

Motivation and Self-Control: Implicit Motives Moderate the Exertion of Self-Control in Motive-Related Tasks

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Abstract

Using a dual-task paradigm, two experiments tested whether aroused implicit motives would moderate the exertion of self-control in motive-related tasks. In Study 1, 67 participants first watched a power dialogue and were then asked to either enact the dialogue or simply reproduce it by writing it down. In Study 2, 74 participants performed either the frustrating or the simple version of an achievement-related sensorimotor task. Participants who were high (compared to low) on the implicit power motive and had exerted power over another person subsequently showed more success at controlling their emotional responses (Study 1). Participants who were high (compared to low) on the implicit achievement motive and who had mastered a frustrating sensorimotor task scored better on a subsequent Stroop task (Study 2). Participants in the control conditions did not differ in self-control performance regardless of their level of implicit motives. These studies provide evidence that aroused implicit motives regulate how much self-control is exerted when performing motive-related tasks that require self-control.

The strength model of self-control (Baumeister, Vohs, & Tice, 2007; Muraven, Tice, & Baumeister, 1998) postulates that self-control, which is the self's capacity to override and alter a person's behavior, draws on a limited resource akin to strength or energy. Consuming this resource in an act of self-control may then result in a state of ego depletion, a temporarily reduced capacity to exert self-control on subsequent tasks. The strength model of self-control has been well validated (for a meta-analysis, see Hagger, Wood, Stiff, & Chatzisarantis, 2010), and the depletion effect has been shown in numerous activities, including intellectual performance (Schmeichel, Vohs, & Baumeister, 2003), impression management (Vohs, Baumeister, & Ciarocco, 2005), emotion regulation (Muraven et al., 1998), and the ability to be constructive in interpersonal conflicts (Finkel & Campbell, 2001).

More recently, researchers have begun speculating about whether self-control and the ego depletion effect may be modulated by motivational factors (Baumeister & Vohs, 2007; Kehr, 2004b; Inzlicht & Schmeichel, 2012; Muraven & Slessareva, 2003). For instance, Baumeister and Vohs (2007) argued that after people depleted their self-control through prior acts, they may still be able to exert further self-control effectively if their motivation is high. In line with this notion, Muraven and Slessareva (2003) found that providing depleted participants with motivational incentives (e.g., a cash incentive) to exert further self-control compensated for the initial depletion and completely erased the ego depletion effect. These findings from research on the dual-task paradigm indicate that motivation for the second task, which follows the

initial depleting task, may moderate the ego depletion effect. However, effects of motivation *during* the initial depleting task have rarely been studied (cf. Inzlicht & Schmeichel, 2012). The present study aimed to fill this gap by considering motivational incentives for performing the initial task of self-control.

In particular, the study examined the influence of implicit motives on motive-related tasks that require self-control. Implicit motives are conceptualized as rather unconscious recurrent preferences for affectively charged incentives (McClelland, Koestner, & Weinberger, 1989; Schultheiss, 2008), such as doing things well (achievement motive), having an impact on and control over others (power motive), and being engaged in interpersonal relationships (affiliation motive). Implicit motives respond to task-intrinsic incentives so that they affect an activity because of the pleasure derived from the activity itself (McClelland, 1980; Schultheiss, 2008). Consequently, aroused implicit motives trigger motivation for related tasks as they energize, select, and direct behavior (McClelland, 1987).

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How do implicit motives affect the person's initial exertion of self-control? The compensatory model of motivation and volition (Kehr, 2004b) sheds light on this issue. The model suggests that volitional self-control is needed to compensate (hence the name of the model) for a lack of motivation or for insufficient motivation resulting from the missing fit between the person's implicit motives and the task at hand. In contrast, a task that provides high motivational incentives and arouses a person's implicit motives may call for less self-control exertion because it may be experienced as more fulfilling and may therefore cause less internal conflict and promote higher intrinsic motivation than a task that does not. Consequently, in the dual-task research paradigm, being intrinsically motivated due to aroused implicit motives to perform the initial task should be less depleting than not being intrinsically motivated to perform this task and thereby result in less ego depletion as assessed in a subsequent self-control task.¹

Consider a person who is cognitively committed to a task. If the person receives some additional motivation for the task from his or her aroused implicit motives, the person's resulting task motivation will be higher than if the person had received no additional motivation for the task because his or her implicit motives were not aroused. For instance, imagine a student who has to resist the urge to watch television due to his intention to study and pass an exam. Restraining an attractive behavioral option in order to achieve something else that is important but probably less attractive increases internal conflict and requires self-control (Baumeister & Vohs, 2007). If the self-control task to study instead of watching TV provides intrinsic incentives (e.g., interesting learning material), this may arouse the person's implicit motive (here: the implicit achievement motive) and increase the person's motivation for the task. The self-control task then seems more attractive, and the internal conflict the person feels is reduced. The task is then performed for intrinsic rather than extrinsic reasons (Deci & Ryan, 2000), which may be less depleting (Moller, Deci, & Ryan, 2006; Muraven, 2008; Muraven, Gagne, & Rosman, 2008). Consequently, resisting TV in order to study may be less depleting for a student high on the implicit achievement motive, but more depleting for a student low on the implicit achievement motive.

In an attempt to examine this line of argument, Kehr (2004a) conducted a field study with managers. The study showed that managers whose cognitive preferences (represented by their self-attributed motives; cf. McClelland et al., 1989) were congruent with their implicit motives² maintained a relatively stable proficiency in using self-control strategies over time in contrast to managers whose cognitive preferences were incongruent with their implicit motives. However, these findings were based on questionnaire data, and self-control strength as well as ego depletion had not been directly observed but only inferred from self-ascriptions. Moreover, motive-related behavior had not been directly manipulated. To overcome these limitations, Kehr (2004a) suggested that future research should "more closely relate field and experimental

research on [ego] depletion" (p. 325) and that the propositions derived from Kehr (2004b) should be tested by adopting Baumeister, Bratslavsky, Muraven, and Tice's (1998) dual-task research paradigm. The present research answered this call and proceeded accordingly. We designed experiments and tested the role of implicit motives in self-control exertion. We hypothesized that *implicit motives would moderate the exertion of self-control in motive-related self-control tasks*, such that higher levels of a task-related implicit motive during an initial task would predict less ego depletion during a subsequent task.

