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First on the List: Effectiveness at Self-Regulation and Prioritizing Difficult Exercise Goal Pursuit

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Abstract

Identifying and understanding the goal pursuit strategies that distinguish effective self-regulators from less effective self-regulators is important for elucidating how individuals achieve their goals. We suggest that the timing of plans for difficult goal pursuits is one differentiation. A pilot study shows that effective self-regulators tend to believe they are best suited to pursue difficult goals earlier in the day, and two studies provide evidence that effective and less effective self-regulators differ in the timing of their plans for difficult goal pursuits. Results indicate that when exercising is perceived as difficult goal pursuit, effective self-regulators prioritize that difficult goal pursuit by planning to exercise earlier in the day whereas less effective self-regulators plan exercise for later in the day.

Keywords

self-regulation; self-control; planning; goal pursuit

Being a proficient worker, living a healthy lifestyle, and staying on a strict budget are examples of complex goal pursuits, all of which require multiple self-regulatory strategies for goal success. To date, much of the research on self-regulation has focused on willpower—the ability to resist temptations—as a means by which people pursue and achieve their goals (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Heatherton, & Tice, 1994; Metcalfe & Mischel, 1999; Muraven & Baumeister, 2000; Muraven, Tice, & Baumeister, 1998). However, effective goal pursuit may often require means other than willpower alone. In the present manuscript, we examine the specific strategy of planning

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when to exert self-control in pursuit of a goal and test the hypothesis that generally effective self-regulators tend to temporally prioritize important but difficult tasks. In doing so, we extend recent work on the regulatory strategies used by effective and less effective self-regulators (e.g., De Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2011; Gollwitzer, Fujita, & Oettingen, 2004; Mann, De Ridder, Fujita, 2013; Masicampo & Baumeister, 2012).

Self-regulation encompasses all of the means that individuals use to accomplish their goals, including those directed at one's self and one's environment (Boekaerts, Maes, & Karoly, 2005). We define effective self-regulation as general success at meeting either a single goal or multiple goals. That is, depending on the context, one might construe effective self-regulation as meeting or making progress on one important goal (Carver & Scheier, 1981; Carver & Scheier, 1982; Higgins, 1987; Lawrence, Carver, & Scheier, 2002) or as meeting or making progress on multiple important goals (Fishbach, Shah, & Kruglanski, 2004; Köpetz, Faber, Fishbach, & Kruglanski, 2011). When individuals' goals are in conflict, such as higher-order goals and goals to engage in pleasurable pursuits (i.e., indulge in temptations), effective self-regulation involves preferences for higher-order, long-term goals (Fujita, Trope, Liberman, & Levin-Sagi, 2006; Hofmann, Luhmann, Fisher, Vohs, & Baumeister, 2014). This frequent preference for higher-order goals is associated with positive outcomes such as high academic performance, a healthy lifestyle, less involvement in crime, and enhanced interpersonal relationships (Boals, vanDellen, & Banks, 2011; Mischel, Shoda, & Peake, 1988; Moffitt et al., 2011; Tangney, Baumeister, & Boone, 2004; Vohs, Finkenauer, & Baumeister, 2011; Wills, DuHamel, & Vaccaro, 1995; Wolfe & Johnson, 1995). Additionally, individuals who are more effective at self-regulation tend to be happier (Hofmann et al., 2014).

Self-control, the effortful and conscious overriding of dominant responses (Baumeister et al., 1994; Baumeister, Vohs, & Tice, 2007; Tangney et al., 2004), is one means by which individuals engage in self-regulation (vanDellen, Hoyle, & Miller, 2012). This particular self-regulatory activity can be challenging because individuals' abilities and motivation to exert the self-control necessary to effectively pursue difficult goal pursuits appears to be limited in capacity (Baumeister et al., 1998; Molden et al., 2012; Muraven & Baumeister, 2000; Vohs, Baumeister, & Schmeichel, 2013). That is, acts of self-control consume physiological and/or motivational resources, leaving fewer resources available for further self-control efforts (for a review, see Hagger, Wood, Stiff, & Chatzisarantis, 2010). Although some research suggests that it is individuals' beliefs that self-control is limited that predicts whether engaging in self-control will have deleterious consequences for subsequent self-control (Job, Dweck, & Walton, 2010), other research suggests that, regardless of beliefs, individuals engaging in self-control in the lab (Vohs, Baumeister, & Schmeichel, 2013) and in everyday life (Hofmann, Vohs, & Baumeister, 2012), are generally less likely to subsequently continue to exert self-control.

Because successfully exerting self-control is difficult and carries implications for one's potential to continue engaging in self-control, individuals may benefit from having strategies that help them manage the challenges of exerting self-control. Early research suggests that effective self-regulators have different strategies for self-control than do less effective self-

regulators (Mischel et al., 1988; Mischel, Shoda, & Rodriguez, 1989). For example, children faced with a tempting marshmallow were more successful at resisting the temptation if they construed it in terms of its abstract features (e.g., thinking of it as a fluffy cloud) rather than if they construed it in terms of its concrete features (e.g., its sweet taste; Mischel & Baker, 1975; Mischel & Moore, 1973). More recent research suggests other strategies, such as precommitment, to help resist temptations (Ariely & Wertenbroch, 2002; Schwartz et al., 2014) and has found support for the notion that effective self-regulators are particularly adept at avoiding temptations (Imhoff, Schmidt, & Gerstenberg, in press). This research suggests that effective self-regulators may avoid temptations but it does not fully address how individuals make plans to face situations in which they suspect they will be tempted—that is, situations in which they believe they might need to engage in difficult goal pursuit. In the present manuscript, we investigate the strategy of considering the timing of when one may be most likely to successfully exert self-control.

