

# Whatever Happened to Self-Control? A Proposal for Integrating Notions From Trait Self-Control Studies Into State Self-Control Research

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In this article we discuss recent findings in trait self-control research suggesting that successful self-control may rely on either handling the self-control dilemma in a smart and effortless way or on the effortfully inhibiting an immediate urge or an unwanted response. We then contrast these results with findings from ego-depletion research on state self-control that up to now has focused on merely (consequences of) effortful inhibition. In doing so, we aim to shift the focus of recent debate about the underlying mechanisms of the ego-depletion phenomenon to the broader and more important question of how successful self-control operates. Specifically, we emphasize that dealing with personally relevant dilemmas or conflicts is often absent from the ego-depletion paradigm, which is crucial for understanding why and how people are able and willing to prioritize a higher ultimate goal. We first discuss the key role for handling self-control dilemmas in trait self-control research. Subsequently, we discuss how self-control dilemmas are seemingly absent from ego-depletion paradigms and then suggest future directions for self-control research.

*Keywords:* trait self-control, state self-control, ego depletion, goals

*Self-control* is often defined as the self's capacity to override or change one's inner responses, as well as to interrupt undesired behavioral tendencies and to refrain from acting on them (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Tangney, Baumeister, & Boone, 2004). Obviously, overruling an immediate urge—even when it is undesired—is not an easy task, and it has been suggested that one is able or willing to do so only in view of an attempt to attain a goal that is more rewarding in the long term (Carver & Scheier, 1981; de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). A more accurate definition of self-control would therefore emphasize the

ability to handle self-control *dilemmas*: situations in which competing behavioral tendencies create a conflict that needs to be resolved rather than simply overriding an immediate urge (Fujita, 2011; Myrseth & Fishbach, 2009). Many people are confronted with such self-control dilemmas on a daily basis. People who watch their weight need to resolve the dilemma of choosing between an apple, which is in line with their long-term goal, or a tempting chocolate bar, which would satisfy their immediate craving for candy. Similarly, people who want to save money are confronted with spending decisions, and academics who want to excel in their work experience a dilemma when their favorite show is on TV. Handling such dilemmas may occur by overriding prepotent responses that prioritize the immediate option or by using (automated) strategies. Self-control can be considered part of the self-regulation feedback loop that encompasses goal setting, monitoring, and reducing discrepancies between actual and desired states (Carver & Scheier, 1982). Specifically, self-control can be considered the “operate” component within the test–operate–test–exit loop proposed in models of cybernetic control (Vohs & Schmeichel,

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2003). People with high levels of self-control are better able to deal with this kind of dilemma, as witnessed by many studies reporting on the role of self-control in a wide variety of positive life outcomes (de Ridder et al., 2012; Tangney et al., 2004). The success story of self-control typically relates to measures of *trait self-control* as the stable ability to handle self-control dilemmas in such a way that the desired goal is prioritized. In contrast, research on *state self-control*, defined as the more transient level of self-control at a given moment, highlights cases of self-control failure by emphasizing that self-control relies on effortful inhibition resulting in a state of ego depletion where people are no longer able to exert self-control.

In recent years, academic debate about self-control has centered around the question of whether the phenomenon of ego depletion, defined as lower performance on a task that requires self-control after previous exertion of self-control (Baumeister et al., 1998), is caused by exhaustion of resources after an initial act of self-control, as is posited in the *strength model of self-control* (Baumeister et al., 1998), or results from temporary flaws in attention and motivation to exercise self-control, as is emphasized in the *process model of self-control* (Inzlicht & Schmeichel, 2012). Although this debate is important for understanding the underlying mechanisms of ego depletion, we argue that urgent questions about essential features of self-control—as for example how a self-control dilemma is handled—are not addressed in this discussion. We therefore propose to shift the focus of debate to better understanding successful self-control, through an integration of research on trait and state self-control. In doing so, we acknowledge the work by Fleeson (2004) on trait and state approaches to personality that aims to reconcile opposing views on whether behavior is primarily stable or variable across situations. Following Fleeson's reasoning, we argue that state and trait approaches to self-control would substantially benefit from research within the same paradigm. We observe that state self-control research typically focuses on (situations and consequences) of self-control failure, whereas research on trait self-control has focused more on understanding self-regulatory success. Until now, this remarkable discrepancy has hardly been addressed in the literature, and therefore the exact relation be-

tween trait self-control and state self-control is not well understood. Whereas one study has suggested that high trait self-control is associated with a larger self-control resource (e.g., Muraven, Rosman, & Gagné, 2007), others have given the idea that high trait self-control buffers the depletion effect (DeWall, Baumeister, Stillman, & Gailliot, 2007) or is associated with more efficient use of the self-control resource (Baumeister, Vohs, & Tice, 2007). Still other studies have suggested that high trait self-control is unrelated to depletion (Stillman, Tice, Fincham, & Lambert, 2009) or even amplifies the depletion effect (Imhoff, Schmidt, & Gerstenberg, 2014). These divergent findings are puzzling and call for a thorough investigation of how both conceptual and empirical approaches to self-control relate to each other.