The Present Research

Prior research on ego depletion has often employed self-control tasks that are related to specific implicit motive domains. For example, persistence on frustrating tasks like the "Roll-Up" game (Tice, Baumeister, Shmueli, & Muraven, 2007, Study 2) or anagrams (e.g., Baumeister et al., 1998, Experiment 3) has been associated with the implicit achievement motive (Horner, 1974; Lowell, 1952). Such tasks provide achievement-related incentives such as continuous improvement and challenge (cf. McClelland, 1987). Hence, it is likely that the level of self-control needed to succeed on these tasks might be moderated by the implicit motives of the person in action. Similarly, the implicit power motive may moderate a person's enjoyment of performing persuasive speeches (Baumeister et al., 1998, Experiment 2), as this task offers the power-related incentive of having an impact on others. We therefore employed tasks that are related to specific motives and proposed that such tasks would be performed with less self-control by individuals high on the respective implicit motive and with more self-control by individuals low on the respective implicit motive. More specifically, we designed two experiments that used the dual-task paradigm (Baumeister et al., 1998). The dual-task paradigm includes two self-control tasks performed one after the other. Self-control exertion is manipulated on the initial task, and the ego depletion effect is measured in the subsequent task. In our study, participants performed motive-related self-control tasks as the initial task. If implicit motives moderate self-control exertion during the initial task, then individuals high on the respective implicit motive should perform better on the subsequent task than individuals low on this motive. Study 1 examined the role of the implicit power motive in performing a persuasive dialogue. Study 2 focused on the implicit achievement motive and employed an achievement-related yet frustrating task.

STUDY 1

In this experiment, participants first watched a power dialogue, which included prohibiting and exerting control over another person by speaking loudly, aggressively, and persuasively. Participants were then asked either to enact the dialogue (treat-

ment group) or to simply reproduce the dialogue by writing it down (control group). Participants in the treatment group enacted the dialogue in front of a video camera. Making recorded speeches has been found to instigate ego depletion (Baumeister et al., 1998), probably because it requires controlling one's behavior in order to make a specific impression in accordance with the experimenter's request. Thus, enacting the dialogue should require more self-control exertion than simply writing it down. We further hypothesized that the implicit power motive would moderate the exertion of self-control. Situations that involve having control and an impact on others arouse the implicit power motive (McClelland, 1987) so that individuals high on the implicit power motive are expected to enjoy such situations relative to individuals who are low on the implicit power motive. Participants low on the implicit power motive (i.e., those who are not likely to typically engage in power-related behavior) who enacted the dialogue were therefore expected to exert more self-control in order to meet the experimenter's request and to have an impact on another person than participants high on the implicit power motive. By contrast, participants who simply wrote down the dialogue were not requested to influence and exert pressure on an opponent and hence did not need to exert self-control, regardless of their level of the implicit power motive.

Subsequently, we administered a suppress-emotion task in order to assess ego depletion. Earlier research using suppress-emotion tasks has shown that the capacity to control one's emotional response is a useful dependent variable for dual-task paradigm research because it reacts sensitively to prior acts of self-control (e.g., Muraven et al., 1998, Study 3). In our study, participants watched a funny video, but they were asked to avoid showing any amusement (i.e., laughing and smiling) while watching the video. Hence, success at controlling one's emotions would be indicated by an absence of amusement. By contrast, failure would be indicated by overt behavioral signs such as smiling and laughing and would hence be indicative of ego depletion (Muraven et al., 1998, Study 3).

Method

Participants. Sixty-seven college students (41 women and 26 men) participated for a payment of €10. Their mean age was 23.4 years. Participants were tested in individual sessions of approximately 60 min.

Procedure. Participants were briefed about the study and signed informed consent forms. They were told that the purpose of the study was to examine how creativity affects people's memory and emotional processes. The participants' implicit power motive was then measured using the Thematic Apperception Test (TAT; Murray, 1943), which was introduced as a test of creativity. Prior research supported the adequate validity and test-retest reliability of the TAT (cf. McClelland et al., 1989; Schultheiss & Pang, 2007; Spangler, 1992).

Participants wrote imaginative stories about each of six pictures according to the standard instructions used in research on implicit motives (Smith, 1992). The pictures depicted, in the order administered, a ship captain talking to a passenger; a couple sitting on a bench by a river; two female scientists working in a laboratory; a man sitting at an office desk; a man and a woman on a trapeze; and a man, a woman, and a guitar player in a bar. These pictures are commonly used in research on implicit motivation (e.g., Brunstein & Maier, 2005; Job & Brandstätter, 2009; Smith, 1992). Two trained scorers coded all TAT protocols according to Winter's (1994) *Manual for Scoring Motive Imagery in Running Text*. In addition to the implicit power motive, the implicit achievement motive and the implicit affiliation motive were also coded. Inter-rater category agreement (cf. Brunstein & Maier, 2005) was adequate, with .83 for the implicit achievement motive, .91 for the implicit affiliation motive, and .83 for the implicit power motive. Scoring disagreements were discussed and solved by consensus. Raw motive scores were correlated with protocol length (for achievement: $r = .45$, $p = .001$; for affiliation: $r = .50$, $p = .001$; for power: $r = .23$, $p = .06$). In accordance with Smith, Feld, and Franz's (1992) procedure, we therefore corrected the raw scores of protocol length by using regression.

