RUNNING HEAD: Switching Mindsets Exhausts Executive Resources

# Being of Two Minds: Switching Mindsets Exhausts Self-Regulatory Resources

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WORD COUNT FOR MAIN TEXT, NOTES, and ACKNOWLEDGEMENTS = 4,947

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## Abstract

The human psyche is equipped with the capacity to solve similar problems in different ways. Social psychologists describe the different, complementary mental states that enable a person to reach a given end as mindsets. Mindset theories rest on the assumption that people can and do switch mindsets and that doing so requires a drastic change in perspective. Given the importance of being able to switch mindsets, it is surprising that the process that enables mindset switching to occur has gone uninvestigated. We propose that mindset switching is an executive function that relies on the same psychological resource that governs other acts of executive functioning, such as self-regulation. This perspective predicts that there are psychic costs to switching mindsets, such that switching mindsets, relative to maintaining a consistent mindset, consumes regulatory resources and thereby leaves people likelier to fail at subsequent self-regulation. Four experiments testing four types of mindset switches provides evidence for a general theory of mindset switching.

People have the remarkable ability to solve similar types of problems in different ways. In the physical world, one can use different tools to complete the same task. In the psychological world, one can use different mental states to accomplish a goal. These mental states, broadly referred to as mindsets, consist of mental processes that result in a general disposition or readiness to respond in a certain manner (Gibson, 1941; Gollwitzer, 1990). In a given situation, activating one mindset instead of another can change the preferences people have, the judgments they form, the decisions they make, and their satisfaction with the outcomes of these decisions (Freitas, Gollwitzer, & Trope, 2004; Stapel & Koomen 2001).

Mindset theories rest on the assumption that people are not locked into a single *modus operandi* but are able to switch mindsets depending on the nature of the task they face. Unlike a strong preference such as handedness, people seem ready and able to adopt different mindsets depending on situational demands. Although there is ample evidence that people can and do switch mindsets, little is known about how such switching takes place. We propose that switching mindsets is an act of executive control and, as such, is governed by the same psychological mechanism that enables other forms of executive functioning. This perspective predicts that there are psychic costs to switching mindsets, such that switching mindsets, relative to maintaining a consistent mindset, consumes regulatory resources and thereby leaves people likelier to fail at subsequent self-regulation.

## Switching Mindsets and Executive Functioning

Mindsets have been invoked to explain a number of psychological phenomena, dating back to some of the earliest days of modern psychology (Ach, 1905; Chapman, 1932). Recently, the use of mindset terminology has grown increasingly popular in theory development in areas as diverse as inference making (Fiedler, Schenck, Watling, & Menges, 2005), interpersonal

relationships (Gagne & Lydon, 2001), stereotyping (Sassenberg & Moskowitz, 2005), and fairness (Van Den Bos, 2002). In addition, many theories do not explicitly invoke the term "mindset" but nonetheless propose that people routinely engage in one of two or more qualitatively different cognitive operations when engaging in the same activity (e.g., Avnet & Higgins, 2003; Freitas et al., 2004; Higgins, 1997; Trope & Liberman, 2003).

Mindset theories are diverse in content but share a common assumption about the underlying process: Given that different mindsets require approaching the world in drastically different ways, it is difficult to simultaneously activate and use more than one mindset at one time, much as it is difficult to simultaneously focus the eye on something far away and up close. Hence, when one mindset is active, using another mindset necessarily requires switching from the first. Although the assumption that people can switch mindsets is ubiquitous, mindset theories have scarcely addressed how this switching takes place.

The current research proposes that switching mindsets is an act of the executive function, an aspect of the self that also governs self-regulation (Baumeister, 1998) and decision making (Vohs et al., 2008). We define self-regulation as the self's exerting control in order to change habitual, natural, or dominant responses. A recent model of self-regulation suggests that diverse acts of self-control use a common—but finite—executive resource (Baumeister & Heatherton, 1996). According to this limited-resource model, each act of self-regulation consumes some of this resource, thereby leaving a smaller supply for subsequent attempts at self-regulation. Furthermore, when taxed, people are vulnerable to failures of self-control, including failure to persist at challenging tasks, keep one's diet, or maintain emotion control (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998; Vohs & Heatherton, 2000).