In this article we discuss recent findings in trait self-control research suggesting that successful self-control may not depend solely on the effortful inhibition of an immediate urge or an unwanted response but can also be achieved by handling the self-control dilemma in much less effortful, and even effortless, ways when the self-control conflict is recognized at an early stage, allowing for a swift resolution of the conflict (Gillebaart & de Ridder, 2015; Gillebaart, Schneider, & de Ridder, 2016). We subsequently contrast these results with findings from ego-depletion research on state self-control. In doing so, we aimed to identify limitations of the ego-depletion paradigm that may produce unsuccessful self-control, because the paradigm does not allow participants to use the smart and effortless strategies for dealing with conflict that in fact characterize the success of trait self-control. We are aware that the ego-depletion model entails a specific approach to state self-control and that other prominent approaches such as the seminal work by W. Mischel exist (e.g., W. Mischel, 1974; W. Mischel, Shoda, & Rodriguez, 1989). We focus on the ego-depletion paradigm for two reasons. The first reason is that the paradigm is still widely used (despite recent discussion). Second, and more important, the ego-depletion model allows for the manipulation of self-control to examine how state self-control fluctuates over time and over situations by highlighting two stages—regardless of how the underlying mechanism that may explain changes in state self-control are specified, that is, as a result of a resource

that gets depleted or as a result of decreased motivation (see later for further discussion of this specific aspect). Specifically, we emphasize that dealing with personally relevant self-control dilemmas or conflicts is often absent from the ego-depletion paradigm, which is crucial for understanding why and how people are able and willing to prioritize a higher ultimate goal. To this end, we first discuss the key role for handling self-control dilemmas in trait self-control. Subsequently, we discuss how self-control dilemmas are seemingly absent from ego-depletion paradigms and then suggest future directions for self-control research.

### Trait Self-Control: Efficient Handling of a Self-Control Dilemma

A large body of evidence exists showing that trait self-control is associated with many positive outcomes in life, such as academic or work performance (Duckworth & Seligman, 2005; W. Mischel, Shoda, & Peake, 1988), maintaining satisfying relationships (Tangney et al., 2004), health (Moffitt et al., 2011), and even happiness (Cheung, Gillebaart, Kroese, & de Ridder, 2014; Hofmann, Luhmann, Fischer, Vohs, & Baumeister, 2014). Although one would expect that being able to inhibit unwanted impulses is underlying these success stories, as is generally assumed in self-control theories, a recent meta-analysis has suggested otherwise. This meta-analysis revealed that the effects of high levels of trait self-control are strongest in behaviors that are performed automatically, without effort, compared to intentional and deliberate behaviors, with effect sizes up to more than twice as large (de Ridder et al., 2012). Specifically, the beneficial effects of high trait self-control were shown to be more manifest in behaviors that are performed routinely or habitually, with people with high self-control reporting both stronger adaptive routines (such as fruit consumption habits) and weaker unadaptive routines (such as smoking habits). These findings evince a sharp contrast with the traditional view that people with high self-control are more effective in intentionally and effortfully resisting temptations and call for alternative explanations of the underlying mechanism of self-control success.

In recent years, several propositions have been made to elucidate this novel view on self-

control, all elaborating on the conception that effective self-control does not rely only on effortful inhibition but also on ways to prevent the employment of effortful inhibition by using more effortless strategies when the self-control conflict is identified at an early stage. First, in line with the notion that trait self-control may be characterized by the increased ability to make behavior automatic (Baumeister & Alquist, 2009; de Ridder et al., 2012), several studies have demonstrated that the effects of trait self-control on behavior are mediated by habits (Adriaanse, Kroese, Gillebaart, & de Ridder, 2014; Galla & Duckworth, 2015; Gillebaart & Adriaanse, 2017), thus exemplifying the notion that self-control exerts its positive influence on behavior by taking advantage of effortless routines. For example, a study by Adriaanse et al. (2014) showed that the inverse relation between trait self-control and unhealthy snacking could partly be explained by habit strength, such that people with higher trait self-control had weaker habits of consuming unhealthy snacks, which in turn was associated with lower intake of unhealthy snacks. This is an interesting notion that underscores the *effortless self-control* proposition: Apparently, people with high trait self-control eat fewer unhealthy snacks not because they successfully inhibit their urges all the time but instead they are simply less inclined to make unhealthy choices as part of their automatic routines. However, it should be acknowledged that the literature has not yet provided direct evidence that people with high self-control are faster to form these adaptive habits, or break undesirable ones, compared to people with low self-control.

Other studies have suggested that people with high self-control are less tempted by opportunities for immediate gratification and thus experience self-control dilemmas to a lesser extent than do people with lower levels of self-control (e.g., Milyavskaya, Inzlicht, Hope, & Koestner, 2015). For instance, in an experience sampling study in a sample of German adults it was demonstrated that people with high self-control tend to experience fewer and weaker problematic temptations in their environment, because they strategically structure their lives to steer away from these vices and thus do not need to exert effortful inhibition to the same extent as do people with low self-control (Hofmann, Baumeister, Förster, & Vohs, 2012). In a similar

vein, it has been suggested that self-control is a proactive trait that helps to avoid problematic desires: For example, people with high self-control were shown to prefer working in a room that had few (vs. many) distractions, relieving them of the necessity to deal with temptations that might otherwise have compromised their task performance (Ent, Baumeister, & Tice, 2015). Other studies have supported the notion of smart self-control strategies that focus on modifying circumstances before a problematic dilemma occurs rather than relying on resolving the conflict when it reaches a critical level (Duckworth, Gendler, & Gross, 2016). Furthermore, recent research has implied that the relation between self-control and various goal-directed behaviors (exercising, studying, healthy eating) are mediated by lower experienced aversion toward these behaviors (Gillebaart & Kroese, 2015), again suggesting that people with high self-control do not necessarily need to invest more effort into the performance of such behaviors but rather have developed ways that make it easier for them to be successful.

