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Effortful experiences of self-control foster lay theories that self-control is limited☆

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ABSTRACT

Though recent motivational accounts of self-control highlight the importance of experiences of effort and fatigue for continued goal pursuit in the moment, less research has investigated potential longer-term effects of these experiences. In three studies, we tested the hypothesis that experiencing self-control as effortful and exhausting would lead to a general belief that the capacity for self-control is limited (Job, Dweck, & Walton, 2010). When participants reflected on a high- versus a low-effort self-control experience (Study 1), engaged in a high- versus low-effort self-control task (Study 2) or experienced a two-week period of self-control practice as more versus less effortful (Study 3), they were more likely to endorse lay theories that self-control is limited. In turn, these limited lay theories led to impairments in self-control performance under high regulatory demand (Study 3). We discuss implications for understanding what limits self-control and the development of lay theories related to self-control.

1. Introduction

Effective self-control—the overriding of immediate impulses or desires in favor of more distal goals—is associated with many positive outcomes, including psychological well-being, social adjustment, work achievement, and physical health (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Mischel, Shoda, & Peake, 1988; Moffitt et al., 2011). Effective self-control not only has benefits at the individual level, but also for society more broadly, and is associated with decreases in obesity, smoking, expression of stereotypes, and violent crime (Elfhag & Morey, 2008; Gailliot, Plant, Butz, & Baumeister, 2007; Gottfredson & Hirschi, 1990; Muraven, 2010b).

Sustaining self-control over time, however, is notoriously difficult. Many studies have found that completing an initial task requiring self-control leads to performance decrements in subsequent, unrelated tasks that also require self-control (for a meta-analytic review see Hagger, Wood, Stiff, & Chatzisarantis, 2010; but also see Carter, Kofler, Forster, & McCullough, 2015; Hagger et al., 2016). The predominant explanation for these types of findings has long come from the *strength model* of self-control, which argues that such control relies on a limited supply of energy that, like a muscle, becomes depleted and renders one unable to continue to exert further self-control (e.g., Baumeister, Heatherton, & Tice, 1994; Baumeister, Vohs, & Tice, 2007; Muraven & Baumeister, 2000). More recent research, however, has questioned the strength model, highlighting the importance of shifting beliefs about, expectations for, and the valuing of self-control in explaining performance decrements (e.g., Clarkson, Hirt, Jia, & Alexander, 2010; Hagger & Chatzisarantis, 2013; Job et al., 2010; Moller, Deci, & Ryan, 2006; Molden et al., 2012; Muraven & Slessareva, 2003). This research has given rise to new, alternative models of self-control that explain performance in terms of the motivated allocation of effort and attention rather than to any true limited capacity for self-control (e.g., Inzlicht & Schmeichel, 2012; Kurzban, Duckworth, Kable, & Myers, 2013; Molden, Hui, & Scholer, 2016, 2018). Drawing from these new models, the present research examines how people's experiences of effort during self-control can directly affect their beliefs about effort and exerting control, as well as their performance on tasks that require control.

1.1. The role of effort in sustaining self-control

One important process in exerting self-control highlighted by newly emerging models is how the phenomenological experience of effort and fatigue while engaged in control affects subsequent performance (Evans, Boggero, & Segerstrom, 2016; Hockey, 2013; Kurzban et al.,

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2013). Simply engaging in an initial act of self-control is not enough to shift performance on subsequent tasks; instead, what appears to influence whether or not individuals are likely to persist on subsequent tasks is the extent to which they perceive this initial exertion of self-control to be highly effortful and exhausting (Molden et al., 2016, 2018). For example, when tasks are framed as fun or are autonomously chosen rather than framed as work or externally assigned, they are experienced as less effortful and fatiguing and do not produce the same decrements in subsequent self-control (e.g., Laran & Janiszewski, 2011; Moller et al., 2006; Muraven, Gagné, & Rosman, 2008; see also Clarkson et al., 2010). Similarly, independent of the objective level of demand, believing one has exerted relatively high effort compared to others also leads to worse subsequent self-control (Kivetz & Zheng, 2006). Furthermore, when some initial exertion of self-control is followed by experiences that increase relaxation or boost tolerance for effort—such as watching a humorous video clip or favorite television program (Derrick, 2013; Tice, Baumeister, Shmueli, & Muraven, 2007), affirming one's core values (Schmeichel & Vohs, 2009), or meditating (Friese, Messner, & Schaffner, 2012)—this too reduces subsequent decrements of self-control (for a review see Masicampo, Martin, & Anderson, 2014). Thus, regardless of the source of one's perceptions of increased or decreased effort, these perceptions appear to influence subsequent exertions of effort and self-control (e.g., Evans et al., 2016, Kurzban et al., 2013; Molden et al., 2016, 2018).