Delaying tasks increases the chances that one will become distracted by other tasks or unexpected demands and that one might be experiencing resource depletion. Thus, we assume that tackling difficult tasks early may improve the chances of succeeding in completing the task. We suggest that effective self-regulators may be more likely to prepare for self-control by planning to engage in difficult tasks relatively early in their day. We focus on the strategy of temporal planning for self-control because previous research suggests that planning goal pursuit facilitates goal outcomes (Gollwitzer, 1993; Gollwitzer, 1999; Gollwitzer & Sheeran, 2006; Webb & Sheeran, 2003; Webb & Sheeran, 2006). Acts of self-control that are needed for many goal pursuits require an individual to move from automatic to effortful control (Hofmann, Baumeister, Förster, & Vohs, 2012; Myrseth & Fishbach, 2009; vanDellen et al., 2012), and having a plan in place can increase the chances of being successful when self-control is necessary (Gollwitzer & Brandstatter, 1997; Gollwitzer & Schaal, 1998). Women who planned when, where, and how to complete breast self-examinations—a task often considered unpleasant and potentially requiring self-control—were more likely to actually complete a breast self-examination (Luszczynska & Schwarzer, 2003). Planning has also been linked to exercise intentions and actual executions of exercise in cardiac rehabilitation patients (Snihotta, Scholz, & Schwarzer, 2006). In part, these increased goal pursuits arise because making plans before a difficult task can help individuals overcome thoughts and feelings that may hinder goal engagement or pursuit (Achtziger, Gollwitzer, & Sheeran, 2008; Bayer, Gollwitzer, & Achtziger, 2010; Masicampo & Baumeister, 2011; Webb & Sheeran, 2003).

Based on these links between planning and successful goal pursuit, we expected that effective self-regulators may better understand the benefits of planning when to exert self-control. As a result, effective self-regulators may make plans to engage in difficult goal pursuit (i.e., tasks that require self-control) when they think they will be most likely to succeed at those pursuits. Consistent with this expectation, some research suggests that effective planning may be associated with expertise. For example, expert volleyball players tend to be better at planning when to practice important volleyball skills than non-experts or novices (Kitsantas & Zimmerman, 2002). Effective self-regulators may be better at planning when to exert self-control because of the expertise gained from successfully pursuing their goals in the past.

Why Might Effective Self-Regulators Prioritize Difficult Goal Pursuit?

The ability to self-regulate is limited, in part, by constraints in mental, physical, and regulatory capacities. Cognitive demands on individuals reduce their ability to exert self-control (Burkley, 2008; Wright et al., 2007) and physical exhaustion, although different from self-control, may reduce the likelihood of engaging in some goal pursuits (Gailliot et al., 2007; Harrison & Horne, 1998; Inzlicht & Gutsell, 2007; Segerstrom & Solberg Nes, 2007). Additionally, as previously noted, exerting self-control will, in many instances, temporarily reduce the capacity for further self-control (Muraven et al., 1998). Hofmann and colleagues (2012) provide evidence of this self-regulatory depletion in an experience sampling study that examined individuals' exertion of self-control throughout the day. When individuals refrained from engaging in a temptation, they were less likely to successfully exert self-control later in the day. Although the assessment of prior self-control was biased in favor of relatively recent self-control exertions, the results of this research support the idea that individuals are less likely to be able to exert self-control later in the day if they have previously faced a challenge to their self-control. Furthermore, Kouchaki and Smith (2014) found evidence of a *morning morality effect*, named based on the finding that people are more likely to act ethically in the morning than later in the day. These examples of evidence support our assumption that self-regulatory resources, specifically self-control, may be greater in the morning and reduced in the afternoon and evening.

When resources are available, individuals may have a strong drive to engage in difficult goal pursuit; however, when mental, physical, and regulatory capacities are reduced, the difficulty of a goal pursuit may be an obstacle that prevents individuals from pursuing it (Kruglanski et al., 2012). Thus, effective self-regulators may manage self-control challenges by planning to tackle them at a time when they have the most mental, physical, and regulatory energy and when they are least likely to get distracted by other tasks or demands. Instead of waiting to complete difficult tasks later in the day, individuals who are effective at self-regulation may plan to complete them earlier in the day before other tasks, stresses, or unexpected demands come up and exhaust their limited time and energy resources. We expect that planning may be specific to difficult goal pursuits because those tasks are the most likely to take mental, physical, and regulatory resources (vanDellen et al., 2012) and are the most likely to be thwarted by distractions.

The Present Studies

Previous studies provide numerous examples of the benefits of being an effective self-regulator. Yet, there is still much to learn about the self-regulatory strategies of effective self-regulators. A pilot study examined whether effective and less effective self-regulators differ in their beliefs about when they are most likely to have resources for difficult goal pursuits. In two subsequent studies, we investigated how effective and less effective self-regulators plan to tackle difficult goal pursuit, focusing specifically on the timing of the plans they make for such goal pursuit.

We hypothesized that effective self-regulators would plan to complete difficult goals earlier in the day compared to less effective self-regulators. In Study 1, adults planned when they

would exercise for 30 minutes on a workday. In Study 2, we moved to the context of multiple goal pursuits, asking undergraduate students to plan when they would complete two important goal pursuits: exercising and studying. In both studies, participants rated the difficulty of engaging in the given goal pursuits prior to making their plans. We also took measures to control for individual differences in waking times. In Study 1, we asked participants when they typically wake up in the morning and go to sleep at night, and in Study 2, participants indicated when they would wake up on their planned day and when they usually go to sleep.

