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A First Examination of the Relationships Between Primed Subconscious Goals, Assigned Conscious Goals, and Task Performance

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The authors conducted 2 studies of subconscious goal motivation. First, the authors ran a pilot study to establish the effects of priming of subconscious goals on a performance task frequently used in goal setting research. Second, the authors conducted the main study in which the authors examined the effects of both priming of subconscious goals and assigned conscious goals on the same performance task. The authors found significant main effects of both manipulations and a significant interaction between subconscious and conscious goals. The effects of conscious difficult and do-best goals were enhanced by subconscious goals, although conscious easy goals were not affected. All effects from the main study still held after 1 day.

Keywords: subconscious, priming, goals

This article reports on the first attempt to connect two substantial theoretical and empirical literatures that pertain to human motivation. The first literature is goal-setting theory (Locke & Latham, 1990, 2002), which has been developed in the field of industrial–organizational (I/O) psychology and organizational behavior (OB) to explain and predict work motivation. Goal-setting theory is focused entirely on conscious motivation. The second literature focuses on goals at the subconscious level, and it comes from social psychology (see Chartrand & Bargh, 2002). Subconscious goal motivation operates automatically, that is, without intention, awareness, and conscious guidance (Bargh, 1990). The research on subconscious goal motivation has included many dependent variables but has rarely examined the level of task performance.

Why attempt to connect these two literatures? Locke and Latham (2004) recently offered recommendations for motivation research in the 21st century. One of their recommendations reemphasized that not all motivation is conscious, and that I/O psychology and OB research should begin to study subconscious motivation. Thus far in these fields, only McClelland (McClelland, Atkinson, Clark, & Lowell, 1953) and Miner (Miner, 2002) have considered subconscious motivation as measured by projective tests. These approaches both involve trait theories, and the projective measures they used show validity (Collins, Hanges, & Locke, 2004); however, neither approach is widely used today, and neither has been found to be related (directly or indirectly) to conscious goals (Tracy, Locke, & Renard, 1999). It remains to be seen whether manipulations of subconscious state goal motivation (e.g., as performed by Bargh & Chartrand, 2000, and Chartrand & Bargh, 2002), as opposed to trait projective measures, affect the level of performance and interact with assigned conscious goals.

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Theoretical Background

Goal-Setting Theory

Because goal-setting theory (henceforth *goal theory*) is well-known and described in detail elsewhere (see Locke & Latham, 1990, 2002), our summary of it is brief. Goal theory asserts that specific difficult goals lead to higher performance than "do best" or easy goals, providing that there is feedback that shows progress in relation to the goals, goal commitment, and sufficient task knowledge. Miner (2003) reported a recent peer review that ranked goal theory first in importance out of 73 management theories, as rated by OB professors.

Since Locke and Latham's (1990) book that summarized goal theory research, many new findings have been added. These include the analysis of the relation between goals and task strategies (Locke, 2000), the importance of learning goals when people need to find strategies for new complex tasks (Seijts & Latham, 2001), the relation of goals and risk (Knight, Durham, & Locke, 2001), the role of goals as mediators of personality traits and incentives (Locke, 2001), the relation of goals and goal orientation (VandeWalle, Cron, & Slocum, 2001), and the relation of goals to small venture growth (Baum & Locke, 2004; Baum, Locke, & Smith, 2001).

Bargh et al.'s Research

We reviewed the social psychology literature in more detail, because this work is not well known in the I/O psychology field.

The key assumption of this research is that goals can be activated subconsciously to affect outcomes (Bargh & Chartrand, 1999). Because cognitive processes like perceptions, stereotyping, and judgments can be subconsciously activated (Higgins, 1996), Bargh, Gollwitzer, Lee-Chai, Barndollar, and Troetschel (2001) reasoned by analogy that goals can also be triggered (or primed) subconsciously. That is, goals will develop an automatic association and activation with features of an environment in which they have been frequently pursued (e.g., the goal to help a friend in need, to act in certain ways in the presence of a relationship partner; Fitzsimmons & Bargh, 2003).

