

Trait self-control and beliefs about the utility of emotions for initiatory and inhibitory self-control

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Trait self-control and beliefs about the utility of emotions for initiatory and inhibitory self-control”

Abstract

How do people with high trait self-control achieve their success? This research aimed to provide evidence for beliefs about emotion utility as a potential mechanism. Specifically, because beliefs about the utility of emotions predict emotion regulation and successful performance, we investigate the hypothesis that trait self-control influences beliefs about the utility of emotions for self-control. Two preregistered studies examined whether beliefs about the utility of emotions in everyday self-control situations varied depending on the person (trait self-control) and the situation (initiatory or inhibitory self-control). Our key finding was that people considered positive emotions more useful for self-control than negative emotions. This effect was also moderated by situational and individual factors, such that positive emotions were considered especially useful by participants with high trait self-control and in situations requiring initiatory self-control (with the opposite effect for negative emotions). This research suggests a potential role for instrumental emotion regulation in self-control success.

Keywords: self-control, trait self-control, emotion, emotion regulation, initiatory self-control, inhibitory self-control

Introduction

Self-control refers to the capacity to “override impulses to act as well as the ability to make oneself initiate or persist in boring, difficult, or disliked activity” (Carver, 2010, p.766). Many studies have shown that the ability to exert self-control is associated with a happy, healthy, and successful life (de Ridder, Lensvelt-Mulders, Finkenauer, & Baumeister, 2012). Nonetheless, *how* people with good self-control achieve these positive outcomes remains unclear. Drawing together research showing that emotions can facilitate self-control (DeSteno, 2018), that people with good self-control are able to regulate their emotions effectively (Paschke et al., 2016), and that people can regulate emotions to attain goals (Tamir, 2009a), we propose that adaptive emotion regulation may be one strategy that people with good self-control use to achieve their goals. Building on the substantial evidence that the emotions people consider useful in a particular situation predict both their emotion regulation and their performance in this situation (Ford & Gross, 2018), we investigate the emotions people with good self-control consider useful in self-control situations, as a starting point for understanding how they might regulate emotions to achieve their goals.

We also propose that these beliefs might differ depending on the type of self-control required. While successful self-control is often equated with the ability to *inhibit* undesired behaviors (Tangney, Baumeister, & Boone, 2004), recent theorizing suggests that successful self-control also involves the ability to *initiate* desired behaviors (de Ridder, de Boer, Lugtig, Bakker, & van Hooft, 2011). In two preregistered studies, we explored these hypotheses by examining the emotions people consider useful in everyday situations that require them to use inhibitory and initiatory self-control, and how these beliefs differ as a function of trait self-control.

What is self-control?

The terms *self-control*, *self-regulation*, *willpower*, and *self-discipline* are often used interchangeably to refer to the same process. Sometimes this process is conceptualized generally as "promoting one's abstract and distal goals when they are threatened by competing concrete and proximal goals" (Fujita, 2011, p.353), whereas other definitions focus more narrowly on self-control as an inhibitory mechanism (the ability to "restrain one's impulses in the service of greater goals and priorities", Milyavskaya & Inzlicht, 2017, p.1). We use the term *self-control* to refer to the ability to "override impulses to act as well as the ability to make oneself initiate or persist in boring, difficult, or disliked activity" (Carver, 2010, p.766), emphasizing that self-control involves both preventing and enacting behaviors, consistent with recent theory and research distinguishing initiatory and inhibitory self-control as distinct but important abilities (Davisson, 2013; de Ridder et al., 2011; de Boer, van Hooft, & Bakker, 2011; Fujita, 2011; Haynes, Kemps, & Moffitt, 2016). In other words, resisting our favorite chocolate, biting our tongues when we are angry, doing one more mile on the treadmill, and doing homework while our friends have fun can all involve self-control.

Theoretical models have distinguished between self-control as a trait that differs between individuals, and self-control as a state that can change over time (Baumeister & Alquist, 2009; de Ridder et al., 2012; Tangney et al., 2004). While trait self-control is relatively stable, state self-control may be influenced by previous self-control efforts (Muraven & Baumeister, 2000), motivation (Inzlicht, Schmeichel, & Macrae, 2014), and environmental factors (Papies, 2016). One theoretical model that attempts to explain variations in state self-control is the elaborated process model, which introduces the role of goals in self-control failure, and suggests that people fail at self-control due to shifts in motivation, attention, and emotion (Inzlicht, Schmeichel, & Macrae, 2014). Broadly, this view suggests that, after people pursue 'have-to' goals that require them to exert self-control, they become motivated to pursue enjoyable 'want-to' goals rather than exerting further self-control, and thus shift their attention and emotions toward these 'want-to' goals and away

from 'have-to' goals. These models provide important insights into why people might fail at self-control. However, much less is known about how people *succeed* at self-control (see Gillebaart & de Ridder, 2015).

One fruitful approach to enhance our understanding of this issue might be to study those who tend to succeed at self-control. Trait self-control is the dispositional ability to exert self-control across time and situations, which tend to emerge early in life (Mischel, 2014). High trait self-control has been linked with numerous positive life outcomes (de Ridder et al., 2012; Tangney et al., 2004); for example, longitudinal research has showed that higher levels of trait self-control at a young age predict numerous positive outcomes later in life including financial stability, reductions in crime, and physical health (Moffitt et al., 2011). Thus, some people appear to be inherently better than others at overriding impulses and persisting in disliked activity, and these differences are associated with success in various life domains. Studying people with high trait self-control therefore forms a promising avenue for understanding strategies and techniques that people may be able to use to succeed at self-control and ultimately at achieving their goals.

Can emotions facilitate self-control?