Third, recent work has propounded yet another, slightly different angle. Whereas the studies just discussed suggest that high self-control is related to absence of conflict—because people with high self-control are not tempted by opportunities for immediate gratification to the same extent as are people with low self-control—this latter approach suggests that people with high self-control do experience conflict to a similar extent as do people with low levels of self-control do but are able to deal with this conflict more efficiently, allowing for faster identification and resolution of the conflict. That is, the daily lives of people with high self-control are probably not void of all self-control conflicts, because in many cases such dilemmas can simply not be avoided (Gillebaart & de Ridder, 2015). For instance, a person may develop routines to avoid passing by the bakery shop in order to not be tempted by the delicious chocolate cookies in the window but may nevertheless be offered a piece of birthday cake when visiting a friend, creating a self-control dilemma. It is important to note that in these situations, people with high self-control still tend to make better choices than do people with low self-control. Gillebaart and colleagues

(2016) were able to demonstrate that people with high trait self-control were faster in identifying and resolving response conflicts that arose when asked to categorize healthy and unhealthy food items as positive or negative. By tracking people's computer mouse movements when categorizing the food items, Gillebaart et al. demonstrated that, rather than not experiencing conflict at all, people with high and low self-control initially experienced conflict to the same extent. Of importance, however, people with high self-control were faster to implicitly identify the conflict, providing them with better opportunities for resolving the conflict, as reflected by faster resolution of the conflict (i.e., faster categorization of the food item as positive or negative). This process of response conflict resolution in people with high trait self-control was effective to such an extent that on an explicit level, people with high self-control reported experiencing weaker conflicts. This recent study thus suggested that the critical aspect of high trait self-control may lie in the ability to identify a self-control dilemma earlier, allowing for faster, smart, and effortless strategies to deal with it. This is in line with theoretical notions stating that the experience of conflict is a prerequisite for engaging in self-regulatory action (Myrseth & Fishbach, 2009).

Altogether, these new directions in trait self-control research help to shed light on the understanding of how successful self-control operates. Depending on the moment when the conflict is identified, people may use different strategies to handle the conflict. At a very early stage they may turn to truly automated strategies such as habits, whereas in later stages they may use “smart strategies” that are still relatively low-effort, and in cases of full-blown self-control conflict people may need to turn to strategies that require effortful inhibition. The timing aspect of the self-control conflict process may prove essential in distinguishing these different ways of handling dilemmas, similar to the theoretical account by Gross on a process model of emotion regulation strategies (Duckworth, Gendler, & Gross, 2014; Gross, 1998). However, we do not wish to elaborate on the timing aspect here but rather point out that regardless of the specific stage, good handling of the conflict is crucial for understanding successful self-control. We posit that these insights bear important implications for the study of state

self-control in the ego-depletion paradigm. Before we present a number of suggestions on how to integrate research on trait and state self-control (particularly taking into account the novel perspective on effortless strategies), we discuss some limitations of the ego-depletion paradigm that currently preclude such conceptual integration.

### State Self-Control: Where Is the Dilemma in the Ego-Depletion Paradigm?

In contrast with research on trait self-control, which has made significant steps in understanding why and how high trait self-control leads to self-regulation success, research on state self-control has witnessed several controversies about the nature and the workings of self-control. These discussions typically do not question the existence of the behavioral phenomenon (i.e., that under certain conditions performance on a second demanding task may be hampered after having done an initial effortful task) but primarily relate to the question of which processes are underlying the ego-depletion phenomenon. For example, there has been debate about whether self-control depletion results from the exhaustion of resources (Baumeister et al., 1998) or from shifts in motivation and attention for exerting self-control after an initial act of self-control (Inzlicht & Schmeichel, 2012), whether ego depletion is caused by naïve beliefs about how self-control operates (Job, Dweck, & Walton, 2010), and whether ego depletion is different from fatigue (Clarkson, Hirt, Austin Chapman, & Jia, 2011). Our goal was not to reiterate these discussions but rather to focus on the way self-control is assessed in ego-depletion research. In doing so, we aimed to uncover the extent to which the paradigm allows for handling a self-control dilemma as is suggested by trait self-control studies.