Pilot Study

The purpose of the pilot study was to gather preliminary evidence in support of our assumption that effective self-regulators are more likely than less effective self-regulators to believe that they should manage their self-regulatory resources by planning to complete difficult tasks earlier in the day. We asked individuals their beliefs about when they are best able to resist temptations, when they have the most physical energy, and when they are most motivated to complete difficult tasks. We employed two measures of trait self-control to measure individuals' general self-regulatory abilities.

Method

Participants—Participants were 100 adults (60 men) recruited from Amazon's Mechanical Turk website (MTurk; Buhrmester, Kwang, & Gosling, 2011). Only adults living in the United States were eligible to participate, and all participants were fluent in English. Participants were White (78%), Asian (10%), Black (6%), and Hispanic (6%). The age range of participants was 18 to 57 years ($M = 33.63$, $SD = 11.38$).

Procedure—Participants completed a brief survey in which they indicated their beliefs about self-regulatory resources, completed two measures of trait self-control, and answered demographic questions.

Measures

Beliefs about self-regulatory resources: Participants completed a five item measure about their beliefs of whether self-regulatory resources for difficult goal pursuits are greater earlier rather than later in a day, Cronbach's $\alpha = .72$. The items were "I get difficult things done early so I won't be distracted by temptations to do other things later", "Resisting temptations is easier for me to do in the beginning of the day compared to later in the day", "I have the most physical energy that is possible for me in the beginning of the day", "I have the most motivation to complete my most difficult goals in the beginning of the day rather than later in the day", and "When it is later in the day, that is when I start to get the motivation to complete my difficult tasks (reverse scored)". They rated each item using the scale 1 (*disagree strongly*) to 5 (*agree strongly*; $M = 3.33$, $SD = 0.82$).

Effectiveness at self-regulation: Recent research suggests that measures of trait self-control, though they appear to focus specifically on self-control, actually pick up on a broader range of self-regulatory skills (Boals, vanDellen & Banks, 2011; Hofmann et al.,

2012; Hofmann et al., 2014; Schmeichel & Zell, 2007). Hence, we used two scales that assess trait self-control to represent self-regulatory effectiveness. First, we used the 13-item Brief Trait Self-Control Scale (Tangney et al., 2004). Sample items include, “I am good at resisting temptation” and “I do certain things that are bad for me, if they are fun (reverse scored).” Participants rated their responses on a scale from 1 (*not at all like me*) to 5 (*very much like me*), $\alpha = 0.89$. The sample mean for this measure of self-control was 3.32 ($SD = 0.71$).

In addition, we included a self-report measure of good behavioral self-control, which assesses a range of skills relevant for effective self-regulation (Wills et al., 2001). In particular, we used two subscales: planfulness (e.g., “I stick with what I’m doing until I’m finished with it”) and good delay of gratification (e.g., “I can do boring work if I think it will pay off later on”). There are seven items on the planfulness subscale and eight items on the good delay of gratification subscale. Participants indicated their agreement with each statement using the scale 1 (*not at all true*) to 5 (*very true*). Internal consistency across the 15 items of both subscales was good, $\alpha = 0.84$, and we created one score that reflected Good Behavioral Self-Control ($M = 3.85$, $SD = 0.50$).

Participants’ scores on the Brief Trait Self-Control Scale and the Good Behavioral Self-Control Scale were highly correlated $r = .61$, $p < .0001$. Thus, we created a composite reflecting the mean of participants’ scores across the two scales ($M = 3.60$, $SD = 0.53$).

Results and discussion

We predicted that participants who were effective at self-regulation would be more likely to believe that resources to pursue difficult goals are greater in the beginning of a day. The relationship between participants’ level of self-regulatory effectiveness and beliefs about resources was positive and significant, $r = .21$, $p = .04$. Thus, this study provides support for the notion that effectiveness at self-regulation is associated with beliefs that self-regulatory resources (e.g., ability to resist temptations, physical energy, motivation) are more likely to be greater in the beginning of a day rather than later in a day. Following from this evidence, Study 1 examined if these beliefs would come into action. That is, do effective self-regulators actually plan to complete difficult goal pursuits earlier in the day?

Study 1

Study 1 tested the hypothesis that effective (vs. less effective) self-regulators plan to complete difficult tasks earlier in the day. As noted, we based this hypothesis on the idea that effective self-regulators believe that mental, physical, and regulatory resources are most likely to be available earlier in a day before both expected and unexpected demands arise, an assumption which was supported by the results of the pilot study. We tested this hypothesis by examining adults’ timing of plans to exercise on a workday. We predicted that when exercise is perceived as a difficult goal pursuit, effective (vs. less effective) self-regulators would plan to exercise at an earlier time of day.

Method

Participants—Participants were 48 adults (27 men) recruited from MTurk. Adults living in the United States were eligible to participate. All participants indicated that English was their first language. Most participants reported being White (79.17%); the remainder were Asian (10.42%), Black (6.25%), and Hispanic (4.17%). The age range of participants was 18 to 57 years ($M = 30.92$, $SD = 9.86$).

Procedure—Participants completed a brief survey. The average completion time of the survey was 9.44 minutes ($SD = 6.26$). Participants completed demographic questions and indicated general times of waking up in the morning and going to bed at night. Next, participants read a brief paragraph asking them to imagine having to work the next day from 8am to 5pm, with a lunch break between 12pm and 1pm.¹ Participants were told their work hours were fixed and were asked when they would plan to exercise: “Of the openings that you have available in your schedule, which hour timeslot will you plan your 30 minutes of exercise for the day?”