Research has generally demonstrated that positive emotions facilitate self-control relative to negative emotions. For example, Winterich and Haws (2011) found that participants who read a positive story reported lower preferences for unhealthy snacks than those who read a negative story. Similarly, Garg, Wansink, and Inman (2007) found that participants consumed more popcorn while watching sad movies than while watching happy movies. Research has also shown that positive emotions can counteract ego depletion, such that the negative effects of performing an initial self-control task were eliminated when participants completed a positive emotion induction (Tice et al., 2007). Emotions also play a central role in the elaborated process model, which proposes that decreased positive emotions

towards 'have-to' tasks are key determinants of ego depletion effects (Inzlicht, Schmeichel, & Macrae, 2014).

Furthermore, specific positive or negative emotions may be particularly helpful or harmful for self-control. For example, Patrick et al. (2009) found that participants who anticipated pride consumed less cake and had fewer tempting thoughts than participants who anticipated shame and control participants who did not anticipate any emotions, and Winterich and Haws (2011) found that participants who experienced hope consumed less unhealthy food than participants who experienced happiness, suggesting that pride and hope might be particularly helpful for self-control (see also DeSteno, 2018; Katzir, Eyal, Meiran, & Kessler, 2010; Williams & DeSteno 2008, for effects of pride on self-control). Similarly, all negative emotions may not be equally harmful to self-control; for example, Zemack-Rugar, Bettman, and Fitzsimons (2007) found that participants primed with guilt spent less money on an indulgent choice than participants primed with sadness, indicating that guilt may have some positive influences on self-control.

Studies which have measured, rather than manipulated, emotions have come to similar conclusions. For example, Vinci et al. (2017) found in an ecological momentary assessment study that smokers who experienced high levels of positive emotions were less likely to lapse, and Niermann et al. (2016) found in an ambulatory assessment study that people who experienced high levels of positive emotions after work spent more time exercising that day, whereas the reverse was true for negative emotions. Experience sampling data have also showed that people higher in trait self-control experience high levels of positive emotions and low levels of negative emotions in their daily lives (Hofmann et al., 2014), providing evidence for a cross-sectional link between self-control success and positive emotions.

The causal mechanisms underlying this link have yet to be untangled; for example, we do not know whether people experience these emotions spontaneously, or whether they

strategically regulate these emotions in order to achieve self-control success. However, these studies together provide consistent evidence that positive emotions improve self-control relative to negative emotions across a wide range of self-control behaviors (although this effect may vary by context: Aspinwall, 1998; Wenzel, Conner, & Kubiak, 2013), and also suggest that some positive emotions such as pride and hope might be especially beneficial, suggesting that increasing positive emotion may be a helpful strategy to boost self-control.

Can people regulate emotions to achieve self-control success?

Emotion regulation is often considered a form of self-control (Muraven, Tice, & Baumeister, 1998; Paschke et al., 2016), and specifically refers to the attempts to alter which emotions we have, when we have them, and how we experience and express them (Gross, 1998, 2015). While most emotion regulation efforts aim to maximize positive emotions and to minimize negative emotions (English, Lee, John & Gross, 2017; Gross, Richards, & John, 2006; Larsen, 2000), the instrumental theory of emotion regulation holds that people also strategically change emotional states in ways they believe will facilitate their performance and goal pursuit (Tamir, 2009a), providing a theoretical foundation for the idea that people might strategically regulate emotions to boost self-control.

For example, Tamir and Ford (2012) found that participants instructed to confront (vs. collaborate) in a negotiation task rated anger as more useful, were more likely to choose pre-negotiation activities that would increase their anger, and that, consistent with their beliefs, anger improved their negotiation performance. Similarly, Tamir and colleagues (2015) found that participants who were led to believe that anxiety or anger would be useful to their performance on an upcoming task were more likely to attempt to increase their anxiety or anger before performing the task, which then lead to increased experiences of anxiety or anger that shaped their subsequent behavior. These findings suggest that the emotions people believe to be useful predict their regulatory attempts to increase these emotions in a particular performance context, and that these regulatory attempts lead to increased experiences of these

emotions that *are* useful to their performance in this context (Tamir, 2005; Tamir, 2009b; Tamir, Bigman, Rhodes, Salerno, & Schreier, 2015; Tamir & Ford, 2012).

The instrumental theory of emotion regulation is consistent with early expectancy-value theories of self-regulation (e.g., Atkinson, 1957; Feather, 1982; see also Tamir & Ford, 2012; Tamir et al., 2015, for more details about these theories), which generally hold that people are motivated to behave in ways they expect will be useful to their goal pursuit. Just as someone may be motivated to train consistently for a triathlon if they expect that this behavior will be useful to their performance on the race day, they might also listen to positive music while on the treadmill if they believe positive emotions will motivate them to run faster.

Therefore, emotion regulation is both a type of self-control and a strategy which could be used to improve other types of self-control. Indeed, research has shown that emotion regulation can be used to enhance self-control. For example, Juergensen and Demaree (2015) found that participants who were instructed to regulate emotions when viewing tempting dessert images were more likely to resist unhealthy snacks than those who simply viewed the images, and Giles et al. (2018) found that endurance runners who were trained to regulate their emotions when completing a 90 min run had a better running experience than those who did not receive such training. Moreover, recent research has demonstrated that people use emotion regulation to succeed in self-control situations in real-life. Hennecke et al. (2018) instructed participants to write down strategies that they typically use to succeed at self-control behaviors (e.g., vigorously exercising on a treadmill, studying boring exam material) and then asked them to report the strategies they actually used in an ambulatory assessment study. In both studies, they found that people reported using emotion regulation as a strategy to succeed at self-control, and the second study confirmed that this strategy predicted self-control success.

Correlational studies have also linked high trait self-control with effective emotion regulation, showing that people higher in trait self-control are better able to regulate their emotions in response to negative stimuli in the lab (Paschke et al., 2016), more likely to report using emotion regulation strategies in self-control situations in real-life (Hennecke et al., 2018), demonstrate greater ability to inhibit daily affective expressions (Zabelina, Robinson, & Anicha, 2007), and generally have greater emotional stability (Tangney et al., 2004), as compared to people lower in trait self-control.

