

## RESEARCH ARTICLE

# More than a muscle: How self-control motivation, depletion, and self-regulation strategies impact task performance

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**Summary**

When conceptualizing work performance as requiring self-control, scholars often employ a resource-depletion perspective. However, this perspective neglects the role of self-control motivation and self-regulation strategies. In this diary study, we examine self-control motivation (viz. motivation to control impulses) and depletion at the beginning of work and at midday as predictors of afternoon task performance. Additionally, we investigate morning aversive tasks as an antecedent of increased depletion and decreased self-control motivation. Further, we examine the role of self-regulation strategies (organizing, meaning-related strategies, and self-reward) for maintaining and improving performance when depleted or low in self-control motivation. Data from a 2-week diary study with three daily measurements ( $N = 135$  employees;  $n = 991$  days) were analyzed. Multilevel path modeling showed that self-control motivation at the beginning of work and depletion at midday predicted afternoon task performance. We found that self-reward in the afternoon counteracts the negative relationship between depletion and task performance. Further, we found an indirect effect from morning aversive tasks on task performance via depletion at noon buffered by afternoon self-reward. Organizing and meaning in the afternoon were positively related to afternoon task performance. Findings suggest that self-control motivation is important for task performance, in addition to low depletion. Moreover, results highlight that self-regulation strategies are beneficial for task performance.

**KEYWORDS**

ego depletion, self-control, self-control motivation, self-regulation, self-regulation strategies, task performance

## 1 | INTRODUCTION

Self-regulation describes the process of goal setting and goal striving while monitoring and ensuring its success. When conflicts between desires and the goal to perform well at work are detected during the monitoring, self-control is needed. Accordingly, self-control at work

refers to situations wherein desires interfere with performance (Inzlicht et al., 2021). For instance, when trying to work with persistence and attention on a task, desires to pause extensively or to process task-relevant information in a shallow way may arise (Dahm et al., 2015; Deng et al., 2016). A lack of self-control is undesirable because tasks remain unfinished and solutions to problems become

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insufficient. Accordingly, a broad organizational literature applies self-control perspectives to performance-related phenomena (Johnson et al., 2017, 2018). The tenet behind this research is that when individuals do not control themselves, their performance suffers.

Organizational psychologists usually view work performance from a self-control capacity-depletion perspective (Lian et al., 2017). The guiding metaphor behind this perspective is the *depleted muscle* (Muraven & Baumeister, 2000). When the muscle is depleted, self-control failure results because the capacity to control impulses is impaired (Johnson et al., 2017). In line with this idea, studies show that depletion predicts performance problems, such as decreased in-role performance (Deng et al., 2016), increased counterproductive work behavior (Fehr et al., 2017), and reduced organizational citizenship behavior (Koopman et al., 2016; Lanaj et al., 2016). Accordingly, in our study, we predict task performance in the afternoon by prior states (beginning of work, midday) of depletion.

Although the muscle is an appealing metaphor, illustrating self-control failure solely by depleted self-control muscles may be insufficient (Hockey, 2011). When explaining self-control failure by depleted self-control capacity, other explanations why self-control fails (e.g., lack of motivation) are neglected (Kotabe & Hofmann, 2015; Wehrt et al., 2020). The image of a depleted muscle is deceptive, as it implies that we already fully understood why performance suffers. The muscle metaphor may evoke the tendency to stop seeking for more differentiated explanations. Underscoring this line of reasoning, Lian et al. (2017) diagnosed that organizational research overly relies on the depletion perspective and fails to adequately consider other relevant components of self-control behavior at work.

In neighboring fields of organizational psychology, perspectives emerged that explain self-control failure by reference to motivational processes (Berkman et al., 2017; Inzlicht & Schmeichel, 2012; Kotabe & Hofmann, 2015; Molden et al., 2016). An example for such a perspective is integrative self-control theory (Kotabe & Hofmann, 2015) that describes self-control motivation as the aspiration to not give in to unwanted desires. In our research, we build on these motivational approaches and suggest that a lack self-control motivation can explain task performance in addition to depletion of self-control capacity.

Extending earlier work from Wehrt et al. (2020) who characterized self-control motivation as domain-specific, we explicitly define self-control motivation at work as the domain-specific motivation to abstain from unwanted desires that interfere with effective task performance. With our predictor (i.e., aversive tasks) and our outcome (i.e., task performance), we position situations in which individuals currently work on tasks at the heart of our study. Such situations are often highly relevant at work (Campbell & Wiernik, 2015) and share important features with self-control experiments, where participants have to work on tasks that essentially require controlling impulses (e.g., Stroop task; Dang, 2018). Further, this focus is in line with typical characterizations of self-control (Inzlicht et al., 2021), noting that “impulse control is at the core of successful self-control” (Wehrt et al., 2020, p. 944). Therefore, we operationalize self-control

motivation at work via the motivation to control impulses when working on tasks.<sup>1</sup>

In contrast to resource depletion as a momentarily limited capacity to exert self-control, self-control motivation is the willingness to exert self-control to control impulses. Beyond depletion, self-control motivation can explain why individuals fail in controlling themselves at work (Wehrt et al., 2020). The higher the self-control motivation, the more individuals should control themselves as becomes manifested by higher task performance (Kotabe & Hofmann, 2016). Accordingly, we propose that self-control motivation at the beginning of work and at midday predicts afternoon task performance.

In addition, we argue that dealing with aversive tasks in the morning fosters a decrease in self-control motivation throughout the workday. With this, we conceptually follow Inzlicht and Schmeichel's (2012) idea that low self-control performance may result not from depletion but from shifts in attention and motivation to control oneself. Because Inzlicht and Schmeichel (2012) refer to laboratory experiments, we do not exactly test their proposed mechanism in the work context. However, testing whether self-control motivation decreases after working on aversive tasks in the morning may yield valuable insights about how self-control processes unfold on a daily level. We simultaneously account for the resource-depletion perspective (Johnson et al., 2017) assuming that working on aversive tasks is depleting. Thus, we consider working on aversive tasks in the morning as a predictor of increased depletion and decreased self-control motivation at midday.

Until this point, we argued that the muscle metaphor may have deflected researchers' attention away from the importance of self-control motivation. Because this metaphor portrays individuals as passive beings at the mercy of their self-control resources, it may also made one overlook another aspect: Individuals do not only have to be motivated or capable to control themselves at work, but they can also actively regulate themselves in order to maintain their motivation for self-control or to recover resources needed for self-control. This is to say that individuals can ensure successful goal pursuit at work not only by effortful self-control but also by efficient self-regulation, which involves a broader set of behaviors (e.g., goal setting and self-regulation strategies; Werner & Milyavskaya, 2019).<sup>2</sup> Moreover, efficient self-regulation can decrease the occurrence of self-control conflicts altogether. One way individuals can do this is by using self-regulation strategies. Relatedly, research indicates that using self-regulation strategies at work influences performance-relevant states (Fritz et al., 2011; Müller & Niessen, 2019; Parker et al., 2017; Zacher et al., 2014). Following up on this idea in an exploratory way, we

<sup>1</sup>Thus, we omit the subscales “motivation to resist distractions” and “motivation to overcome inner resistances” that Wehrt et al. (2020) adopted from Schmidt and Diestel (2015). This is not to say that resisting distractions or overcoming inner resistances do not require self-control in a broader sense, but that in particular, controlling impulses when working on a task represent a prototypical self-control situation at work.

<sup>2</sup>We draw from Inzlicht et al.' (2021) definition of self-regulation which slightly differs from Kuhl's (2000) conceptualization who links self-regulation not only to goal setting and striving but also to the idea that the goals one strives for are self-congruent (i.e., in line with the integrated self). Similarly, our notion of efficient self-regulation may point to the idea that efficient self-regulation requires a flexible handling and integration of potentially competing goals into the self.

examine whether and how self-regulation strategies (e.g., organizing, rewarding oneself, and reminding oneself of meaning of one's work) benefit task performance in the afternoon.

To sum up, we simultaneously consider resource-depletion (Baumeister et al., 2007; Baumeister & Vohs, 2016) and motivational perspectives on self-control (Berkman et al., 2017; Inzlicht & Schmeichel, 2012; Kotabe & Hofmann, 2016). Following this integrated self-control perspective, we differentiate between self-control motivation and depletion predicting task performance in the afternoon. To understand how responding to work demands may impact self-control motivation and depletion, we examine aversive tasks in the morning as a predictor of depletion or diminished self-control motivation. Figure 1 shows our conceptual model depicting the hypothesized relationships. In addition, we build on research on self-regulation strategies at work (SR strategies; Fritz et al., 2011), by investigating organizing, self-reward, and meaning-related strategies as possible ways individuals use to self-regulate their performance-related self-control behavior.