If switching mindsets is indeed an act of the executive function, then it will consume self-regulatory resources and diminish people's ability to self-regulate afterward. We propose a general theory of mindset switching, such that switching between any qualitatively different mindsets consumes precious self-regulatory resources. We tested this prediction using the two-task paradigm that has become standard procedure for assessing self-regulatory resource depletion (e.g., Baumeister et al., 1998; Vohs & Heatherton, 2000). In the first phase of the current experiments, some participants performed a task that required them to switch mindsets, while others performed a similar task that did not require switching mindsets. In the second phase, participants completed a task that is known to require self-regulation (e.g., persistence, suppression of a natural impulse, etc.). We expected that, due to the taxing nature of switching mindsets, participants who repeatedly switch mindsets in the first task would perform worse on the second self-regulation task than participants who maintained a single mindset.

## Overview of Experiments

In order to provide converging evidence in support of a general theory of mindset switching, we tested this hypothesis in four experiments across four types of mindsets, using four different measures of self-control. In Experiment 1, participants were encouraged to think abstractly, concretely, or to alternate between abstract and concrete perspectives. Next, participants were asked to consume a healthy but bad-tasting drink—an act requiring self-regulation. We predicted that participants who switched mindsets would drink less of the unpleasant liquid than would those who maintained a consistent mindset. In Experiment 2, participants made choices in a thorough, comparative style consistent with an assessment mindset, in a rapid, non-comparative style consistent with a locomotion mindset, or by switching between the two decision making modes. Subsequently, participants were given the goal of

suppressing their natural emotional responses while watching a humorous video. We predicted that participants who switched between assessment and locomotion mindsets would be less able to suppress their emotions than those who maintained a consistent mindset. In the third experiment, participants played a game in which the scoring was designed to activate a promotion mindset (by penalizing errors of omission), to activate a prevention mindset (by penalizing errors of commission), or to encourage switching between promotion and prevention mindsets (by alternating how points were distributed on every other question). Following the game, participants worked on an unsolvable puzzle. We predicted that participants who switched mindsets would give up sooner than participants who maintained a single mindset. Finally, in Experiment 4, bilingual participants completed a personality questionnaire in English, in their other language, or by alternating languages. Following the questionnaire, they squeezed a handgrip for as long as they could. Building on literature showing that speaking a particular language activates an associated language-mindset (Stapel & Semin 2007; Whorf, 1957), we predicted that switching languages would impair participants' handgrip stamina relative to those who completed the questionnaire in a single language.

## Experiment 1

We first tested the hypothesis that mindset switching would tax self-regulatory resources using abstract and concrete mindsets. Construal level theory (Trope & Liberman, 2003) proposes that people represent goals, actions, or events in one of two ways. High-level construals are abstract mental representations that contain comprehensive, summary information, whereas low-level construals are concrete mental representations that consist of detailed, incidental information. Abstract mindsets facilitate answering the question "why" with regard to a goal or action whereas concrete mindsets answer "how" (Freitas et al., 2004). For example, in one study,

participants who were in an abstract mindset explained common activities (e.g., moving into a new apartment) in terms of *why* they might be performed (e.g., "starting a new life") but when in a concrete mindset participants described *how* the activities could be performed (e.g., "packing and carrying boxes"; Liberman & Trope, 1998). Because abstract and concrete mindsets invoke drastic changes in perception, they have been conceptualized as mutually exclusive mental orientations (Freitas et al., 2004; Liberman & Trope, 1998; Trope & Liberman, 2003).

## Method

*Participants and design.* Forty-four undergraduate students (30 women) were randomly assigned to one of four mindset conditions. Participants in the abstract mindset condition completed a task that required thinking about why a person might pursue eight common goals (e.g., saving money), whereas participants in the concrete mindset condition completed the same task while thinking about how a person could pursue those same goals (Freitas et al., 2004; see Appendix A). There were two mindset switching conditions in which participants alternated between tasks; the difference between them was whether the participants started with an abstract or concrete goal. For example, for the first goal, a participant in the abstract-first mindset switching condition would think about why a person would pursue that goal and for the second goal think about how a person could pursue that goal.

*Procedure.* Participants first completed the thought task (i.e., the mindset manipulation). Then they were led to a separate room for an ostensibly unrelated taste perception task for which they were presented with a tray of twenty small paper cups. Each cup held one ounce of a vinegar-based drink described as being similar to health drinks that are currently popular in Japan (which is true) but something that most Americans would not enjoy (which is also true). Participants earned a nickel for every cup consumed. The measure is akin to a "taking-your-

medicine" scenario, which represents a self-control dilemma because medicinal administration is often inconvenient and distasteful (Vohs et al., 2008). The number of ounces each participant drank was recorded as a measure of self-regulation; the fewer ounces consumed, the less self-control the participant exhibited.