Chartrand and Bargh (2002) suggested that priming (e.g., with achievement-related words) will automatically arouse the goal to achieve, which is then applied to the task that follows. These authors stated that "once activated, the [subconscious or primed] goals [will] operate [like] consciously held goals do, all without the individual's awareness of the goal's guiding role" (p. 15).

Subconscious goals are activated through either a subliminal (by below-threshold stimuli) or supraliminal (in disguised form) priming technique (Chartrand & Bargh, 2002). Subliminal priming involves presenting the prime material on a computer rapidly and outside the field of focal vision; thus, the participant allegedly does not see it. For example, the means word (e.g., *run*) in a means–goal relationship (run → fit) might be shown subliminally, and the dependent variable, the reaction time to the goal word (*fit*), is measured (Shah & Kruglanski, 2003).

Supraliminal priming, which was used in the present study, involves providing participants in the experimental group with information consciously but in a way that seems to have no relation to the experimental task that follows. For example, in one frequently used method, participants are asked to find and circle a number of achievement-related words (e.g., *win*, *compete*, *succeed*) in a word matrix. In another frequently used method, participants are asked to write achievement-related words in the process of unscrambling five words into correct four-word sentences, with each containing one achievement-related word (e.g., "want, I, as, to, win"; "I want to win"; in which *win* is the prime word in this sentence). Participants in the control group are given only neutral (nonachievement) words (e.g., *turtle*, *green*, *lamp*) in the matrices or "scrambled" sentences. Then, all participants are given the seemingly unrelated experimental task to perform.

At the end of the experiment, participants are administered questions concerning their awareness of the priming, the supraliminally primed words, and the purpose of the study. Those who report any awareness are removed from the experiment. Typically, primed participants show stronger measured outcomes than do nonprimed participants (see Chartrand & Bargh, 2002, for a review).

Most of the studies on subconscious goals have used supraliminal priming (henceforth *prime*). For example, some studies involve mimicry, that is, determining whether participants who have observed a stooge shaking a foot or smiling will exhibit such behaviors more frequently during a discussion with the stooge as compared with participants primed with no such behaviors (Bargh & Chartrand, 1999).

Other studies have involved norm activation, that is, participants are primed with a picture of a library, are given the assignment to visit the library later, and then it is measured how fast participants respond to library-relevant words (e.g., *quiet*; Aarts & Dijksterhuis, 2003). Studies have also examined how priming affects how participants form impressions of people. Descriptions of the people of whom impressions are formed and the relevant context are usually presented in writing (Chartrand & Bargh, 1996).

We found only three priming studies that used level of performance as an outcome: Two studies used performance on a word-search matrix, and one used performance in a modified Scrabble game (Bargh et al., 2001). We performed a pilot study before our main study to determine whether priming worked on a task typically used in goal-setting studies. Thus, the pilot study's purpose was to link the work in social psychology to the goal-setting task and outcome. The purpose of the main study was to link subconscious and conscious goals by empirically examining the interaction between the two.

Pilot Study

Seventy-six masters-of-business-administration students participated. The average age of participants (68% female, 32% male) was 28.4 years ($SD = 4.6$). The priming manipulation asked participants to find 13 words, of which 7 were achievement-related (*win*, *master*, *succeed*, *strive*, *attain*, *compete*, *achieve*), in a 10 × 10 word matrix. All 13 words in the no-prime matrix (control group) were achievement-neutral. The performance task was listing uses for a common object (a wire coat hanger), as often used in goal theory research. Participants were randomly assigned to conditions. No time limit was set for the priming task, and 5 min were allowed for listing uses. Participants were then asked to complete the postexperimental awareness questionnaire, which used two questions (with subquestions) adapted from Bargh and Chartrand (2000). The questions measured participants' memory of the words in the puzzle and awareness of a theme behind the words in the puzzle.