We contribute to the literature in several ways. First, by investigating self-control motivation in addition to depletion, our study simultaneously considers two explanations for self-control success at work that manifests itself in task performance (Kotabe & Hofmann, 2016). Because we model self-control motivation and depletion as parallel predictors of task performance, these variables statistically control for each other, which helps to identify their unique contributions. In particular, by explaining variance in task performance by self-control motivation, we consider motivational explanations and counterbalance the literature's overly strong focus on explaining self-control failures at work by depletion (Lian et al., 2017).

Second, we assess morning aversive tasks as a common day-to-day demand potentially predicting depletion and decreasing self-control motivation at midday. Thus, we test whether responding to self-control demands (i.e., aversive tasks) depletes resources (Baumeister & Vohs, 2016) and decreases self-control motivation

(Inzlicht & Schmeichel, 2012). By considering depletion and self-control motivation as precursors of performance, we provide insight into the unfolding of self-control processes throughout the workday.

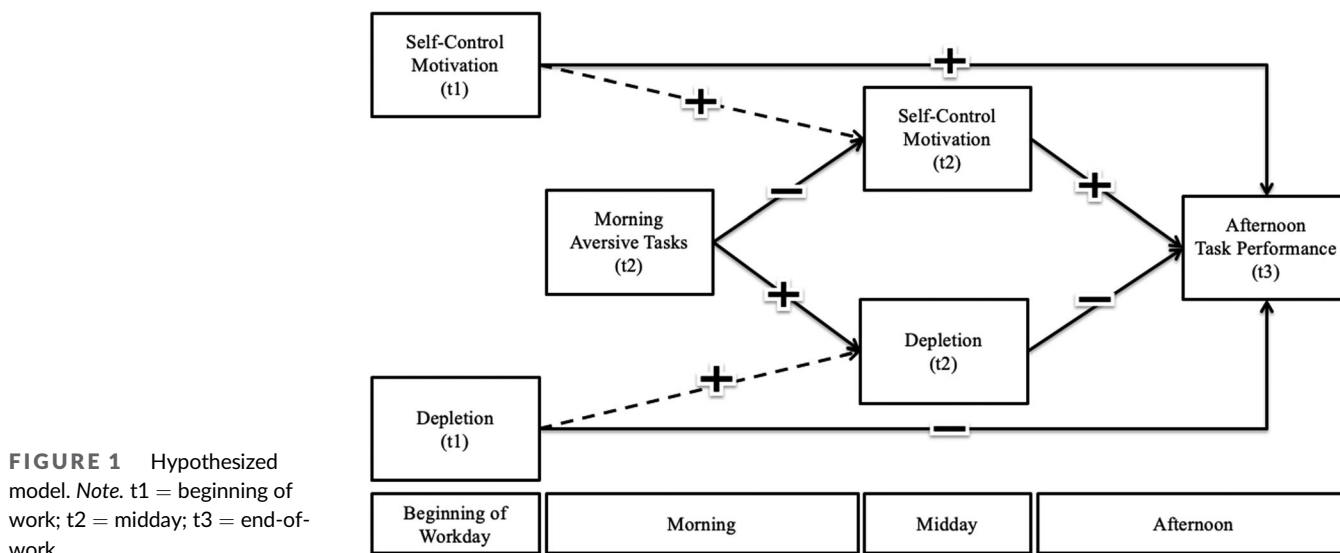
Third, by investigating self-regulation strategies, our study integrates the literature on self-control and active self-regulation within organizational psychology and organizational behavior. We test if using self-regulation strategies directly boosts performance but explicitly go beyond previous studies (e.g., De Bloom et al., 2015; Parke et al., 2018) by taking a more fine-grained look on how these strategies shape motivational and depletion-related self-control processes and subsequently task performance in the afternoon. Therewith, we transcend a passive view on self-control failure and acknowledge the active role individuals play in self-regulating their own behavior at work (Duckworth et al., 2018; Lord et al., 2010).

In the following paragraph, we first introduce working on aversive tasks in the morning as a predictor of depletion and of a decrease in self-control motivation at midday. Then, we explain how depletion may negatively and self-control motivation may positively predict task performance in the afternoon. Finally, we introduce two general perspectives regarding how self-regulation strategies at work (organizing, self-reward, and meaning-related strategies) may impact performance-related self-control processes.

## 2 | AVERSIVE TASKS AS A PREDICTOR

### 2.1 | Working on aversive tasks as a predictor of increased depletion

According to the predominant depletion perspective for understanding self-control processes at work (Lian et al., 2017), exerting self-control consumes self-control resources and therefore leads to depletion (Baumeister et al., 1998; Johnson et al., 2017). In line with this perspective, we propose that working on aversive tasks in the morning predicts an increase in depletion at midday.



Working on aversive tasks refers to a situation when individuals try to accomplish tasks they perceive as unpleasant (Blunt & Pychyl, 2000). For instance, searching for spelling mistakes in a long text may be perceived as relatively unrewarding but still requires sustained attention. Therefore, working on such a task may be aversive. There are several reasons why working on aversive tasks in the morning may be depleting. First, in order to maintain focused on tasks, impulses to process tasks in a shallow way or to even omit important subtasks have to be controlled, this is especially true when tasks are aversive (Schmidt & Diestel, 2015). Several studies indicate that dealing with such demands to control impulses positively relates to depletion (Gombert et al., 2020; Rivkin et al., 2018).

Second, alternative tasks may appear more appealing when the current task one is working on is aversive. When the current task is aversive, potentially joyful tasks may become salient, which may make the current task even more depleting, because additional self-control is required to suppress urges to switch towards more rewarding tasks (Kurzban et al., 2013; Milyavskaya & Inzlicht, 2017).

Third, perceiving tasks as aversive may yield negative emotions requiring emotion regulation which further increases the need to exert self-control (Tice & Bratslavsky, 2000). For example, the employee searching for spelling mistakes may become frustrated by the tediousness of the task. Thus, it may be that besides working on the task itself, additional demands to regulate one own's emotions arise. Accordingly, Eckert et al. (2016) found that procrastination—a manifestation of self-control failure at work—was reduced when emotion regulation skills were high.

In sum, we expect that working on aversive tasks depletes self-control resources because inner impulses to process tasks in a shallow way have to be controlled, urges to switch to more appealing alternative tasks have to be suppressed, and additional emotional regulation may become necessary.

**Hypothesis 1:** Working on aversive tasks in the morning positively relates to an increase of depletion at midday.

## 2.2 | Working on aversive tasks as a predictor of decreased self-control motivation

Accounting for a motivational self-control perspective (Inzlicht & Schmeichel, 2012), we propose that working on aversive tasks in the morning predicts a decrease in self-control motivation at midday. Accordingly, alternative perspectives propose to consider motivation for self-control besides depletion processes (Inzlicht et al., 2014; Kotabe & Hofmann, 2015). These alternative perspectives propose that decreased self-control performance is not only driven by depletion but rather by diminished self-control motivation—as a response to previous self-control demands (Inzlicht & Schmeichel, 2012).

When applying the idea that decreased self-control is driven by decreased self-control motivation for daily work, it may be

that self-control demands at work (i.e., aversive tasks in the morning) do not only lead to depletion but rather demotivate individuals to exert further self-control. Accordingly, we propose that working on aversive tasks in the morning predicts a decrease in self-control motivation at midday.

When working on aversive tasks, tasks are unpleasant and appear annoying. Thus, it may be that working on aversive tasks elicits high opportunity costs (Kurzban et al., 2013). This means that individuals perceive working on aversive tasks as costly in the sense that other more rewarding alternative behavioral options are missed. Such rewarding behavioral options may be pausing work or alternatively switching towards more interesting tasks. If such options are not appropriate or feasible (e.g., pausing does not complete tasks; interesting tasks are of low instrumental value), to remain focused on aversive tasks may be additionally effortful and yield to a decrease in motivation to exert further self-control (Inzlicht & Schmeichel, 2012). Even though individuals might see that aversive tasks are instrumental to achieve work goals, their aversive character may still foster decrements in the motivation to exert self-control (Berkman et al., 2017).

**Hypothesis 2:** Working on aversive tasks in the morning positively relates to a decrease in self-control motivation at midday.

## 3 | TASK PERFORMANCE AS AN OUTCOME

### 3.1 | Depletion as a predictor of task performance

In line with the depletion perspective (Johnson et al., 2017), we propose that state depletion is negatively related to task performance in the afternoon. In this study, we view state depletion as a proxy for a momentarily limited capacity (i.e., reduced resources) to exert self-control. When self-control resources are depleted, the current capacity to act in a self-controlled way is diminished (Kotabe & Hofmann, 2016; Lian et al., 2017). Thus, when the momentary capacity to exert self-control is reduced, maintaining concentration and focus or resisting desires interfering with effective task handling (e.g., shielding off distractions) may become more difficult. Accordingly, studies show that depletion relates negatively to work performance (Deng et al., 2016; Deng & Leung, 2014).