## Results and Discussion

*Ounces of vinegar drink consumed.* The main hypothesis was that participants who switched mindsets during the initial task would have exerted more executive functioning and therefore would exhibit worse self-regulation in the subsequent vinegar-drinking task than would participants who did not switch mindsets. A 4-way analysis of variance (ANOVA) with abstract, concrete, and the two mindset switching conditions as predictors found an overall effect on ounces consumed, $F$ (3, 39) = 3.81, $p < .02$, $d = .63$ (Figure 1). Planned contrasts supported the hypothesis in showing that participants in both mindset switching conditions drank less than participants in either the abstract, $t$ (39) = 3.21, $p < .01$, $d = 1.03$, or concrete condition, $t$ (39) = 2.19, $p < .04$, $d = .70$. There was no difference between the two mindset switching conditions, $t < 1$.

*Control variables*. After the mindset manipulation but before the vinegar drinking task, participants completed the Positive and Negative Affect Schedule (PANAS) questionnaire to check for possible mood differences (Watson, Clark, & Tellegen, 1988). As expected, mood was unaffected by experimental condition, $F$s < 1. Participants also responded to questions regarding their enjoyment of the goal-analysis task and the vinegar-drinking task, neither of which varied as a function of condition, $F$s < 1.10, *ns*.

## Experiment 2

The second experiment tested whether switching decision making mindsets affected subsequent executive functioning. Regulatory mode theory (Higgins, Kruglanski, & Peirro,

2003) proposes a distinction between two mental functions: Assessment, which is a comparative function concerned with critically evaluating options relative to their alternatives, and locomotion, which is a motive function concerned with moving the person from state to state. In a decision making context (Avnet & Higgins, 2003), an assessment mindset is associated with a weighted-additive strategy (WADD), in which each alternative is evaluated relative to the others that are being considered (Payne, Bettman, & Johnson, 1993). In contrast, a locomotion mindset is associated with an elimination-by-aspects strategy (EBA), in which alternatives are eliminated from consideration in a serial fashion that eventually leaves an acceptable option (Tversky, 1972). These two mindsets evoke quite different perspectives on a given decision making scenario and consequently heighten different motivational tendencies. Activation of an assimilation or locomotion mindset produces differences in self-evaluation (Kruglanski et al., 2000), decisiveness (Kruglanski et al., 2000), entertainment preferences (Higgins et al., 2003), extroversion (Kruglanski et al., 2000), and the speed and accuracy with which people perform a decision task (Kruglanski et al., 2000). Hence, we hypothesized that switching between these decision making modes involves costly executive functioning and therefore would deplete self-regulatory resources.

## Method

*Participants and design.* Fifty-four students (35 women) were randomly assigned among three conditions for an initial decision making task that involved consumer products. In the assessment mindset condition, participants were instructed to make a choice using a WADD strategy, whereas in the locomotion mindset condition, participants were instructed to use an EBA strategy. In the mindset switching condition, participants alternated between decision strategies.

*Procedure.* Participants first completed the product choice task (i.e., the mindset manipulation) and were given instructions regarding how to make each choice (Avnet & Higgins, 2003). In the assessment mindset condition, a WADD decision strategy was explained: "Look at Brand A. Compare it to the rest of the brands based on each of the features. Now look at Brand B. Compare it to the rest of the brands based on each of the features. Continue this process until you have looked at all the brands and at all the features. After you are done comparing between brands, decide which brand you prefer most." In the locomotion mindset condition, an EBA decision strategy was explained: "Start with the feature you consider to be the most important and compare the values on that feature, brand by brand. Exclude the brand that has the worst value on this feature. Now you are left with four brands. Go to what you consider to be the second most important feature, and again look at it for all the remaining brands. Exclude the brand that has the worst value on this feature. Follow this procedure until you are left with only one brand." In the mindset switching condition, participants were given instructions for both WADD and EBA decision strategies (for assessment and locomotion mindsets, respectively), which they were told to use in an alternating fashion. Choices were made in 10 product categories: cell phone, refrigerator, apartment, camcorder, athletic shoe, PDA, pillow, vacuum cleaner, deodorant, and MP3 player.