Participants were excluded from the data set if they did not circle all the prime words ($n = 6$, 7.9%) or if they indicated any awareness of the priming manipulation ($n = 5$, 6.6%). This left 65 participants for the analysis. On the basis of previous research, we hypothesized that priming would positively affect performance. One-way analysis of variance (ANOVA) showed significant effect of prime, $F(1, 64) = 5.59$, $p < .05$, effect size $d = .60$.[1] The mean for prime condition was 13.70 ($SE = .884$), and for no prime condition it was 10.72 ($SE = .897$). Thus, the priming effect obtained by Bargh and colleagues (Bargh & Chartrand, 2000; Chartrand & Bargh, 2002) worked on a task not used by them but used often in goal theory research to measure performance level.

Main Study

In this study, we manipulated subconscious and conscious goals in the same experiment. On the basis of previous research, we

[1] The equations for effect size d (see Hunter & Schmidt, 1995; Rosenthal, 1991, 1994) are based on two means from experimental and control groups. However, when a factor has more than one condition (e.g., difficult goal, do-best goals, and easy goal), the equation for effect size d with two means cannot be used unless one mean is disregarded; using η^2 is recommended (Hunter & Schmidt, 1995). Square root of η^2 provides η, which is equivalent to r (Hunter & Schmidt, 1995, pp. 501–502) and which is then easily convertible to effect size d (Hunter & Schmidt, 1995, p. 284). As a result, we could determine a d value for effects with more than two means. For consistency sake, these procedures are used for all effect size d calculations reported in this article.

hypothesized significant main effects on performance for both consciously and subconsciously primed goals (for reviews, see Chartrand & Bargh, 2002; Locke & Latham, 2002). However, of more interest was a possible interaction effect on performance between subconscious (or primed) and conscious goals, an idea never examined before.

There is no previous conceptual or empirical work that links subconscious and conscious goals. Because the two literatures have been entirely separate, it is hard to make an unequivocal deduction of an interaction from previous work. However, on the basis of our reading of the literatures on subconscious and conscious goals, we hypothesize that there will be a significant interaction between subconscious (primed) and conscious goals on performance. Before discussing possible reasons for an interaction effect, it is pertinent to discuss the form that such an interaction may take. Because easy goals basically limit task performance (Locke & Latham, 1990), priming may not be beneficial in that treatment condition. Thus, priming effects, if they occur, will mostly likely enhance performance in the difficult goal condition and in the do-best goal condition.

We next discuss several mechanisms of the hypothesized interaction. It is important to note that we are not basing our conceptualization on past findings that tested such interaction but on what we believe (on the basis of our knowledge of the domain) may account for the hypothesized effect.

First, an interaction between subconscious and conscious goals may occur, because priming may enhance the amount of goal-directed motivation (or energy) aimed at the task. That is, motivation at two levels, subconscious and conscious, is more potent than goal motivation at just one level. For instance, to use extreme treatment conditions to illustrate the proposed interaction, more motivation may be produced by prime and difficult goals than by no prime and easy goals.

Second, the combination of conscious and subconscious goal motivation may promote a more intense task focus, which would then lead to better performance outcomes. The main idea here is that the combined presence of conscious and subconscious goals could reduce problems of divided attention and thus foster greater retrieval fluency of relevant information. On the one side of the coin, subconscious goals may offer another source of focus for the attempted achievement. On the other side of the same coin, conscious goals, by offering specific indicators of action, may help the subconscious mind suppress the arousal of irrelevant information. Because the subconscious mind stores both relevant and irrelevant information for any given task (see Schwarz et al., 1991), conscious goals may help pull out more of the relevant task-focused material.

Third, goal commitment (an individual's psychological attachment to the goal) may be another explanation for the interaction effects. The more difficult the goal, the more important is goal commitment (Locke, Latham, & Erez, 1988). Goal commitment works in two different ways: as a moderator when goal difficulty varies and as a main effect when goal difficulty is held high and constant (Locke & Latham, 1990). It could be that priming triggers previous goal commitment established for some difficult goals in the past when such goals are consciously set again.