Further, Boksem and Tops (2008) view mental fatigue which overlaps with depletion as a signal to reevaluate costs and benefits of the current behavior. For example, a depleted employee working on a complex task may tend to reevaluate the utility of being highly concentrated on the current task in comparison with engaging in alternatives and as a result may switch to more resource-conserving behaviors (e.g., working on a simpler task and oversimplifying the task). This is not to say that working with high concentration may be perceived as not useful but that depletion may foster a reevaluation which leads to disengagement from working with high

concentration. Thus, depletion may trigger the adoption of resource-conserving behaviors which may ultimately decrease performance on tasks.

However, it is not clear if individuals immediately switch towards resource-conserving behavioral strategies when they are depleted or if this switch may take time to occur. It may be that depletion does not necessarily lead to decreased performance immediately but later throughout the day because the tasks one is currently working on are of high importance (Wright et al., 2013). To incorporate this possibility, we predict task performance in the afternoon by depletion at the beginning of work and at midday.

**Hypothesis 3:** Depletion at the beginning of work (a) and at midday (b) negatively predicts task performance in the afternoon.

### 3.2 | Self-control motivation as a predictor of task performance

We suggest that self-control motivation positively relates to task performance in the afternoon. As previously defined, self-control motivation is the motivation to abstain from unwanted desires which interfere with effective task performance. In the following, we explain why self-control motivation is an important aspect to consider. First, individuals are motivated to control themselves because successful self-control can yield pleasant self-conscious emotions (e.g., pride) and self-control failure may result in unpleasant self-conscious emotions (e.g., guilt; Hofmann & Fisher, 2012). When individuals can improve self-control at work in domains they had difficulties in before (e.g., concentration on tasks), they may feel proud. In contrast, they may feel guilty when constantly failing in certain domains (e.g., procrastinating on tasks, working carelessly).

Second, employees are motivated to exert self-control at work because they want to avoid negative consequences that may result from self-control failure. For example, promotion opportunities may not be offered when one is seen as lazy or one might lose one's job when task performance seems insufficient (Kraimer et al., 2011; Staufenbiel & König, 2010; Wang et al., 2015).

Third, in general, individuals want to work effectively and stay in control, because not reaching these goals will harm their own sense of agency and control (Deci & Ryan, 1985; Higgins, 1997). Further, individuals have the goal to perform well at work for additional reasons such as interest in tasks, payment, or social recognition (Howard et al., 2016).

Effective performance requires abstaining from acting on desires which interfere with task performance. This may require motivation to control desires which otherwise could harm effective task performance, for instance, controlling one's impulses that otherwise could undermine concentration and performance. Especially on days when reaching work goals seems more difficult, individuals may be more strongly motivated to invest effort into goal striving (Kotabe & Hofmann, 2015; Wright et al., 2019). In sum, we hypothesize that

self-control motivation (at the beginning of work, at midday) positively relates to task performance in the afternoon.

**Hypothesis 4:** Self-control motivation at the beginning of work (a) and at midday (b) positively predicts task performance in afternoon.

## 4 | SELF-REGULATION STRATEGIES AT WORK

In organizational psychology, studies investigated the effects of self-regulation strategies<sup>3</sup> on performance and well-being (De Bloom et al., 2015; Kinnunen et al., 2015; Parker et al., 2017; Zacher et al., 2014). In this study, we focus on the three strategies organizing, self-reward, and meaning and conceptually distinguish them by drawing on Kuhl and Fuhrmann's (1998) differentiation between goal pursuit and self-maintenance strategies. Goal pursuit strategies refer to a particular goal (e.g., to work in a focused way) despite competing goals or desires, whereas self-maintenance strategies refer to maintaining an integrated self (e.g., to adapt a work style which suits own preferences and values).

The first strategy organizing refers to planning behaviors such as setting new goals or making to-do lists (Parker et al., 2017). It can be conceptualized as a goal-pursuit strategy because it implies prioritizing important work goals above others and defines how these goals can be pursued efficiently. As a consequence, tasks may become easier to handle. When organizing, individuals translate goals into more concrete plans (Parke et al., 2018). For instance, an employee may decide to work on a specific task before working on another task and set the time for doing so.

The second strategy self-reward refers to distinct behaviors such as treating oneself a nice coffee, having a chitchat with colleagues or listening to a favorite song. Self-reward may help to fulfill nonwork-related desires that otherwise interfere with effective task performance and with that enables persisting on tasks. Thus, it can be conceptualized as a goal-pursuit strategy. Because different behaviors can be rewarding for different individuals, essential to this strategy is the experience of treating oneself with something personally rewarding. For instance, a supervisor may find reward in walking in the park for 10 min minutes (Sianoja et al., 2018).

The third strategy meaning entails reminding oneself of the meaningfulness in one's work, seeing opportunities to learn and grow in

<sup>3</sup>Fritz et al. (2011) coined the term of energy-management strategies referring to self-regulation strategies which workers may use to enhance their vitality, such as setting a new goal or reflecting about the meaning of one's work. We prefer to use the broader term self-regulation strategies over energy-management strategies, because our focus lies on investigating the role of these strategies for the regulation of self-control depletion and self-control motivation. Further, Quinn et al. (2012) provided a conceptualization of the energy-concept indicating that the term can carry different meanings (e.g., vigor, physical energy and emotional energy). Although the term may provide useful if clearly defined and operationalized, we prefer to stick to the broader term also to facilitate further theoretical integration, for instance, with the self-regulation literature focusing on concepts such as multiple goal pursuit, negative feedback loops, self-efficacy, or task choice (Lord et al., 2010; Neal et al., 2017).

challenging situations or thinking about the impact of one's work (Fritz et al., 2011). Meaning can make the occupational identity salient and thus relates to the integrated self (Rosso et al., 2010). Therefore, this strategy may be conceptualized as a self-maintenance strategy in Kuhl and Fuhrmann's (1998) terms. For instance, nurses may remind themselves of the importance of caring for other people's health.

#### 4.1 | How self-regulation strategies interact with self-control motivation and depletion to shape performance

The way self-regulation strategies can be beneficial for task performance may differ from strategy to strategy. So far, there is no literature regarding the question how these strategies interact with self-control motivation or depletion to shape performance at work. Thus, by means of an explanatory research question, we attempt to investigate two possibilities of how self-regulation strategies may benefit these self-control related aspects and consequently task performance.

First, self-regulation strategies may help to stabilize the positive relationship of self-control motivation with task performance. For instance, meaning-related strategies (e.g., reminding oneself of the importance of one's work) may increase the salience of higher-order goals at work (e.g., working carefully, performing well). In turn, this may help to sustain self-control motivation throughout the day, which further facilitates that self-control motivation can translate into self-control effort exerted on tasks. Alike, organizing may help to structure work in a better way so that demotivating tasks or interruptions can be avoided. This may foster sustained self-control motivation and can improve task performance (Parke et al., 2018). Finally, self-reward may fulfill some nonwork-related desires to uphold self-control motivation so that it can translate into persistence and sustained attention on work tasks (Jia et al., 2019).

Second, self-regulation strategies may help to buffer negative consequences of being depleted. For instance, organizing may help to restructure tasks in ways that they can be done without being unpleasant or too effortful. Thus, depletion may not yield shallow information processing or withdrawal of effort, because the tasks are restructured to be intrinsically more rewarding or easy to handle (Eisenberger et al., 2005; Fullagar & Kelloway, 2009). Further, meaning-related strategies may help to remind oneself of the importance of one's work, focusing on its positive consequences which may help to persist despite being depleted (Hennecke et al., 2019). In addition, self-reward may provide fulfillment of short-term desires allowing individuals to refocus on their core tasks (Jia et al., 2019). Perceiving oneself as depleted has been interpreted as signaling a shift with increased sensitivity to short-term rewards (Inzlicht & Schmeichel, 2012; Kotabe & Hofmann, 2016). Thus, when individuals at work treat themselves with something rewarding from time to time, short-term desires may be satisfied and focus on long-term goals can be re-established. This may help to prevent that

initial depletion is accompanied by disengagement from goal-relevant tasks.

We investigate whether and how the self-regulation strategies (i.e., organizing, meaning-related strategies, and self-reward) interact with self-control related aspects and consequently benefit task performance on the basis of the following research questions. For simplicity, we focus on potential effects of these strategies in the afternoon.