Studies on ego depletion typically use a dual task paradigm. This paradigm holds that participants have to engage in an initial task that requires self-control (e.g., resisting chocolate chip cookies or crossing out *e* letters in a text conforming to complex rules; Baumeister et al., 1998), which is considered a manipulation of the self-control resource. Subsequently, participants perform a secondary task that also requires self-control (e.g., completing an anagram

or holding a hand grip). Performance on this second self-control task serves as the dependent variable. The paradigm reflects the view that self-control is a resource rather than a skill and that this resource is generic in nature and not specific to a certain task (Baumeister et al., 1998) but also accommodates related views on state self-control that allow for the influence of motivation, attention, and self-control beliefs by introducing slight variations to the task (e.g., Inzlicht & Schmeichel, 2012). Although meta-analytic evidence has supported the existence of the ego-depletion effect within the dual task paradigm (Hagger, Wood, Stiff, & Chatzisarantis, 2010), its validity has also recently been contested in a number of critical reviews (Carter & McCullough, 2013, 2014; Hagger et al., 2016). We do not aim to discuss the validity of the dual task paradigm in general here but rather want to allude to several aspects of the task that complicate the employment and identification of smart strategies for handling a self-control dilemma, as highlighted by recent advances in trait self-control research. Our point of departure thus is not to contest the ego-depletion phenomenon as such but rather to illuminate methodological limitations of the paradigm that prevent an accurate assessment of dealing with self-control dilemmas.

We have identified two main problematic aspects of state self-control research that interfere with the notion that self-control involves smart resolution of self-control dilemmas: It is not so much about dilemmas, and it does not allow for using smart strategies.

*Does ego-depletion research involve a self-control dilemma?* The first concern is about the critical sequential setup of the dual task paradigm. Whereas this sequence serves the central idea of the strength model that after initial exertion of self-control, the resource gets depleted, one may wonder to what extent the paradigm simply examines how people deal with performing two subsequent different tasks rather than assessing how they deal with a self-control dilemma (the secondary task) in a state of low self-control (because of the initial task). There are several reasons for considering this question. The first reason is that this setup does not allow for examining whether the first task in fact leads to low self-control, because the dual task paradigm does not generally entail a manipulation check (for exceptions, see Halali,

Bereby-Meyer, & Meiran, 2014; Schmeichel, Vohs, & Baumeister, 2003)—or rather the manipulation check and the dependent variable cannot be disentangled. Strictly speaking, one thus has no evidence that the initial task leads to a state of low self-control, as is assumed, making it more difficult to appreciate whether poor performance on the secondary task is indeed due to low self-control or due to different reasons.

The second reason—related to the first one—is that the very requirement that the paradigm should involve two different tasks rather than two similar tasks (Baumeister et al., 1998) may produce poor performance on the second task (Dewitte, Bruyneel, & Geyskens, 2009). Research has shown that if people are allowed to engage in two similar tasks requiring self-control, a decline in performance is not observed (Dewitte et al., 2009; for a review see Kiesel et al., 2010), suggesting that poorer performance on the second task does not provide evidence of low self-control but rather of decreased performance due to task switching. Related to this point is the issue that the time frame of doing two subsequent tasks has never been explicitly addressed in ego-depletion research, although the time spent on a task critically affects performance on a task after completion of an initial task (Langner, Steinborn, Chatterjee, Sturm, & Willmes, 2010; Lorist et al., 2000).

A third and more important reason lies in the second task that is used as the dependent variable in the dual task paradigm. This second task often seems to be unrelated to self-control in terms of inhibiting responses in view of a long-term goal because a long-term goal is absent from the paradigm. If self-control is defined in terms of handling a dilemma (inhibiting an immediate response in view of a goal that is more important in the long run), then a task assessing self-control should incorporate goals rather than only inhibiting a response “for nothing.” For instance, it is difficult to imagine in what way holding a handgrip a bit longer or solving more anagrams relates to any long-term goal people may have. Studies on the role of motivation in ego-depletion research support this line of reasoning. If people are more motivated for the secondary task—either because the task is important to them or is made more important by providing them with incentives—the depletion effect is diminished or disappears (Muraven,

2008; Muraven & Slessareva, 2003). In extreme cases one may even argue that quitting early on the second task is actually a good example of successful self-control because participants have better things to do in their lives than solving anagrams in the lab (e.g., studying for an exam, going running to improve their physical condition, or any other activity that is in line with their long-term goals). We argue that, taken together, there are serious objections to the dual task paradigm in terms of whether it presents people with a true self-control dilemma, thus threatening the external validity of the task (cf. Hommel, 2015). If people are required to engage in two subsequent trivial tasks that do not speak to their long-term goals, one may seriously wonder whether they experience any dilemma that needs to be regulated and thus any need to exert self-control.

Our reservations about the validity of the dual task paradigm are fueled by the scarcity of studies on the depletion phenomenon outside the lab. As far as we know, there are only two published studies that have manipulated ego depletion in a real-life setting (Janssen, Fennis, Pruyn, & Vohs, 2008; Salmon et al., 2015). Both were conducted in a consumer psychology setting and showed that consumers who were depleted—by applying a speech control manipulation (Salmon et al., 2015) or letting people respond to a series of questions (Janssen et al., 2008)—were more easily persuaded by heuristics. That is, Salmon et al. (2015) showed that depleted consumers were more likely to follow a social proof heuristic that led them to buy a healthy low-fat cheese product, and Janssen et al. (2008) demonstrated that depleted passersby were more likely to donate to charity when it was promoted by an authority heuristic. These studies suggested that depleted people relied more strongly on automatic processing (heuristic thinking) compared to nondepleted people. Although this is promising, one can conclude that the evidence for ego depletion outside of the lab is still scarce (but see Danziger, Levay, & Avnaim-Pesso, 2011, and Vohs et al., 2008, for field studies on decision fatigue and depletion). Moreover, these results point toward another relevant issue slightly beyond the scope of this article’s aims, namely that depletion does not necessarily lead to self-control failure in the sense that depleted people always make choices that are bad in view of their long-term goal. In

fact, depleted participants in Salmon et al.'s study who were presented with a heuristic made better (i.e., healthier) choices than did nondepleted people.

