The effect of priming learning vs. performance goals on a complex task

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This research examined the effect of priming a learning goal, a performance goal, and both a learning and a performance goal on a task requiring the acquisition of knowledge. A photograph of Rodin’s “The Thinker” primed a learning goal, and a photograph of a racer primed a performance goal, as measured by a projective test. A laboratory experiment (n = 88) involving a 2 (a primed learning goal vs. control) × 2 (a primed performance goal vs. control) × 3 (trials) repeated measures factorial design revealed a significant main effect for only the primed learning goal. The results are interpreted within two frameworks, namely, goal setting theory and the automaticity model.

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Introduction

Miner (2008) was among the first to argue that subconscious processes must be systematically studied in order to fully understand behavior in the workplace. Subsequent reviews of the social psychological literature on priming suggest that subconscious goals are both relevant to and viable for increasing job performance (Friedman, 2013; Latham & Locke, 2012; Latham, Stajkovic, & Locke, 2010). In light of these reviews, we suggest that research on primed goals regarding organizational behavior, although still in its infancy, can be properly guided by principles derived from goal setting theory (Locke & Latham, 1990, 2013) and the automaticity model (Bargh, 1994; Bargh & Chartrand, 1997, 1999).

Goal setting theory

At the end of the 20th century, a cognitive theory of motivation in the workplace, goal setting, was developed inductively from the results of approximately 400 empirical studies (Locke & Latham, 1990). These studies led to the conclusion that a specific, high consciously set goal leads to higher performance than an easy goal, no goal, or even a general goal. This same body of work also led to the identification of four moderators of the goal-performance relationship (i.e., ability, commitment, feedback, and resources) as well as four mediators (i.e., choice, effort, persistence, and strategy).

No sooner did goal setting theory appear than there were empirical experiments showing that when there is a task that requires the acquisition of knowledge before it can be performed effectively, a general goal, namely “to do one’s best,” leads to higher performance than a specific high goal (e.g., Kanfer & Ackerman, 1989; Mone & Shalley, 1995). This finding is consistent with the theory’s identification of ability, or the lack thereof, as a variable that moderates the relationship between a specific high goal and subsequent performance. People have limited cognitive resources (Anderson, 1982; Fitts & Posner, 1967). When these resources, during the declarative stage of learning, are diverted to attaining a specific challenging performance outcome rather than on ways of mastering the task, performance suffers. Moreover, when knowledge acquisition is necessary for effectively performing a task, setting a specific high goal for a level of performance to attain, in addition to taxing limited cognitive resources, can lead people to focus on the potential negative consequences of failure rather than on task-relevant ways to attain the goal (Brown & Latham, 2002).

Performance vs. learning goals

In light of the finding that a general goal can sometimes lead to higher performance than a specific high goal, a series of experiments were conducted where the focus was on strategy, a mediating variable in goal setting theory (e.g., Winters & Latham, 1996). As a result of these experiments, goal setting theory was revised to distinguish between two types of goal content, namely, specific high performance and specific high learning goals (Latham & Locke, 2007; Locke & Latham, 2013). These two goals differ from one
another in at least two important ways. First, a performance goal focuses attention on a task outcome; a learning goal focuses attention on thinking of, or gaining insight into, ways to perform a task as opposed to relying on extant knowledge or skill (Seijts & Latham, 2005). Second, while a performance goal, during the declarative stage of learning, diverts limited attentional resources away from mastering the task (Kanfer & Ackerman, 1989), a learning goal shifts attention to thinking of task relevant strategies (Seijts & Latham, 2001; Seijts, Latham, Tasa, & Latham, 2004). In short, whereas the setting of a performance goal increases one’s motivation to implement one’s knowledge, the setting of a learning goal focuses attention on developing one’s task related ability through knowledge acquisition.

The results of laboratory experiments on goal setting typically generalize to field settings (Latham & Lee, 1986). In a field experiment, Latham and Brown (2006) found that first year MBA students who set specific difficult learning goals to attain obtained a significantly higher GPA at the end of the academic year than those who only set a specific high distal performance goal, or those who were urged by the Dean to do their best to obtain a meaningful MBA education. Porter and Latham (2013) found that departmental performance was significantly higher when employees, working in a turbulent economic environment, had a learning rather than a performance or a vague “do-your-best” goal.

Research on goal setting theory has also examined the effect of consciously setting both a performance and a learning goal simultaneously on a task that an individual has yet to master. The addition of another consciously set goal was found to hurt rather than help the performance of people relative to those with only a learning goal (e.g., Noel, 2012). This finding is consistent with Anderson’s (1982) theory on the acquisition of cognitive skill. Focusing on both goals at once likely places a heavy burden on working memory, and hence produces errors. Until relatively recently, goal setting theory and the research on which it is based has been concerned solely with these two types of conscious goals.