Together, these findings suggest that emotion regulation has beneficial influences on self-control behaviors such as unhealthy eating and exercising, that people use this strategy to improve self-control performance in real-life, and that people with higher trait self-control might be especially likely to use this strategy to achieve self-control success.

Emotions and initiatory and inhibitory self-control

While positive emotions generally seem to boost self-control, the most adaptive way to regulate emotions might depend upon the demands of the situation. As discussed earlier, we define self-control not only as the ability to inhibit attractive but undesired behaviors (e.g., unhealthy snacking), but also as the ability to initiate unattractive but desired behaviors (e.g., exercising). This distinction may not always be clear-cut and these forms of self-control may depend on each other; for example, a person may first need to inhibit a behavior (e.g., resist playing video games) in order to initiate another (e.g., go for a run; Davisson, 2013). However, evidence suggests that inhibitory and initiatory self-control are related but yet distinct constructs ($r = .68$; De Ridder et al., 2011), which predict different outcomes (de Boer et al., 2011).

It has been argued that emotions function to both initiate and inhibit behaviors (Zhu & Thagard, 2002), suggesting that emotions might influence initiatory and inhibitory self-control in different ways. While positive emotions have been shown to benefit both initiatory and inhibitory self-control behaviors (Garg et al., 2007; Niermann et al., 2016), we are not

aware of any research examining whether the effects of emotions on self-control are moderated by the type of self-control required. Indirect evidence suggests that positive emotions may be particularly beneficial for initiating behaviors, while negative emotions might be more useful for inhibiting behaviors. For example, positive and negative affect are related to approach and avoidance behaviors, respectively (Carver & Scheier, 1998; but see Carver & Scheier, 2011, for a discussion regarding anger). Similarly, studies have found positive links between positive affect and the Behavioral Activation System (BAS), and between negative affect and the Behavioral Inhibition System (BIS; Carver & White, 1994; Elliot & Thrash, 2002), which are conceptually similar to initiatory and inhibitory self-control, respectively (de Ridder et al., 2011). Cross-sectional data also suggests that increased positive affect is related to a greater ability to initiate self-control behaviors, although negative affect does not seem to predict a greater ability to inhibit self-control behaviors (in fact, the opposite might be true; De Boer et al., 2011).

Other research has further demonstrated that positive emotions enhance performance when paired with action concepts (e.g., go, doing), whereas negative emotions enhance performance when paired with inaction concepts (e.g., stop, pause; Albarracín & Hart, 2011), again providing evidence to link positive emotions with initiation and negative emotions with inhibition. Additional theoretical support comes from Fredrickson's (2001) broaden-and-build theory, which proposes that positive emotions spark the urge to initiate new activities and behaviors. Consistent with this, Cunningham (1998) found that experiencing positive emotions after a mood induction predicts intentions to initiate social, physical, and leisure activities.

Thus, there is strong theoretical and empirical evidence to suggest that positive emotions might be particularly beneficial for initiatory self-control (e.g., exercising, studying), with more mixed evidence in support of a beneficial effect of negative emotions for inhibitory self-control (e.g., avoid late-night snacking, resist smoking). Taken together,

these different lines of research underline the conceptual distinction between initiatory and inhibitory self-control and suggest that positive and negative emotions may influence initiatory and inhibitory self-control in different ways.

Present Studies

Drawing together these strands of research, we suggest that people can regulate their emotions to help them succeed at self-control, and that people with high trait self-control may be especially likely to do so, given their superior ability to adaptively regulate emotions (Paschke et al., 2016). We also suggest that the emotions people regulate in self-control situations may vary depending on whether the situation requires initiatory vs. inhibitory self-control. To further our understanding of these issues, we conducted two studies to examine the emotions people consider useful for self-control and how these vary according to the individual (differences in trait self-control) and the situation (whether initiatory or inhibitory self-control is required). We focused on the emotions people consider useful given that prior studies have suggested that beliefs about utility are a precursor to regulation; people regulate their emotions to increase the emotions they believe to be useful in a particular context (Ford & Gross, 2018; Tamir & Ford, 2012). Our studies thus allow us to provide initial evidence in support of the idea that people with high trait self-control might regulate emotions differently in self-control situations, and to provide insights into which emotions might facilitate self-control and under what circumstances they might do so.

We examined these hypotheses in two preregistered studies which progress from exploratory to confirmatory evidence. In Study 1, our preregistered predictions were that people higher in trait self-control would consider positive emotions more useful for their self-control success, in particular pride and hope, and that they would consider negative emotions less useful for their self-control success, as compared to people lower in trait self-control. In other words, we predicted that they would better recognize the beneficial effects of positive emotions and harmful effects of negative emotions on self-control. We focused on pride and

hope because these particular emotions have been experimentally linked to enhanced self-control performance in prior studies (Patrick et al., 2009; Winterich & Haws, 2011), allowing us to make specific predictions regarding the potential utility of these emotions.

In Study 1 we did not make any preregistered predictions about how these effects would vary as a function of inhibitory or initiatory self-control. Our exploratory analyses of the emotions people considered useful for inhibitory and initiatory self-control situations, and how these beliefs varied by trait self-control, led us to make preregistered predictions about these effects in Study 2. Study 1 therefore includes both exploratory and confirmatory analyses, whereas Study 2 includes only confirmatory analyses, aimed at replicating the findings of Study 1. We used this approach to improve the quality, reproducibility, and reliability of our findings (Open Science Collaboration, 2015).

Study 1: Initial Evidence

Method

The study overview, materials, and data can be found via the Open Science Framework (OSF: https://osf.io/zvtsa/?view_only=61b80a8f1dc548df90001e8e074beefe).