*Does ego-depletion research allow for using smart strategies?* This leads to our second concern, which relates to whether the dual task paradigm allows participants to truly deal with a self-control dilemma in smart, effortless ways (e.g., by relying on their automatic processing). Specifically, the paradigm does not give people the opportunity to rely on their adaptive routines when they have to deal with unfamiliar and often trivial or artificial lab tasks. One may even argue that the paradigm interferes with smart and automatic dealing with conflict, because it presents people with odd tasks that they are not used to handling in their everyday lives. Keeping the findings on early conflict identification and effortless handling of the conflict in mind, as suggested by the study from Gillebaart et al. (2016), it may well be that the ego-depletion paradigm prevents people with high self-control from using their smart routines for conflict handling, as is suggested by a recent study by Imhoff and colleagues (2014). This study showed that people with high trait self-control showed stronger depletion effects (i.e., performed worse on the second task in a dual task paradigm) compared to people with lower trait self-control. The authors explained this finding by suggesting that, because people with high self-control typically rely on effortless, adaptive routines, they are in fact less well trained to deal with acute self-control dilemmas that are unfamiliar to them. Thus, it is important to realize that the dual task paradigm may not be suitable to detect potentially smarter and faster conflict resolution strategies that might typically underlie successful self-control as suggested by trait self-control studies.

### Implications and Directions for Future Research

Considering the emerging findings on smart and effortless strategies in the context of trait self-control success, combined with the concerns related to the validity of the ego-depletion paradigm, we see a number of exciting opportunities for future research, taking the best of both worlds and moving closer to a more comprehensive view on self-control success and

failure. In particular, we suggest that to advance the understanding of how (successful) self-control operates, research should incorporate insights from trait self-control into state self-control designs and vice versa. Next, we outline some research questions that might inspire such work.

First, research on state self-control should take into account the notion that self-control dilemmas may be handled without requiring effortful control and should offer the opportunity to do so. A crucial question is whether people with high trait self-control are also able to engage with dilemmas in smart, effortless ways when they experience a temporary drop in state self-control. To this end, it is important to distinguish between tasks for which routinized, effortless strategies can and cannot be used. To investigate to what extent effortless self-control strategies are still employed when state self-control is low, one should first have participants become depleted by a task for which they cannot rely on their routines (to make sure they indeed have to exert inhibitory control causing low state self-control), whereas after this manipulation, one should employ a task for which participants are allowed to rely on routines. This could be done in either a lab setting or a field setting. For example, studies could employ depletion manipulations after which participants' behavior is assessed in the lab (e.g., by letting them do tasks that are familiar to them) or observed in a natural setting (e.g., prosocial behavior at a busy train station, spending money in a store). Such work could reveal to what extent people high in trait self-control still function successfully (prosocially, economically sound) when they have had to previously exert effortful control. Careful consideration should be given to determining whether these settings (either lab or field) allow people to rely on their routines or other effortless self-control strategies (e.g., avoidance). Inspiration for this direction of research can be drawn from studies that observe use of self-control strategies (e.g., H. N. Mischel & Mischel, 1987; W. Mischel et al., 1988).

A second line of research could look at spontaneous, or "natural," rather than manipulated situations of low state self-control (e.g., having to make a series of choices in the supermarket) and how this lowered state of self-control affects people with low and high trait self-control.

State self-control research is currently confounded with the dual task paradigm, but it would be important to consider how states of low self-control come about in real life outside the lab. Resisting a simple temptation or doing brief tasks that are aversive may not require so much self-control and thus not result in low state self-control. Still, many people will recognize the phenomenon of low state self-control (either in relation to their naïve beliefs of how self-control operates or not; cf. Job et al., 2010): feeling like they have less “willpower” after a strenuous meeting, having difficulty resisting the urge to snap at one’s nagging kids after a busy day at work, or impulsively buying cookies when going out for groceries after an exhausting activity. Thus, future research may investigate such naturally occurring states of low self-control and examine to what extent people high or low in trait self-control might be differentially affected. For instance, the key to success for people with high self-control may lie in the fact that even in this lowered state of self-control they are still able to make good choices, because they have their smart, effortless strategies to fall back on, whereas people with low self-control do not have such strategies to rely on when their resource gets depleted, which leads to a third possible research question.

This third, and equally crucial, question is whether people with high trait self-control are less prone to typical depletion effects because of their effortless strategies. To address this question, one must take another approach. In this case it would be interesting to consider self-control dilemmas in which people—presumably as a function of trait self-control—may or may not have adaptive routines (e.g., making food choices in a cafeteria), after which a more unfamiliar task (with which people have no prior experience, and they can therefore not rely on any routines) could illustrate whether the handling of the initial conflict was depleting or not, depending on level of trait self-control. Of course, the ultimate test would then be to examine to what extent an effortlessly solved dilemma affects performance on a subsequent, equally relevant dilemma for which people have no adaptive routines.