**Automaticity model**

The automaticity model, also developed inductively, states that goals can be activated subconsciously, and that the pursuit of a goal can occur outside of awareness (Bargh, 1994; Bargh & Chartrand, 1997, 1999; Moskowitz & Grant, 2009). Because a goal is a mental representation, it can be activated by subtle situational cues or naturally occurring environmental stimuli through the technique of priming (Bargh, 1994; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001). Priming exerts a passive influence on cognition, affect, and behavior through either exposing participants to an environmental stimulus or cue, or instructing them to engage in an unobtrusive priming task (Bargh & Chartrand, 1997). Individuals are neither aware of, nor able to control the influence of such stimuli on their behavior (Bargh, 1994; Bargh, Gollwitzer, & Oettingen, 2010). In short, the automaticity model states that the critical difference between conscious and subconscious goal pursuits is that “unlike unconscious goal strivers, conscious goal strivers know why they do what they do” (Bargh et al., 2010, p. 299). The model further states that conscious and subconscious goal pursuits follow the same processing stages, predict the same phenomena, and produce the same outcomes. To date, the automaticity model has been based largely on the results of social psychology experiments.

**Effect of primed goals on organizational behavior**

Following Locke and Latham’s (2004) recommendation to examine subconscious motivation on task performance, Stajkovic, Locke, and Blair (2006) conducted the first laboratory experiment to examine the effect of a primed subconscious goal and a specific conscious goal on task performance. They obtained two main effects. That is, both the conscious specific, difficult goal and the primed goal increased the participants’ performance. Specifically, in a 2-min brainstorming session, those in the primed condition, who made sentences out of scrambled achievement-related words, generated significantly more ideas for the uses of a coat hanger than did participants in the control condition who made sentences using scrambled neutral words.

Based on this finding, Shantz and Latham (2009) conducted a field experiment involving call center employees who solicit money from potential donors. They obtained two main effects, one for the consciously set goal, and one for the primed goal. Employees primed with a performance goal via a photograph of a woman winning a race raised significantly more money from donors than those who were not primed during their 3-h work shift. Subsequently, Shantz and Latham (2011) replicated their results regarding the primed goal-performance relationship in two additional call centers. A meta-analysis, based on the data obtained from the three call centers at three different points in time in three different geographical regions revealed support for the effectiveness of priming a performance goal to increase job performance.

Because goal setting theory emphasizes the importance of goal specificity, Latham and Piccolo (2012) examined whether a context specific prime and a general achievement prime differ in their effect on job performance. Call center employees were randomly assigned to a condition where the employees viewed a photograph of employees making telephone calls in a call center, or they viewed the photograph of the racer. Both photographs led to a significant increase in job performance over a 4-day work week relative to those randomly assigned to the control condition. Moreover, as was hypothesized based on goal setting theory, the amount of dollars from donors was highest in the context specific condition. In terms of practical significance, the actual amount of money raised by those with a context specific prime was 16% more than that which was raised by those with the general achievement prime (i.e., the racer), and 85% more than those in the control group. Employees in the general prime condition raised 60% more money than those in the control group. None of the employees was aware of the effect of either prime on their job performance.

In each of the above experiments, the participants had already mastered the skills necessary to perform the task prior to priming the performance goal. A question that has generated considerable controversy is whether performance on a task that requires the acquisition of knowledge will increase if a learning goal is primed.

**Primed learning goals**

Cognitive psychologists, such as Anderson (1982), have argued that problem solving is the basic mode of cognition, that is, conscious awareness. Yet a series of experiments conducted by Dijksterhuis and van Knippenberg (1998) revealed that merely writing down the characteristics of a professor primed students to concentrate and think hard before answering multiple choice questions adapted from the game, Trivial Pursuit. Consequently, these students obtained significantly higher scores than those who were primed with instructions to write down characteristics of soccer hooligans. It would appear that asking people to think of a professor primed them with the determination to solve problems (Bargh et al., 2001).

Cognitive psychologists such as Pashler, Coburn, and Harris (2012) have questioned the replicability of findings from priming experiments. Shanks et al. (2013), for example, were unable to replicate the findings obtained by Dijksterhuis and van Knippenberg.
(1998). This has set off what Abbott (2013) described as an acrimonious email debate between skeptics and believers of findings from primed goal experiments. In this email exchange, Kahneman (2012) warned of a “train wreck looming” unless the results of priming experiments are replicated. Even the public has become sensitized to this issue. The New Yorker (Marcus, 2013) labeled this problem “the crisis of replicability,” and raised the possibility that the results of primed goals may be trivial or easily overrun by other factors.

In light of these issues, we conducted research on the priming of learning and performance goals to examine whether one or both increases performance on an organizationally relevant task that requires the acquisition of knowledge in order to perform it effectively.

Experimental design

The present experiment builds on the goal priming literature on organizational-related behavior in three important ways. First, the effect of a subconscious learning goal on performance, as noted by Latham et al. (2010), has yet to be explored. Effective performance on tasks that people have yet to master requires thinking of (i.e., generating/discovering) solutions, rather than sheer effort and persistence. These tasks are arguably the norm in many industries.

Unlike the present experiment, the task used by Dijksterhuis and van Knippenberg (1998) did not require learning effective strategies. Instead, the participants were given a multiple choice test. Thus the present study provides a rigorous test of those original findings.