All participants watched a 2-min scene that involved the exertion of power (as evaluated previously by motivational experts; cf. Rawolle, 2006) taken from the film *Dead Poets Society* (Witt & Thomas, 1989). The scene shows a dialogue between Neil, a student who loves and excels at acting, and his strict father, who prohibits him from pursuing acting any longer. The father exerts power and control over his son, which results in the son's resignation. Participants were then randomly assigned either to an acting condition (treatment group) or to a writing condition (control group). In the *acting* condition, two persons were involved: a real participant and our confederate. Participants were asked to enact the scene, playing the role of the father while our confederate played the role of the son. They received the scenario and had time to prepare. After approximately 5 min, they were asked to enact the scene in front of a video camera. Participants in the *writing* condition were asked to write down the dialogue as closely as they could remember it.³

Thereafter, participants completed a manipulation check by rating how effortful the task was on a 10-point scale (ranging from *not at all* to *extremely*). They were also asked to complete Brunstein's (1993) mood adjective checklist to measure their current mood level. The checklist consists of four positive mood items (e.g., happy or joyful) and four negative mood items (e.g., sad or dissatisfied) that are rated on a 7-point scale ranging from 1 (*not at all*) to 7 (*extremely*).

Subsequently, ego depletion was measured using the suppress-emotion condition adopted from Muraven et al. (1998). Participants watched a humorous 8-min video consisting of scenes taken from the computer-animated films *Ice Age* (Forte, 2002) and *Ice Age: The Meltdown* (Forte, 2006). The

scenes present a prehistoric saber-toothed squirrel called Scrat trying to obtain and store his prized acorn; these scenes are known as the most humorous parts of the film. However, we told participants to avoid showing any signs of amusement (e.g., laughing and smiling) while watching the video. Participants' facial expressions were videotaped for subsequent coding. A student assistant unaware of the study conditions, the primary coder, judged how much each participant smiled and laughed. To obtain a measure of ego depletion, we aggregated the coder's ratings. The total amount of unwanted smiling and laughing represented participants' success at controlling their amusement, with more amusement representing more ego depletion. To assess inter-rater reliability, all videos were double coded by another student assistant unaware of the study's intent. Inter-rater category agreement was .82, which indicates that the raters agreed reasonably well on how well participants were able to control their emotional responses. Finally, participants were debriefed, paid, and dismissed.

Results

Preliminary Analyses. A one-way analysis of variance (ANOVA) revealed no statistical differences between the two study conditions with respect to age, gender, or motive scores. Furthermore, there were no significant differences between men and women except that men scored higher than women on the implicit achievement motive, $F(1, 65) = 5.26, p = .03, f = 0.28$, and women scored marginally higher than men on the implicit affiliation motive, $F(1, 65) = 2.81, p = .10, f = 0.21$.⁴ Controlling for gender and age in the following analyses did not significantly affect any of the results. Therefore, we will not discuss gender or age any further.

Manipulation Check. Participants were asked to rate how effortful it was to enact or to write down the dialogue. They found it significantly more effortful to enact the dialogue ($M = 5.76$) than to write down the dialogue ($M = 4.32$), $F(1, 65) = 8.63, p = .01, f = 0.36$. Moreover, participants in the acting condition showed significantly more amusement (i.e., more ego depletion; $M = 1.30$) than participants in the writing condition ($M = 0.59$), $F(1, 65) = 4.11, p = .04, f = 0.26$. These findings confirm that more exertion was required to enact the dialogue than to write it down.

Implicit Power Motive and Amusement. The main dependent variable was the unwanted amusement while watching the funny movie. We predicted that the implicit power motive would moderate self-control exertion on acting out the power dialogue, resulting in more amusement by participants low on the implicit power motive and in less amusement by participants high on the implicit power motive.

To test our hypothesis, a hierarchical regression analysis was conducted with amusement as the dependent variable. The implicit power motive and the dummy-coded study condition variable (acting condition = 1, writing condition = 0) were

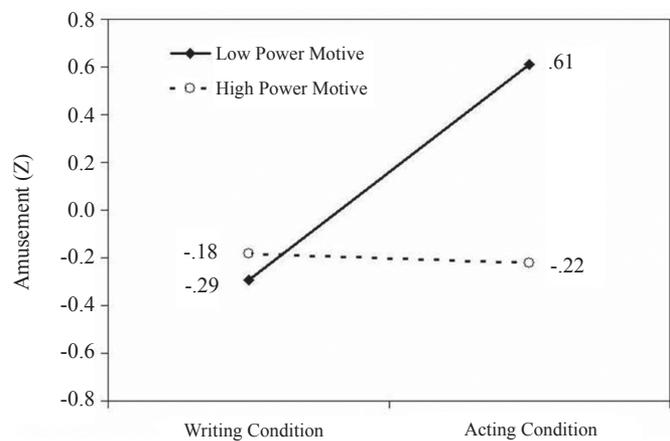


Figure 1 Study 1: Unwanted amusement as a function of implicit power motive and study condition.

entered as the first block, and their interaction term was entered as the second block in the regression equation. The predictor variables were standardized before their interaction term was calculated. The findings showed a marginally significant main effect of study condition, $\beta = .22, t(64) = 1.86, p = .07$, but no significant main effect of the implicit power motive, $\beta = -.19, t(64) = -1.56, p = .13$. In line with our predictions, we found a significant interaction of implicit power motive and study condition, $\beta = -.24, t(63) = -2.04, p = .04$. Unstandardized regression weights computed with a range of ± 1 standard deviation on the implicit power motive were used to illustrate this interaction effect (see Figure 1). The impact of prior self-control on amusement varied as a function of the implicit power motive. Consistent with our hypothesis, after enacting the power scene, participants low on the implicit power motive showed more amusement than participants high on the implicit power motive or than the participants in the writing condition.

Simple slope analyses (O'Connor, 1998) revealed that, among participants low on the implicit power motive, enacting the power dialogue led to significantly more amusement than writing the dialogue down, $t(63) = 2.82, p = .01$. Conversely, participants high on the implicit power motive who had enacted the power dialogue did not differ in amusement from their counterparts who had written the dialogue down, $t(63) = -0.11, p = .91$.

Implicit Achievement and Affiliation Motives. We computed the above interaction analyses with the implicit achievement motive as a predictor. Neither the implicit achievement motive nor its interaction with study condition yielded a significant effect on amusement, $\beta = .12, t(64) = 0.97, p = .34$, and $\beta = .02, t(63) = 0.13, p = .90$, respectively. Similarly, no significant main or interaction effects were found with the implicit affiliation motive as a predictor, $\beta = .05, t(64) = 0.37, p = .71$, and $\beta = .02, t(63) = 0.17, p = .86$, respectively.