Fourth, the use of subconscious priming may free up space in the conscious memory; thus, more of its capacity can be dedicated to performance, other pressing demands of the task, or both. This idea rests on the basic view in the literature on the subconscious mind—the subconscious mind can free up the conscious mind of content that may be automated (Hassin, Uleman, & Bargh, 2005). For instance, to use Bargh and Chartrand's (1999) example, automated mechanical tools (e.g., autopilot) free us from having to attend to every detail of the particular job. Thus, they allow us to focus our attention on other aspects of a job that need conscious control and could not be done by the subconscious mind (e.g., promptly reacting to changing flight conditions). Simply, the conscious mind is not limitless, and the more of it that is readily available, the better the performance.

We added one more aspect to the main study. We tested the duration of effects we obtained in the main experiment again after 1 day. Although long-term effects of conscious goals have been shown (Locke & Latham, 1990), the priming research has not discussed or examined the duration effect of subconscious goals past the range of 5 min (see Chartrand & Bargh, 2002). Obviously, the duration of the interaction effect of conscious and subconscious goals on performance has never been examined. On the basis of this somewhat limited research background, we reasoned the following: If conscious goals affect performance over time, and conscious and subconscious goals help each other in affecting performance (as we hypothesized in this study), then such an effect may still be there after 1 day. Thus, we offer an exploratory hypothesis that the effects found in the main experiment will still hold when performance is measured again 1 day later.

Method

Participants and Design

The original participants were 96 undergraduate (49%) and graduate (51%) business students at a large upper Midwestern University. The average age of participants (36.5% were female, 63.5% were male) was 25.08 years ($SD = 5.65$). Class credit was given for participation. This experiment was 2 (prime, no prime) $\times$ 3 (conscious easy, do your best, and difficult goals) analysis of variance (ANOVA). Performance was the dependent variable. We randomly assigned participants to one of the six conditions.

Treatment Manipulations

Priming. Priming was delivered by a scrambled sentence test, a frequently used method (see Bargh et al., 2001). Participants were asked to construct a grammatically correct four-word sentence (e.g., *The eagle flew around*) from a set of five randomly positioned words (e.g., *flew*, *eagle*, *the*, *blue*, *around*). There were a total of 20 sentences in this test. In the priming conditions, per Bargh et al. (2001), 12 out of 20 sentences (60%) included words related to achievement. These words were *prevail, compete, accomplished, strive, thrive, triumphed, achieve, mastered, wins, success, effort*, and *attain* (nine words were in present tense and three were in past tense to fit the content of the given sentence). Seven of these words were taken from previous research as reported in various articles (e.g., Bargh et al., 2001), and we added the remaining five (for a total of 12 sentences that included achievement-related prime words). In the no-prime group, all words in the 20 sentences were achievement-neutral (e.g., *melts water when butter heated*).

Conscious goal setting. Conscious goals were set in three conditions (easy, do your best, difficult) in relation to a performance task. The performance task was giving uses for common objects, as also used in the previously described pilot study. The same object (a wire coat hanger) was used again and was kept the same across conditions examined in this study. On the basis of our pilot testing for the conscious goal manipulations and in relation to previous goal studies (Locke & Latham, 1990), the easy goal

consisted of giving 4 uses (expected success rate of 90% on the basis of pilot work), and the difficult goal consisted of giving 12 uses (expected success rate of 10%).

Procedures

The experiment was administered in a classroom. Participants were randomly assigned to one of the six conditions. They were told, following the Bargh et al. (2001) procedure, that this was a "psycholinguistics experiment." Instructions and the tasks were presented in writing at the beginning of the experiment. After signing the consent forms, participants read the instructions for the priming manipulation, which explained the task and the rules, and provided an example of the sentences to follow. On the basis of a pilot test, participants were given 7 min to complete 20 sentences that were listed on the next two pages. Bargh et al. (2001) did not assign time to complete the sentences, because they performed the experiment in the lab with a few students at a time. Although we followed that practice in the pilot study, we feared that unscrambling 20 sentences correctly may result in more time variation than doing a word puzzle, which could end up being hard to control in the classroom setting. Thus, we did a pilot and took an average time.