Second, no published study to date has examined the effectiveness of simultaneously priming both a performance and a learning goal on task performance. As performance is a function of both ability and motivation (e.g., Maier, 1955; Vroom, 1964), given a conscious learning goal’s ability-enhancement function (Seijts, Latham, & Woodwarl, 2013; Winters & Latham, 1996) and a conscious performance goal’s motivation-facilitation mechanism (Locke & Latham, 1990, 2002, 2013), the priming of both a learning and a performance goal may increase performance on a task that people lack the knowledge to perform effectively. This is because at the subconscious level, it may be that priming a learning goal and a performance goal simultaneously has a beneficial effect on performance because their respective mental representations are automatically formed. Hence, relative to consciously set goals, each may consume minimal cognitive resources. Moreover, subconscious processes have been found to handle large amounts of information well especially in integrating and weighing information (Bos, Dijksterhuis, & van Baaren, 2011; Custers, Etam, & Bargh, 2012). Thus the present research is the first to investigate the effectiveness of priming a learning goal and both a learning and a performance goal simultaneously on a task where people must acquire knowledge to perform it effectively.

Third, in this study the prime was not constantly available to the participants. In the four field experiments conducted by Latham and his colleagues (Latham & Piccolo, 2012; Shantz & Latham, 2009, 2011), the prime, a photograph, was constantly present while the employees performed their job. In this experiment, the prime was presented for 75 s and then removed immediately prior to a subsequent 20-min filler task. The experimental task, involving three 8-min trials, was administered after the filler task. Thus the time lag between seeing the prime and performing the task on the last trial was approximately 45 min. This temporal marker is important for eliminating the rival hypothesis that semantic or non-motivational activation by a prime, rather than a goal, explains a change in subsequent behavior (Bargh, 2006; Hassin, Uleman, & Bargh, 2005). The effect of semantic activation, relative to a primed goal, has been found to quickly decay over time (Bargh et al., 2001; Forster, Liberman, & Friedman, 2007; Goschke & Kuhl, 1993; Sull & Wyer, 1979). In both the Dijksterhuis and van Knippenberg (1998) and the Stajkovic et al. (2006) experiments, the participants performed the task for only a few minutes, immediately following the presentation of the prime.

Overall, the present experiment differed from previous research on the effect of subconscious goals on organizational behavior in terms of the (1) independent variables, (2) dependent variable, and (3) time length between removal of the prime and performing a task. As such, it contributes knowledge to both theory and practice in human resource management in the domain of subconscious motivation. This issue is important because, as noted earlier, unlike the subconscious, the conscious mind has limited storage capacity (Dijksterhuis & Nordgren, 2006; Miller, 1956; Wilson & Schooler, 1991). Due to its much higher processing capacity, the subconscious has been found to operate effectively in solving complex problems (Dijksterhuis, 2004; Dijksterhuis & Nordgren, 2006). Primed goals consume less attentional resources than consciously set goals (Norretranders, 1998). Thus when a performance goal is primed, contrary to what has been found with a consciously set goal, it may have an additive or an interaction effect with a primed learning goal.

Research hypotheses

The following hypotheses were tested:

Hypothesis 1: A primed learning goal leads to significantly higher performance on a task that requires the acquisition of knowledge than a primed performance goal or a “do your best” control condition. The automaticity model states that lack of awareness of the goal-performance relationship is the only critical factor that differentiates a primed from a conscious goal in terms of their respective effects on behavior. Thus, this hypothesis should be supported in light of the findings obtained with conscious learning goals.

Hypothesis 2: A primed performance goal leads to significantly higher performance on a task that requires knowledge acquisition than a do your best condition. A conscious, specific performance goal, as noted earlier, consumes cognitive resources during the declarative stage of learning. Hence people with a vague goal to do one’s best perform significantly higher in the early stages of learning than those with a specific, high goal (Kanfer & Ackerman, 1989, Winters & Latham, 1996). But, a performance goal that is primed consumes minimal cognitive resources relative to a consciously set goal. Hence, it may lead to an increase in performance on a complex task where people lack the knowledge to perform it.

Hypothesis 3: In addition to two main effects, there is an interaction effect of priming both a learning and a performance goal on a task that requires the acquisition of knowledge. This might occur on the last trial. Once learning occurs, the effect of having a performance goal that is primed, may have a beneficial effect on performance.

Pilot study 1

Shantz and Latham (2009) suggested that a photograph of Rodin’s “The Thinker” might prime a subconscious goal for knowledge acquisition. As there was neither a theoretical nor an empirical basis for predicting that one photograph is superior to another in terms of priming knowledge acquisition, a pilot test was conducted, prior to conducting the experiment, to identify which photograph of “The Thinker,” among a set of eight collected from the internet, is likely to make people “think” the most. The eight photographs varied in terms of backdrop, color scheme, and statue position/orientation.
Twenty-eight undergraduate students enrolled in an upper division organizational behavior course in a large North American business school volunteered to participate in the pilot study. They were asked to rank order the eight photographs in terms of which one makes them think from 1 (the most) to 8 (the least). The results showed that there were two pictures sharing the same mode of 1 (the most), with two photographs sharing the mode of 3, two the mode of 4, one the mode of 7, and one the mode of 8 (the least). Among the two top ranked photographs, the one with the lowest mean and standard deviation was chosen for priming a learning goal in the subsequent pilot study and experiment (see Fig. 1).

Pilot study 2

Based on current theorizing (e.g., Strack & Deutsch, 2004), priming activates concepts that spread attention to other concepts that are episodically linked (e.g., “professor-intelligent”). Thus priming is said to influence behavior based on concepts whose activation potential has been increased. However, as Stroebe and Strack (2014) noted, even though an experimenter has control over a prime, this is not the case for the concept it activates.