**Research Questions:** Do self-regulation strategies (organizing, meaning-related strategies, and self-reward) in the afternoon benefit task performance in the afternoon (a) by means of stabilizing positive relationship(s) of self-control motivation with task performance in the afternoon (i.e., stabilizing moderation effect) or (b) by means of buffering negative relationship(s) of depletion with task performance in the afternoon (i.e., buffering moderation effect)?

## 5 | METHOD

### 5.1 | Procedure and sample

We collected the data for this study in the context of a larger German research project on self-control and stress at work.<sup>4</sup> Undergraduate students recruited study participants. This approach helps to increase response rates, especially crucial for diary studies (Demerouti & Rispens, 2014). Following guidelines for student-recruited samples (Wheeler et al., 2014), the first and second authors closely oversaw registration for the study, made sure that participants were employees that worked a minimum of 6 h per day, and managed participant communication (e.g., briefing participants, mailing survey links, and replying to questions).

Participants were recruited from students' social networks (e.g., companies they had worked in previously) and via online flyers on social media, especially on [www.facebook.com](http://www.facebook.com) and [www.xing.de](http://www.xing.de). Study participants could win one of two vouchers of 50€ from an online retailer. Employees had to work a minimum of at least six daily hours. Shift workers were not eligible to participate. The students who recruited the participants were not aware of the study hypotheses.

One-hundred-forty-two participants registered and completed the entrance survey in which variables on the person level (e.g., demographic data) were measured. After completing the entrance survey, three surveys per day were sent during two regular work weeks (Monday to Friday). The first daily survey (beginning-of-work survey) had to be completed shortly before starting to work, the second daily survey (midday survey) had to be completed around midday—if feasible before the lunchbreak—, and the third survey (end-of-work survey) at the end of work. Participants received all links to the surveys via email.

<sup>4</sup>This is the first publication from this data set.



Seven participants did not provide any daily survey data; they were therefore dropped from the dataset. The remaining participants provided valid data from 933 beginning-of-work surveys, 822 midday surveys, and 789 end-of-work surveys. We regarded surveys as invalid and consequently excluded them from the dataset when they were filled in at implausible times.<sup>5</sup> The final sample consisted of 135 participants (51.1% female), providing data on a total of 991 days. On 597 days, all three surveys were answered; on 269 days, two surveys were answered, and on 125 days, one survey was answered. On average, participants provided 7.34 daily records.

In the final sample ( $N = 135$ ), mean age was 37.7 years ( $SD = 10.9$ ) and mean organizational tenure was 9.8 years ( $SD = 13.6$ ). On average, participants worked 8.3 h per day ( $SD = 1.4$ ). Fifty-three (39.6%) were in a leadership position. Sixty-two (45.9%) had a university or a degree of comparable level. With respect to occupations, the sample was very diverse. For instance, participants worked as advisor, banker, commercial director, civil servant, docent, educator, electrician, graphic designer, interior architect, IT consultant, mail carrier, marketing manager, nurse, project manager, professor, receptionist, scientist, or teacher.

When it comes to the industrial sectors (using the European NACE system categorization), participants worked in several sectors, such as human health and social work activities (12.6%), manufacturing (10.4%), other service activities (9.6%), education (7.4%), banks and private insurance (5.2%), wholesale and retail trade, repair or motor vehicles (4.4%), information and communication (3.7%), public administration and defense, compulsory social security (3.7%), or construction (3.7%).

We checked whether the 135 participants who made up the final sample were different from the seven individuals not providing any daily data. We found no significant differences concerning gender,  $\chi^2(1, N = 142) = 1.46, p = .482$ ; education level (dichotomously coded: 0 = without university degree, 1 = with university degree),  $\chi^2(1, N = 142) = 2.066, p = .244$ ; and family status,  $\chi^2(1, N = 142) = 2.32, p = .195$ , or age,  $t(140) = .070, p = .946$ .

## 5.2 | Measures

Surveys were in German. We used backtranslation to create German versions of the scales (Brislin, 1970), if necessary. All items were answered on a 5-point rating scale ranging from 1 (*not true at all*) to 5 (*very true*).

<sup>5</sup>Fifty-one beginning-of-work surveys were excluded because completion time was after 10:30 AM (except for cases where work times reported in the last daily survey indicated a later start of work), 56 midday surveys were excluded because completion time was after 3:00 PM, and 46 end-of-work surveys were excluded because completion time was after 9:00 PM (except for cases where work times reported in the last daily survey indicated a later end of work and survey completion time was within an one-hour range of the indicated time for ending work.). Further, surveys from 8 days were excluded because participants were absent from work due to illness or vacation.

### 5.2.1 | Variables assessing demands and performance at work

#### *Aversive tasks in the morning*

In the midday survey, we assessed aversive tasks in the morning with three items derived from Solomon and Rothblum's procrastination assessment scale (1984) that were adjusted by Bosch and Sonnentag (2019) for day-level assessment. A sample item is "This morning, I did not like what had to be done." Mean Cronbach's alpha over 10 workdays was .82 (range .75 to .91).

#### *Task performance in the afternoon*

We assessed task performance in the afternoon with four items (Williams & Anderson, 1991) adjusted for day-level assessment. A sample item was "This afternoon, I adequately completed assigned duties." Mean Cronbach's alpha over the ten workdays was .66 (range from .52 to .74).<sup>6</sup>

### 5.2.2 | Variables concerning internal self-control states

#### *Depletion*

We measured depletion with five items using the state self-control scale (Ciarocco et al., 2007) in the beginning-of-work and midday survey. The items are the same as the German items from Bertrams et al. (2011). A sample item is "Right now, I feel mentally depleted." Mean Cronbach's alpha over 10 workdays was as follows: for beginning-of-work: .91 (range .88 to .94); for midday: .93 (range .89 to .95).

#### *Self-control motivation*

Following earlier research by Wehrt et al. (2020), we assessed self-control motivation with three items at the beginning of work and at midday. We selected items from the impulse control aspect of the self-control demands scale (Neubach & Schmidt, 2006; Schmidt & Diestel, 2015). Similar to Wehrt et al. (2020), we added "Today, I am motivated ..." (beginning-of-work survey) or "Now, I am motivated ..." (midday survey) before the original items. Further, we added "when working on my tasks" after the original items to focus on task-related self-control motivation. For instance, "My job requires me not to become impatient" became "Today, I am motivated to not become impatient when working on my tasks." We selected those three out of the six subscale items (Neubach & Schmidt, 2006) because they unambiguously assess impulse control when working on tasks. Specifically, we avoided items that refer to controlling one's verbal or mimic

<sup>6</sup>We investigated the low reliability of the afternoon task performance measure. We identified careless responding in 63 cases on the third and fourth reverse-coded items (i.e., participants seem to have ignored the reversed wording) as the most likely cause. In line with this view, reliability increases when computing mean split-half reliability for only the first two items over the 10 workdays (mean Cronbach's alpha = .93) or when computing reliability over the 10 workdays excluding these 63 cases (mean Cronbach's alpha = .80).

expressions towards others. All self-control motivation items are shown in the Appendix. Mean Cronbach's alpha over 10 workdays was as follows: for beginning of work: .97 (range .93 to .99); for midday: .97 (range .93 to .99).

### 5.2.3 | Self-regulation strategies

#### *Organizing*

We assessed organizing in the morning and the afternoon with four items based on Fritz et al. (2011), further compiled and used by Parker et al. (2017) in the midday and end-of-work survey. A sample item is "This morning/afternoon, I put a lot of care into planning and preparation." Mean Cronbach's alpha over 10 workdays was as follows: for morning: .80 (range .65 to .86); for afternoon: .82 (range .62 to .89).

#### *Meaning-related strategies*

We assessed meaning in the morning and afternoon with four items based on Fritz et al. (2011), further compiled and used by Parker et al. (2017) in the midday and end-of-work survey. A sample item is "This morning/afternoon, I tried to see the meaningfulness in my work." Mean Cronbach's alpha over 10 workdays was as follows: for morning: .90 (range .76 to .95); for afternoon: .90 (range .83 to .95).

#### *Self-reward*

We assessed self-reward in the morning and afternoon with three items originally derived from the revised self-leadership questionnaire (Houghton & Neck, 2002; German version by Andreßen & Konradt, 2007) and then adapted by Bosch and Sonnentag (2019) to assess desire for self-reward in the midday and end-of-work survey. We adapted items by changing the focus from desires to actual behavior. For instance, the item "I felt the need to reward myself with something special," became "This morning/afternoon, I rewarded myself with something special". Mean Cronbach's alpha over 10 workdays was as follows: for morning: .93 (range .89 to .95); for afternoon: .93 (range .90 to .97).