After the decision making task, participants were given an emotion regulation task, which served as the dependent measure of self-control (Vohs, Baumeister, & Ciarocco, 2005). Participants were told that their job was to watch a video and maintain a neutral facial expression, such that "another person should not be able to tell that you are feeling anything." A videocamera, located in plain view, recorded participants' facial expressions while they watched a humorous clip from the movie *Eddie Murphy Raw* (Townsend, 1987).

## Results and Discussion

*Facial expressiveness*. A judge blind to condition rated participants' facial expressiveness at four points during the video: at the start and at minutes one, two, and three (the video lasted a little more than three minutes). Facial expressions were rated on a scale from 1 (*not at all expressive*) to 7 (*extremely expressive*), and the four ratings were added to yield an overall expressiveness score (Vohs et al., 2005). As a reliability check, a second judge, also blind to condition, performed the same rating process on 22 faces (41%); agreement between the two judges was quite high, $k = .93$.

The main hypothesis was that switching decision mindsets would impair later self-control by virtue of involving the executive functioning system to a greater extent than not switching mindsets would. As Figure 2 displays, a deleterious effect of switching mindsets was found. Compared to participants who used one decision strategy during the initial task, participants who switched decision strategies were less able to subsequently neutralize their emotional reactions, $F(2, 51) = 6.05$, $p < .01$, $d = .69$. Expressiveness in the switching condition was significantly higher than in the locomotion, $t(51) = 2.96$, $p < .01$, $d = .83$, and assessment conditions, $t(51) = 3.05$, $p < .01$, $d = .85$.

*Control variables*. After the mindset manipulation but before watching the video, participants completed the PANAS questionnaire (Watson et al., 1988). Analysis of both positive and negative affect subscales confirmed that mood was unaffected by experimental condition, $F$s $< 1.5$.

## Experiment 3

Experiment 3 tested our hypothesis about the taxing nature of mindset switching in the context of promotion and prevention mindsets. Regulatory focus theory proposes that people

pursue goals in one of two distinct ways (Higgins, 1997; 1998; Molden, Lee, & Higgins, 2008). A promotion orientation is concerned with advancement, growth, and development. People in a promotion mindset use eager strategies, focusing on securing gains and avoiding errors of omission (i.e., missed opportunities). A prevention orientation, conversely, is concerned with safety, precaution, and protection. People in a prevention mindset use vigilant strategies, focusing on securing non-losses and avoiding errors of commission (i.e., mistakes). To illustrate, in one study, participants with a promotion or a prevention mindset were asked to indicate whether they had previously been exposed to a set of nonsense words. Participants with a promotion mindset activated an overly-eager state that favored avoiding errors of omission. The result was a risky bias, which is to say that they incorrectly guessed that they had seen a word that, in fact, was new. In contrast, participants with a prevention mindset activated an overly-cautious state that favored avoiding errors of commission. The result was a conservative bias, which is to say that they incorrectly guessed that a word they had seen before was new (Crowe & Higgins, 1997). The qualitatively different aims of promotion and prevention have been tied to separate developmental influences (Crowe & Higgins, 1997) and require distinct cognitive processes to enact (Higgins, 1997; 1998).

The current experiment also included a control condition in order to rule out an alternative explanation for the results of Experiments 1 and 2. Recall that participants in those mindset switching conditions were faced with changing sets of instructions during their initial task, the purpose of which was to activate different mindsets. Yet participants in the non-switching conditions dealt with only one set of instructions throughout the task. Hence, it could be argued that impaired self-regulation after mindset switching was due to the changing instructions, which may have required more attention or cognitive processing, rather than the act

of switching mindsets. To address this concern, Experiment 3 included a condition in which the instructions change during the manipulation task but the mindset does not.

## Method

*Participants and design.* One-hundred and eight undergraduate students drawn from a paid subject pool were randomly assigned to one of four experimental conditions. Participants played a game in which they were asked to judge the size, length, angle, or some other physical dimension of 32 target shapes relative to a reference shape (e.g., to determine if a target line segment was longer than a reference line segment). Mindset was manipulated through the allocation of points for each question by making participants more sensitive to gains or to losses. Participants were told they could earn (or lose) points if they were right, wrong, or answered "I don't know." Previous research has demonstrated that gain-focused incentives induce a promotion mindset, whereas loss-focused incentives induce a prevention mindset (Crowe & Higgins, 1997; Molden et al., 2008). In the promotion mindset condition, participants were given a gain-focused point schedule, in the prevention mindset condition, participants were given a loss-focused point schedule, and in the mindset switching condition, participants alternated between the promotion point schedule and the prevention point schedule. In the control condition, participants alternated between two different point schedules that both activated the same mindset.