Building upon these findings, we propose that experiences of effort may not only affect whether people sustain self-control in the moment, but may also, over time, more broadly influence their beliefs about the nature of self-control. Previous research has shown that individuals differ in their *lay theories*—their fundamental beliefs about the ways the world works (see Molden & Dweck, 2006)—with respect to whether self-control is limited and can be exhausted (Job et al., 2010; Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002). The present studies examine whether the phenomenological experience of self-control as effortful and exhausting—especially over time—may increase the likelihood that people come to believe that there is a limit to their ability to exert self-control (e.g., "I must be reaching a limit if I feel so exhausted"). Moreover, as reviewed in the following section, we further test whether such limited theories of self-control may in turn lead to decrements in self-control performance when demands for effort are high (e.g., Bernecker & Job, 2015; Job et al., 2010; Job, Walton, Bernecker, & Dweck, 2015; Miller et al., 2012). Although, as reviewed above, previous studies have examined the proximal effects of effort perceptions on self-control performance, an important question that has received less attention is how such perceptions may shift broader lay theories of self-control, which could then further influence self-control performance days or even weeks later.

1.2. Lay theories of self-control

Because the environments in which people live are complex and multi-faceted, people often formulate a set of basic assumptions about the fundamental nature of these environments. These assumptions—or lay theories—then create a broader system of meaning that provides people with a sense of understanding, prediction, and control in their judgments and behaviors (Dweck, Chiu, & Hong, 1995; Plaks, 2017; Molden & Dweck, 2006). That is, lay theories function both as beliefs about what is fundamentally true in world and as frameworks that explain and organize the world (Levy, Chiu, & Hong, 2006), and thus provide an interpretive framework for noticing, categorizing, and processing information.

In the domain of self-control, research has shown that individuals vary in their lay theories about the extent to which such control is limited (e.g., Bernecker & Job, 2015; Job et al., 2010; Job, Walton, et al., 2015; Martijn et al., 2002; Miller et al., 2012). Individuals who hold a *limited* theory of self-control or willpower believe, much like the core tenet of the strength model, that engaging in such control consumes energy and exhausts their capacity for subsequent acts of control. For example, individuals with lay theories that important aspects of self-control, such as resisting temptation or engaging in strenuous mental activity, are limited more strongly endorse the idea that "it is particularly difficult to resist a temptation after resisting another temptation right before" or that "after a strenuous mental activity your energy is depleted and you must rest to get it refueled again" (Job et al., 2010). In contrast, individuals who hold a *non-limited* theory of various aspects of self-control believe that engaging in acts of control has no influence on, or may even energize, one's capacity to engage in subsequent acts of self-control. For example, individuals with non-limited theories endorse the idea that "resisting temptations activates your willpower and you become better able to face new upcoming temptations" or that "your mental stamina fuels itself; even after strenuous mental exertion you can continue doing more of it" (Job et al., 2010).

Multiple studies examining the consequences of lay theories of self-control have found that these theories predict and influence how people exert control in ways that are consistent with the content of the theory they hold. Lay theories of self-control do not appear to consistently affect the moderate exertion of self-control in the short term; however, they do begin to affect self-control when it must be sustained over longer periods of time or when it becomes particularly strenuous, which is when people with limited theories might be expected to begin withdrawing effort and "conserving" these presumably limited resources. For example, Job et al. (2010) found that while lay theories of self-control did not predict students' control-related behaviors (i.e., better eating habits, study habits, and personal goal-striving) during a non-stressful time of the academic term, individuals with stronger non-limited theories of control did display more of these behaviors during a stressful final-exam period. In addition, Miller et al. (2012) demonstrated that, while participants holding limited vs. non-limited theories of self-control performed equally well at the beginning of a long, strenuous mental task, individuals who more strongly endorsed non-limited theories sustained this level of performance throughout the task whereas individuals who more strongly endorsed limited theories did not. Similarly, Bernecker and Job (2015) found that individuals with stronger non-limited theories had higher expectations for goal progress than students who endorsed limited theories, but only on days directly following a highly demanding day. Job, Walton, et al. (2015) also found that students who more strongly endorsed non-limited theories earned higher grades than students who more strongly endorsed limited theories, but only when taking a particularly heavy course load.

Although such findings illustrate how lay theories of self-control have important influences on performance when self-control becomes particularly effortful, these types of studies have not examined whether or how everyday experiences with exerting effortful self-control might itself also affect the lay theories that people come to hold. Given the existing evidence that people's limited or non-limited theories of self-control can be readily manipulated and primed (e.g., Job et al., 2010; Mukhopadhyay & Johar, 2005), it seems likely that both types of beliefs are available to everyone, even if specific individuals tend to have one of these beliefs more chronically accessible than the other (Higgins, 1996). What has not yet been established, however, is what types of experiences occurring in people's daily lives might also influence such accessibility and naturally shift people's lay theories of self-control.

We thus propose to investigate how everyday experiences with exerting effortful self-control can lead to changes in people's lay theories and, ultimately, affect self-control outcomes. Research on the phenomenological experience of effort suggests that effort may serve as a signal about the value of continued investment in a current task given other opportunities and goals (see Hockey, 2013). The utility of such signals for self-regulation is that there are limits on how one's mental resources can be *simultaneously* invested, even if there are no absolute limits on the capacity of those resources (Kurzban et al., 2013). Thus, experiences of effort and fatigue may help people effectively allocate