## 5.3 | Data preparation and robustness checks

Because our data set included missing data, which is common for diary studies (Gabriel et al., 2019), we followed Newman's (2014) suggestion and used multiple imputation. This procedure yields reliable unbiased parameter estimates when data are missing to a certain degree (i.e., more than 10% of the participants do not provide responses to all surveys). We applied multiple imputation with 50 repetitions in MPlus 7.4 (L. K. Muthén & Muthén, 2012) on our full dataset ("Dataset A" hereafter), which easily suffices to yield reliable standard errors and parameter estimates (Bodner, 2008; von Hippel, 2020).

Further, because we identified 63 cases of inconsistent responding on the task-performance items in the afternoon (Meade &

Craig, 2012),<sup>7</sup> we separately applied multiple imputation on a dataset in which we replaced the potentially inconsistent answers to all four afternoon task-performance items by missing values ("Dataset B" hereafter). Consequently, to ensure the robustness of our findings, we run confirmatory factor analyses and hypotheses tests with both datasets and report when results based on Dataset B differ from results based on Dataset A, that is, when significant estimates from Dataset A become nonsignificant in Dataset B and vice versa.

## 5.4 | Construct validity

We ran a multilevel confirmatory factor analysis in Mplus Version 7.4 (L. K. Muthén & Muthén, 2012), to examine the construct validity of our measures. In a multilevel measurement model, we specified all latent variables on the between- and within-level by letting scale items (i.e. self-control motivation items assessed at the beginning of work) load on the respective factor (i.e. factor self-control motivation at the beginning of work) on the between- and the within-level (Heck & Thomas, 2017). We did neither allow any cross-loadings nor specify any correlations at the item level, except for the task-performance measure where we allowed positively worded items and negatively worded items to correlate separately with each other. For a total of four items (one in the morning measures, one in the midday measures, and two in the afternoon measures), we set negative residual variances to zero on the between level.

We conducted the analyses separately for the variables measured in the morning, at midday, and in the afternoon (for morning: self-control motivation at the beginning of work, depletion at the beginning of work; for midday: self-control motivation at midday, depletion at midday, organizing in the morning, meaning-related strategies in the morning, self-reward in the morning, and aversive tasks in the morning; for afternoon: organizing in the afternoon, meaning-related strategies in the afternoon, self-reward in the afternoon, and task performance in the afternoon). The models fit the data reasonably well (fit indices for morning:  $\chi^2$  (38) = 214.533,  $p < .001$ , CFI = .945, RMSEA = .068; for midday:  $\chi^2$  (430) = 1135.791,  $p < .001$ , CFI = .928, RMSEA = .041; for afternoon (Dataset A):  $\chi^2$  (194) = 408.627,  $p < .001$ , CFI = .957, RMSEA = .033); for afternoon (Dataset B):  $\chi^2$  (194) = 421.631,  $p < .001$ , CFI = .949, RMSEA = .034.

We compared our measurement models to several other plausible models. Our measurement models were superior to (1) models subsuming organizing, meaning, and self-reward under one common factor (for midday:  $\chi^2$  (448) = 3822.860,  $p < .001$ , CFI = .656, RMSEA = .087, Satorra-Bentler  $\Delta\chi^2$  (18) = 1198.834,  $p < .001$ ; for afternoon:  $\chi^2$  (206) = 3181.997,  $p < .001$ , CFI = .405, RMSEA = .120, Satorra-Bentler  $\Delta\chi^2$  (7) = 970.730,  $p < .001$ ) and (2) subsuming depletion and self-control motivation under one common factor (for morning:  $\chi^2$  (40) = 1832.455,  $p < .001$ , CFI = .443, RMSEA = .213, Satorra-Bentler  $\Delta\chi^2$  (2) = 516.197,  $p < .001$ ; for midday:  $\chi^2$  (440)

<sup>7</sup>See footnote 6 describing the inconsistent responding pattern on the task performance measure.



= 3486.688,  $p < .001$ , CFI = .689, RMSEA = .084, Satorra-Bentler  $\Delta\chi^2(10) = 1109.058$ ).

## 5.5 | Data analysis

Daily surveys were answered repeatedly over the course of two regular work weeks. Because days were nested in persons, data had a two-level structure. Accordingly, we partitioned between-person and within-person variance for all variables by specifying one overall multilevel path model in Mplus 7.4 (L. K. Muthén & Muthén, 2012). All paths referring to main effects were modeled identically between-person and within-person (Preacher et al., 2010). Accordingly, within-person estimates refer to within-person relationships and between-person estimates to between-person relationships. We did not specify covariances between our morning variables or midday predictor variables.<sup>8</sup>

Regarding the creation of interaction terms, we proceeded as follows: First, we generated person-mean centered variables for the constructs (self-control motivation at the beginning of work and midday, depletion at the beginning of work and at midday, and the three self-regulation strategies in the morning and the afternoon) in SPSS 25 which eliminated variance on the between-person level (Enders & Tofghi, 2007). Second, we computed interaction terms with these person-mean centered variables using the DEFINE command in Mplus. Thus, our interaction terms did not contain between-person variance and are suitable for testing within-person moderation effects. We entered interaction terms simultaneously at the within-person level as additional predictors to the multilevel path model. When interaction terms were significant, we tested simple slopes using the CONSTRAINT command in Mplus.

## 6 | RESULTS

For the hypothesis tests, we started with testing a basic model without interaction terms. In this basic model, we specified one path with self-control motivation at the beginning of work (control variable), depletion at the beginning of work, the three self-regulation strategies in the morning, and aversive tasks in the morning as predictors of self-control motivation at midday. In parallel, we also specified one path with depletion at the beginning of work (control variable), self-control motivation at the beginning of work, the three self-regulation strategies in the morning, and aversive tasks in the morning as predictors of depletion at midday. Finally, we specified a path with depletion states (beginning of work, midday), self-control motivation (beginning of work, midday), and all three self-regulation strategies (organizing, meaning, and self-reward) in the morning and the afternoon as predictors of task performance in the afternoon. The basic model without

the within-person interaction terms showed a good fit,  $\chi^2(16) = 24.105$ , CFI = .989, TLI = .961, RMSEA = .020.<sup>9</sup>

To examine the research question concerning the potential interaction effects with the self-regulation strategies, we entered the within-person interaction terms to the basic model. The model including the within-person interaction terms showed a good fit,  $\chi^2(34) = 63.646$ , CFI = .961, TLI = .891, RMSEA = .029.

Table 1 displays means, standard deviations, correlations, and intraclass correlation coefficients. Because our hypotheses refer to the within-level, we focus on within-person estimates in this result section, reporting unstandardized coefficients. Direct effects are displayed in Table 2. More specifically, Table 2 shows the estimates when predicting the outcomes, namely, depletion at midday, self-control motivation at midday, and task performance in the afternoon. Results for the afternoon within-person interaction effects are displayed in Table 3.<sup>10</sup>

### 6.1 | Hypothesis tests

Hypothesis 1 suggested that working on aversive tasks in the morning predicts an increase in depletion at midday. Accordingly, we controlled for baseline levels of depletion at the beginning of work. Supporting Hypothesis 1, the third row of the left column in Table 2 shows that working on aversive tasks in the morning was a significant within-person predictor of depletion at midday while controlling for depletion at the beginning of work,  $\gamma = .14$ ,  $SE = .04$ ,  $p < .001$ .

Hypothesis 2 proposed that working on aversive tasks in the morning predicts a decrease in self-control motivation. Accordingly, we controlled for baseline levels of self-control motivation at the beginning of work. Failing to support Hypothesis 2, the third row of the middle column in Table 2 shows that working on aversive tasks in the morning was not a significant predictor of self-control motivation at midday while controlling for self-control motivation at the beginning of work,  $\gamma = .01$ ,  $SE = .03$ ,  $p = .697$ .

Hypothesis 3 suggested that depletion at the beginning of work and at midday negatively predicts task performance in the afternoon. The within-person effect of beginning-of-work depletion which can be found in the first row of the right column was marginally significant but had a positive sign,  $\gamma = .07$ ,  $SE = .04$ ,  $p = .093$ . When analyzing Dataset B, depletion in the beginning of work even became a significant positive predictor of afternoon task performance,  $\gamma = .09$ ,  $SE = .03$ ,  $p = .021$ . Thus, Hypothesis 3 (a) was not supported.

Regarding depletion at midday, the seventh row of the right column in Table 2 shows the significant negative within-person effect of depletion on task performance in the afternoon,  $\gamma = -.11$ ,  $SE = .04$ ,  $p < .010$ . Thus, Hypothesis 3(b) was supported.

<sup>8</sup>However, results remain stable when specifying covariances between our main predictor variables depletion and self-control motivation at the beginning of work and at midday, respectively.

<sup>9</sup>Because we apply multiple imputation, fit indices are means from the results of the 50 imputed datasets.