Mood. We computed separate hierarchical regression analyses on effort and mood responses to performing the initial task, with implicit power motive and study condition entered as the first block and their interaction entered as the second block. There were no significant main effects of implicit power motive, $\beta = .03$, $t(64) = 0.24$, $p = .81$, or study condition, $\beta = .04$, $t(64) = 0.32$, $p = .75$, and there was no significant interaction between them, $\beta = .07$, $t(63) = 0.54$, $p = .59$, on positive mood. Similarly, there were no main effects of implicit power motive, $\beta = -.04$, $t(64) = -0.28$, $p = .78$, or study condition, $\beta = -.01$, $t(64) = -0.05$, $p = .96$, and there was no significant interaction between them, $\beta = -.05$, $t(63) = -0.35$, $p = .73$, on negative mood. In addition, participants' performance in suppressing emotions was unrelated to participants' self-reported positive ($r = -.03$, $p = .82$) and negative moods ($r = -.06$, $p = .65$). Hence, participants in both study conditions felt equally good regardless of their implicit power motive; therefore, any difference in unwanted amusement was not due to differences in mood state.

Perceived Effort. Enacting the power dialogue was perceived as being much more effortful than writing it down, $\beta = .34$, $t(64) = 2.87$, $p = .01$. However, these differences were not due to differences in the implicit power motive. Neither the main effect of implicit power motive nor its interaction with study condition yielded a significant effect on participants' self-reported response about how effortful the initial task was, $\beta = -.03$, $t(64) = -0.26$, $p = .80$, and $\beta = -.15$, $t(63) = -1.24$, $p = .22$, respectively. In addition, participants' performance in suppressing emotions was unrelated to self-reported effort, $r = .04$, $p = .75$. Hence, the moderating effect of the implicit power motive on controlling emotional responses was independent of perceptions of effort.

Discussion

The results of Study 1 provided initial evidence that implicit motives moderate self-control exertion in a motive-related self-control task. This experiment manipulated power incentives and self-control exertion by having participants either write down or actually enact a high-powered dialogue that involved exerting dominance over another person in front of a video camera. Participants in the acting condition were subsequently less successful at controlling their emotional responses when watching a funny movie as compared to participants who simply reproduced the dialogue by writing it down. These findings are in accordance with the strength model of self-control (Muraven et al., 1998). Moreover, and even more important, we found that the implicit power motive moderated the exertion of self-control while enacting the power dialogue, as indicated by impaired self-control performance on the subsequent suppress-emotion task: Participants in the acting condition who were low on the implicit power motive showed significantly less success at controlling their emotional responses than their counterparts who were high on the

implicit power motive, as well as less success than participants in the writing condition. Thus, it seems likely that an aroused implicit power motive made the acting task produce less conflict because participants who were high on the implicit power motive performed a motive-congruent behavior, which resulted in a reduced necessity for self-control during the acting task and subsequently in less ego depletion. The writing condition did not require either a display of powerful behavior or a great deal of self-control. Hence, in the writing condition, subsequent self-control performance did not differ between participants high and low on the implicit power motive. All of the above findings were unrelated to mood state or perceived effort. Further, it seems important to note that the implicit achievement motive as well as the implicit affiliation motive did not predict or moderate the ego depletion effect. Neither the acting condition nor the writing condition included achievement or affiliation incentives. Therefore, these findings confirm that implicit motives moderate self-control exertion in only motive-related tasks, but not in motive-unrelated tasks.

STUDY 2

Study 2 sought to provide further evidence for the notion that implicit motives moderate self-control exertion in motive-related self-control tasks by using a quite different procedure. This time, we focused on the implicit achievement motive and the achievement domain. Participants performed one or the other version of an achievement-related sensorimotor task. Both tasks provided achievement incentives such as challenge, achievement-related work contents, and time pressure (cf. Spangler, 1992) and were approximately of the same time duration. However, the two tasks differed in their demands for self-control. One version included abrupt, unpredictable changes that frustrated the person's attempt to perform well, whereas the other version did not contain any frustrating changes and was relatively smooth and easy to master. Overcoming frustration has been repeatedly shown to require a great deal of self-control exertion (e.g., Baumeister et al., 1998, Muraven et al., 1998; Tice et al., 2007). Accordingly, we predicted a stronger ego depletion effect after the frustrating task than after the simple nonfrustrating task. We further predicted that the implicit achievement motive would moderate the ego depletion effect in the frustrating task condition, but not in the simple task condition.

The implicit achievement motive has been found to affect performance on a variety of achievement tasks (Spangler, 1992). This effect is believed to be mediated by enhanced persistence rather than by superior skill (cf. McClelland, 1987). The initial task was fixed in duration and hence did not allow for differences in persistence, but it seemed nevertheless important to control for participants' effort on the initial task. Both versions of the sensorimotor task in the current experiment represented standardized tests included in the Vienna Test System software (Schuhfried, 2010), which automatically

computed standardized performance scores (i.e., T-scores). Hence, we were able to control for the person's initial performance.

Ego depletion was assessed by using the Stroop test, a classic instrument for testing self-control, as it assesses the ability to inhibit overlearned answers to simple tasks. Participants were instructed to name the color of the ink used to write a series of color words. The meaning of these color words was either congruent (e.g., the word *blue* appearing in blue ink) or incongruent with the color of the ink used to write the word (e.g., the word *blue* appearing in red ink). Correctly naming the ink color takes longer when the ink color is incongruent rather than congruent with the meaning of the word. This is called *Stroop interference*. Because the Stroop test requires inhibiting automated answers based on semantic processing, reduced Stroop interference represents better self-control performance. Accordingly, Stroop interference has been successfully used in research on ego depletion (e.g., Gailliot et al., 2007; Job, Dweck, & Walton, 2010; Webb & Sheeran, 2003).