*Procedure.* Participants played the game with one of four point schedules that served as the mindset manipulation. The gain-focused point schedule (promotion condition) awarded three points for each correct response. Participants were encouraged to avoiding errors of omission (i.e., missed opportunities) by receiving no penalty for incorrect responses (0 points) but losing one point for each answer of "I don't know." The loss-focused point schedule (prevention

condition) awarded only one point for a correct answer, and focused participants on avoiding errors of commission (i.e., mistakes) by leveling a heavy penalty on incorrect responses (-3 points) and no penalty on answers of "I don't know" (0 points). In the mindset switching condition, the point schedule alternated between questions, starting with the promotion point schedule. Finally, in the control condition, participants alternated between two promotion point schedules that differed in magnitude. The point schedule for the first question had a larger magnitude (correct response = 3 points, incorrect response = 0 points, "I don't know" = -3 points) and the point schedule for the second question had a smaller magnitude (correct response = 1 point, incorrect response = 0 point, "I don't know" = -1 point). The point schedules continued to alternate throughout the game. Thus, the control condition contained changing instructions but would not produce a change in mindset.

Subsequently, participants took part in an ostensibly unrelated experiment in which they were to solve a number puzzle. The puzzle consisted of 15 numbered tiles arranged in a 4 x 4 grid, such that there was one empty space. The object of the game was to arrange the tiles in ascending numerical order by sliding tiles one at a time into the empty space on the grid. Unbeknownst to participants, the order in which the tiles were placed rendered the puzzle unsolvable. The dependent variable was length of time spent trying to solve the puzzle.

## Results and Discussion

*Persistence on unsolvable puzzle*: We predicted that participants in the switching mindsets condition would persist less than participants in the other three conditions who maintained a single mindset throughout the first task. A 4-way ANOVA revealed a significant effect of experimental condition, $F(3,104) = 3.10$, $p < .03$, $d = .35$. As predicted, participants in the mindset switching condition spent significantly less time working on the unsolvable task than

did participants in the other three conditions (Figure 3), $F(1,104) = 9.22$, $p < .003$, $d = .60$. Consistent with predictions, time spent working on the puzzle in the mindset-switching condition was less than time spent working in the promotion, $F(1,104) = 6.69$, $p < .01$, $d = .51$, prevention, $F(1,104) = 6.45$, $p < .01$, $d = .50$, and control conditions, $F(1,104) = 5.34$, $p < .02$, $d = .45$. There were no differences among participants in the three no-switching conditions, $Fs < 1$.

*Control variables*: After the mindset manipulation but before working on the puzzle, participants completed the PANAS (Watson et al., 1988), which revealed no differences across conditions, $F$s < 1. Hence the results cannot be accounted for by differences in mood.

## Experiment 4

The fourth experiment tested the impact of switching languages on subsequent self-regulation. Theories of linguistic relativity conceptualize language as activating an accompanying mindset that shapes thought, memory, attention, and perception (Stapel & Semin 2007; Whorf, 1957). People from different linguistic communities appear to understand concepts such as color and time in qualitatively different ways (Boroditsky, 2001; Ozgen, 2004). Likewise, the self-perceptions of bilinguals change depending on which language they use (Luna, Ringberg, & Peracchio, 2008; Ross, Xun, & Wilson, 2002; Trafimow, Silverman, Fan, & Law, 1997). Given that using a language involves activating its associated mindset, we expected that switching languages, relative to maintaining one language, would bear on the executive functioning system and reduce participants' capacity for later self-regulation.

### Method

*Participants and design.* Sixty bilingual students from a large eastern university (36 Mandarin-English, 12 Korean-English, and 12 Hindi-English speakers; 47 women) answered 18 open-ended personality questions (e.g., "Please describe yourself socially."). In the two single-

language conditions, participants completed questionnaires in English or in the participant's other language. In the switching languages condition, the language in which the questions were asked (and answered) switched every two to four questions (e.g., two questions in Korean, then three in English).