<sup>10</sup>Results with Dataset B can be found in Tables S1 and S2 in the online supplement.

**TABLE 1** Means, standard deviations, intraclass correlations, and intercorrelations among study variables

	M	SD <sup>b</sup>	SD <sup>w</sup>	ICC	1	2	3	4	5	6	7	8	9	10	11	12
1 Depletion (t1)	1.96	0.53	0.62	.41	-	.28***	-.10*	-.03	.14**	.03	-.03	-.03	-.02	.02	-.05	.03
2 Depletion (t2)	1.96	0.58	0.59	.50	.91***	-	-.07	-.01	.20***	-.11*	-.02	-.04	-.00	.02	.05	.06
3 SC motivation (t1)	3.73	1.10	0.66	.74	-.01	-.04	-	.43***	.01	.15***	.10	.06	.16***	.04	-.03	-.05
4 SC motivation (t2)	3.73	1.10	0.70	.71	-.03	-.03	.98***	-	.02	.07	.12*	.05	.14***	.08	-.02	.02
5 Morning aversive tasks (t2)	2.23	0.72	0.67	.54	.60***	.69***	-.07	-.05	-	-.03	-.01	.02	.00	-.02	.03	.01
6 Afternoon task perform. (t3)	3.96	0.48	0.58	.38	-.43***	-.47***	.27*	.27**	-.41***	-	.12**	.23***	.11*	.19***	-.05	.01
7 Morning organizing (t2)	3.24	0.77	0.62	.60	-.02	.06	.28**	.26*	.20*	.32***	-	.47***	.33***	.14*	.03	-.05
8 Afternoon organizing (t3)	3.32	0.81	0.56	.67	.02	.08	.27**	.25*	.16	.35***	.98***	-	.21**	.23***	.09	.07
9 Morning meaning (t2)	2.39	0.82	0.58	.66	.11	.19	.24**	.23*	.14	-.08	.35***	.34***	-	.33***	.10**	.02
10 Afternoon meaning (t3)	2.54	0.86	0.55	.71	.00	.11	.34***	.33***	.04	.04	.35***	.34**	.96***	-	.05	.12*
11 Morning self-reward (t2)	1.65	0.63	0.74	.43	.08	.13	-.04	-.02	-.03	-.21	.05	-.04	.32**	.28**	-	.20***
12 Afternoon self-reward (t3)	1.93	0.76	0.83	.44	.04	.14	.13	.18	-.03	-.07	.02	-.05	.30**	.30**	.89***	-

Note: Descriptives marked with <sup>b</sup> are on the between level, with <sup>w</sup> are on the within-level. ICC = percentage of variance between persons. Intercorrelations above the diagonal refer to the within-level (n = 991), below the diagonal to the between level (N = 135).

Abbreviation: SC, self-control.

\*p < .05. \*\*p < .01. \*\*\*p < .001.

**TABLE 2** Unstandardized coefficients from multilevel path analysis predicting depletion (t2), self-control motivation (t2), and afternoon task performance (t3)

Within-level predictors	Depletion (t2)				SC motivation (t2)				Afternoon task performance (t3)			
	Est.	SE	z	95% CI	Est.	SE	z	95% CI	Est.	SE	z	95% CI
Depletion (t1)	.24	.04	5.59***	[.16, .32]	.01	.04	0.34	[-.06, .09]	.07	.04	1.68	[.01, .15]
SC motivation (t1)	-.05	.03	-1.40	[-.11, .02]	.45	.07	6.54***	[.31, .58]	.11	.04	3.01**	[.04, .19]
Morning aversive tasks (t2)	.14	.04	3.64***	[.07, .22]	.01	.03	0.39	[-.05, .08]	-	-	-	-
Morning organizing (t2)	-.00	.04	-0.12	[-.07, .06]	.07	.05	1.45	[-.03, .17]	.01	.04	0.32	[-.07, .10]
Morning meaning (t2)	.00	.04	0.01	[-.09, .09]	.07	.05	1.45	[-.03, .17]	.00	.05	0.08	[-.10, .10]
Morning self-reward (t2)	.04	.03	1.34	[-.02, .11]	-.02	.03	-0.62	[-.08, .04]	-.05	.04	-1.48	[-.12, .02]
Depletion (t2)									-.11	.04	-2.57*	[-.20, -.03]
SC motivation (t2)									-.00	.04	-0.09	[-.08, .07]
Afternoon organizing (t3)									.19	.06	3.26**	[.08, .30]
Afternoon meaning (t3)									.16	.04	3.53***	[.07, .25]
Afternoon self-reward (t3)									.00	.03	0.02	[-.05, .05]
Residual variance	.31	.03	11.36***	[.25, .36]	.39	.04	9.22***	[0.31, 0.48]	.30	.02	13.22***	[.26, .35]
Within-level R-square	11.0%	.03	3.94***		19.9%	.04	4.56***		11.2%	.03	4.33***	

Note.  $N = 135$ ;  $n = 991$ . Estimates are unstandardized, resulting from one overall analysis including the prediction of depletion (t2), self-control motivation (t2), and afternoon task performance (t3) in one model. When analyzing with Dataset B, depletion (t1) becomes a significant positive predictor of afternoon task performance (t3), estimate = .08,  $SE = .03$ ,  $z = 2.28$ ,  $p = .023$ .

Abbreviations: CI, confidence interval; SC, self-control.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**TABLE 3** Interactions of the self-regulation strategies in the afternoon with depletion and self-control motivation at midday predicting task performance in the afternoon

Within-level interaction terms	Task performance in the afternoon			
	Est.	SE	z	95% CI
Depletion $\times$ organizing	-.04	.08	-0.53	[-.21, .12]
Depletion $\times$ meaning	-.04	.08	-0.53	[-.19, .11]
Depletion $\times$ self-reward	.16	.06	2.73**	[.05, .27]
SC motivation $\times$ organizing	.01	.05	0.09	[-.10, .11]
SC motivation $\times$ meaning	-.06	.07	-0.95	[-.20, .07]
SC motivation $\times$ self-reward	-.06	.03	-1.82	[-.13, .01]
Residual variance	.29	.02	13.52***	[.25, .33]
Within-level R-square	14.8%	.03	5.29***	

Note.  $N = 135$ ;  $n = 991$ . Estimates are unstandardized, resulting from one overall analysis including the prediction of depletion (t2), SC motivation (t2), and afternoon task performance (t3) in one model. Interaction terms with self-regulation strategies in the morning are also included in the within-level paths predicting depletion (t2), SC motivation (t2), and afternoon task performance (t3) but are not displayed here for simplicity. None of the morning interactions is significant below  $p < .05$  in both datasets (a, b).

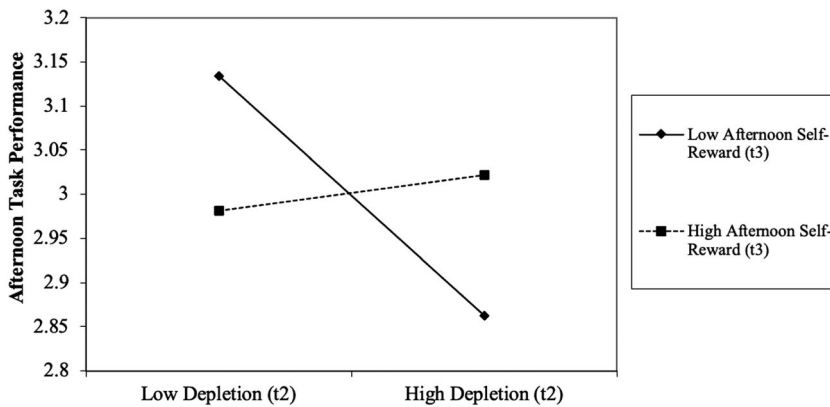
Abbreviations: CI, confidence interval; SC, self-control.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Hypothesis 4 suggested that self-control motivation at the beginning of work and at midday positively predicts task performance in the afternoon. The second row in the right column in Table 2 shows the positive effect of self-control motivation at the beginning of work

on task performance in the afternoon,  $\gamma = .11$ ,  $SE = .04$ ,  $p < .010$ . Thus, Hypothesis 4(a) was supported.

The within-person effect of self-control motivation at midday, however, which can be found in the eighth row of the right column



**FIGURE 2** Moderation effect of afternoon self-reward on the relationship of depletion at midday with afternoon task performance

was not significant,  $\gamma = -.00$ ,  $SE = .04$ ,  $p = .929$ . Thus, Hypothesis 4 (b) was not supported.