The dependent measure for this study was the timeslot that participants selected for their exercise session, with lower values representing earlier possible timeslots and higher values representing later possible timeslots. Eleven timeslot options were presented to participants in a multiple choice format, and participants were asked to select one option. The first option was 5–6 am, the second was 6–7am, and the third was 7–8am. Because participants were asked to imagine working from 8am–12pm, the next timeslot option was during their hypothetical lunch break from 12–1 pm. The timeslot options began again after their workday ended. The fifth option was 5–6 pm, and the rest of the timeslot options continued for every hour until the last option, which was 11pm–12am. Thus, participants were able to choose when to exercise based on a wide range of times, none of which conflicted with their scheduled work times. After participants selected one of the timeslot options, participants completed measures of exercise difficulty and importance and effectiveness at self-regulation.

Measures

Wake up and bed time: Because we suspected planned wakeup time might be related to our dependent variable of planned exercise time (Digdon & Howell, 2008), we asked participants to report when they typically wake up and go to sleep on a daily basis.

Exercise difficulty and importance: We used three items to measure how challenging participants find exercising. The items were “I find it unpleasant to exercise,” “I find it difficult to make myself exercise,” and “I enjoy exercising (reverse scored).” Participants rated the items using the scale 1 (*strongly disagree*) to 7 (*strongly agree*). Internal

¹We also included an experimental manipulation in this study in which we indicated that there may be a conflict with exercise after work. Participants in the no conflict condition completed the planning task without any additional information. Participants in the conflict condition additionally read, “An out-of-town client is potentially coming into town tomorrow, and you don’t know if you will have to stay late or go to dinner with the client who is visiting the office. The odds of you having to stay late are low, but you won’t know until tomorrow.” Results showed that there was not a significant interaction between condition and trait self-regulatory effectiveness in predicting the exercise option chosen, $F(1, 44) = 1.82$, $p = .18$, $d = 0.40$. Thus, this manipulation is not discussed further.

consistency of these three items was good, $\alpha = 0.86$. Higher numbers on the scale indicate finding exercise to be a more difficult self-regulatory task ($M = 3.32$, $SD = 1.53$).

One item assessed participants' feelings about the importance of exercising. Using the scale 1 (*strongly disagree*) to 7 (*strongly agree*), participants rated the item "Exercising is very important to me." On average, participants indicated exercise as being very important ($M = 5.00$, $SD = 1.65$).

Effectiveness at self-regulation: As in the pilot study, we used two measures of self-control to reflect general self-regulatory abilities. Participants' scores on the Brief Trait Self-Control Scale and the Good Behavioral Self-Control Scale were highly correlated $r = .56$, $p < .001$. Thus, we created a composite reflecting the mean of participants' scores across the two scales ($M = 3.61$, $SD = 0.53$).

Results

Participants' chosen exercise slot was not correlated with their usual wake up time, $r = 0.13$, $p = 0.37$, nor with their usual bedtime, $r = -.00$, $p = .99$. Furthermore, participants' sex, age, and race were not related to their chosen exercise slot. Participants' self-regulatory effectiveness was related to their wakeup time, $r = -.30$, $p = .04$ but not their bedtime, $r = .09$, $p = .53$. Finally, participants' self-regulatory effectiveness was weakly related to their perceived difficulty of exercise, $r = .22$, $p = .13$.

We conducted a multiple regression analysis to test whether self-regulatory effectiveness, perceived exercise difficulty, and their interaction predicted planned exercised time. All continuous variables were standardized prior to entry in the model and creation of the interaction term. There was neither a main effect of self-regulatory effectiveness, $\beta = -0.11$, $t(44) = -0.83$, $p = .41$, $d = -0.25$, nor a main effect of perceived exercise difficulty, $\beta = 0.14$, $t(44) = 1.06$, $p = .29$, $d = 0.31$. Consistent with our primary hypothesis, the interaction between self-regulatory effectiveness scores and perceived exercise difficulty in predicting planned exercise time produced a large effect size and a significant interaction, $\beta = -0.43$, $t(44) = -3.13$, $p < .01$, $R^2 = .17$. Following the recommendations of Cohen, Cohen, Aiken, and West (2003), we plotted this interaction by generating predicted values at one standard deviation above and below the mean on each continuous variable. As shown in Figure 1, the effect of perceived exercise difficulty on chosen exercise timeslot differed based on self-regulatory effectiveness. Among effective self-regulators, increased exercise difficulty led to scheduling exercise earlier in the day, $\beta = -0.41$, $t(44) = -1.95$, $p = .06$, $d = -0.58$. In contrast, among less effective self-regulators, increased exercise difficulty led to scheduling exercise later in the day, $\beta = 0.70$, $t(44) = 2.98$, $p < .01$, $d = 0.88$.

In order to confirm that exercise selection was not merely a function of preferred waking and bed times, we ran additional analyses treating participants' typical waking and bed times as covariates in the analyses. The observed interaction remained largely unchanged despite adding these covariates, $\beta = -0.45$, $t(44) = -3.27$, $p < .01$, $R^2 = .19$. We also examined whether participant's ratings of exercise importance influenced the results. Including ratings of the importance of exercise as a covariate did little to change the results, $\beta = -0.40$, $t(44) = -2.89$, $p = .01$, $R^2 = .15$.

Discussion

Results from Study 1 indicate that self-regulatory effectiveness and perceived exercise difficulty influence the timing of plans to exercise on a workday. The observed interaction appeared to be a combination of prioritizing difficult tasks by effective self-regulators and postponing difficult tasks by less effective self-regulators. These results suggest that effective and less effective self-regulators may differ in how they plan difficult activities: effective self-regulators may plan to complete demanding tasks earlier in the day whereas less effective self-regulators may exhibit the opposite pattern, planning hard tasks for later in the day.