Participants

Participants ($N = 253$) were recruited through Amazon Mechanical Turk (MTurk) and received \$0.75 cents ($M_{\text{age}} = 41.53$ years, $SD_{\text{age}} = 12.81$; 155 females; 79% White, 10% Asian/Asian American/Asian European, 8% Black/African American/African European, 1% Hispanic/Latino, and 2% Other). Adults living in the USA participated; all participants reported being fluent in English. This study was approved by the local Ethics Committee.

A priori power analysis (G*power: Faul, Erdfelder, Buchner, & Lang, 2009) indicated that the required sample size for testing our key effects (design: emotion x self-control type + TSC as a covariate) was $N = 128$ (assuming power = .80, alpha = .05, effect size $f = .25$), although we set a target sample size of 250 based on the amount of money we were able to

spend on the study. Our final sample exceeded this target sample because 3 additional people voluntarily completed the study via MTurk. However, given that we only preregistered our target sample size rather than a description of our a priori power analysis, we also conducted a sensitivity power analysis ($N = 253$, power = .80, alpha = .05) for our most central hypothesis tests in Study 1 (i.e., the effects of trait self-control on utility ratings of positive and negative emotions), in order to complement our a priori power analysis. The sensitivity power analysis revealed minimum effect sizes f^2 of 0.03 for these central effects, suggesting that our study was powerful enough to detect small effects.

Materials

Scores on the following scales were averaged to form one composite score for each scale/subscale, with higher scores indicating higher levels of that construct.

Trait Self-Control. Trait self-control was measured using the Brief Self-Control Scale (Tangney et al., 2004). Participants rated 13 items (e.g., “I say inappropriate things”) on a scale of 1 (*not at all like me*) to 5 (*very much like me*). The scale was reliable (9 reversed scored; Cronbach’s $\alpha = .88$).

Self-control vignettes. Participants read five vignettes that described self-control situations that varied in self-control type, with three describing inhibitory self-control (e.g., resisting sweets) and two describing initiatory self-control (e.g., start exercising; see Appendix A). To ensure that our findings were generalizable across life domains, the self-control descriptions also varied in life domain. That is, the vignettes described self-control situations in the relationship, food, sex, exercise, and work domains, one vignette for each domain (domains adapted from Tsukayama, Duckworth, & Kim, 2013).

These five vignettes were selected by asking undergraduates ($N = 60$) in a supplemental study to write about two personal self-control events. In a second supplemental study, Mturk workers ($N = 49$) imagined themselves in these events and rated them for self-control demand (i.e., “To what degree do you think this event would require you to use self-

control?") on a continuous slider scale from 0 (*no self-control at all*) to 100 (*a lot of self-control*). The five events that received the highest self-control demand scores (each receiving a mean above 67) were included in this study. Mean self-control demand for these five events was 72.87 ($SD = 20.40$). A dependent sample t-test revealed that the initiatory ($M = 69.17$, $SD = 24.42$) and inhibitory ($M = 69.80$, $SD = 23.19$) self-control events did not significantly differ in self-control demand, $t = .15$, $p = .88$.

Expected Emotion Utility. Following Tamir (2005), we assessed how useful participants thought different emotions would be to their self-control success in each of the situations described. Emotions were chosen from the Modified Differential Emotions Scale (Fredrickson, Tugade, Waugh, & Larkin, 2003). Participants indicated how much they thought four positive emotions (hope, joy, pride, and serenity) could help them to succeed in initiatory (Cronbach's $\alpha = .87$) and inhibitory (Cronbach's $\alpha = .88$) self-control situations. Likewise, participants indicated how much they thought four negative emotions (sadness, guilt, anxiety, and anger) could help them to succeed in initiatory (Cronbach's $\alpha = .82$) and inhibitory (Cronbach's $\alpha = .85$) self-control situations. Each emotion was defined by three adjectives (e.g., joy: joyful, glad, or happy) to ensure the same understanding of these constructs among the participants. For example, participants rated the statement "To what extent do you think feeling hopeful, optimistic, or encouraged would help you succeed in the situation described?" on a scale of 1 (*not at all*) to 7 (*extremely*).

Instructional Attention Checks. To ensure data quality in MTurk (Peer, Vosgerau, & Acquisti, 2014), we included three instructional attention checks that were embedded within the other measures (available at the OSF website provided above). Participants ($N = 37$) who failed to follow these instructions were immediately thanked and dismissed. That is, they did not complete the remaining tasks and their provided data was immediately disregarded.

General Emotional Preferences. As stated in our preregistration documents, at the end of the study, we also collected exploratory data on how people generally want to feel in their everyday lives. This measure, and the data for this measure, can be found via the OSF website provided above.

Procedure

Participants answered questions about demographics (age, gender, ethnicity) and completed the Brief Self-Control Scale. They were then presented with the five self-control vignettes, one at a time, and were asked to imagine themselves in each described situation. For each vignette, participants completed the expected emotion utility survey, which asked them to rate how much they thought eight emotions could help them to succeed in the described situation. Each emotion utility item was presented on a separate page, below the vignette, so that participants could refer to the vignette when providing their utility ratings. After participants provided their utility ratings for the eight emotions, they repeated the same procedure for the remaining vignettes. Emotion utility items and vignettes were presented in a random order. The study was completed through Qualtrics and took 10-15 minutes to complete.

Results and Discussion

Data Analysis strategy

To assess both our preregistered and exploratory hypotheses, we conducted a 2 (emotion: positive, negative) x 2 (self-control type: initiation, inhibition) within-subjects ANOVA; following Tamir (2005, 2009b), emotion and self-control type were within-subjects factors, trait self-control (centered) a covariate, and utility ratings the dependent variable, allowing us to examine interactions between our within-subjects variables and trait self-control without dichotomizing trait self-control. To examine our preregistered hypotheses concerning whether trait self-control predicted utility ratings for pride and hope specifically, we conducted individual simple regressions. Given that we only planned to conduct a small

number of confirmatory follow-up tests and that the majority of our tests were exploratory, we chose not to adjust our p values to correct for multiple comparisons (Armstrong, 2014; Streiner & Norman, 2011).