The instructions for the performance task (in short, "give all the uses you have seen or can imagine") were the same as in the pilot study and were given on page 1 of the instructions. The next page stated the object and conscious goal assignment (*4*, *do your best*, and *12*). Each page had 22 lines (double-spaced, across full page) for listing uses. To provide clear feedback, only the first four lines were numbered for the easy goal, no lines were numbered for the "do your best" goal, and 12 lines were numbered for the difficult goal (these procedures were taken from previous goal theory research; Locke & Latham, 1990). Participants were given 2 min to list uses.

Finally, participants were administered a postexperimental awareness questionnaire consisting of six questions (see Bargh and Chartrand, 2000, p. 85). Participants were excluded from the data if they did not complete the priming manipulation correctly (missed a prime; $n = 6$, 6.1%), or if they stated written awareness of the priming (e.g., "Something to do with achievement, success, motivation"; "Words like success, achievement used often") or the purpose of the experiment ($n = 9$, 9.4%). Two participants qualified under both exclusion criteria mentioned above, and five were excluded because they had completed a similar experiment before. Data for the remaining 78 participants were analyzed.

Procedures for the Effects After 1 Day

In this follow-up condition, we tested the same questions but after 1 day had passed. Although general procedures were the same, an important question was whether the participants should be reminded of the treatments from the previous day or not. There is no reason to expect treatment effects if priming cleared out of the subconscious memory or if participants forgot what their conscious goal was. Thus, we decided to remind participants to recall the treatments they had the last time but without actually stating the treatments. On a separate page, we simply stated "Try to recall: (a) the sentences you unscrambled the last time, and (b) the goal you were given for listing uses the last time." The participants were verbally instructed to take some time to "think about this." After 20 s (measured by the experimenter but not told to the participants), participants were told to turn the page and start working on the next task, which was the same performance task (with a different object—wooden ruler) and the same time duration. The same postexperimental questions were used as before.

The same exclusion rules as in the previous experiments were used. Because priming was done only once in this study, those who missed prime were already excluded on Day 1, and no new participants reported awareness on Day 2. However, some students did not appear for the second day part of the experiment. Only data for those who participated both days in the study (matched participants) were analyzed. Sample size on Day 2 was $N = 57$.

Results

We conducted a 2×3 ANOVA with repeated measures on the performance task.[2] Tables 1 (Day 1) and 2 (Day 2) report descriptive statistics for all conditions, and Figures 1a (Day 1) and 1b (Day 2) plot the performance means. A test of between-groups effects, which is based on combined performance scores or estimated marginal means, showed a significant subconscious goals main effect, $F(1, 56) = 4.61$, $p < .05$, $d = .45$; a significant conscious goals main effect, $F(2, 55) = 6.46$, $p < .01$, $d = .63$; and a significant two-way interaction between subconscious and conscious goals, $F(2, 55) = 3.07$, $p < .05$, $d = .58$. A test of within-groups effects, which is based on change–difference in performance scores within groups over time, showed a significant effect of time (also known as practice, learning, or task difficulty effect), $F(1, 56) = 28.82$, $p < .01$, but importantly, neither subconscious goals, $F(1, 56) = .18$, $p = .67$, nor conscious goals, $F(2, 56) = .62$, $p = .38$, nor combined effect, $F(2, 56) = .90$, $p = .41$, significantly interacted with time. Tukey's HSD (honestly significantly different) comparisons, following repeated measures ANOVA, showed that the means for difficult goals were significantly different from easy goals, as were do-best goals. The means for difficult and do-best goals were not significantly different from each other. Regarding the interaction, subconscious goals significantly enhanced the effect of do-best and difficult goals but not that of easy goals.