Both the Dijksterhuis and van Knippenberg (1998) study and the Shanks et al. (2013) study that failed to replicate it, did not determine whether the word professor increased the cognitive representation of the concept “intelligent.” One way to do so is to use a projective test whereby participants write stories about the pictures that they see (Latham & Piccolo, 2012; Schultheiss & Pang, 2007; Shantz & Latham, 2009).

The purpose of this second pilot test was to determine whether Rodin’s “The Thinker” primes learning, thinking, insight, intelligence, etc. The necessity for doing so can be seen in Fig. 1. “The Thinker” appears so athletic that he might trigger thoughts of physical labor rather than intelligence/insight. Similarly, the photograph of the racer might activate concepts related to athletics that are unrelated to performance achievements. Consequently, this second pilot study was conducted to assess whether the two primes aroused the respective cognitive representations of thinking vs. achievement. This was done by asking each participant to write a story about “The Thinker” or the racer.

Method

Sample

The participants (n = 66) were undergraduate business school students who did not participate in the first pilot study. They were recruited from the school’s participant pool. In exchange for their participation, the participants received one extra course credit for an introductory management course. Of the 66 participants, fifty-eight (87.9%) were between 18 and 22 years of age, seven (10.6%) were between 23 and 27, and one (1.5%) was between 28 and 32: 44.0% were male. The participants were randomly assigned to one of four conditions in a 2 x 2 factorial design, that is, (1) a photograph of “The Thinker” (n = 17), (2) a photograph of a racer (n = 18), (3) photographs of both “The Thinker” and the racer (n = 15), and (4) no photograph control group (n = 16).

The photograph of the racer was used to prime a performance goal because as noted earlier, Shantz and Latham (2009) found that this photograph elicited the implicit motive for need for achievement as measured by the Thematic Apperception Test (TAT; Morgan & Murray, 1935). Moreover, this photograph significantly increased the job performance of call center employees relative to those in the control group in four field experiments (Latham & Piccolo, 2012; Shantz & Latham, 2009, 2011).

Procedure

The participants in the three experimental conditions read the following instructions adapted from Schultheiss and Pang (2007): “This is a test of imagination. Here is (are) one picture (two pictures); please look at it (them) carefully. Your task is to write ONE complete story about this picture (these two pictures) – an imaginative story with a beginning, a middle, and an end. In the space below and on the following page, try to describe the situation, what led to the situation, and how everything turned out in the end. Write your thoughts as they come to your mind. Don’t worry about grammar, spelling, or punctuation – they are of no concern here. You will have approximately 7 minutes to devote to this task.”

In the control condition, no photograph was presented. The instructions given to the participants were: “Close your eyes and picture something. Now tell a story about it!” With the exception of these two sentences, the instructions in all four conditions were identical.

Word imageries connoting learning vs. achievement were measured using a text analysis program, the Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis, & Booth, 2001). The LIWC scans stories and computes the percentage of words (relative to the total word counts of each passage) that represent certain categories of human speech patterns such as standard linguistic dimensions (e.g., articles, auxiliary verbs) as well as psychological constructs (e.g., cognitive processes, achievement). Each LIWC dimension of words is part of an extensive dictionary that is composed of almost 4500 words and word stems (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). This dictionary was developed based on an initial vocabulary pool of almost 100,000 English words.
Word imageries connoting learning were assessed by counting the number of insight related words. This category in the LIWC reflects a person’s tendency to engage in active cognitive activities, namely, active thinking towards acquisition of knowledge and the gaining of wisdom (Pennebaker & Stone, 2003). The LIWC insight dictionary (version 2007) includes words and word stems such as analy’, conclu’d, discover’, explor’, find’, know’, learn’, resolu’, solve, and think’ (Pennebaker et al., 2007).

Word imageries connoting achievement were assessed by counting the number of achievement related words. The LIWC achievement dictionary (version 2007) includes words and word stems such as accomplish’, achieve’, challeng’, perform’, and win.

Results

A one-way analysis of variance (ANOVA) revealed significant differences among the four conditions in terms of the use of insight [F(3,62) = 5.18, p = .003, η² = .20] and achievement related words [F(3,62) = 5.46, p = .002, η² = .21] in the stories that were written. To further determine the differences in word imagery between conditions, a series of planned independent-sample two-tailed t-tests were conducted.

The stories written by participants primed with “The Thinker” (M = 3.94, SD = 1.67) contained significantly more insight related words than those written by participants in the control condition (M = 1.69, SD = 1.29) (t(31) = 4.32, p = .00, d = 1.53) and those primed with the racer (M = 2.36, SD = 2.18) (t(33) = 2.40, p = .022, d = .82). The difference between these latter two conditions was not significant.

The stories written by participants primed with the racer (M = 4.13, SD = 2.68) contained significantly more achievement related words than those written by those in the control condition (M = 1.73, SD = 1.79) (t(32) = 3.03, p = .005, d = 1.06) as well as those primed with “The Thinker” (M = 2.05, SD = 1.99) (t(33) = 2.59, p = .014, d = .89). The difference between these latter two conditions was not significant.