Method

Participants. Seventy-four college students participated for a payment of €10. Three participants showed poor initial performance (i.e., T-scores⁵ below 40) on the frustrating ($n = 2$) or the simple task ($n = 1$). Because we could not be sure whether these participants were truly committed to the tasks, they had to be dropped from the sample, leaving 71 students (49 women and 22 men) in the final sample, with a mean age of 23.5 years. Participants were tested in individual sessions of approximately 50 min.

Procedure. Participants were briefed about the study and signed informed consent forms. They were told that the purpose of the study was to examine the relationship between creativity and various sensorimotor skills. Then participants' implicit achievement motive was measured with the same method as in Study 1. Inter-rater category agreement was adequate, with .87 for the implicit achievement motive, .92 for the implicit affiliation motive, and .84 for the implicit power motive. Consensus was sought by discussion to resolve scoring disagreements. Raw motive scores were correlated with protocol length (for achievement: $r = .39$, $p = .001$; for affiliation: $r = .27$, $p = .02$; for power: $r = .10$, $p = .39$). As in Study 1, we corrected the raw scores of protocol length by using regression.

Next, participants were randomly assigned to either the frustrating task or the simple task condition. In the *frustrating task* condition, participants performed the standardized Sensorimotor Coordination Test, which is a part of the Vienna Test System software (Schuhfried, 2010). The participants' task was to maneuver an element (i.e., yellow circular segment) to a specific preset goal (i.e., green bars forming an upside-down T), but the element moved on its own. Hence, the participants had to react adequately to the element's abrupt, unpredictable

changes of direction and size. Because of these changes, the task was very frustrating, as it was almost impossible to hold the element in the target position for much time. The task was performed on a computer with a special joystick and took 20 min, including a 5-min instruction and practice phase. Participants in the *simple task* condition performed the standardized Motor Performance Series, which is another test of sensorimotor ability included in the Vienna Test System software. Using a special work panel, the participants' task was to track lines, to insert pins into small holes, to aim a stylus into different grooves, and to perform a tapping exercise using the right and then the left hand. The task was straightforward and relatively easy to master because there were no changes or complications to frustrate the performers' efforts. It took about 20 min (including a 5-min instruction and practice phase) to complete the task.

Participants then completed a manipulation check by rating how effortful the task was on a 10-point scale that ranged from 1 (*not at all*) to 10 (*extremely*). They also completed Brunstein's (1993) mood adjective checklist to measure their current mood level.

Finally, a computerized version of the Stroop test (the dependent measure) was administered using the Vienna Test System software (Schuhfried, 2010). Color words (*red*, *green*, *yellow*, and *blue*) appeared on a computer screen in a font color that was either congruent or incongruent with their meaning. The participants' task was to press the correct color button for the font used to write the word as quickly as possible. The outcome variable was Stroop interference, which is the difference in the median reaction times between incongruent and congruent trials. Hence, high Stroop interference represents poor self-control performance (i.e., more ego depletion). The test took about 8 min, including a 2-min instruction and practice phase. The experimenter then debriefed, paid, and dismissed the participants.

Results

Preliminary Analyses. A one-way ANOVA revealed no statistical differences between the two study conditions with regard to age, gender, and motive scores. Furthermore, there were no significant differences between men and women, except that men scored higher than women on the implicit power motive, $F(1, 69) = 8.90$, $p = .01$, $f = 0.36$. Since controlling for gender and age in the following analyses did not significantly affect any of the results, we will not discuss gender or age any further here.

Manipulation Check. Participants were asked to rate how effortful the initial task was. Participants in the frustrating task condition perceived the task to be significantly more effortful ($M = 7.31$) than participants in the simple task condition ($M = 4.36$), $F(1, 69) = 48.58$, $p = .001$, $f = 0.84$. Moreover, participants in the frustrating task condition showed significantly higher Stroop interference ($M = .063$) than those in the

simple task condition ($M = .037$), $F(1, 69) = 6.98$, $p = .01$, $f = 0.32$. This finding is in line with the strength model of self-control (Baumeister et al., 2007; Muraven et al., 1998). These findings confirm that the frustrating task required a greater degree of self-control exertion than the simple task.

Initial Performance. According to participants' T-scores, participants in the frustrating task condition ($M = 54.29$) showed about the same initial performance as participants in the simple task condition ($M = 52.81$), $F(1, 69) = 1.65$, $p = .20$, $f = 0.15$. Hence, the two groups did not differ with respect to their level of sensorimotor skills and were equally committed to the task. Also, the implicit achievement motive was unrelated to performance on the initial task ($r = -.01$, $p = .96$). An additional hierarchical regression analysis showed no significant interaction effect between the implicit achievement motive and study condition on initial performance, $\beta = -.18$, $t(67) = -1.42$, $p = .16$, indicating that participants in the two study conditions worked equally well on the task regardless of the level of their implicit achievement motive. Notably, initial performance was slightly correlated with Stroop interference ($r = .23$, $p = .06$), suggesting that working better on the initial task led to somewhat poorer subsequent performance. We therefore controlled for initial performance in all further analyses.

Implicit Achievement Motive and Stroop Performance.

The main dependent variable was performance on the Stroop test. We hypothesized that the implicit achievement motive would moderate self-control exertion in the preceding frustrating task, resulting in higher Stroop interference on the subsequent task (i.e., more ego depletion) for participants who were low compared to high on the implicit achievement motive. To test our hypothesis, a hierarchical regression analysis was conducted with Stroop interference as the dependent variable. Initial task performance was entered as the first block, implicit achievement motive and dummy-coded study condition (frustrating task condition = 1, simple task condition = 0) were entered as the second block, and their interaction term was entered as the third block of the regression equation. Predictor variables were standardized before calculating their interaction term. The main effect of study condition turned out to be significant, $\beta = .28$, $t(67) = 2.44$, $p = .02$. By contrast, there was no main effect of implicit achievement motive, $\beta = -.11$, $t(67) = -0.99$, $p = .33$.