Discussion

These experiments are the first to follow Locke and Latham's (2004) recommendation to study subconscious motivation and its relation to conscious motivation (i.e., goals) in the realm of performance-related tasks. Overall, we believe that the reported results encourage further study.

Theory Building

It is too early to suggest a theory of the relationship between subconscious and conscious goal motivation, but we have provided a start. First, our pioneering study found that both motivation types affect performance with a level of performance task commonly used in I/O psychology and OB research. Second, we found that the combination of subconscious and conscious goal motivation yields an interactive effect on the same performance task.

The subconscious goal motivation results may seem somewhat surprising, because the priming manipulation does not appear intuitively to be very powerful (finding and circling achievement-related words or unscrambling sentences with one achievement-related word in such a sentence). However, on the basis of our results (both in the pilot and main study) and previous results in the priming literature (see Chartrand & Bargh, 2002), priming effects appear to be reliable.

Future Research

Goal theory was built inductively (see Locke & Latham, 2005), and this study followed that inductive pattern (going from partic-

[2] ANOVA of Day 1 data only ($n = 78$) showed the same pattern of results (available from the corresponding author on request) as repeated measures ANOVA. Thus, we only report here the results of the latter analysis.

ular to general). It is the first building block for a future theory. The initial results from this study indicate that more future research tying the domains of subconscious and conscious goal motivation may be fruitful. We offer several suggestions.

Mechanisms of interaction effect. There is a need to understand and test the cognitive processes of the interaction effect found. We conceptually discussed several alternatives that may account for this effect in the introduction of this article. Here, we offer several suggestions for their empirical testing.

Verifying our first conceptual suggestion that combining conscious and subconscious goal motivation may result in greater total motivation and then greater total effort toward a task empirically poses somewhat of a challenge. This is because although subjective effort ratings (either by self or others) may reveal conscious effort, they may not reveal subconscious effort. Thus, an experiment will probably need to have long time limits and task persistence, which could also be manipulated by presenting obstacles to performance, and could be taken as a measure of total effort.

Testing our second suggestion—the subconscious mind stores both relevant and irrelevant information for any task, and conscious goals may help pull out relevant information—may involve manipulation of irrelevant information across treatment conditions. For instance, an unobtrusive distraction task in terms of focus (e.g., usually asking participants to do something else at the same time as performing the main task) may be added to see if it had less of a detrimental effect in the combined condition than in either the conscious or subconscious conditions alone.[3]

Examining our third suggestion—priming triggers stored commitment for some past difficult goal—would focus on measuring goal commitment across groups. Commitment to a conscious goal (easily measured by goal-commitment scales) in the prime plus conscious goal group may be compared with that for conscious goals only. As an alternative, because goal commitment cannot be assessed for subconscious goals, a subconscious goal commitment indirect indicator based on action (e.g., effort shown after an initial failure) may be developed (and it can be used for all treatment groups). However, it is not clear whether goal commitment is separable from goal effort and goal focus or is an aspect of one or both. Studies may also examine these questions by measuring goal commitment in the first two scenarios we discussed (regarding effort and focus).

Empirically validating our last suggestion—sharing a goal in conscious and subconscious minds frees up conscious memory capacity that then can be applied toward the task—would entail comparisons among several conditions. A first manipulation may include conscious goal and progressively difficult task-related demands in the same condition. A second manipulation would add priming to the conscious goals and progressive task-related demands. A comparison would be made to see whether more task demands were accomplished in the condition including priming.

Duration and delay effects. Future studies may attempt to replicate the time duration effect we found in the main study, with and without recall reminders. First, the effect of the length of