*Procedure.* Participants first completed a handgrip test, said to be part of a pretest for future experiments. Next they completed the personality questionnaire (i.e., the mindset manipulation). Following the questionnaire, participants completed a second handgrip test. For both tests, participants' goal was to squeeze a handgrip exerciser for as long as they could. To measure self-control ability, a slip of paper was placed between the two ends of the handgrip and we recorded the time at which it fell as the point at which participants stopped exerting self-control on the task. The dependent measure was the difference between the handgrip durations measured pre- and post-manipulation (Muraven, Tice, & Baumeister, 1998).

## Results and Discussion

*Handgrip endurance.* The hypothesis was that responding to a personality questionnaire while switching languages, relative to responding using a single language, would draw on executive resources and thereby impair participants' stamina on the handgrip task. Consistent with this prediction, participants in the language switching condition performed worse on the handgrip task compared to participants in both single language conditions, $t(57) = 2.52$, $p < .02$, $d = .67$ (Figure 4). Participants in the language switching condition performed marginally worse than participants who completed the questionnaire in English only, $t(57) = 1.67$, $p = .10$, $d = .44$; and significantly worse than participants who completed the questionnaire in their other language only, $t(57) = 2.70$, $p < .01$, $d = .72$.

*Control variables.* After completing the personality questionnaire, participants completed the PANAS (Watson et al., 1988) and answered seven questions that measured bilingual fluency (e.g., "I can speak / read / write [language] as fluently as a native speaker"). Analysis revealed no difference in mood across conditions, *F*s < 1. Moreover, none of the seven bilingualism controls was a significant predictor of handgrip performance, *p*s > .30, suggesting that reduced handgrip performance did not result from switching between languages that varied in familiarity and hence ease of activation.

## General Discussion

Across four studies we found support for the hypothesis that switching mindsets is an executive function that consumes self-regulatory resources and therefore renders people relatively unsuccessful in their self-regulation endeavors. The current studies found converging effects across a wide range of mindset operationalizations. Participants who switched volitional mindsets pertaining to levels of construal, decision making modes, strategies for goal pursuit, and languages were consistently worse at self-regulation than were participants who performed similar tasks that used only one mindset. The harmful effects of mindset switching were observed for a set of diverse regulatory endeavors, too. Performing a healthy but unpleasant task (akin to taking one's medicine), controlling emotional expressiveness, persisting under challenging circumstances, and maintaining physical stamina were hindered by mindset switching. These effects were not due to the mere fact that our manipulations of mindset switching also involved changing instructions: Participants in Experiment 3 who dealt with changing instructions (but who maintained a consistent mindset) during the initial task were unimpaired in their later self-regulation, whereas participants who alternated mindsets during the same task were significantly impaired. Hence, being attentive to changing instructions was not

the cause of self-regulatory resource depletion in the mindset switching group. Instead, the dramatic change in vantage point that is required for each change in mindset appears to be the causal factor in the present studies.

The notion that people possess different mindsets that are functional under different circumstances has been around for over a century (Ach, 1905), yet little was known about how people perform such an elaborate switching operation. We proffer executive functioning as the underlying mechanism and, in doing so, tie the ability to switch mindsets to the crucial operations of decision making and self-regulation, which also rely on the executive function (Baumeister et al., 1998; Vohs et al., 2008).

The finding that switching mindsets leads to self-regulatory depletion raises questions about the reverse process: the impact of depleted executive resources on the ability to switch mindsets. The current research suggests that since switching mindsets consumes resources, people who are depleted of executive resources will be less able to switch mindsets. We would expect then that depleted people will continue to use one mindset, even if that mindset is unsuitable to their current activity. Research addressing this prediction may help explain why people who are executive resource depleted exhibit decision biases, illogical thinking, and poor judgment (Schmeichel, Vohs, & Baumeister, 2003; Vohs et al., 2008).