Finally, it would be interesting to investigate whether people’s levels of state self-control affect their use of effortless self-control strategies, in the sense that people with high state self-

control may be more prone to using effortless strategies than are people with low state self-control. Research may therefore either manipulate high and low states of self-control or observe them in a natural setting and subsequently employ tasks like the ones used in trait self-control research (e.g., implicit assessment of identifying and resolving self-control conflicts).

Considering all these aspects, we see ample opportunities for novel research that examines how trait self-control and state self-control relate to each other and that may reconcile the divergent findings on their association that hitherto have been reported. Even more important than resolving the apparent contradictions of the two distinct approaches to state self-control and trait self-control is to learn more about whether insight into the mechanisms that underlie successful trait self-control also apply when people experience a temporary drop in self-control. Knowing more about when and why state self-control varies across situations (e.g., novel vs. well known) or over time as a function of trait self-control is crucial for enhancing the understanding of self-control success. One final caveat is important in this regard. In this article we have focused on the shortcomings of the ego-depletion paradigm, but in future attempts to address trait self-control and state self-control within the same paradigm it may be equally important to consider the shortcomings of how trait self-control is assessed and develop more sophisticated measures of trait self-control than the ones that now primarily focus on self-report. Self-report trait self-control measures rely on the assumption that people have sufficient awareness of their capacity for self-control to report it accurately, that it does not vary across situations or time, and that it does not vary across categories of self-control challenges (Hoyle & Davison, *in press*). These assumptions are dubious given the low convergence between self-report measures and behavioral measures of trait self-control (Duckworth & Kern, 2011).

## Conclusion

The aim of this article was to discuss how different insights gained from trait self-control and state self-control research relate to each other. To this end, we have discussed recent developments in trait self-control research and

have identified problematic aspects of state self-control research. Although self-control by definition involves a dilemma between immediate gratification and (long-term) goal pursuit, the dual task paradigm does not entail these goals or such a dilemma. Furthermore, dual task paradigms typically do not allow for employing or assessing the effortless strategies that people with high trait self-control tend to use. By highlighting the opportunities that lie in combining the existing knowledge on trait and state self-control, we believe that a better understanding of the mechanisms that are involved in self-control success and failure will be possible.

### References

- Adriaanse, M. A., Kroese, F. M., Gillebaart, M., & Ridder, D. T. D. (2014). Effortless inhibition: Habit mediates the relation between self-control and unhealthy snack consumption. *Frontiers in Psychology: Eating Behavior*, 5, 444. <http://dx.doi.org/10.3389/fpsyg.2014.00444>
- Baumeister, R. F., & Alquist, J. L. (2009). Is there a downside to good self-control? *Self and Identity*, 8, 115–130. <http://dx.doi.org/10.1080/15298860802501474>
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74, 1252–1265. <http://dx.doi.org/10.1037/0022-3514.74.5.1252>
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science*, 16, 351–355. <http://dx.doi.org/10.1111/j.1467-8721.2007.00534.x>
- Carter, E. C., & McCullough, M. E. (2013). Is ego depletion too incredible? Evidence for the overestimation of the depletion effect. *Behavioral and Brain Sciences*, 36, 683–684. <http://dx.doi.org/10.1017/S0140525X13000952>
- Carter, E. C., & McCullough, M. E. (2014). Publication bias and the limited strength model of self-control: Has the evidence for ego depletion been overestimated? *Frontiers in Psychology*, 5, 823. <http://dx.doi.org/10.3389/fpsyg.2014.00823>
- Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control theory approach to human behavior*. New York, NY: Springer Verlag. <http://dx.doi.org/10.1007/978-1-4612-5887-2>
- Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality-social, clinical, and health psychology. *Psychological Bulletin*, 92, 111–135. <http://dx.doi.org/10.1037/0033-2909.92.1.111>
- Cheung, T. T. L., Gillebaart, M., Kroese, F., & de Ridder, D. (2014). Why are people with high self-control happier? The effect of trait self-control on happiness as mediated by regulatory focus. *Frontiers in Psychology*, 5, 722. <http://dx.doi.org/10.3389/fpsyg.2014.00722>
- Clarkson, J. J., Hirt, E. R., Austin Chapman, D., & Jia, L. (2011). The impact of illusory fatigue on executive control: Do perceptions of depletion impair working memory capacity? *Social Psychological and Personality Science*, 2, 231–238. <http://dx.doi.org/10.1177/1948550610386628>
- Danziger, S., Levav, J., & Avnaim-Pesso, L. (2011). Extraneous factors in judicial decisions. *Proceedings of the National Academy of Sciences of the United States of America*, 108, 6889–6892. <http://dx.doi.org/10.1073/pnas.1018033108>
- de Ridder, D. T. D., Lensvelt-Mulders, G., Finckhauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review*, 16, 76–99. <http://dx.doi.org/10.1177/1088868311418749>
- DeWall, C. N., Baumeister, R. F., Stillman, T. F., & Gailliot, M. T. (2007). Violence restrained: Effects of self-regulation and its depletion on aggression. *Journal of Experimental Social Psychology*, 43, 62–76. <http://dx.doi.org/10.1016/j.jesp.2005.12.005>
- Dewitte, S., Bruyneel, S., & Geyskens, K. (2009). Self-regulating enhances self-regulation in subsequent consumer decisions involving similar response conflicts. *Journal of Consumer Research*, 36, 394–405. <http://dx.doi.org/10.1086/598615>
- Duckworth, A. L., Gendler, T. S., & Gross, J. J. (2014). Self-control in school-age children. *Educational Psychologist*, 49, 199–217. <http://dx.doi.org/10.1080/00461520.2014.926225>
- Duckworth, A. L., Gendler, T. S., & Gross, J. J. (2016). Situational strategies for self-control. *Perspectives on Psychological Science*, 11, 35–55. <http://dx.doi.org/10.1177/1745691615623247>
- Duckworth, A. L., & Kern, M. L. (2011). A meta-analysis of the convergent validity of self-control measures. *Journal of Research in Personality*, 45, 259–268. <http://dx.doi.org/10.1016/j.jrp.2011.02.004>
- Duckworth, A. L., & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science*, 16, 939–944. <http://dx.doi.org/10.1111/j.1467-9280.2005.01641.x>
- Ent, M. R., Baumeister, R. F., & Tice, D. M. (2015). Trait self-control and the avoidance of temptations. *Personality and Individual Differences*, 74, 12–15. <http://dx.doi.org/10.1016/j.paid.2014.09.031>