Table 1
Descriptive Statistics in the Main Study—Day 1

Condition	Observed mean	*SE*	95% confidence interval: Lower bound	95% confidence interval: Upper bound
Descriptive statistics for prime (subconscious goals) main effect				
Priming				
Prime	5.28	.239	4.81	5.76
No prime	4.25	.261	3.73	4.77
Descriptive statistics for conscious goals main effect				
Conscious goal				
Easy	3.86	.299	3.26	4.45
Do your best	4.62	.299	4.02	5.21
Difficult	5.83	.322	5.18	6.47
Descriptive statistics for the interaction between subconscious and conscious goals				
Priming and conscious goal				
Prime				
Easy	3.80	.399	3.01	4.60
Do your best	5.24	.375	4.49	5.98
Difficult	6.82	.466	3.07	7.75
No prime				
Easy	3.92	.446	3.03	4.81
Do your best	4.00	.466	3.07	4.93
Difficult	4.83	.446	3.95	5.72

Table 2
Descriptive Statistics in the Main Study—Day 2

Condition	Observed mean	*SE*	95% confidence interval: Lower bound	95% confidence interval: Upper bound
Descriptive statistics for prime (subconscious goals) main effect				
Priming condition				
Prime	6.65	.390	5.87	7.44
No prime	5.58	.447	4.69	6.48
Descriptive statistics for conscious goals main effect				
Conscious goal				
Easy	5.16	.509	4.14	6.18
Do your best	6.29	.500	5.29	7.30
Difficult	6.90	.533	5.83	7.97
Descriptive statistics for the interaction between subconscious and conscious goals				
Priming and conscious goal				
Prime				
Easy	4.82	.661	3.50	6.15
Do your best	7.58	.663	6.31	8.85
Difficult	7.56	.731	6.09	9.02
No prime				
Easy	5.50	.775	3.94	7.06
Do your best	5.00	.775	3.44	6.56
Difficult	6.25	.775	4.69	7.81

[3] We thank our Reviewer 1 for pointing us to the source of important research on conscious and subconscious metacognition between Israeli and German scientists, of which we were not aware. This research can be found at http://dipmetacognition.haifa.ac.il/introduction.htm#WP-3.

