



A daily diary approach to investigate the effect of ego depletion on intentions and next day behavior[☆]



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ABSTRACT

Objectives: Ego depletion impairs physical and cognitive capacities, but its effects on daily intentions and behavior remain unclear. This study provides insight into relationships between ego depletion, intentions, and exercise, leisure sitting and other non-activity related behaviors.

Design: The study involved repeated assessment using a daily diary.

Method: Australian university students ($N = 103$, 52% female, M age = 22 years) self-reported end-of-day ego depletion, decisional intentions, and behavior for time spent exercising, in leisure-time sitting, doing paid work, sleeping, studying, housework, and the amount of alcohol consumed across seven days.

Results: When people were more ego depleted at the time of reporting intentions, they intended to exercise for less time the next day than when people were less ego depleted. However, if people were highly ego depleted when reporting exercise intentions for the next day, they were subsequently more likely to reach those intentions. There were no significant effects of ego depletion on intentions or on the likelihood of achieving intentions for any behavior other than exercise.

Conclusions: Given that the effects of ego depletion on intentions and behavior were seen for exercise but not other daily behaviors, it may be that ego depletion only impacts intentions to engage in physically effortful behavior. Future research is needed to test replicability of the effects. Interventions may consider accounting for ego depletion in efforts to enhance behavioral intentions; however, the findings also highlight the importance of keeping behavior change (as opposed to change in intentions) as the main outcome focus.

1. Introduction

Most people do not exercise enough to gain substantial health benefits (Australian Bureau of Statistics, 2013; Physical Activity Guidelines Advisory Committee, 2008). On any given day, people may not exercise simply because they had no intentions to do so; alternatively, people may have made intentions to exercise but failed to follow through with them. For example, someone might have had a taxing day and felt drained, and as a result, reduced or eliminated their *decisional intention* (e.g., aim or outcome plan; Rhodes & Rebar, 2017) to exercise. This sensation of having limited cognitive and physical capacities as a result of taxed self-control is referred to as ego depletion (Baumeister & Vohs, 2016; Baumeister, Bratslavsky, Muraven, & Tice, 1998; Cunningham & Baumeister, 2016; Hagger, Wood, Stiff, & Chatzisarantis, 2010). Ego depletion should be particularly

consequential for decisional intentions of effortful behaviors such as exercise but likely would not impact how much a person intends to do non-effortful activities such as sitting in leisure (e.g., sitting while watching television), drinking alcohol, sleeping, or studying. The aim of this study is to test how ego depletion at the time of making next-day decisional intentions predicts (a) the time people intend to engage in behavior and (b) the intention-behavior relationships (i.e., the extent to which individuals act in accordance with their intentions).

According to many socio-cognitive theories of behavior change, intentions are the primary precursor to behavior. Indeed, intentions do predict a substantial amount of variability in exercise behavior (Hagger, Chatzisarantis, & Biddle, 2002; McEachan, Conner, Taylor, & Lawton, 2011; Rhodes & Dickau, 2012; Webb & Sheeran, 2006), so it is important to understand what factors influence exercise intentions. Recently, it has been noted that intentions can refer to two distinct

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motivational processes – decisions (e.g., do you intend to exercise tomorrow?) and degree of commitment to that decision (e.g., to what degree do you intend to exercise tomorrow) (Rhodes & Rebar, 2017; Sheeran, 2002). These are referred to as *decisional intention* and *intentional strength*, respectively. Whereas decisional intention is the pre-intentional processes that drive the initial intention, intentional strength is a reflection of the post-intentional processes that drive the implementation of the intentions. Comparatively, most research has focused on the impact of intentional strength on exercise behavior, showing that it is a robust mediator between social cognitive constructs and behavior (Rhodes & Rebar, 2017). As a result, it remains relatively unknown what predicts the initial decision of whether to exercise or not, which is crucial for instigation of deliberative motivation processes like planning.

In line with the theory of planned behavior, it has been shown that people who have more favorable attitudes about exercise experience more positive subjective norms about exercise, and perceive more control over their exercise behavior tend to make decisional intentions to exercise more than other people (Rhodes & Courneya, 2003). Beyond these socio-cognitive factors, decisional intentions may also be influenced by individuals' cognitive and/or affective states at the time they are making the decisions; however up to this point, such studies have focused on intentional strength. For example, Abraham and Sheeran (2004) showed that people who feel anticipated regret about not exercising when making exercise intentions make stronger intentions than those who do not experience anticipating regret. Magaraggia, Dimmock, and Jackson (2014) showed that motivational priming can influence the intended duration of exercise-related goal-setting, which suggests plans for how long a person decides to exercise is impacted by states at the time of decision-making.