- Fleeson, W. (2004). Moving personality beyond the person-situation debate: The challenge and the opportunity of within person variability. *Current Directions in Psychological Science*, *13*, 83–87.
- Fujita, K. (2011). On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality and Social Psychology Review*, *15*, 352–366. <http://dx.doi.org/10.1177/1088868311411165>
- Galla, B. M., & Duckworth, A. L. (2015). More than resisting temptation: Beneficial habits mediate the relationship between self-control and positive life outcomes. *Journal of Personality and Social Psychology*, *109*, 508–525. <http://dx.doi.org/10.1037/pspp0000026>
- Gillebaart, M., & Adriaanse, M. A. (2017). Self-control predicts exercise behavior by force of habit, a conceptual replication of Adriaanse et al. (2014). *Frontiers in Psychology*, *8*, 190. <http://dx.doi.org/10.3389/fpsyg.2017.00190>
- Gillebaart, M., & de Ridder, D. T. D. (2015). Effortless self-control: A novel perspective on response conflict strategies in trait self-control. *Social and Personality Psychology Compass*, *9*, 88–99. <http://dx.doi.org/10.1111/spc3.12160>
- Gillebaart, M., & Kroese, F. M. (2015, August). Easier done than said: People with high self-control feel less aversive to health behaviors. Paper presented at the 29th Conference of the European Health Psychology Society, Limassol, Cyprus.
- Gillebaart, M., Schneider, I. K., & de Ridder, D. T. D. (2016). Effects of trait self-control on response conflict about healthy and unhealthy food. *Journal of Personality*, *84*, 789–798. <http://dx.doi.org/10.1111/jopy.12219>
- Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, *74*, 224–237. <http://dx.doi.org/10.1037/0022-3514.74.1.224>
- Hagger, M. S., Chatzisarantis, N. L. D., Alberts, H., Anggono, C. O., Batailler, C., Birt, A. R., . . . Zwiener, M. (2016). A multilab preregistered replication of the ego-depletion effect. *Perspectives on Psychological Science*, *11*, 546–573. <http://dx.doi.org/10.1177/1745691616652873>
- Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin*, *136*, 495–525. <http://dx.doi.org/10.1037/a0019486>
- Halali, E., Bereby-Meyer, Y., & Meiran, N. (2014). Between self-interest and reciprocity: The social bright side of self-control failure. *Journal of Experimental Psychology: General*, *143*, 745–754. <http://dx.doi.org/10.1037/a0033824>
- Hofmann, W., Baumeister, R. F., Förster, G., & Vohs, K. D. (2012). Everyday temptations: An experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology*, *102*, 1318–1335. <http://dx.doi.org/10.1037/a0026545>
- Hofmann, W., Luhmann, M., Fisher, R. R., Vohs, K. D., & Baumeister, R. F. (2014). Yes, but are they happy? Effects of trait self-control on affective well-being and life satisfaction. *Journal of Personality*, *82*, 265–277. <http://dx.doi.org/10.1111/jopy.12050>
- Hommel, B. (2015). Between persistence and flexibility: The yin and yang of action control. In A. J. Elliot (Ed.), *Advances in motivation science* (Vol. 2, pp. 33–67). <http://dx.doi.org/10.1016/bs.adms.2015.04.003>
- Hoyle, R. H., & Davisson, E. K. (in press). Measurement of self-control by self-report: Considerations and recommendations. In D. T. D. de Ridder, M. A. Adriaanse, & K. Fujita (Eds.), *Handbook of self-control in health and well-being*. New York, NY: Routledge.
- Imhoff, R., Schmidt, A. F., & Gerstenberg, F. X. R. (2014). Exploring the interplay of trait self-control and ego-depletion: Empirical evidence for ironic effects. *European Journal of Personality*, *28*, 413–424. <http://dx.doi.org/10.1002/per.1899>
- Inzlicht, M., & Schmeichel, B. J. (2012). What is ego depletion? Toward a mechanistic revision of the resource model of self-control. *Perspectives on Psychological Science*, *7*, 450–463. <http://dx.doi.org/10.1177/1745691612454134>
- Janssen, L., Fennis, B. M., Pruyn, A. T. H., & Vohs, K. D. (2008). The path of least resistance: Regulatory resource depletion and the effectiveness of social influence techniques. *Journal of Business Research*, *61*, 1041–1045. <http://dx.doi.org/10.1016/j.jbusres.2007.09.013>
- Job, V., Dweck, C. S., & Walton, G. M. (2010). Ego depletion—Is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science*, *21*, 1686–1693. <http://dx.doi.org/10.1177/0956797610384745>
- Kiesel, A., Steinhauser, M., Wendt, M., Falkenstein, M., Jost, K., Philipp, A. M., & Koch, I. (2010). Control and interference in task switching—A review. *Psychological Bulletin*, *136*, 849–874. <http://dx.doi.org/10.1037/a0019842>
- Langner, R., Steinborn, M. B., Chatterjee, A., Sturm, W., & Willmes, K. (2010). Mental fatigue and temporal preparation in simple reaction-time performance. *Acta Psychologica*, *133*, 64–72. <http://dx.doi.org/10.1016/j.actpsy.2009.10.001>
- Lorist, M. M., Klein, M., Nieuwenhuis, S., De Jong, R., Mulder, G., & Meijman, T. F. (2000). Mental fatigue and task control: Planning and preparation. *Psychophysiology*, *37*, 614–625. <http://dx.doi.org/10.1111/1469-8986.3750614>