## 6.2 | Exploratory research questions regarding self-regulation strategies

Regarding the role of self-regulation strategies, the right column in Table 2 shows that organizing and meaning-related strategies in the afternoon had a direct relationship with task performance in the afternoon, organizing:  $\gamma = .19$ ,  $SE = .06$ ,  $p = .001$ ; meaning-related strategy:  $\gamma = .16$ ,  $SE = .04$ ,  $p < .001$ .

Concerning our exploratory research questions, we found that self-reward in the afternoon moderated the negative relationship of depletion at midday with task performance in the afternoon,  $\gamma = .16$ ,  $SE = .06$ ,  $p = .006$ . The simple slope for low self-reward was negative and significant,  $\gamma = -.23$ ,  $SE = .06$ ,  $p < .001$ . The simple slope for high self-reward was not significant,  $\gamma = .04$ ,  $SE = .07$ ,  $p = .607$ . Thus, only when self-reward was low, depletion at midday predicted a decrease in afternoon task performance. Figure 2 graphically depicts the effect. All other interaction effects tested were not significant.<sup>11</sup>

## 6.3 | Additional analyses

Aversive tasks in the morning might even indirectly impair task performance in the afternoon because they relate to an increase in depletion from morning to afternoon. Put differently, employees who work on aversive tasks in the morning may show worse task performance later in the day because they have started their afternoon in a state of depletion.

Consequently, in order to understand if aversive tasks translate throughout the day into decreased task performance in the afternoon via depletion, we tested an indirect effect of working on aversive tasks in the morning on decreased task performance in the afternoon via depletion at midday. We computed the within-person indirect effect via a 1-1-1 mediation model (Preacher et al., 2010). As described by Preacher et al. (2010), we multiplied the predictor-mediator path with the mediator-outcome path on the within-person level in the MODEL CONSTRAINT command in Mplus. We controlled for baseline levels of depletion at the beginning of work. The indirect effect was significant using the Monte Carlo method with 20,000 repetitions (Preacher & Selig, 2008);  $\gamma = -.014$ ,  $SE = .01$ , 95% CI  $[-.027, -.002]$ .

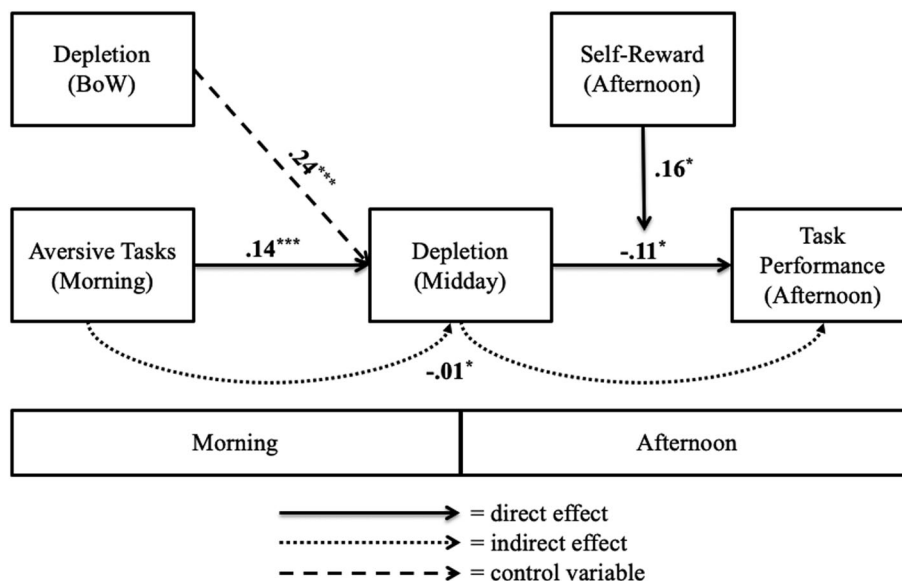
Additionally, because we found that self-reward in the afternoon buffered the negative relationship of depletion at midday on task performance in the afternoon, we aimed to understand if self-reward can also offset the negative indirect effect of aversive tasks on task performance via depletion. Thus, we tested if the indirect effect of aversive tasks in the morning on task performance in the afternoon via depletion at midday is moderated by self-reward in the afternoon (i.e., moderated indirect effect; Mathieu & Taylor, 2006). Applying the approach of Stride et al. (2015) to our multilevel model, we found a conditional indirect effect: When self-reward was low, the indirect within-person effect was negative,  $\gamma = -.032$ ,  $SE = .01$ ,  $z = -2.66$ ,  $p = .008$ , 95% CI  $[-.06, -.01]$ . When self-reward was high, the indirect effect was positive and nonsignificant (i.e., absent),  $\gamma = .005$ ,  $SE = .01$ ,  $z = 0.48$ ,  $p = .630$ , 95% CI  $[-.01, .02]$ . Thus, self-reward in the afternoon counteracted the translation of aversive tasks in the morning into decreased task performance in the afternoon via depletion at midday. Figure 3 graphically depicts this moderated indirect effect.

## 7 | DISCUSSION

Our study showed that working on aversive tasks in the morning was positively related to increased depletion at midday, but not to decreased self-control motivation. Further, self-control motivation at the beginning of work and depletion at midday predicted task

<sup>11</sup>In Dataset B, we found an interaction effect of SC motivation at the beginning of work (t1) x meaning in the morning (t2) predicting task performance in the afternoon,  $Est = .16$ ,  $SE = .06$ ,  $z = 2.64$ ,  $p = .008$ . The slope for high meaning was positive and significant,  $\gamma = .019$ ,  $SE = .06$ ,  $p < .01$ . The slope for low meaning was not significant,  $\gamma = .01$ ,  $SE = .04$ ,  $p = .840$ .

**FIGURE 3** Afternoon self-reward buffers the indirect effect of aversive tasks in the morning on afternoon task performance via depletion at midday



performance in the afternoon—while controlling for self-control motivation at midday and depletion at the beginning of work. In our additional analyses, we found an indirect effect of aversive tasks in the morning on task performance in the afternoon via depletion at midday.

Regarding self-regulation strategies, meaning-related and organizing strategies were directly related to task performance in the afternoon. Moreover, we found an interaction effect of self-reward in the afternoon on the relationship of depletion at midday on task performance in the afternoon. When use of self-reward was high, the negative relationship was offset. Moreover, the indirect effect of aversive tasks in the morning via depletion at midday on task performance in the afternoon was moderated by self-reward in the afternoon. Thus, high self-reward counteracted the indirect effect between working on aversive tasks in the morning and task performance in the afternoon via depletion at midday.

## 7.1 | Theoretical implications

Our results support an integrative view on self-control at work (Kotabe & Hofmann, 2015). Afternoon task performance—which requires successfully controlling oneself—benefits from self-control motivation in the beginning of work and suffers from depletion at midday. Interestingly, only self-control motivation in the morning—but not at midday—and only depletion at midday—but not in the morning—predicted afternoon task performance. To understand this pattern of results, the difference between controlled (i.e., have-to) and autonomous (i.e., want-to) motivation is important. Whereas want-to motivation applies when goals are pursued because of enjoyment, guiding life values or personal meaningfulness, have-to motivation applies when goals are pursued out of rather extrinsic reasons

(e.g., rewards) or internal forces to avoid guilt, shame or to achieve pride (Werner & Milyavskaya, 2019).

Relatedly, self-control motivation may be conceptualized as a form of have-to motivation, because individuals control themselves at work to attain external rewards (e.g., promotion opportunities; Seibert et al., 2001), avoid punishment (e.g., losing one's job; Staufenbiel & König, 2010; Wang et al., 2015), or to be proud on their performance (i.e., introjected motivation; Deci & Ryan, 2000; Hofmann & Fisher, 2012). This is not to say that individuals are not also enjoying work or do not find their work personally meaningful. The point is that when individuals are autonomously motivated to work on tasks, it is likely that they do not *have to* exert self-control because desires that interfere with task performance may not arise (Milyavskaya et al., 2015). Moreover, when autonomously motivated, working on even complex tasks may feel easier and more effortless and thus can be considered a case of efficient self-regulation instead of effortful self-control (Werner & Milyavskaya, 2019).

In contrast to self-control motivation, which refers to controlling desires interfering with effective task performance, depletion may signal an increased motivation to give in to short-term desires (e.g., resting, having fun) instead of working on important tasks. This also means that depletion is not simply low self-control motivation but a high motivation to indulge in short term desires. Accordingly, the shifting priorities model (Inzlicht & Schmeichel, 2016) suggests that depletion is the consequence of shifting preferences from “have-to” goals (i.e., working on tasks) towards “want-to” goals referring to rest and leisure. Thus, depletion may indicate increased attention towards short-term rewards, which may foster superficial processing of task-relevant information (Schmeichel et al., 2003). It may further be that this shift is more likely in the afternoon than in the morning, because some time working has already passed and nonwork-related



needs (e.g., rest and leisure) might have become more salient.<sup>12</sup> Accordingly, there are studies emphasizing that considering shifts from morning to afternoon is important for understanding self-regulation processes at work (Bledow et al., 2011).