Preregistered hypothesis tests

Do people with higher trait self-control consider positive emotions to be more useful in self-control situations, and negative emotions to be less useful? The key test of this hypothesis was the interaction between emotion and trait self-control. The analysis first revealed a significant main effect of emotion, $F(1, 251) = 507.70, p < .001, \eta_p^2 = .67$, indicating that participants generally considered positive emotions ($M = 4.54, SE = .07$) to be more useful for self-control than negative emotions ($M = 2.30, SE = .06$), and a non-significant main effect of trait self-control, $F(1, 251) = .93, p = .34, \eta_p^2 = .004$, indicating that people with higher trait self-control did not believe that emotions were generally more or less useful for self-control than people with lower trait self-control. The emotion x trait self-control interaction was significant, $F(1, 251) = 4.35, p = .038, \eta_p^2 = .02$. That is, consistent with our predictions, people higher (+1 SD) in trait self-control considered negative emotions less useful for self-control (estimated $M = 2.18$) than people lower (-1 SD) in trait self-control (estimated $M = 2.45$), $\beta = -.15, p = .02$. However, contrary to our predictions, people higher (+1 SD) in trait self-control did not consider positive emotions more useful for self-control (estimated $M = 4.57$) than people lower (-1 SD) in trait self-control (estimated $M = 4.46$), $\beta = .05, p = .42$.

Do people with higher trait self-control consider pride and hope to be more useful in self-control situations? Inconsistent with our predictions, simple regressions demonstrated that people higher in trait self-control did not consider pride ($\beta = .11, p = .079$) or hope ($\beta = .10, p = .11$) more useful for self-control than people lower in trait self-control, although the beta coefficients were positive in both cases. This is, however, unsurprising

given our finding that trait self-control was a non-significant predictor of utility ratings for positive emotions overall.

Thus far, our findings provide evidence that people generally believe that positive emotions are more useful for their self-control success than negative emotions, consistent with the findings of experimental studies on the link between emotions and self-control performance. Our findings also provide evidence that these beliefs differ for people higher, relative to lower, in trait self-control, but only for negative and not positive emotions, partially supporting our predictions.

Exploratory analyses

Which emotions do people consider useful in initiatory and inhibitory self-control situations? To explore this question, we focused on the interaction between emotion and self-control type. The main effect of self-control type was not significant, $F(1, 251) = 1.80, p = .18, \eta_p^2 = .007$, suggesting that people consider emotions equally useful for both self-control types. However, the interaction between emotion and self-control type was significant, $F(1, 251) = 19.43, p < .001, \eta_p^2 = .07$. Exploratory post hoc tests revealed that people rated positive emotions as more useful for situations involving initiation ($M = 4.64, SE = .08$) than situations involving inhibition ($M = 4.43, SE = .07$), $t(252) = 4.27, p < .001, d = .27$. In contrast, people rated negative emotions as more useful for situations involving inhibition ($M = 2.37, SE = .06$) than situations involving initiation ($M = 2.22, SE = .06$), $t(252) = 3.29, p = .001, d = -.21$ (See Table 1). These findings suggest that, while people generally believe that positive emotions are more useful for self-control than negative emotions, this effect is moderated by the type of self-control required; people believe that positive emotions are more useful for situations involving initiatory self-control than situations involving inhibitory self-control, with the opposite pattern for negative emotions. This provides preliminary evidence that people view these self-control types differently, which might suggest that they also regulate their emotions differently in these situations.

Does trait self-control moderate the effects of emotions and self-control type on utility ratings? The interaction between self-control type and trait self-control was non-significant, $F(1, 251) = .61, p = .44, \eta_p^2 = .002$, suggesting that people higher and lower in trait self-control provided similar utility ratings of emotions for initiatory and inhibitory self-control. Moreover, the emotion x self-control type x trait self-control interaction was also non-significant, $F(1, 251) = 3.26, p = .07, \eta_p^2 = .01$. While this interaction did not reach significance, we conducted exploratory follow-up analyses to examine whether the significant moderation effects observed in our earlier preregistered analyses were particularly driven by one type of self-control.

Specifically, two ANOVAs were conducted to examine the interaction between self-control type and trait self-control on utility ratings for each emotion separately. The self-control type x trait self-control interaction was significant for negative emotions, $F(1, 251) = 4.23, p = .04, \eta_p^2 = .02$. People higher in trait self-control considered negative emotions less useful for initiatory self-control than people lower in trait self-control, $\beta = -.19, p = .002$, but people higher and lower in trait self-control provided similar utility ratings of negative emotions for inhibitory self-control, $\beta = -.10, p = .12$. The self-control type x trait self-control interaction was not significant for positive emotions, $F(1, 251) = 1.24, p = .27, \eta_p^2 = .005$, but this is unsurprising given our findings above showing that people higher in trait self-control did generally not consider positive emotions more useful for self-control than people lower in trait self-control. These preliminary findings suggest that people higher in trait self-control believe that negative emotions are especially unhelpful for initiatory self-control (see Figure 1).

What is the relationship between emotion utility beliefs and general emotional preferences? Consistent with suggestions made by Ford and Tamir (2014), our exploratory findings showed that the emotions people considered useful were also the emotions they

generally wanted to experience in their everyday lives (positive emotions: $r = .30, p < .001$; negative emotions: $r = .46, p < .001$). The exploratory findings of Study 1 led us to focus our confirmatory Study 2 on people's beliefs about the utility of emotions and how these beliefs varied by self-control type and trait self-control, and to leave the question of *why* people believe that certain emotions are helpful or unhelpful for their self-control success for future research.