Study 2

Although Study 1 provided an initial test of our hypothesis, participants were only asked to consider one goal pursuit in their plans. Undoubtedly, most people have more than one goal to accomplish in a given day. In fact, people can easily come up with an average of 15 goals they are trying to attain (Emmons, 1986; Emmons & King, 1988). Considering multiple goal pursuits simultaneously means that individuals need to account for the mental, physical, and regulatory resources they will have available for varied goal pursuits. In this context, individuals may have an even greater need to prioritize a difficult goal pursuit, as wanting to pursue other goals may interfere with pursuing the difficult goal (Kruglanski et al., 2012). Therefore, in Study 2 we aimed to investigate how people make temporal plans for difficult goal pursuit in the context of multiple goal pursuits. Undergraduate students were asked to plan five activities to be completed on a Saturday—exercising, studying, doing laundry, making a difficult phone call, and applying for summer jobs/internships. Their commitment to goals represented by each pursuit and the perceived difficulty of each task were measured, along with participants' level of self-regulatory effectiveness.

Participants were asked to plan five tasks, but our analyses focused on exercising and studying; the other three tasks were used as filler items. Because Study 1 suggested that the planning effects we expected were relevant to exercise, in Study 2, we chose exercise to be the primary goal pursuit and studying to be the comparison goal pursuit, however, we expected that the results would be similar for both exercise and study plans such that effective self-regulators would generally plan to complete difficult tasks before easier tasks to a greater extent than would less effective self-regulators.

In Study 1, we controlled for participants' wake up time in analyses by using their typical wake up time and not a planned wake up time for the specific day. In order to more precisely account for wake up time in Study 2, we asked participants when they would wake up on the day for which they were planning.

Method

Participants—Participants ($N = 66$) were recruited from an undergraduate research pool at a large southeastern university and received credit for a course requirement. They ranged in age from 18 to 24 years ($M = 19.7$, $SD = 1.25$). Participants were White (83.33%), Black (7.58%), Asian (7.58%), and Hispanic (1.52%). Because our analyses focused specifically on pursuing the goals of studying and exercising, participants who did not indicate when

they planned to exercise, when they planned to study, or both were not included in analyses, reducing our sample size to 59 participants (37 women).

Procedure—Participants first completed demographic questions. Next, participants answered items measuring commitment to and difficulty of pursuing five goals—doing well in school, maintaining social relationships, keeping clothes clean, exercising, and finding a summer job/internship. They also completed the two self-control measures used in Study 1, which we again used to operationalize self-regulatory effectiveness. Last, participants were given an empty one-day agenda sheet that depicted one hour timeslots beginning at 6 am and ending at 12 am. They were instructed to plan what time they would complete five tasks: exercise, study for class (including studying for exams and completing homework), make an unpleasant phone call (e.g., to a relative who talks too much, to someone to whom you need to give bad news), laundry, and apply for a job/internship for the summer. The instructions read:

“Imagine that you are planning a Saturday, and you have the following goals to complete. Assume that each task will take one hour to complete. Fill in the calendar below with the tasks given here for when you plan to complete each one. If there are other things that you might do (e.g., hang out with friends, get lunch, take a nap, run errands), fill those in on the calendar as well. Mark when you anticipate you might wake up realistically and when you might ‘stop for the day,’ whether that means going to sleep or stopping your work and beginning evening leisure activities.”

Although participants were asked to assume each task would take an hour, they could also indicate as much time as they wanted for each task and readily did.

Measures

Goal commitment and goal difficulty: We used 10 items to measure the extent to which the five goals were (a) important to participants and (b) difficult for participants to pursue. Example items of goal importance include, “Doing well in school and studying for my classes is very important to me” and “Keeping my clothes clean and organized is very important to me.” Example items of goal difficulty are “I find it very unpleasant/difficult to exercise” and “I find it very unpleasant/difficult to make a lengthy phone call to someone who will talk longer than I would like to.” Participants responded to the ten items using a scale from 1 (*disagree strongly*) to 7 (*agree strongly*). Each item was used individually to reflect either goal importance or goal pursuit difficulty in a given domain.

Effectiveness at self-regulation: As in the pilot study and Study 1, participants’ average scores on the Brief Trait Self-Control Scale ($M = 3.42$, $SD = 0.50$) and on the Good Behavioral Self-Control Scale ($M = 3.44$, $SD = 0.47$) were averaged to create a new variable called self-regulatory effectiveness ($M = 3.44$, $SD = 0.43$). The internal consistency in this sample was adequate for both the Trait Self-Control Scale ($\alpha = 0.70$) and the Good Behavioral Self-Control Scale ($\alpha = 0.73$). Scores on each scale were strongly correlated, $r = 0.58$, $p < 0.001$, supporting our decision to combine them into a composite.

Data Preparation—On average, participants planned to wake up at 9:41 am ($SD = 86.4$ minutes); the earliest participants planned to wakeup was 6 am and the latest was 2 pm. To account for this variability in planned wakeup time, we subtracted the time participants planned to wake up from the time they planned to exercise ($M = 218.4$ minutes, $SD = 175.2$ minutes; range 0–12 hours). In this way, we controlled for the potential that individuals who are generally effective self-regulators may wakeup earlier in the day than less effective self-regulators. We also calculated the number of minutes that participants chose to study after their planned wakeup time ($M = 373.2$ minutes, $SD = 202.8$ minutes; range 1–15 hours).

Additionally, we examined whether participants planned to exercise prior to studying, an analysis which required logistic regression. We created a variable that represented whether or not participants planned to exercise before studying, with a score of 1 representing electing to exercise prior to studying and 0 representing electing to study prior to exercising.