Participants primed with both photographs generated significantly more insight related words (M = 3.71, SD = 2.34) than did those in the control condition (M = 1.69, SD = 1.29) (t(29) = 3.00, p = .005, d = 1.12). In addition, they (M = 4.25, SD = 2.64) generated significantly more achievement related words than did those in the control condition (M = 1.73, SD = 1.79) (t(29) = 3.13, p = .004, d = 1.15).

Finally, participants primed with both photographs generated marginally significantly more insight related words (M = 3.71, SD = 2.34) than did those in the racer only condition (M = 2.36, SD = 2.18) (t(31) = 1.71, p = .097, d = .60). However, participants primed with both photographs generated significantly more achievement related words (M = 4.25, SD = 2.64) than did those in “The Thinker” only condition (M = 2.05, SD = 1.99) (t(30) = 2.68, p = .012, d = .96). No other significant difference in the use of either insight or achievement related words between conditions was found.

Discussion

The results from this pilot study suggest that the photograph of “The Thinker,” with or without the photograph of the racer, primed people to engage in thinking. In addition, the photograph of the racer, with or without the photograph of “The Thinker,” primed the implicit motive for achievement. This finding is consistent with Shantz and Latham’s (2009) experiment involving students, and Latham and Piccolo’s (2012) experiment involving employees. Moreover, the photograph of the racer did not prime people to think; the photograph of “The Thinker” did not prime the implicit need for achievement. This suggests that the two photographs were successfully linked to the constructs they were intended to activate. Yet, whether the activated cognitive representation of learning and performance can act as goals depends on whether they are desirable for people (Bargh et al., 2001; Custers & Aarts, 2005). There is ample evidence in organizational psychology that increases in performance typically lead to increases in positive affect (Latham, Locke, & Fassina, 2002; Locke, Cartledge, & Knerr, 1970; Mento, Locke, & Klein, 1992). To further establish that these photographs primed a goal in the subsequent experiment, we included a temporal marker criterion for goal activation (Bargh, 2006; Hassin et al., 2005).

Experiment

The scheduling task (Earley, 1985) that has been used in previous research to examine the effect of a consciously set learning and a performance goal on complex task performance (e.g., Winters & Latham, 1996) was used in the present experiment. The rationale for choosing this task was fourfold. First, scheduling is a task required in most organizations (e.g., logistics); using a work-related task enhances the generalizability of laboratory findings to similar tasks in organizational settings (Latham & Lee, 1986). Second, this task meets Wood’s (1987) objective criteria for task complexity in that it includes a large amount of task information inputs such as scheduling rules, and a great number of course listings (component complexity). Moreover, creating a correct schedule requires integrating cues in judgment and coordinating simultaneous information from different courses and rule items (coordinative complexity). Ongoing changes in information cues are essential to performing this task effectively. Third, the task has been shown to be perceived as complex by the participants (e.g., Seijts & Latham, 2001; Winters & Latham, 1996). The task requires thinking of ways to perform it effectively rather than sheer effort and persistence. Finally, this was a novel task in that the participants had no prior experience performing it.

Method

Sample

The participants (n = 88) were undergraduate business students from the same North American business school who did not participate in the pilot studies. They were recruited through the school’s participant pool. They volunteered to participate in this experiment in exchange for 1.5 extra course credit for an introductory management course. The mean age of the participants was 20.70 (SD = 3.47); 23% were male. As noted earlier, the participants were randomly assigned to one of four conditions in a 2 (“The Thinker” vs. control group) × 2 (racer vs. control group) × 3 (trials) factorial design, namely, (1) a photograph of “The Thinker” (n = 19), (2) a photograph of a racer (n = 21), (3) photographs of both “The Thinker” and the racer (n = 24), and (4) a control group (n = 24). The unequal n’s is the result of drawing one of four numbers from an urn in order to randomly assign a participant to one of the four conditions. The experiment lasted 70–80 min.

Procedure

Upon arrival at the laboratory, the participants were asked to sit at separated computer workstations. After they read and signed the study consent forms, the experimenter administered a 14-min introductory session for the scheduling task. Participants spent the first 10 min reviewing the instructions. The instructions had four basic components: (1) a cover story (i.e., “...the Office of the Registrar has requested you to complete class schedules...” This assignment is a good indicator of a person’s problem solving abil-
ities”), (2) six rules for completing the class schedules (e.g., “Any course with a quiz section must have the quiz section scheduled on the same day as the class;”), (3) examples of both correct and incorrect class schedules, with explanations for the scheduling rules (e.g., “There are conflicts in class time”), and (4) course listings for the task.

The participants were subsequently given four minutes to practice producing class schedules and record the schedules on an answer sheet labeled “Practice Trial”. The answer sheet stated that their task was to “complete as many accurate class schedules as possible”. The number of accurate schedules produced in this 4-min period provided a pre-measure of each participant’s ability to perform the scheduling task (Winters & Latham, 1996). This number was entered as a covariate in subsequent data analyses.

Next, the experimenter instructed the participants to view their respective computer screens. The first screen displayed the instructions for a filler task allegedly assessing their ability to write short stories about neutral pictures that were displayed on their computer screen. During this time period, the prime was presented on the central top section of the screen: (1) a photograph of “The Thinker” (priming a learning goal), or (2) a photograph of a racer (priming a performance goal), (3) photographs of both “The Thinker” and the racer (priming both a learning and a performance goal), or (4) a photograph of trees and rocks (control/placebo condition). The latter condition was included to assess the rival hypothesis that a photograph, regardless of content, can have a positive effect on task performance.