In line with our predictions, there was a significant interaction effect between implicit achievement motive and study condition on Stroop performance, $\beta = -.31$, $t(66) = -2.65$, $p = .01$. Unstandardized regression weights computed with a range of ± 1 standard deviation on the implicit achievement motive were used to illustrate this interaction effect (see Figure 2). The impact of prior self-control on Stroop interference varied as a function of the implicit achievement motive. As predicted, participants in the frustrating task condition who were low on the implicit achievement motive showed higher

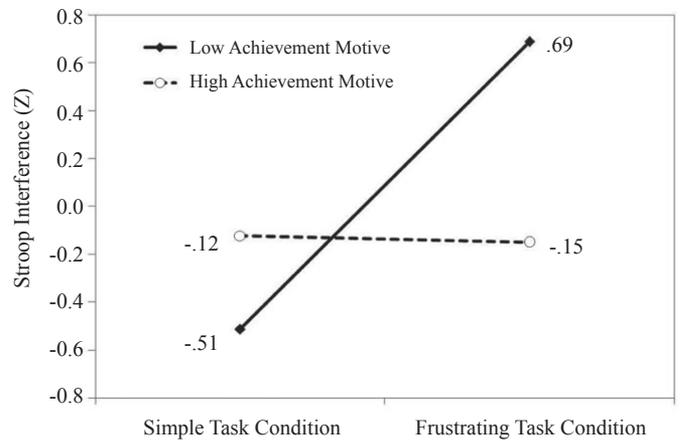


Figure 2 Study 2: Stroop interference as a function of implicit achievement motive and study condition.

Stroop interference when compared to participants who were high on the implicit achievement motive and participants in the simple task condition.

Simple slope analyses (O'Connor, 1998) revealed that among participants low on the implicit achievement motive, performing the frustrating task led to significantly higher Stroop interference than performing the simple task, $t(66) = 3.65$, $p = .001$. Conversely, participants high on the implicit achievement motive who had performed the frustrating task did not differ in Stroop interference from participants in the simple task condition, $t(66) = -0.25$, $p = .80$.

Implicit Affiliation and Power Motives. We conducted the above analyses with the implicit affiliation motive as a predictor. Neither the implicit affiliation motive nor its interaction with study condition yielded a significant effect on Stroop performance, $\beta = .01$, $t(67) = 0.06$, $p = .95$, and $\beta = -.05$, $t(66) = -0.39$, $p = .70$, respectively. Similarly, no significant main or interaction effects were found when the implicit power motive was used as the predictor, $\beta = -.08$, $t(67) = -0.68$, $p = .50$; $\beta = .10$, $t(66) = 0.82$, $p = .42$, respectively.

Mood. We conducted separate hierarchical regression analyses on effort and mood responses to performing the initial task, with the implicit achievement motive and study condition entered as the first block and their interaction entered as the second. There were no significant main effects of implicit achievement motive, $\beta = .04$, $t(67) = 0.32$, $p = .75$, or study condition, $\beta = -.14$, $t(67) = -1.14$, $p = .26$, and there was no significant interaction effect between them, $\beta = -.03$, $t(66) = -.23$, $p = .82$, on positive mood. Similarly, there were no significant main effects of implicit achievement motive, $\beta = -.12$, $t(67) = -0.99$, $p = .33$, or study condition, $\beta = .10$, $t(67) = 0.79$, $p = .44$, and there was no significant interaction effect between them, $\beta = .05$, $t(66) = 0.35$, $p = .73$, on negative

mood. In addition, Stroop interference was unrelated to participants' self-reported positive ($r = -.05, p = .68$) or negative mood ($r = .05, p = .67$). Hence, after performing the initial task, participants in the two study conditions felt equally good regardless of their implicit achievement motive. Therefore, any differences in Stroop performance were not due to differences in mood state.

Perceived Effort. Performing the frustrating task was perceived as being significantly more effortful than performing the simple task, $\beta = .65, t(68) = 7.16, p = .001$. However, these differences were not due to differences on the implicit achievement motive. Neither the main effect of implicit achievement motive nor its interaction with study condition yielded a significant effect on participants' self-reported response about how effortful the initial task was, $\beta = -.17, t(68) = -1.86, p = .07$, and $\beta = .14, t(67) = 1.51, p = .14$, respectively. In addition, Stroop interference was unrelated to self-reported effort, $r = .15, p = .22$. Hence, the moderating effect of the implicit achievement motive on Stroop performance was independent of participants' effort perceptions.

Discussion

The results of Study 2 provided further support for the proposition that implicit motives moderate self-control exertion in a motive-related self-control task.⁶ After having performed a frustrating achievement-related task, participants low on the implicit achievement motive showed higher Stroop interference on a subsequent task as compared to participants high on the implicit achievement motive as well as compared to participants in the simple task control condition. Apparently, the latter group exerted less self-control than the former group while performing the frustrating task, leaving more resources available for the subsequent self-control task. These differences in Stroop performance were independent of participants' initial performance, mood state, and perceptions of how effortful the initial task was. However, Stroop performance was affected by how much self-control the initial task required. The simple task did not call for a great deal of self-control; hence, the implicit achievement motive could not play a significant role. Once self-control was required, however, as it was for the frustrating task, the implicit achievement motive moderated the exertion of self-control. Participants low on the implicit achievement motive who were supposed to be less consonant with the frustrating achievement-related task showed poorer performances on the subsequent self-control task than participants high on the implicit achievement motive. Additionally, neither the implicit affiliation motive nor the implicit power motive predicted Stroop interference. These results support the notion that implicit motives moderate self-control exertion in self-control tasks that are motive related, but not in easy or motive-unrelated tasks.

GENERAL DISCUSSION

The aim of the present research was to examine whether implicit motives may moderate the effect of an initial task requiring self-control on a subsequent self-control task under the condition that the respective implicit motives are congruent with the initial self-control task. Study 1 manipulated power incentives and self-control by having participants in the treatment group perform a difficult dialogue, which included enacting a high-powered role by expressing power over another person in front of a video camera. In line with our predictions, participants high on the implicit power motive were subsequently more successful at controlling their emotional responses as compared to participants low on the implicit power motive. Participants in the control group did not enact the dialogue, but instead reproduced it by writing it down. As expected, participants in the control group did not differ in success at suppressing their emotional responses regardless of their level of implicit power motive. Study 2 involved performing either a frustrating or a simple version of a sensorimotor task, both of which provided achievement incentives. Relative to participants in the simple task condition, participants who had worked on the frustrating task performed worse on a subsequent Stroop task, indicating ego depletion. However, in the frustrating task condition, participants high on the implicit achievement motive were less depleted and performed better on the subsequent Stroop task.