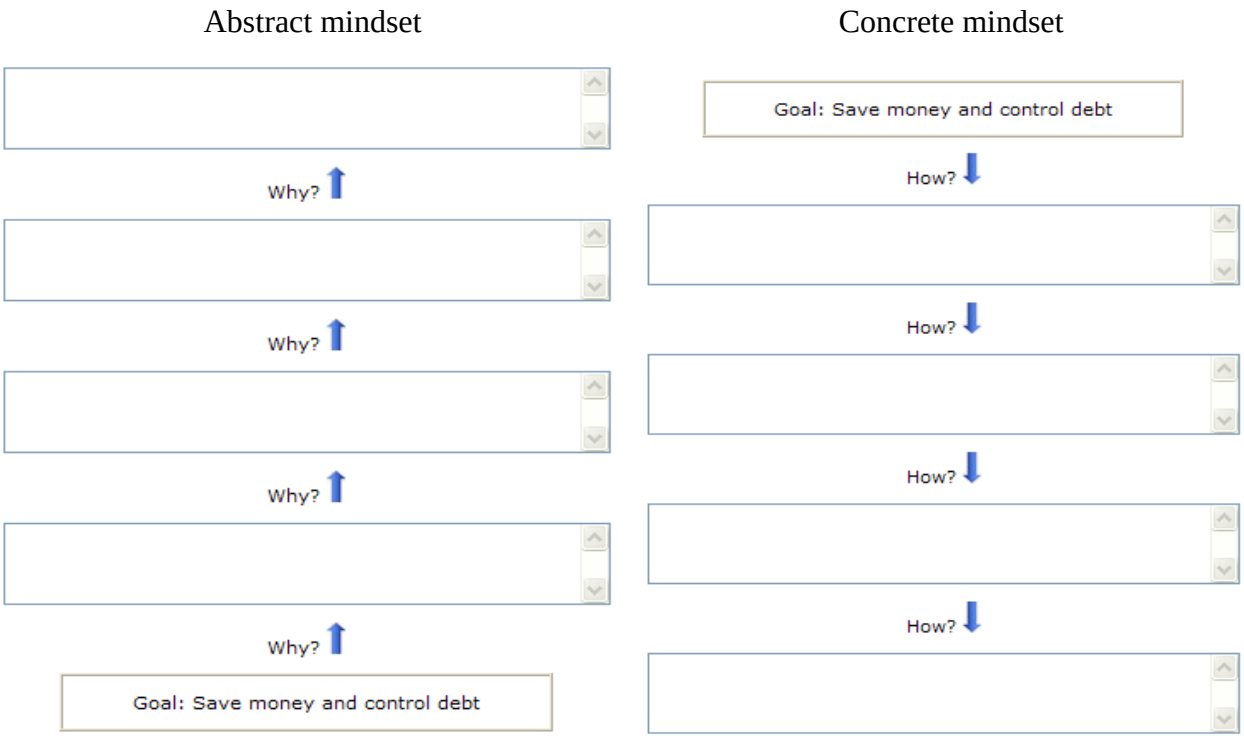
The current findings also offer a potential explanation for the phenomenon that although people have multiple complementary mindsets in their possession, they often develop a chronic preference for one in particular (e.g., Lee, Aaker, & Gardner, 2000; Liberman & Trope, 1998; Vallacher & Wegner, 1989). The present results suggest that, in terms of executive resources, it is efficient to maintain a consistent mindset. In concordance with findings that people strategically alter their behavior to conserve self-regulatory resources (Muraven, Shmueli, &

Burkley, 2006), the present findings suggest that establishing a chronic, default mindset may be the adaptive result of attempts to conserve limited executive resources.

## Closing Remarks

The human psyche has the ability to conjure up different mental states in service of achieving the same goal. Not only do people possess this ability, they regularly activate and use distinct mental sets in their daily lives. Such sophisticated mental transformations would require a similarly sophisticated enabler, which the current experiments locate in the executive function of the self. The executive function is one of the greatest – and latest – evolved features of modern human brains due to its central role in planning, choice, and self-regulation (Gazzaniga, Ivry, & Mangun, 2002). As the present work demonstrates, the central executor also makes possible the ability to go between qualitatively different states of mine.

*Appendix A*: Stimuli for Experiment 1




NOTE.— The mindset priming task was adapted from Freitas et al., 2004, Experiment 1. The task was completed for eight common goals: save money, maintain friendships, lose weight, establish a successful career, get organized, maintain a "balanced" life, improve relationships with family, and learn a new skill.

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We thank Steven Oravecz, Andrew Kaikati, and Alison Boyce for their data collection assistance. This research was supported in part by University of Minnesota McKnight Land-Grant Professorship funds.

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*Figure 1*: Ounces of Vinegar-Based Drink Consumed; Experiment 1.