Results

Preliminary analyses—Self-regulatory effectiveness was related to participants' level of commitment to studying, $r = .45$, $p < .001$, but self-regulatory effectiveness was not related to participants' level of commitment to exercising, $r = .16$, $p = .22$, perceived difficulty of exercise, $r = .04$, $p = .74$, or perceived difficulty of studying, $r = -.00$, $p = .98$. Planned wakeup time was not related to self-regulatory effectiveness, $r = .01$, $p = .91$. Therefore, although effective self-regulators generally reported studying to be more important to them, exercise was not rated as more important. Additionally, effective self-regulators did not report engaging in either studying or exercising to be any easier for them relative to less effective self-regulators. Furthermore, self-regulatory effectiveness was not related to planned time of exercising after waking up, $r = -.00$, $p > .99$, but self-regulatory effectiveness was related, although weakly, to planned time of studying after waking up, $r = -.21$, $p = .11$.

Although we examined both exercising and studying, these tasks may differ in the qualities of their pursuit, specifically in how long they might take to complete, how many sessions of goal pursuit they might require in a day, and when general preferences might be to complete the activities. Indeed, almost 90% of participants planned to exercise for an hour or less (the remainder planned to exercise for two or three hours) whereas only 51% of participants planned to study for only one hour and 15% of participants planned to study for four or more hours. Additionally, only one participant planned to exercise in more than one separate instance but nine participants planned to study in more than one separate instance. In the current sample, participants, on average, planned to exercise at 1:19pm ($SD = 182$ minutes; range: 6am–9pm) and planned to study at 3:53pm ($SD = 190$ minutes; range: 10am–11pm). The mode for planned exercise time was 2pm and the mode for planned study time was 4pm. Even though the sample generally planned to exercise earlier than study, many participants planned to exercise in the afternoon and participants demonstrated great variability in planned time for both exercising and studying. These preliminary analyses suggest that, although we expected to see similar patterns of prioritization across exercising and studying, the goal pursuits differ in important ways.

Linear regression—We used a mixed model examining the effects of domain (exercise, study), exercise goal difficulty, study goal difficulty, and trait self-regulatory effectiveness. Domain was treated as a within-subjects categorical variable; all other independent variables were treated as between-subjects and continuous. All continuous independent variables were standardized prior to analyses. As expected, the four-way interaction produced an interaction, $F(1, 51) = 3.85, p = .06, d = 0.52$.² Probing the four-way interaction showed that the three-way interaction predicting the number of hours between waking up and planning to study was not significant, $F(1, 51) = 1.20, p = .28, d = 0.30$, but the three-way interaction produced a medium effect size and was marginally significant for predicting the amount of hours between waking up and planning to exercise, $F(1, 51) = 3.45, p = .07, d = 0.50$. As in Study 1, controlling for how important exercise is to participants did little to change the effect, $F(1, 50) = 3.12, p = .08, d = 0.47$, and thus we did not include it as a covariate.

The three-way interaction for planned exercise time is displayed in Figures 2a & 2b. As shown in Figure 2a, when participants reported studying to be relatively difficult, there was not an interaction between perceived difficulty of exercising and self-regulatory effectiveness, $\beta = 0.21, t(51) = 0.97, p = .34, d = 0.26$. However, as is evident in Figure 2b, when participants reported studying to be relatively easy, there was a marginally significant two-way interaction between perceived difficulty of exercising and self-regulatory effectiveness, $\beta = -0.40, t(51) = -1.79, p = .08, d = -0.47$. Examining the simple effects, results showed that when exercise was perceived as easy, there was not an effect of self-regulatory effectiveness, $\beta = -0.04, t(51) = -0.22, p = .82, d = -0.06$. However, when exercise was perceived as difficult, there was an effect of self-regulatory effectiveness, $\beta = -0.89, t(51) = -2.12, p = .04, d = -0.56$. Thus, higher self-regulatory effectiveness was associated with planning to exercise earlier, suggesting a prioritization of the difficult goal of exercising over the easy goal of studying.³ The effect of self-regulatory effectiveness when exercise is perceived as relatively difficult seems to be driven both by less effective self-regulators putting off increasingly difficult tasks for later, $\beta = -0.43, t(51) = -1.49, p = .14, d = -0.40$, and by more effective self-regulators prioritizing increasingly difficult tasks, $\beta = 0.41, t(51) = 1.14, p = .26, d = 0.30$.

²We also examined participants' plans to determine whether or not they planned breaks between when they planned to study and to exercise. A planned break was coded as occurring when either the word 'break' was written on their calendar between planned times of studying and exercising or when participants planned an activity that specified relaxation, resting, fun social events, eating, and watching television or movies, between planned studying and exercising. Most of the activities that participants listed were taking a nap, hanging out with friends, watching television, playing video games, and eating. Effective (vs. less effective) self-regulators were not more likely to take a break between the two target activities of studying and exercising, $B = 0.49, Wald \chi^2 = 1.28, p = .26$.

³An additional approach to the dependent variable was taken to account for individuals' varying lengths of time being awake. We calculated a proportion of planned exercise time after waking for each participant using participants' wake up time, exercise time, and average bed time. The numerator was participants' wakeup time subtracted from their planned exercise time, and the denominator was the total number of hours being awake. The four-way interaction was similar, $F(1, 51) = 5.40, p = .02$. Both the three-way interactions predicting exercise, $F(1, 51) = 3.28, p = .08, d = 0.48$, and studying, $F(1, 51) = 3.02, p = .09, d = 0.46$, were marginally significant. Examining these three-way interactions, both two-way interactions for planned study time were non-significant, $ps > .28$. However, like the results when the dependent variable is planned exercise time after waking up, when participants reported studying as easy, there was a marginally significant two-way interaction between perceived difficulty of exercising and self-regulatory effectiveness, $\beta = 0.40, t(50) = 1.75, p = .09, d = 0.46$, but when participants reported studying as difficult, there was not an interaction between perceived difficulty of exercising and self-regulatory effectiveness, $\beta = 0.21, t(50) = 0.96, p = .34, d = 0.25$. The simple effects remained similar.