Study 2: Confirmatory Evidence

Study 2 was designed as a confirmatory test of Study 1's findings. The method was identical except that we modified the length and number of the self-control vignettes to allow us to more closely investigate our hypotheses concerning initiatory and inhibitory self-control. Specifically, whereas Study 1 asked participants to consider five descriptions of self-control situations, with only two describing initiatory self-control, Study 2 asked participants to consider 18 self-control behaviors, with 10 describing initiatory self-control. These changes were made to ensure that Study 2 had a sufficient number of events representing each self-control type to allow us to draw generalizable conclusions concerning initiatory and inhibitory self-control.

Based on the findings of Study 1, we predicted that people would consider positive emotions more useful for initiatory than inhibitory self-control, and negative emotions more useful for inhibitory than initiatory self-control. We also predicted that people with higher trait self-control would consider negative emotions less useful for self-control, particularly in situations involving initiatory self-control.

Method

The study overview, materials, and data can be found at https://osf.io/97395/?view_only=5004af39783d466383caa115009d53dc.

Participants

Participants ($N = 306$) were recruited through MTurk and received \$0.75 cents for participating ($M_{age} = 38.21$ years, $SD_{age} = 12.35$; 169 females; 70% White, 16% Asian/Asian American/Asian European, 9% Black/African American/African European, 3% Hispanic/Latino, 1% Native Hawaiian/Pacific Islander, and 1% Other). Adults living in the USA participated; all participants reported being fluent in English. This study was approved by the local Ethics Committee.

A priori power analysis (G*power: Faul et al., 2009) indicated that a sample size of 128 (assuming power = .80, alpha = .05, effect size $f = .25$) would be sufficient for testing our most central effects (design: emotion x self-control type + TSC as a covariate). However, a second power analysis estimated a required sample size of 290 participants (assuming power = .80, alpha = .05, effect size $f = .25$) for detecting the effects of the more complex interactions that we intended to explore (e.g., specific emotion x self-control type + TSC as a covariate). We rounded up this target sample size and decided to recruit 300 participants. Our final sample exceeded this because 6 additional people voluntarily completed the study through MTurk. The effect size ($f = .25$; medium effect; Cohen, 1988) was based on our exploratory study (Study 1), and data from our other similar studies, which generally demonstrated effect sizes ranging from small to medium, with some large effects.

Materials

Trait Self-Control. Participants completed the same trait self-control scale (Cronbach's $\alpha = .89$) as in Study 1.

Self-control behaviors. Participants read 18 short descriptions of self-control behaviors (See Appendix B) that varied in self-control type. Ten described initiatory self-control (e.g., initiating healthy food choices) and eight inhibitory self-control (e.g., resist late-night eating). Study 2's behaviors described self-control behaviors in the food, work, relationship, sleep, and exercise domains (Tsukayama et al., 2013), four behaviors for each

domain (except the exercise domain, which included two initiatory and no inhibitory behaviors given that people do not typically seek to inhibit exercise behaviors).

The 18 behaviors were selected by first asking Mturk workers ($N = 384$) in a supplemental study to pre-rate 111 self-control behaviors for their self-control demand (i.e., “How much self-control do you think you would need to use to do this behavior successfully?”) on a continuous slider scale of 0 (*no self-control at all*) to 100 (*a lot of self-control*). Some behaviors were adapted from previous studies (Davisson, 2013; Tsukayama et al., 2013), although most were new. We selected 18 behaviors that received high self-control demand ratings (each receiving a mean above 50) and that could be classified as involving either initiatory or inhibitory self-control (as determined by two trained coders). Mean self-control demand for these behaviors was 55.37 ($SD = 20.64$). A dependent sample t-test revealed that the initiatory ($M = 54.93$, $SD = 23.65$) and inhibitory ($M = 54.91$, $SD = 24.72$) self-control behaviors did not significantly differ in self-control demand, $t = .01$, $p = .99$.

Expected Emotion Utility. The utility scale was the same as in Study 1, with one minor change. To ensure that the question was suitable for *behaviors* rather than *situations*, participants rated how much they thought various emotions would help them to perform each behavior successfully (e.g., “To what extent do you think feeling hopeful, optimistic, or encouraged would help you to do this behavior successfully?”). The scales were reliable for positive emotions in initiatory (Cronbach’s $\alpha = .95$) and inhibitory (Cronbach’s $\alpha = .96$) self-control situations, as well as for negative emotions in initiatory (Cronbach’s $\alpha = .96$) and inhibitory (Cronbach’s $\alpha = .96$) self-control situations. The Cronbach’s alphas were generally higher in Study 2 than in Study 1, which could either suggest that the scales had higher internal consistency in Study 2 than in Study 1, that the scale items were somewhat redundant in Study 2 (see Briggs & Cheek, 1986; Streiner, 2003), or simply that people do typically not discriminate between different positive or negative emotions in terms of their utility in these self-control situations.

Instructional Attention Checks. The instructional attention checks were the same as in Study 1. In Study 2, 92 participants failed to follow these instructions and were immediately thanked and dismissed. Thus, they did not complete the remaining tasks and their provided data was immediately disregarded.

Procedure

The procedure was identical to Study 1.

Results and Discussion

Data Analysis strategy

The goal of Study 2 was to confirm Study 1's findings. Therefore, we conducted the equivalent analyses as in Study 1.