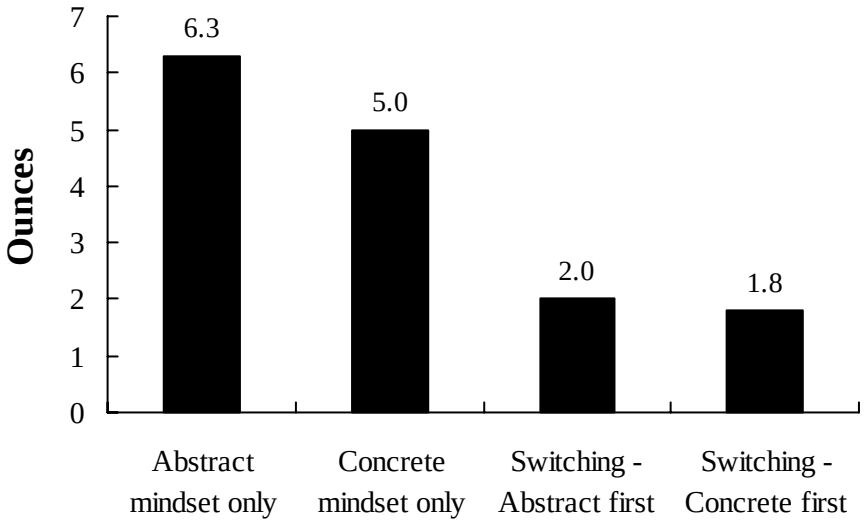

*Figure 2*: Facial expressiveness while watching a humorous movie; Experiment 2.

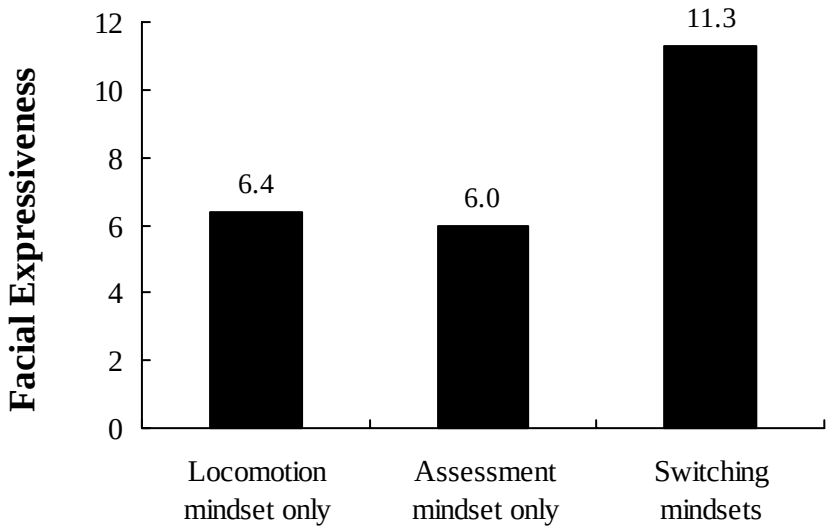

*Figure 3*: Persistence on an unsolvable puzzle; Experiment 3.

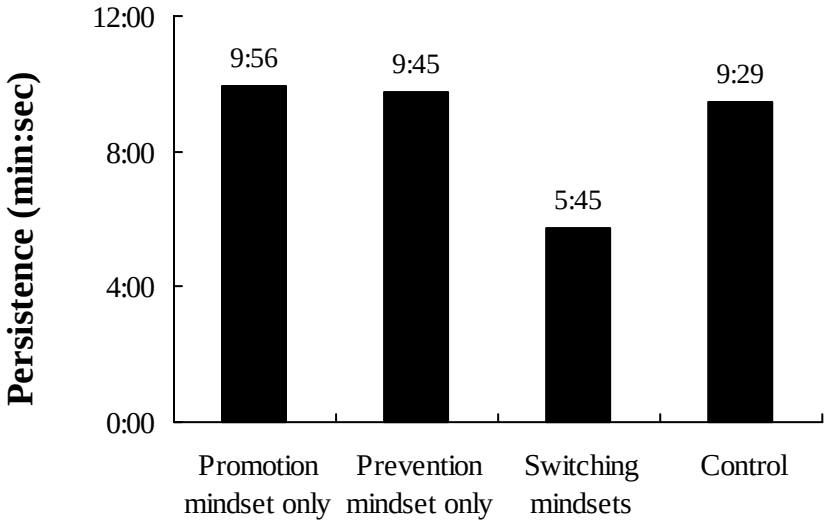

*Figure 4*: Handgrip endurance; Experiment 4.