After 75 s had elapsed, following reading the filler task instructions with the prime displayed, the computer automatically advanced to the next screen starting the filler task. After 20 min had elapsed, all the participants read the following information displayed on their respective computer screens: “In the following section, your task is to complete as many accurate class schedules as possible on THREE separate trials. For each trial, you will have 8 minutes. Please record your schedules onto the answer sheets labeled ‘Trial 1, 2, and 3’.”

Upon completion of the three trials, participants reported their perceived complexity of the task by responding to six 5-point Likert-type items (1 = not at all, 5 = very much so) adopted from Wood’s (1987) Task Complexity Scale (e.g., “How complicated was the task of completing class schedules?”). Previous research using this scale reported relatively high internal consistency (e.g., \( \alpha = .78 \); Sejits & Latham, 2001).

Subsequently, the participants provided typed answers to a series of open-ended questions pertaining to their awareness of the experimental manipulation and the hypotheses. Consistent with previous experiments on the automaticity model, Bargh, Chen, and Burrows (1996) open-ended funnel debriefing questionnaire was used: (1) “What was the purpose of this study?” (2) “What do you think this study was trying to uncover?” (3) “Did the photograph (i.e., “The Thinker,” the racer, “The Thinker” and the racer, or the trees and rocks) presented along with the task instructions affect your performance in making schedules? If so, how?” (4) “Did the photograph affect what you did on the scheduling task in any way? If so, how?”

Finally, the participants reported their demographic information. The experimenter then debriefed and thanked them for participating in the experiment.

**Results**

**Manipulation checks**

**Task complexity.** The coefficient alpha for the 6-item task complexity scale was .68. An ANOVA revealed no significant difference regarding participants’ perceived task complexity among the four conditions. The mean overall rating was 3.73 (SD = .65) suggesting that participants perceived the scheduling task to be moderately complex.

**Awareness.** The manipulation check for awareness of the primed goal-performance relationship revealed the following: The typical answers to question 1 were “to study how students solve problems under time pressure,” “to get an insight into different people’s organizational skills,” or “don’t know.” In responding to question 2, participants either reported “don’t know,” or wrote general psychological concepts such as “stress,” “confidence,” and “cognitive speed” without elaborating on what specific relationships were being tested. Other participants included a brief account related to the information in the consent form they signed at the beginning of the experiment, e.g., “to test my ability to make a schedule, to test my creativity in writing stories.” In responding to questions 3 and 4, participants either left them blank, or explained how they thought their performance had been affected by factors such as time pressure, concentration, and anxiety. In short, no participant reported an awareness of the priming technique. Neither did any participant correctly identify the purpose of the experimental procedure. Hence, no participant was dropped in the subsequent data analyses.

**Task performance**

The dependent variable was the number of correct schedules generated on each of the three trials. There was no significant difference among the four conditions on the pre-test performance measure \( F(3,84) = .79, \text{n.s.} \). The results for task performance are shown in Fig. 2. A \( 2 \times 2 \times 3 \) repeated measures ANCOVA with priming and learning goals as between-group factors, trials as a within-group factor, and performance on the pre-test as a covariate indicated a significant within-effect for trials \( F(2,82) = 3.75, p = .028, \eta^2 = .08 \). A series of paired sample two-tailed \( t \)-tests indicated that performance on trials 2 (\( M = 2.62, SD = 1.29 \)) \( t(87) = 5.29, p = .00 \) and 3 (\( M = 2.84, SD = 1.39 \)) \( t(87) = 7.08, p = .00 \) were significantly higher than performance on trial 1 (\( M = 2.17, SD = 1.13 \)). Moreover, performance on trial 3 was significantly higher than performance on trial 2 (\( t(87) = 2.48, p = .015 \)). This suggests that learning increased across the three trials.

The results also showed that there was a significant main effect for only the primed learning goal \( F(1,83) = 10.29, p = .002, \eta^2 = .11 \). Planned independent-sample two-tailed \( t \)-tests were conducted to test each of the three research hypotheses. The primed learning goal (\( M = 9.28, SD = 2.90 \)) led to significantly higher performance than the no prime control condition (\( M = 6.68, SD = 4.43 \)) \( t(41) = 2.22, p = .032, d = .69 \) as well as the primed performance goal (\( M = 7.09, SD = 3.29 \)) \( t(38) = 2.23, p = .032, d = .71 \). These findings show that a primed learning goal increases performance on a task requiring the acquisition of knowledge. Therefore, hypothesis 1 was supported. Priming a performance goal did not significantly increase performance over that of the control group \( t(43) = .35, \text{n.s.} \). Thus, hypothesis 2 could not be confirmed.