First and foremost, the results of the two experiments reported here add further support to the strength model of self-control (Baumeister et al., 2007; Muraven et al., 1998). Participants who had to exert self-control on a task by presenting themselves in a high-powered role in front of a video camera (Study 1) and by overcoming frustrations (Study 2) showed poorer self-control performance on a subsequent seemingly unrelated self-control task than participants who did not have to exert self-control on the preceding task. These differences were not attributable to mood state because the moods of the participants did not differ between the treatment and control conditions in both studies.

Second, and even more important, the results of our two experiments extended prior research on motivation and self-control by showing that implicit motives that were aroused while participants performed the motive-related self-control tasks alleviated the exertion of self-control. Participants high on the implicit power motive (Study 1) and the implicit achievement motive (Study 2) were less depleted after performing their respective motive-related self-control tasks when compared to participants low on the respective implicit motive. This is especially novel, as no previous research has examined how much self-control people exert while mastering tasks that arouse their implicit motives. Based on Kehr's (2004b) proposition that implicit motives play a role in how much volitional self-control is exerted on motive-related self-control tasks, we speculated that cognitive preferences, such as the cognitive preference to meet the experimenter's request and enact a

high-powered role involving the exertion of a lot of pressure on another person (in Study 1) or to master a difficult and potentially frustrating task (in Study 2), do not cause internal conflict and hence require less or no volitional self-control if they are matched with the implicit motives aroused by the task at hand. The findings from the research reported here confirm that a difficult task (i.e., a task requiring self-control) does not need to be exhausting if it fits a person's implicit motives. Conversely, effortful self-control with its ego-depleting consequences is needed if the task at hand does not match a person's implicit motives or, what might be even worse, if the person's implicit motives are aroused but are not in line with the task at hand. For instance, if a self-control task is in the achievement domain, an aroused implicit achievement motive would make a subsequent depletion effect less likely, but an aroused implicit affiliation motive (e.g., by a sympathetic experimenter) would not. Similarly, a depletion effect can be expected if a person's implicit motive, for example, her implicit power motive, is aroused, but situational constraints call for suppressing the aroused motive.

To be sure, the important question is whether the task at hand indeed provides specific incentives that will arouse the person's implicit motives; if so, internal conflict will be reduced and less exertion of self-control will be required. Performing a task that is generally perceived as frustrating might in fact be perceived as fulfilling by individuals high on the implicit achievement motive, but only if the task provides ample achievement-related incentives. Similarly, expressing high and perhaps even socially less accepted levels of power behavior against others might be perceived as self-congruent for individuals high on the implicit power motive, thus resulting in less internal conflict and less necessity for self-control.

An alternative explanation for our findings is that the arousal of implicit motives on the first task made people more willing to exert self-control on the second task. Recently, Inzlicht and Schmeichel (2012) proposed a process model that attributes ego depletion to shifts in motivation. They argued that the ego depletion effect is caused by motivational deficits rather than by depleted self-control resources. According to this model, exerting self-control at Time 1 makes people less motivated to exert self-control at Time 2; this does not mean that they cannot control themselves but rather that they *choose* not to. Hence, self-control resources are still available, but their further allocation depends on the person's motivational state. Applied to the findings of the present research, it is possible that those participants in the treatment groups who experienced motive-arousing incentives during the initial task were willing to invest further effort and to continue allocating resources despite their previous efforts in exerting self-control.

Our findings that implicit motives moderate the ego depletion effect provide evidence for motivational mechanisms involved in self-control exertion and fit well with the alternative explanation described above. Indeed, we suppose that the propositions provided by Kehr (2004b) and the explanations presented by Inzlicht and Schmeichel (2012) are complemen-

tary. Experiencing motive-arousing incentives while executing an otherwise difficult task that requires self-control produces less conflict and reduces the inner urge to quit. The person may not necessarily perceive the task as being less effortful, but rather as more intrinsically motivating. Accordingly, the person need not restrain him- or herself as much as somebody who has to overcome an internal behavioral conflict in addition to mastering the task. Moreover, the strenuous but at the same time motivating experience allows the person to stay motivated, which, in turn, may make the person more willing to invest further effort into a subsequent task. By contrast, performing tasks that do not arouse one's personal needs reduces one's intrinsic motivation (Deci & Ryan, 2000) and may cause internal conflict (Kehr, 2004b), resulting in less willingness to engage in subsequent self-control.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Some limitations deserve mention. The moderating effect of implicit motives found here would probably not apply to severe self-control exertion. For example, Baumeister and Vohs (2007) reported a study in which individuals performed an effortful task in which choices were made for 4 or 12 min. When the task was brief, those who enjoyed the task showed little or no sign of depletion. When the choice task was extended to 12 min, however, all participants showed signs of depletion regardless of whether they had liked or disliked the task. Similarly, Vohs, Baumeister, and Schmeichel (2012) showed that increased motivation prevented ego depletion among participants who had completed one self-control task only, but failed to regulate ego depletion among severely depleted participants who had completed multiple self-control tasks. Accordingly, as found in the present research, the arousal of implicit motives may have substantial effects on self-control exertion under conditions of moderate self-control demands. Under conditions of severe self-control demands, however, aroused implicit motives would probably have less or no effect at all. Note that this limitation of the influence of motives on behavior is typical in so-called *strong situations* (cf. Cooper & Withey, 2009), in which the influence of differential motives disappears because situational cues are so intense and affect all individuals in the same way regardless of individual preference patterns.