- Milyavskaya, M., Inzlicht, M., Hope, N., & Koestner, R. (2015). Saying “no” to temptation: Want-to motivation improves self-regulation by reducing temptation rather than by increasing self-control. *Journal of Personality and Social Psychology, 109*, 677–693. <http://dx.doi.org/10.1037/pspp0000045>
- Mischel, H. N., & Mischel, W. (1987). The development of children’s knowledge of self-control strategies. In F. Halisch & J. Kuhl (Eds.), *Motivation, intention, and volition* (pp. 321–336). [http://dx.doi.org/10.1007/978-3-642-70967-8\\_22](http://dx.doi.org/10.1007/978-3-642-70967-8_22)
- Mischel, W. (1974). Processes in delay of gratification. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 7, pp. 249–292). New York, NY: Academic Press.
- Mischel, W., Shoda, Y., & Peake, P. K. (1988). The nature of adolescent competencies predicted by preschool delay of gratification. *Journal of Personality and Social Psychology, 54*, 687–696. <http://dx.doi.org/10.1037/0022-3514.54.4.687>
- Mischel, W., Shoda, Y., & Rodriguez, M. I. (1989, May 26). Delay of gratification in children. *Science, 244*, 933–938. <http://dx.doi.org/10.1126/science.2658056>
- Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., . . . Caspi, A. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences of the United States of America, 108*, 2693–2698. <http://dx.doi.org/10.1073/pnas.1010076108>
- Muraven, M. (2008). Autonomous self-control is less depleting. *Journal of Research in Personality, 42*, 763–770. <http://dx.doi.org/10.1016/j.jrp.2007.08.002>
- Muraven, M., Rosman, H., & Gagné, M. (2007). Lack of autonomy and self-control: Performance-contingent rewards lead to greater depletion. *Motivation and Emotion, 31*, 322–330. <http://dx.doi.org/10.1007/s11031-007-9073-x>
- Muraven, M., & Slessareva, E. (2003). Mechanisms of self-control failure: Motivation and limited resources. *Personality and Social Psychology Bulletin, 29*, 894–906. <http://dx.doi.org/10.1177/0146167203029007008>
- Myrseth, K. O. R., & Fishbach, A. (2009). Self-control: A function of knowing when and how to exercise restraint. *Current Directions in Psychological Science, 18*, 247–252. <http://dx.doi.org/10.1111/j.1467-8721.2009.01645.x>
- Salmon, S. J., De Vet, E., Adriaanse, M. A., Fennis, B. M., Veltkamp, M., & de Ridder, D. T. D. (2015). Social proof in the supermarket: Promoting healthy choices under low self-control conditions. *Food Quality and Preference, 45*, 113–120. <http://dx.doi.org/10.1016/j.foodqual.2015.06.004>
- Schmeichel, B. J., Vohs, K. D., & Baumeister, R. F. (2003). Intellectual performance and ego depletion: Role of the self in logical reasoning and other information processing. *Journal of Personality and Social Psychology, 85*, 33–46. <http://dx.doi.org/10.1037/0022-3514.85.1.33>
- Stillman, T. F., Tice, D. M., Fincham, F. D., & Lambert, N. M. (2009). The psychological presence of family improves self-control. *Journal of Social and Clinical Psychology, 28*, 498–529. <http://dx.doi.org/10.1521/jscp.2009.28.4.498>
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*, 271–324. <http://dx.doi.org/10.1111/j.0022-3506.2004.00263.x>
- Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2008). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Journal of Personality and Social Psychology, 94*, 883–898. <http://dx.doi.org/10.1037/0022-3514.94.5.883>
- Vohs, K. D., & Schmeichel, B. J. (2003). Self-regulation and the extended now: Controlling the self alters the subjective experience of time. *Journal of Personality and Social Psychology, 85*, 217–230. <http://dx.doi.org/10.1037/0022-3514.85.2.217>

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