Preregistered hypothesis tests

Do people with higher trait self-control consider positive emotions to be more useful in self-control situations, and negative emotions to be less useful? Here we were interested in the interaction between emotion and trait self-control. Consistent with Study 1, the ANOVA first revealed a significant main effect of emotion, $F(1, 304) = 792.55, p < .001, \eta_p^2 = .72$, indicating that people rated positive emotions ($M = 4.86, SE = .06$) as more useful for self-control than negative emotions ($M = 2.32, SE = .06$), and a non-significant effect of trait self-control, $F(1, 304) = 1.06, p = .30, \eta_p^2 = .003$. The interaction between emotion and trait self-control was significant, $F(1, 304) = 25.24, p < .001, \eta_p^2 = .08$. Consistent with our predictions, people higher (+1 *SD*) in trait self-control considered negative emotions as less useful for self-control (estimated $M = 2.05$) than people lower (-1 *SD*) in trait self-control (estimated $M = 2.58$), $\beta = -.26, p < .001$. In contrast to Study 1, people higher (+1 *SD*) in trait self-control also considered positive emotions more useful for self-control (estimated $M = 5.05$) than people lower (-1 *SD*) in trait self-control (estimated $M = 4.68$), $\beta = .17, p = .003$, although we did not preregister a hypothesis concerning this relationship in Study 2 given the

lack of association between trait self-control and utility ratings for positive emotions in Study 1. These findings suggest that people higher in trait self-control believe that negative emotions are less useful, and positive emotions more useful, for self-control than people lower in trait self-control.

Do people with higher trait self-control consider pride and hope to be more useful in self-control situations? While we preregistered that we were interested in exploring the link between trait self-control and utility ratings for pride, we did not state any directional hypotheses regarding this relationship in Study 2. Moreover, even though we did not preregister an interest in hope specifically, we explored the link between trait self-control and utility ratings for hope in order to be consistent with Study 1's analyses. In contrast to Study 1, trait self-control positively predicted utility ratings for both pride ($\beta = .17, p = .003$) and hope ($\beta = .22, p < .001$), suggesting that that people with higher trait self-control consider pride and hope more useful for self-control relative to people with lower trait self-control.

Which emotions do people consider useful in initiatory and inhibitory self-control situations? The key test of this hypothesis was the interaction between emotion and self-control type. The main effect of self-control type was significant, $F(1, 304) = 13.56, p < .001, \eta_p^2 = .04$, such that people rated emotions as more useful for initiatory ($M = 3.62, SE = .04$) than inhibitory ($M = 3.56, SE = .04$) self-control. Consistent with our predictions, the interaction between emotion and self-control type was significant, $F(1, 304) = 91.01, p < .001, \eta_p^2 = .23$. As in Study 1, people rated positive emotions as more useful for situations involving initiation ($M = 5.00, SE = .06$) than for situations involving inhibition ($M = 4.72, SE = .07$), $t(305) = 9.41, p < .001, d = .29$, and negative emotions as more useful for situations involving inhibition ($M = 2.40, SE = .06$) than for situations involving initiation ($M = 2.23, SE = .06$), $t(305) = 6.78, p < .001, d = .38$ (See Table 1). These findings support the hypotheses that people would consider positive emotions more useful for initiatory than

inhibitory self-control, and that they would consider negative emotions more useful for inhibitory than initiatory self-control.

Does trait self-control moderate the effects of emotions and self-control type on utility ratings? Our preregistered prediction was that self-control type would moderate our earlier finding that people higher in trait self-control considered negative emotions to be less useful for self-control; we expected this to be particularly true in situations involving initiatory self-control. Overall, our results did not support this hypothesis. The interaction between self-control type and trait self-control, $F(1, 304) = .85, p = .36, \eta_p^2 = .003$, and the predicted interaction between emotion, self-control type, and trait self-control, $F(1, 304) = .22, p = .64, \eta_p^2 = .001$, were not significant. These findings suggest that people higher in trait self-control consider negative emotions less useful and positive emotions more useful for situations involving initiatory *and* inhibitory self-control, as compared to people lower in trait self-control (see Figure 1).

General Discussion

In two preregistered studies, we examined the emotions that people considered useful for inhibitory and initiatory self-control, and how these beliefs differed as a function of trait self-control. We found that people generally believed positive emotions would be more helpful than negative emotions in everyday situations that involved self-control, but that this effect was moderated by the type of self-control required and by individual differences in trait self-control. Our results suggest that people are sensitive to whether a situation requires enacting or preventing a behavior and view the demands of these situations differently, and further suggest that people with good self-control differ from others regarding their beliefs about which emotions that can help them to succeed in these situations. These effects were generally stronger in Study 2 than in Study 1, most likely due to the methodological improvements that were made and the stronger and more reliable manipulations of independent variables that were used (e.g., Sawyer, 1982).

Trait self-control influenced beliefs about the utility of emotions in self-control situations, such that, people higher in trait self-control believed that negative emotions would be less useful (across Studies 1 and 2), with some evidence that they also believed that positive emotions would be more useful, in particular pride and hope (Study 2). While we did not assess whether participants regulated their emotions accordingly, there is consistent evidence to suggest that people upregulate the emotions they consider useful for the task at hand (e.g., Ford & Gross, 2018; Tamir et al., 2015), so our findings may have implications for regulatory behaviors and self-control success in real-life situations. We speculate that people might upregulate positive and downregulate negative emotions in self-control situations, and that people with higher trait self-control might be more likely to do this, which might explain their increased success at self-control.

Our participants' beliefs that positive emotions facilitate self-control behaviors relative to negative emotions, and that positive emotions are especially beneficial for initiatory self-control, are consistent with the experimental and correlational evidence reviewed earlier (Albarracín & Hart, 2011; Garg et al., 2007; Niermann et al., 2016; Raghunathan & Trope, 2002; Vinci et al., 2017; Winterich & Haws, 2011). That people with high trait self-control were especially likely to endorse the benefits of positive emotions versus negative emotions might suggest they possess a more accurate understanding of how emotions can help or hinder self-control. Future research is needed to confirm whether these beliefs translate into differences in emotion regulation and subsequent improvements in self-control performance.