Furthermore, the moderating effect of implicit motives is limited to motive-related tasks only. In our studies, self-control exertion in motive-unrelated tasks was not affected by implicit motives. Study 1 showed that the implicit power motive moderated the ego depletion effect after participants engaged in behavior that involved expressing power, but not after a rather neutral writing task that did not require any power-related action. In addition, neither the implicit achievement motive nor the implicit affiliation motive predicted or moderated ego depletion after the power-related task in Study 1. Similarly, in

Study 2, neither the implicit affiliation motive nor the implicit power motive moderated self-control exertion in the frustrating achievement-related task. This suggests that scholars interested in studying the relation between motivation and self-control exertion should either employ self-control tasks that provide motive-related incentives or manipulate other types of motivational stimuli, such as rewards or meaningfulness.

Finally, the underlying mechanism of exactly how implicit motives affect subsequent self-control is still not entirely clear. There are two possible mechanisms. Aroused implicit motives may reduce the necessity for self-control during the initial task (i.e., self-control resources are depleted to a lower degree) or they may prolong a person's willingness to exert self-control on the subsequent task (i.e., disengagement is prevented), or both. In our study, the subjective, self-reported effort does not seem to provide information to answer this question, as there was no interaction effect of implicit motives and study conditions on self-reported effort. However, aroused implicit motives are primarily active in subconscious rather than conscious processes and, hence, the relevant effects may be subconscious. Consequently, future research may use more subtle, nonconscious signs of effort exertion in order to shed light on the mediating processes. For example, beta-adrenergic sympathetic impact on the heart responds sensitively and proportionally to the level of task demands and reflects effort (Gendolla, Wright, & Richter, 2012). Future research should therefore include cardiac reactivity (e.g., the reactivity of systolic blood pressure; Gendolla et al., 2012) as an indicator of more objective, physiological effort. In addition, implicit measures of affect should also be included in this line of research.

CONCLUSION

Self-control exertion is a product of an individual's motivation to perform a task and meet its self-control demands. In accordance with Kehr's (2004b) compensatory model of motivation and volition, we found that individuals whose implicit motives matched the task at hand had more self-control left in reserve for a subsequent task presumably because they exerted less self-control on the preceding task. Conversely, individuals whose implicit motives did not match the task had less self-control left in reserve for a subsequent task presumably because they exerted more self-control on the preceding task in order to compensate for their insufficient motivation. Providing motivational incentives that match a person's implicit motives or trying to improve the person's self-motivation skills may therefore be direct practical implications that can be directed toward optimizing the person's self-management proficiency (cf. Kehr & von Rosenstiel, 2006).

Notes

1. In principle, this line of argument may also apply to the second stage of the dual-task paradigm. A person who is depleted due to an

initial self-control task, but is nonetheless intrinsically motivated for a subsequent self-control task, would probably experience less internal conflict in a subsequent task, and therefore be more willing to master it, than a person who is depleted and not intrinsically motivated. Hence, it is possible that enhanced intrinsic motivation reduces internal conflict and thereby moderates the exertion of self-control in both the first and second stages of the dual-task research paradigm. The present research focused on the initial stage and its underlying motivation.

2. To measure implicit motives, Kehr (2004a) used a semi-projective instrument—the Multi-Motive Grid (MMG; Sokolowski, Schmalz, Langens, & Puca, 2000)—in his pilot research with managers rather than a projective measure such as the Thematic Apperception Test (TAT; cf. Smith, 1992) because of “high drop-out rates on the TAT” (Kehr, 2004a, p. 319). Although the MMG may predict effects similar to those of the TAT (cf. Kehr, 2004a; Schüler, Job, Fröhlich, & Brandstätter, 2008), the two measures share only small portions of variance (cf. Brunstein & Heckhausen, 2008; Schultheiss, Yankova, Dirlikov, & Schad, 2009). According to recent research on the measurement of implicit motives (Schultheiss, 2008; Schultheiss & Pang, 2007), implicit motives should preferably be measured using projective instruments such as the TAT, since these instruments are more appropriate for valid assessment of the operant, nondeclarative aspect of the construct “implicit motive.” Therefore, we decided to use the TAT for the present research.

3. While rewriting the dialogue might also arouse and perhaps satisfy the power motive, this effect should be relatively small compared to a real social situation involving real power over real people. Indeed, the TAT scoring procedure (cf. Winter, 1994) is based on the notion that an aroused implicit motive by writing a story may affect the next sentence (which is why the next sentence must not be coded if it contains the same motive). However, motive arousal by writing the sentence is not considered strong or stable enough to affect the whole story for this picture (which is why the next sentence but one is coded again if it still pertains to the same motive) or to spill over to the story of the next picture. Hence, it seems rather unlikely that motive arousal from writing a story would be strong enough to affect a subsequent part of an experiment. Therefore, we believe that motive arousal in the acting condition was substantially higher than in the writing condition.

4. By convention, *f* effect sizes of 0.10, 0.25, and 0.40 are considered small, medium, and large, respectively (Cohen, 1988).

5. The T-score is a standardized score that is calculated from the total distribution of scores within the reference group. The T-score makes it possible to compare a person's individual performance against norms from an equivalent age, gender, and education-level group. A T-score of 50 represents the mean, and a difference of 10 from the mean indicates a difference of one standard deviation. The T-score enabled us to compare the initial performance between participants who mastered the frustrating or the simple sensorimotor task.

6. Unlike Study 1, for which the motive-relevant task was motive-satisfying, the corresponding task in Study 2 was somewhat frustrating. This raises the question of whether a frustrating task can also arouse the respective implicit motive. Although the task in Study 2 was frustrating, we are not sure if it should be considered “motive-

frustrating.” According to our view, a motive-frustrating task would be one that arouses implicit motive but does not a priori allow motive satisfaction or success in this task (e.g., an unsolvable puzzle). However, in the sensorimotor task used here, participants repeatedly experienced success since they all managed to move the element to the target position several times (according to their scores). The task was also frustrating because, after reaching the target position, participants had to maintain their effort at a high level in order to control the element, lest it move away due to unpredictable, automatic changes. Thus, participants repeatedly experienced both success and frustration. According to Schultheiss and Brunstein (2005), such a task is likely to arouse rather than frustrate the achievement motive.

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