Another cognitive state which may impact exercise decisional intentions is ego depletion. Self-regulation is needed to implement intentions if doing so requires overcoming opposing temptations or impulses (Hall & Fong, 2007, 2010). The strength model of self-control proposes that the ability to self-regulate is a finite resource that can be drained by exerting self-control (Baumeister & Vohs, 2016; Baumeister et al., 1998). Thus, if individuals exert self-control throughout a day, such as by undertaking onerous tasks that require effort to override temptations to quit, they will experience diminished self-control capacities late in the day (Baumeister, 2002). Under conditions of ego depletion, future efforts to engage in self-regulation are compromised, and even imagining effortful experiences can be taxing (Graham, Sonne, & Bray, 2014; Neil et al., 2014). In a direct test of the relationship between ego depletion and goal-setting, Martin Ginis and Bray (2010) found that individuals induced to experience self-regulatory depletion planned to exert less effort in an upcoming exercise session relative to those who did not experience the depletion manipulation. In the present study, we sought to investigate the relationship between ego depletion and another aspect of exercise planning – that of the decisional intention of exercise duration. Given that this effect is anticipated to be the result of the deleterious effects of ego depletion on planning an effortful activity, we also investigated the relationship between ego depletion and planning for time spent sitting in leisure, doing paid work, sleeping, studying, doing housework, and amount of alcohol consumed. If it is the anticipated effort that underlies the effect, ego depletion should reduce the time people intend to exercise but not the time they intend to do the other daily behaviors.

A further consideration for the present study is the extent to which decisional intentions created under different levels of ego depletion vary in how effectively they are implemented into behavior. On the one hand, it is possible that individuals align their behavior to reach intentions irrespective of the circumstances under which the intentions were set. Evidence for this possibility has been provided by Magaraggia et al. (2014), who found that exercise goals were predictive of exercise behavior over one week regardless of individuals' prime-induced states at the time of goal-setting. On the other hand, decisional intentions

might vary in their prediction of behavior to the extent that circumstances at the time of intention-setting influence the self-concordance of those intentions and/or engagement with the post-intention processes. In alignment with this general notion, a vast body of research on the elaboration likelihood model has shown that attitudes of similar valence and extremity can be more or less predictive of behavior depending on the amount of elaboration that was used in the formation of the attitude (Petty & Briñol, 2012). In addition, it has previously been shown that exercise intentions are more likely to predict exercise behavior when the intentions are modest (Rhodes, Courneya, & Jones, 2003), which means that the potential undermining effect of ego depletion on decisional intentions could actually make it *more* likely that people will successfully follow through with those intentions. People are more likely to try to reach attainable goals than ones that seem out of reach (Locke & Latham, 2002). Additionally, by the very nature of modest goals, they are easier to accomplish than less ambitious ones. For example, if in the evening a woman makes the decision to intend to get up early and go for a 90 min walk around the neighborhood, she may not even try to accomplish that intention when she wakes up and still feels exhausted. Comparatively, if the intention was simply to walk instead of drive her children to school in the morning, she likely will be more willing to consider it and more likely to accomplish it.

Most studies investigating ego depletion are conducted in laboratory settings, in which ego depletion is induced through effortful, self-control tasks (Cunningham & Baumeister, 2016; Hagger et al., 2010). These studies provide valuable insight into the behavioral after-effects of self-control exertion but not necessarily the psychological states that underpin these effects. Investigations of subjective states of ego depletion are likely more relevant for investigating the psychological processes behind behavior change. Past research has been conducted on ego depletion and health behaviors by monitoring fluctuations in daily self-control and behaviors. For example, a study was conducted in which alcohol intake intentions and behavior were logged as well as the occurrences of daily self-control demands which likely lead to ego depletion (e.g., mood regulation, controlling their thoughts, stress management, and feeling overwhelmed; Muraven, Collins, Shiffman, & Paty, 2005). The study found that people's intentions to drink were not impacted by daily self-control demands; however, people were more likely to drink beyond their self-imposed drinking limits on days when they experienced more self-control demands than usual (and therefore were likely ego depleted).

In an ecological momentary assessment study of a sample of university students who all had strong intentions to exercise, Schönndube, Bertrams, Sudeck, and Fuchs (2017) found that people tended to exercise more on days when they had greater self-control (were not ego depleted). Englert and Rummel (2016) conducted a daily diary of inactive university students and found that daily ego depletion (but not trait ego depletion) partially explained why people were less likely to exercise on days when they were highly stressed. Importantly, daily intentions were not monitored in either of these studies, so the daily interplay between self-control, exercise intentions, and exercise behavior remains untested. Given that both exercise intentions (Rebar, Elavsky, Maher, Doerksen, & Conroy, 2014) and ego depletion (Muraven et al., 2005; Schönndube et al., 2017) have shown to be variable across days, research on the interplay between these factors and their influence on exercise should be conducted using within-person, repeated assessment studies.

The aim of this study was to test two sets of hypotheses. First, it was hypothesized that if people were more ego depleted, they would make intentions to do less exercise the next day but that ego depletion at the time of intention-setting would have no impact on intended time spent sitting in leisure, doing paid work, sleeping, studying, doing housework, or the amount of alcohol consumed. Second, it was hypothesized that being ego depleted at the time of setting intentions would make it more likely that people would successfully enact their daily exercise intentions but have no impact on the likelihood of acting in line with

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