One may speculate that depletion reflects a subconscious process wherein nonwork-related needs become increasingly frustrated what in turn fosters a reduction of self-control effort. Even though individuals may still be consciously motivated to control themselves at midday, depletion may overshadow self-control motivation and foster task disengagement, resulting in low task performance in the afternoon (Kurzban et al., 2013; Wright et al., 2019). This interpretation may also further explain our finding that only self-control motivation at the beginning of work is important for task performance in the afternoon, but depletion becomes the predictor at midday.

Further supporting such an interpretation, we found that aversive tasks in the morning predict depletion at midday but not a decrease in self-control motivation. Thus, when aversive experiences at work accumulate—not self-control (i.e., have-to) motivation decreases—but depletion increases. In that sense, depletion may signal that engaging in further self-control is of low subjective value because rest and leisure needs are frustrated and need to be satisfied (Hockey, 2013; Kurzban et al., 2013). Similarly, Boksem and Tops (2008) proposed that mental fatigue signals to people that they should seek for behavior that fulfills immediate needs (e.g., rest and leisure).

Regarding the role of self-regulation strategies, we found that organizing and meaning-related strategies in the afternoon are directly positively related to afternoon task performance. For organizing, it may simply be that this strategy is effective because it helps to structure work tasks which decreases the need to actively control oneself to complete these tasks (Parke et al., 2018). For meaning-related strategies, it may be that it increases task engagement and, in turn, helps to boost task performance (Fletcher et al., 2018).

Interestingly, we found that self-reward in the afternoon did not directly relate to performance but moderated the negative relationship of depletion at midday with task performance in the afternoon. When self-reward in the afternoon was high, depletion at midday did not relate to task performance in the afternoon. Moreover, in our additional analysis, we found that self-reward in the afternoon offsets the negative indirect effect from aversive tasks in the morning on task performance in the afternoon via depletion at midday. These findings further support the ideas of the shifting-priorities model (Inzlicht & Schmeichel, 2016) described above: When individuals exert self-control, for instance, by responding to aversive tasks, their priorities shift towards rest and leisure which foster superficial processing of task-relevant information. However, if individuals use small self-rewards, this may prevent further shifts in priorities (Inzlicht et al., 2014). Accordingly, experiments indicate that depletion can be counteracted

by potentially rewarding things fulfilling rest and leisure needs, such as watching a funny video (Tice et al., 2007), receiving an opportunity to meditate (Yusainy & Lawrence, 2015), or relaxation (Englert & Bertrams, 2016).

## 7.2 | Limitations and future research

Our study has some limitations. First, we used self-reports to assess all variables. Even though it is a common practice in field studies (Johnson et al., 2017), it may be problematic to assess depletion via self-report. Research suggests that depletion reports may be biased by lay theories of willpower or other factors such as sleep quantity (Job et al., 2010; Johnson et al., 2014). Moreover, the neurological basis of self-control resources has been questioned, including a general doubt if such a basis exists at all (Kanfer et al., 2017; Molden et al., 2016, 2012). However, on the perceptual level, our results show that individuals differentiate between self-control capacity (i.e., depletion) and self-control motivation. Nevertheless, it remains an important task to identify reliable markers of state self-control capacity usable in field studies. Future studies may relate self-control capacity to objective physiological markers (e.g. sympathetic cardiovascular activity; Gieseler et al., 2020) or to maximum self-control performance (e.g. Wright et al., 2019).

Second, similar to the previous limitation, it is not entirely clear if our explicit assessment of self-control motivation focusing on impulse control fully captures the construct. Future studies may want to also examine the roles of potential subtypes of self-control motivation (e.g., motivation to overcome inner resistances) or develop implicit measures of self-control motivation complementing explicit ones. Relatedly, another interesting avenue for research is considering self-awareness as a boundary condition which may influence a person's ability to reliably report their self-control motivation or their state of depletion (Johnson et al., 2017).

Third, assessing afternoon task performance via self-report is a limitation because we cannot know that depletion relates to objectively decreased task performance or only goes along with subjective perceptions of performing worse. In a similar vein, the buffering effect of self-reward on the negative relationship of depletion at midday with afternoon task performance may be affected by this limitation. Minimizing these concerns, Deng et al. (2016) found that depletion-related negatively to supervisor ratings of performance. However, future studies may benefit from linking depletion self-reports with objective performance measures.

Fourth, in our study, we relied on three measurement points per day. A more fine-grained measurement of the ups and downs of depletion and self-control motivation might be helpful to understand if and how motivational and resource-depletion processes interact and unfold throughout the workday. Some experience-sampling studies in the area of self-control already adopt such approaches (Milyavskaya et al., 2015; Milyavskaya & Inzlicht, 2017). However, conducting such studies in organizational settings may be difficult as it puts additional demands on participants possibly impacting the self-

<sup>12</sup>When analyzing Dataset B, we even found that depletion at the beginning of work predicted task performance in the afternoon which may indicate that individuals can deal with depletion at the beginning of work by mobilizing compensatory effort (Wright et al., 2019). However, in the afternoon, it seems that depletion cannot be that easily overridden, and rest and leisure needs have to be fulfilled in order to prevent impaired task performance (see also relatedly the interaction effect with self-reward in the afternoon).

control processes under investigation. Nevertheless, future studies in organizational behavior may benefit from using more daily measurement occasions.

### 7.3 | Practical implications

Our results offer several practical implications. First of all, self-control motivation at the beginning of work helps to improve performance on tasks in the afternoon. One may speculate that motivation to control oneself is negatively impacted by insufficient leisure or low quality sleep (Kühnel et al., 2016; Sonnentag et al., 2017). Further, people have multiple goals (e.g., family and leisure) which compete with work goals for time and attention (Courtright et al., 2016; Louro et al., 2007). Frustration of such goals from the private domain may impair self-control motivation at work. Therefore, organizations should provide employees with enough free time and latitude to satisfy such needs and goals.

Second, working on aversive tasks in the morning elicits depletion which further harms task performance in the afternoon. One straightforward implication of this finding would be to avoid working on aversive tasks. Obviously, it is not always feasible for leaders or employees to avoid allocating aversive tasks or working on them, respectively. Further, aversive tasks cannot always be modified to be less aversive. However, we identified self-reward as a strategy which helps to offset the negative effect of depletion on task performance that followed from working on aversive tasks. In line with our findings, Jia et al. (2019) suggest that giving in desires from time to time can be adaptive, because this may make goal pursuit (e.g., finishing work tasks) less tiresome and more pleasant (Kurzban et al., 2013). Attractive alternatives to task performance are usually present in the workplace (e.g., snack machines, a chat with the colleague next door). Employees may want to reward themselves with little things they like (e.g., a coffee, a snack, and a break) to keep them going. Importantly, supervisors shall acknowledge that these little rewards are not expressions of laziness or counterproductive work behavior but a way to stay in a state that helps to perform well.

Third, using organizing and meaning-related strategies in the afternoon helps to improve task performance in the afternoon. Organizing, for instance, after lunchbreak, might help employees to get a clear view on how to efficiently proceed with their tasks. Such behaviors can boost their engagement (Parke et al., 2018). Relatedly, supervisors can encourage employees to spend a fixed time a day (e.g., after lunch) to organize upcoming tasks. Further, individuals may remind themselves what is valuable on their work and how it may contribute to a greater good. Also, organizations can use cues to remind employees how their work is meaningful (e.g., a restaurant showing a poster to employees displaying quotes of satisfied customers).

## 8 | CONCLUSION

In this 2-week diary study, we found that self-control motivation at the beginning of work and depletion at midday is related to task

performance in the afternoon. These findings highlight that pure depletion explanations fail short in acknowledging the role of motivational explanations of self-control at work. Further, in our explanatory analyses, we found that self-regulation strategies can help to improve performance; in particular, self-reward may help to undo negative performance consequences of working on aversive tasks and subsequently being depleted. We encourage efforts to further integrate the self-control and self-regulation literatures in organizational behavior and to differentiate between self-control motivation and depletion.

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### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

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## SUPPORTING INFORMATION

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## APPENDIX A

TABLE A1 Items for measuring self-control motivation

Beginning-of-work survey	Midday survey
Today, I am motivated ...	Now, I am motivated ...
... to never lose my temper, when working on my tasks.	... never to lose my temper, when working on my tasks.
... not to become impatient at work, when working on my tasks.	... not to become impatient at work, when working on my tasks.
... not to let myself go, when working on my tasks.	... not to let myself go, when working on my tasks.