Our findings suggest that people not only believe that some emotions are more useful than others for self-control, but also recognize that some situations require different emotions than others. While positive emotions generally seem to facilitate self-control relative to negative emotions, the link between emotions and self-control performance seems to depend upon the demands of the situation. Our participants' beliefs converge with prior evidence

(e.g., Albarracin & Hart, 2011) to suggest that people who experience positive emotions might be particularly likely to succeed at initiating a self-control behavior (e.g., studying) versus inhibiting a self-control behavior (e.g., resisting alcohol at a party), and that the reverse might be true for those who experience negative emotions. However, future research is needed to confirm whether these beliefs translate into actual emotion regulation and improved performance in these situations.

Limitations and Future Directions

One limitation is that trait self-control and emotion utility beliefs were measured through self-reports, which can be vulnerable to social desirability and demand effects. If people are unwilling to report on their emotions (Mauss & Robinson, 2009), they may also be unwilling to report on the emotions they consider useful, and self-control ability may be overreported because “good self-control” is generally considered a desirable trait.

Participants in this study were also relatively aware of the study aims; for example, the instructions stated “people often prefer to feel emotions they think will help them to achieve their goals” and gave the example “a student might want to feel slightly anxious while taking an exam because they think this will help them to perform better”. This could have influenced participants to rate negative emotions (e.g., anxiety) as useful for initiation (e.g., studying), although in fact we found the opposite.

Another methodological limitation is that we cannot be sure people’s beliefs about the utility of emotions in imagined everyday self-control situations predict how they would feel in *real* self-control situations. Prior self-control research has suggested that imagined scenarios generally produce responses that are similar to people’s real-life reactions (e.g., McIntyre, Barlow, & Hayward, 2015), but future research could employ the experience sampling method (ESM) to test whether results from this method are consistent with the emotions people rate as useful “in the moment” when faced with initiatory and inhibitory self-control demands. Given that this technique provides considerable ecological validity and

reduced recall bias (Scollon, Kim-Prieto, & Diener, 2003), this would allow us to determine whether our findings translate into real everyday self-control situations.

Another limitation is that we did not investigate whether participants' beliefs influenced how they regulated their emotions, or the actual effects of emotions and emotion regulation on self-control performance. Our conclusions about how these beliefs might translate into emotion regulation, emotions, and improvements in self-control in situations that require initiatory and inhibitory self-control are therefore speculative, based on previous evidence suggesting that people attempt to upregulate the emotions they consider useful to achieve their goals (Ford & Gross, 2018; Tamir et al., 2015). Future research assessing emotion and self-control performance is needed to confirm how emotions influence performance in inhibitory and initiatory self-control situations, and whether people with high trait self-control are especially likely to upregulate positive emotions. Future work could also investigate which strategies they might use to do so (see Quoidbach, Berry, Hansennea, & Mikolajczak, 2010, for potential strategies). Understanding how people who are successful at self-control achieve this success could inform the design of interventions to help others achieve their goals. This approach has great potential given that many existing interventions designed to improve self-control often fail (e.g., Miles et al., 2016).

Additionally, while we attempted to distinguish between situations requiring initiatory control and situations requiring inhibitory control, these processes are difficult to disentangle, both in the situations we presented to participants in the current studies and in real life. Initiation of one behavior might first involve inhibition of another (Davisson, 2013), as in the vignette used in Study 1, in which a person attempts to resist their sexual impulses in order to get ready and leave for a football game. Our results suggest that people view situations where the primary task involves inhibition differently from those where the primary task involves initiation, but future research is needed to differentiate between these two self-control types in a more targeted way.

Finally, we also took a broad approach in comparing beliefs about how positive emotions benefit self-control relative to negative emotions (see Aspinwall, 1998, for a review). We limited our analysis of specific emotions to those for which we had a priori hypotheses, based on research linking them to self-control performance (i.e., pride and hope; Patrick et al., 2009; Winterich & Haws, 2011). Much less is known about how other specific emotions (e.g., awe, anger) influence self-control, or about how other aspects of emotions such as their intensity may moderate their effects on self-control. While we argue that positive emotions generally benefit self-control, some research suggests that extreme positive emotions can impair self-control; for example, positive urgency (i.e., the tendency to act rashly when experiencing extreme positive affect) predicts impulsive behaviors (e.g., problem drinking; Cyders & Smith, 2007), particularly in people with bipolar disorder (Muhtadie et al., 2014). We also focused on beliefs about how current emotional states influence self-control and did not measure beliefs about anticipated emotions (i.e., the emotions a person expects to feel in the future). Prior work has found that thinking about the positive emotions we will experience in the future *if* we succeed at inhibiting our impulses helps us to resist those impulses (Patrick et al., 2009; Winterich & Haws, 2011), so beliefs about the utility of anticipated emotions may also predict emotion regulation and subsequent self-control success. Future research could explore in more detail how these nuances of emotional experience might interact with beliefs, emotion regulation, and self-control.

Conclusions

We conclude that, although people generally believe that positive emotions can help them succeed at self-control relative to negative emotions, these beliefs vary as a function of the specific self-control situation and individual differences in self-control. Specifically, people believe that positive emotions are more useful in initiatory than inhibitory self-control situations, whereas they have the opposite beliefs regarding negative emotions, and people with higher trait self-control recognize negative emotions as less useful and positive emotions

as more useful for their success in both types of self-control situations. Because beliefs about the utility of emotions influence emotion regulation and ultimately behavior, this research contributes to our understanding of how emotions and emotion regulation might shape everyday self-control success.

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Table 1. *Descriptive Statistics for Utility Ratings of Positive and Negative Emotions for Initiatory and Inhibitory Self-Control*

	STUDY 1		STUDY 2	
	Initiation	Inhibition	Initiation	Inhibition
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Positive Emotions	4.64(1.22)	4.43(1.18)	5.00(1.06)	4.72(1.23)
Negative Emotions	2.22(1.00)	2.37(1.00)	2.23(1.03)	2.40(1.09)

Note. All measures are on 7-point scales.