The interaction effect between the two primed goals was marginally significant \( F(1,83) = 3.45, p = .067, \eta^2 = .04 \). A \( 2 \times 2 \) ANCOVA (pre-test performance on the practice trial as a covariate) for each of the three trials showed that this interaction effect, as predicted by hypothesis 3, was due primarily to performance on the last trial \( F(1,83) = 5.06, p = .027, \eta^2 = .06 \). However, performance on the final trial was still highest in the learning goal condition. Tukey’s HSD comparisons revealed that only the participants in the primed learning goal condition (\( M = 3.57, SD = 1.15 \)) generated significantly more accurate schedules than...
did those in the control condition ($M = 2.37, SD = 1.74$) ($p = .023$, $d = .81$). Hence, the overall marginally significant effect between the two primed goals lacks practical as well as statistical significance.

These findings suggest that on a knowledge acquisition task, the primed learning goal was constantly meaningful across the three trials. By contrast, neither priming the performance goal alone nor priming both goals together had a beneficial effect on task performance.

**General discussion**

The contributions of the present experiment to the goal priming literature are at least twofold, namely, providing a theoretical framework for conducting priming research on organizational behavior, and reducing the “replicability crisis.”

**Goal setting theory: A framework for primed goal research**

A major criticism of research on primed goals is the lack of a theoretical framework (Dijksterhuis, 2014). A theory not only enables the prediction, explanation, and influencing of causal variables, it specifies the mediators and moderators. As Cesario (2014) noted, absent a theory that specifies moderators, a failure to replicate another researcher’s findings will necessarily be ambiguous with respect to the inferences that can be drawn. What is needed, he argued, is a sufficiently developed theory of priming that specifies exactly what features of an experiment are important and with what effect. Similarly, Stroebe and Strack (2014) stated that a theory of priming is needed to enable replications to ascertain the experimental contributions that reflect the theoretical variables manipulated and measured in the original study.

Although Locke and Latham’s (1990, 2013) goal setting theory is among the most cited theories of motivation in organizational psychology (Miner, 2003; Mitchell & Daniels, 2003; Pinder, 1998), it has been over-looked by the social psychologists who conduct research on the effects of primed goals. This is surprising in light of a central argument of the automaticity model, namely, that primed goals follow the same processing stages, predict the same phenomena, and produce the same outcomes as consciously set goals (Bargh et al., 2010). Moreover, previous studies by social psychologists have shown that a primed goal affects behavior through effort and persistence (e.g., Hassin, 2008), two mediators in goal setting theory. As noted earlier, Latham and Piccolo (2012) found that a context specific prime leads to higher job performance than a general prime. The importance of goal specificity is central to goal setting theory.

The present experiment, consistent with goal setting theory, shows the importance of differentiating goal content, that is, a learning vs. a performance goal in priming research. The present findings are consistent with those obtained in conscious goal setting studies on this theory (e.g., Winters & Latham, 1996). Only the primed learning goal in the present experiment led to higher performance on a task requiring the acquisition of knowledge. Consistent with experiments on consciously set goals, the primed performance goal was not effective in increasing performance, nor was the combination of a primed learning and a primed performance goal effective. These findings add further support for a central contention of the automaticity model. With the exception of
awareness, a primed goal has the same effects and operates in the same way as a consciously set goal (Bargh et al., 2010).

Goal setting theory views learning and performance goals as *intrapersonal* motivational states. This is in contrast to the achievement goal literature (e.g., Elliot, 1999; Elliot & Harackiewicz, 1996) in social psychology that distinguishes between setting *performance* goals to demonstrate competence to others and setting *mastery* goals for developing one’s competence. The former is an interpersonal goal and the latter is intrapersonal. This literature further distinguishes between approach and avoidance goals (Elliot & Harackiewicz, 1996; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). The present findings are consistent with approach goals. Whether avoidance goals can be primed has yet to be tested.

That the contribution of primed performance and learning goals did not increase performance over that of a learning goal alone is contrary to what was hypothesized. Subsequent to conducting this experiment, we discovered research which showed that, as is the case with conscious goal pursuits, the pursuit of a primed goal consumes cognitive resources. It appears that the same executive processes occur in subconscious and conscious goal pursuit (Marien, Custers, Hassin, & Aarts, 2012). Moreover, the use of working memory in subconscious goal pursuit utilizes the same brain structures and executive process as that used in conscious goal pursuit (Bargh, 2005; Hassin, Bargh, Engell, & McCulloch, 2009).

In summary, when ability, a moderator in goal setting theory, is lacking, that is when the acquisition of knowledge is necessary to perform a task, when one or more strategies, a mediating variable in goal setting theory, must be learned, a learning rather than a performance goal should be primed.

Given the similarity in findings between experiments that led to the development of the automaticity model and those that led to the development of goal setting theory, and given the consistency in the findings from primed goal experiments with those on consciously set goals, goal setting theory would appear to provide a useful framework for conducting further research on priming goals to influence behavior in work-settings. Although this theory does not explain neurological changes in the brain due to priming, nor the spreading activation of one concept or neural site to another (e.g., Klaczky & Creswell, 2014), it does specify mediators (e.g., strategy) and moderators (e.g., ability) that may enhance or attenuate work related priming effects. Thus goal setting theory provides a framework for conducting future job related research such as the extent to which priming can be used to influence choice, a mediating variable in goal setting theory, of an easy vs. a conscious difficult goal. Further research is also needed on the extent to which feedback and commitment, two additional moderators in this theory, affect primed goal-performance relationships in work related contexts. Future research should also examine whether proximal primes aid in the pursuit of a distal prime as has been found with consciously set goals (Latham & Seijts, 1999). Finally, as Locke and Latham’s (2002) goal setting theory emphasizes the value and importance of goals to an individual for strengthening the goal-performance relationship, future research should investigate whether goal-relevant reward cues and incentives strengthen the effect of the primed goal-performance relationship (Aarts, Custers, & Marien, 2008; Custers & Aarts, 2010).