Logistic Regression—As a secondary means of exploring our hypothesis, we used logistic regression to examine the odds that a participant planned to exercise prior to studying. Again, all independent variables were standardized prior to entry into the model. Results indicated a significant three-way interaction, $B = -0.97$, $Wald \chi^2 = 3.98$, $p = .05$. Controlling for participants' feelings of importance of exercising did little to change the results, $B = -0.94$, $Wald \chi^2 = 3.65$, $p = .06$. Therefore, whether or not participants valued exercising did not play a role in prioritizing exercising over studying and was not included as a covariate in subsequent analyses.

From the logistic regression model, we calculated the predicted probabilities of exercising prior to studying at one standard deviation above and below the mean on each independent variable. As with the linear regression analyses, we found that study difficulty moderated the interaction between exercise difficulty and self-regulatory effectiveness. When studying was perceived as relatively difficult, the interaction between exercise difficulty and self-regulatory effectiveness was not significant, $B = -0.91$, $Wald \chi^2 = 1.90$, $p = .17$. When studying was perceived relatively easy, the interaction between exercise difficulty and self-regulatory effectiveness approached significance, $B = 1.04$, $Wald \chi^2 = 2.83$, $p = .09$. Thus, even this more conservative test of our hypothesis suggests that the extent to which exercise is difficult moderates the effect of self-regulatory effectiveness on planned exercise time, but only when studying is perceived as an easy goal pursuit.

Discussion

Results of Study 2 provide evidence that when exercising is perceived as difficult, participants who are effective (vs. less effective) self-regulators are more likely to plan to exercise earlier in their day, but only when other important goal pursuits (e.g., studying) are perceived as easy. Study 2 replicated and extended the results from Study 1, suggesting that participants' self-regulatory effectiveness is related to their prioritization of difficult goal pursuit. The results suggest that effective self-regulators prioritize exercise when it is a difficult goal pursuit over studying (when studying is easy). In contrast, less effective self-regulators prioritize less difficult goal pursuit by planning to exercise later in the day when exercise is perceived as difficult and plan to study earlier in the day when studying is perceived as easy.

Unexpectedly, the pattern of results observed for planned time of exercising did not emerge as significant for planning when to study. That is, there were no interactions between perceived difficulty of studying, perceived difficulty of exercise, and self-regulatory effectiveness on the number of hours between waking up and planning to study. As noted, exercise and study goals differed in our sample with participants tending to plan to exercise for only one hour, to exercise only once in the day, and to exercise somewhat earlier than they planned to study. One possibility is that exercise, because it fits into a neater box of time and can be considered done afterwards (at least for the day), is the kind of goal pursuit most suited to the observed planning effects. That is, when making plans for when to pursue a goal, individuals may not be as influenced by the difficulty of the expected goal pursuit if that goal pursuit can only be partially accomplished.

General Discussion

Across three studies, results suggest that effective self-regulators believe they have more self-regulatory resources earlier in the day to pursue difficult goals, and at least with regards to the domain of exercise, effective self-regulators prioritize difficult goal pursuit according to those beliefs. Study 1 provided evidence that individuals' plans to exercise on a workday are a function of self-regulatory effectiveness and perceived difficulty of exercising. Specifically, for individuals who find exercise to be difficult, the higher their self-regulatory effectiveness, the earlier they planned to exercise. In Study 2, when participants planned multiple goal pursuits, effective self-regulation was associated with prioritizing exercise when it was difficult over an easier alternative goal of studying. Taken together, results suggest that when exercising is difficult to pursue, effective self-regulators plan to tackle the goal first whereas less effective self-regulators do not. This specific strategy of planning to exercise early in the day may be beneficial for goal achievement if effective self-regulators are able to take advantage of when they have (or believe they have) the most mental, physical, and regulatory resources available (Baumeister et al., 1998; Kruglanski et al., 2012; Muraven et al., 1998).

Why might effective self-regulators make plans to exercise early in the day when exercise is considered a difficult goal pursuit for them? One possibility is that effective self-regulators understand nuances of self-regulation such as limited mental, physical, and regulatory resources. Indeed, results from our pilot study suggest that effective self-regulators believe they have more resources for difficult goal pursuit earlier in the day. And, research provides evidence that people tend to have more self-control in the morning compared to the afternoon (Kouchaki & Smith, 2014). By planning this difficult goal pursuit earlier in the day, effective self-regulators may capitalize on having increased motivation, physical energy, and willpower to tackle the tasks that are most likely to require these resources, thus having the energy they will need for the task (Kruglanski et al., 2012).

Although our results suggest that planning to complete difficult tasks earlier in the day may be an effective self-regulatory strategy for at least some goals, not everyone may benefit from engaging in difficult goal pursuit early in the day. Research indicates that effective self-regulators tend to employ self-control strategies in a more efficient way than do less effective self-regulators (e.g., Niven et al., 2013), and thus they may be more capable of continuing to engage in self-control following difficult goal pursuit than less effective self-regulators (c.f., Imhoff et al., in press). If less effective self-regulators struggle more following self-control exertion, it may be to their benefit to put off difficult goal pursuits for later in the day. In fact, the effects we observed could be driven by less effective self-regulators recognizing that engaging in difficult goal pursuits earlier in the day may deplete them of resources they need to pursue other goals. For instance, an individual with many goals to pursue in a given day may believe—and perhaps accurately so—that exercising in the morning causes him to feel fatigued hours later, and afterwards he ends up resting instead of pursuing his other goals. Completing his difficult tasks may be better suited for after easier goal pursuits so that he does not compromise his potential to pursue other goals effectively. Although the present manuscript cannot provide direct evidence of the

mediation of beliefs about resources on self-regulatory effectiveness and planning, future research should investigate this possibility.