The “replication crisis”

Cognitive psychologists have argued that the priming effects of goals are likely the result of Type I errors, or at best are so fragile as to be unimportant (e.g., Pashler et al., 2012; Simmons, Nelson, & Simonsohn, 2011). The results of the present experiment provide a strong conceptual replication for those obtained by Dijksterhuis and van Knippenberg (1998) who, as noted earlier, used a multiple choice test of Trivial Pursuit. A conceptual replication is arguably preferable to an exact replication because with every difference that is introduced (e.g., independent and dependent variables; operationalization of the construct), the confirmatory power of the replication increases. This is because the phenomenon has been shown not to hinge on a particular set of operations, but to generalize to a larger area of application (Schmidt, 2009; Stroebe & Strack, 2014).

Conceptual replications are essential if psychology is to mature as a science (Cesario, 2014). Doing so successfully indicates that the knowledge generated passes the social verification test. An effective strategy for increasing confidence in a set of findings is to test them using completely different manipulations (Stroebe & Strack, 2014). In order to take a step toward eliminating the “replicability crisis” in priming research, we followed this strategy.

In the present experiment, the primes were photographs rather than listing the characteristics of one of two labels. The dependent variable was the acquisition of knowledge, specifically, learning ways of performing the task rather than ascertaining the correct multiple choice item. The outcome was the same in both experiments. Those primed with intelligence out-performed those in the control group, and in the present experiment they also performed significantly better than those primed with the achievement motive. Further support for Dijksterhuis and van Knippenberg’s (1998) findings has been obtained using functional magnetic resonance imaging (fMRI). Bengtsson, Dolan, and Passingham (2011) replicated the professor-hooligan study by showing evidence of plausible brain region activation corresponding with the priming effect on performance.

Stroebe and Strack (2014) offered several reasons why Shanks et al. (2013) were unable to replicate Dijksterhuis and van Knippenberg’s (1998) findings. First, unlike the present experiment, Shanks et al. did not assess whether the prime, professor, increased the cognitive representation of the concept intelligence. Second, the original findings are widely cited in introductory social psychology text books, and therefore widely known in psychology as opposed to business school participant pools. The participants’ prior knowledge of the research findings may have affected Shanks et al. results. Third, the multiple choice items Shanks et al. chose for the students to answer may have been too easy or too hard resulting in a restriction of range in the responses.

**Limitations and future directions**

A limitation of this laboratory experiment is the few number of trials. This is a limitation because Fig. 2 shows that as people learned how to perform the task, the effect of the primed performance goal, relative to the control, increased. Future experiments, in the laboratory and field, should include a greater number of trials to ascertain if there is ever a time period when the presentation of both a primed learning and performance goal results in optimum performance, and whether there is a subsequent time period when a primed learning goal loses its effectiveness on performance, because it is no longer needed, relative to a primed performance goal.

Another limitation of the present experiment from the standpoint of human resource management is that societal culture was not investigated as a possible boundary condition (Latham, 2012; Latham & Pinder, 2005). The extant research regarding human resource management has used photographs of Western cultural origins to prime goals. Cultural priming research (e.g., Oyserman & Lee, 2007) may suggest alternative images reflective of ‘cultural thickness’ for priming a performance or a learning goal. It is possible that a photograph of “The Thinker,” with a
background characterized by additional cues for thinking, may be more effective than a photograph of only “The Thinker” in priming a learning goal among East Asians. It is possible that an image of the racer alone, relative to an image showing the racer with significant others celebrating and sharing her achievement, may be less effective in arousing the need for achievement among East Asians than their Western counterparts. Previous research has shown that East Asian individuals pay more attention than Americans to context rather than the focal object of a photograph (Masuda & Nisbett, 2001). Still, since priming a cultural element also leads to priming other interconnected schemas, attributes, and orientations, it will be difficult to isolate a single manipulation for goal priming that will account for the causal effect on performance (Cohen, 2014).

Future research should assess affective arousal over multiple trials, as affect may strengthen or weaken the primed goal-performance link. Whether a goal is conscious or subconscious, affect gives a goal motivational force (Bargh, Schwader, Hailey, Dyer, & Boothby, 2012; Locke & Latham, 2002). Ferguson and Porter (2009) found that a primed goal must be sufficiently positive for it to shield it from other demands on one’s time and attention.

Another avenue for future research concerns the determinants or antecedents of subconscious goal activation. To date, research in human resource management on subconscious goals has only started to examine the effect of visual stimuli, namely, photographs, on activating a goal to affect organizational behavior. George (2009) suggested that environmental cues in job design and characteristics may subconsciously affect behavior in work settings. Hence, research is needed to assess job characteristics that may prime goals.

Despite these needs for future research, the practical significance of the present findings is that they suggest the value of priming learning goals in work settings in order to increase job performance. The beneficial effect of doing so is likely to occur in contexts requiring task mastery, that is, tasks where people initially lack the requisite knowledge to perform effectively.

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