In addition, individual differences in alertness for goal pursuit may be related to variations in morningness and eveningness. Effective self-regulators may be more likely to be morning-people (Digdon & Howell, 2008), and our own data (Study 1) suggest that effective self-regulators tend to rise earlier in the morning. Importantly, in the present research, controlling for preferred waking and bed times—variables that factor heavily into determinations of morning and evening chronotypes—did not change the observed pattern of results. Furthermore, in Study 2, we examined time of planned goal pursuits in terms of hours after waking, thus controlling for morningness to some degree. Although we do not provide evidence in this manuscript that people tend to have more self-regulatory capacity in the morning, previous research has suggested this is likely (e.g., Hofmann et al., 2012; Kouchaki & Smith, 2014). Our evidence does suggest that at the very least, effective self-regulators believe that their self-regulatory resources are greater earlier rather than later in the day. Whether or not individuals are actually more likely to successfully tackle difficult goal pursuits in the morning needs further investigation. Additionally, the extent to which the observed effects of temporal planning involve individuals' self-awareness of their self-regulatory resources and circadian rhythms should be examined.

Although our data suggest that effectiveness at self-regulation may affect when individuals plan to pursue difficult goals, our results do not offer evidence as to whether or not participants are actually likely to follow through with their exercise plans. In fact, plans do not always result in action (Webb, Sheeran, & Luszczynska, 2009). For instance, plans can be optimistic such that people tend to underestimate how much time it will take them to complete a given task (Buehler, Griffin, & Ross, 1994; Kahneman & Tversky, 1979). Despite the possibility that individuals may not carry out their plans, evidence suggests that making specific plans (e.g., I plan to exercise when I wake up in the morning) is associated with goal initiation behaviors and pursuit (Gollwitzer & Brandstatter, 1997; Luszczynska & Schwarzer, 2003; Sniehotka et al., 2006). Future research should investigate plans and action on those plans, examining whether or not effective and less effective self-regulators equally follow the plans they make. Furthermore, Studies 1 and 2 overtly asked individuals to plan when to exercise. In a real life setting, individuals with greater self-regulatory skill may not spontaneously plan to exercise earlier. Despite the need for more research on naturally occurring planning and follow through with plans, the data are still suggestive of how effective self-regulators may coordinate difficult and easy goal pursuits.

Moreover, the present work provides evidence for our predicted planning effects in only one particular goal domain—exercising. Exercising is a specific type of goal pursuit and the results may or may not extend well to other goal pursuits. For instance, exercising is a goal pursuit that is unlikely to be fully attained once per month or year (e.g., having a difficult conversation with a friend) or even once per week (e.g., doing laundry or other household chores). Rather, exercise is a goal pursuit that probably should be completed several times per week but that can easily be identified as accomplished on a given day (e.g., preparing a healthy meal). Additionally, goals may differ based on how easily one can judge goal progress. Exercise and meal preparation are goal pursuits that may be clearly evaluated as

success or failure (e.g., Did I run today?, Did I make a healthy meal today?), whereas other goal pursuits, such as many academic and career pursuits (e.g., Did I study enough for an upcoming exam?, Did I publish enough to earn tenure?) may be more difficult to evaluate. Many academic and career goals, as well as goals related to maintaining positive relationships, may require more frequent pursuits, most likely several times per day. More research is certainly needed to investigate the complexities of planning for the multiple goals that individuals plan to pursue in a given day beyond our focus on exercise.

Finally, beliefs about resources and when one should engage in difficult goal pursuits may vary based on beliefs specific to those domains. An individual who believes mental resources are highest in the morning may choose to engage in tasks that seem to tap those specific resources whereas someone who believes that it takes time for mental alertness to develop may choose to engage in physically, rather than mentally, challenging tasks early in the day. These domain-specific regulatory beliefs should be further studied.

An interesting route of future research could examine how temporal construal level theory (Trope & Liberman, 2003) influences plans for difficult and easy goal pursuit. Temporally distant events are generally construed in abstract terms compared to temporally proximal events, suggesting that individuals may not be accurately aware of the difficulty of a future event. In fact, one possibility is that effective self-regulators prioritize difficult goal pursuit because they are better able to accurately consider how difficult a future demand on their self-control will be than are less effective self-regulators. Manipulating the construal level at which people are operating as they plan when to pursue difficult goals may increase prioritizing, and particularly among less effective self-regulators.

Conclusion

A great deal of research has identified the academic, health, and societal merits of effectiveness at self-regulation. Yet, many individuals are poorly self-regulated, and as a result, experience problems that interfere with their potential to live a long and happy life. Furthermore, the health problems and criminal activities associated with poor self-regulation cost society. Effective self-regulators—who are happier, healthier, and wealthier—may prioritize some difficult goal pursuits, which may be one reason they are able to meet the goals they set for themselves, even the ones that are the most challenging. The present findings are ambivalent as to whether this association arises because prioritizing difficult goal pursuits produces self-regulatory successes or that self-regulatory success involves prioritizing difficult goal pursuits. Either way, the results suggest a way to improve the self-regulatory skills of individuals who tend to struggle. Namely, one possible way to improve individuals' self-regulatory effectiveness—at least in the domain of exercise—is to teach them to tackle difficult goal pursuits earlier in the day rather than later.

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Figure 1.
Chosen exercise slot predicted by perceived exercise difficulty and self-regulatory effectiveness (SRE).

Figure 2.

Figure 2a. Planned exercise time after waking up predicted by perceived exercise difficulty and self-regulatory effectiveness (SRE), when studying is perceived as difficult.

Figure 2b. Planned exercise time after waking up predicted by perceived exercise difficulty and self-regulatory effectiveness (SRE), when studying is perceived as easy.