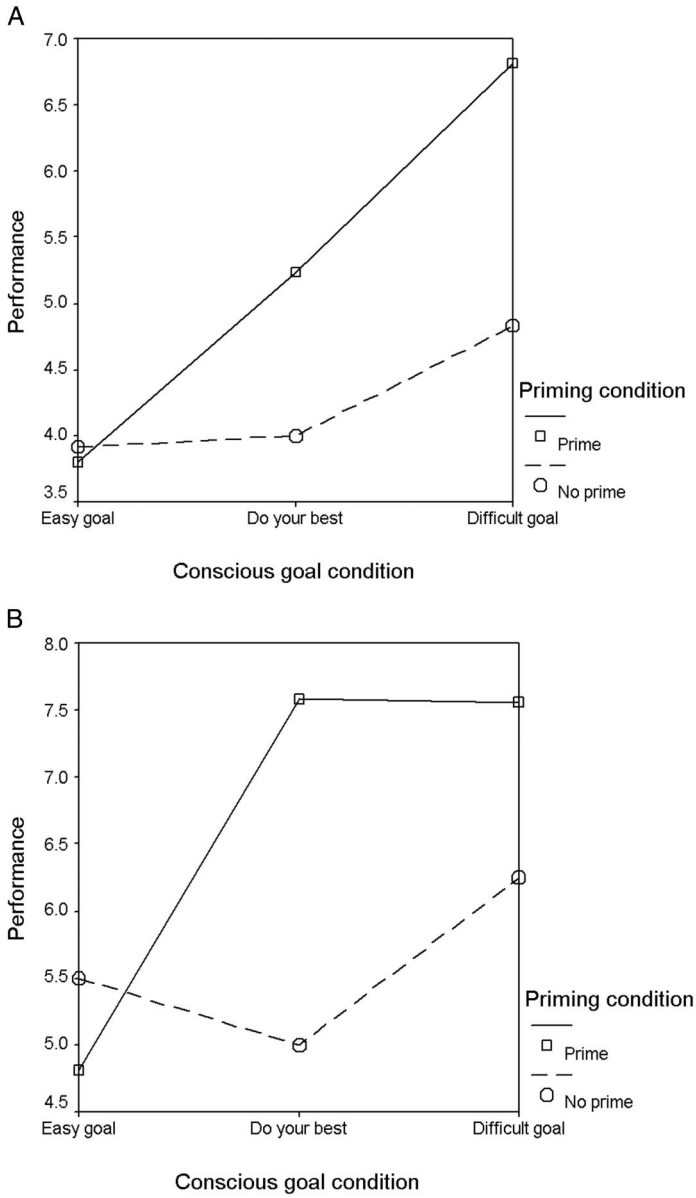

Figure 1. A: Interaction effect between subconscious and conscious goals at Day 1. Observed means at Day 1. In the no-prime–conscious-goal conditions, the performance for easy-goal participants was virtually identical to that for the do-your-best goal participants, and difficult goal increased performance by 17.2% compared with do-your-best goal participants. In the prime–conscious-goal conditions, the do-your-best goal increased performance by 27.5% over easy goal. The difficult goal increased performance by 44.3% over the easy goal and by 23.2% over the do-your-best goal. In terms of between-groups means, performances for no-prime and easy-goals groups were virtually identical. However, do-your-best goal in the prime group outperformed do-your-best goal in the no-prime group by 23.7%, and difficult goals in the prime condition did better than difficult goals in the no-prime condition by 29.2%. The prime condition is indicated with a solid line and square; the no-prime condition is indicated with a dashed line and circle. B: Interaction effect between subconscious and conscious goals at Day 2. Observed means at Day 2. In no-prime–conscious-goal conditions, the performance for easy goal and that for do-your-best goals, albeit visually apparently different, were numerically fairly similar. Difficult goals increased performance by 20% compared with do-your-best goals. In prime–conscious-goal conditions, do-your-best goals increased performance by 36.4% over easy goals, and difficult goals showed almost identical performance with that for do-your-best goals. Regarding between-groups means, performances for no-prime–easy-conscious goal and prime–no-conscious goal conditions were similar. However, do-your-best goals in the priming condition outperformed do-your-best goals in the no-priming condition by 34%, and difficult goals in the priming condition outperformed difficult goals in the no-prime condition by 17.3%. The prime condition is indicated with a solid line and square; the no-prime condition is indicated with a dashed line and circle.

duration should be varied systematically to see how long (e.g., beyond 1 day) the effects last. Second, Bargh et al. (2001) found, in a very different type of time manipulation, that delaying actual performance for 5 min after priming has occurred enhanced the priming effect. There was no delayed performance enhancement for the nonprimed participants. The theory behind this effect was that delaying goal-directed action from being immediately acted on would actually increase the strength of the (pent up) subconscious goal motivation. This delay effect also needs replication with various time intervals and with different performance tasks.

Primed versus conscious goal effects. We examined primed and conscious goals working in concert. It may also be interesting to test in the same study the effects of primed and conscious goals when the two goals are in conflict with regard to the task performance. For example, a study could manipulate conscious quantitative goals that emphasize competition and primed goals that emphasize cooperation (or quality vs. quantity or speed vs. accuracy) and vice versa.

Priming and self-set goals. Another direction for research would be to prime participants but have no assigned goals. Half of the prime and half of the no-prime participants would be asked to set their own goals and the other halves would not. This would allow one to test (a) whether the very process of setting conscious goals, regardless of content, fosters prime effects, and (b) whether prime participants set higher goals for themselves than no-prime participants. A related idea would be to test whether self-set goals mediate the priming effect on performance. Full mediation would indicate that primed subconscious goals work through self-set conscious goals. Partial mediation would suggest that primed subconscious goals have a direct (broader) effect on performance in addition to indirect effect through self-set conscious goals. Another related idea would be to prime both general and specific goals to see whether they get the same effect. Presumably, priming of the type we (and Bargh and colleagues; Bargh & Chartrand, 2000; Chartrand & Bargh, 2002) did activates rather general (e.g., achievement) goals. It remains to be seen whether one could even prime specific goals, and if so, whether general and specific goals reinforce one another.

Limitations

In our 1-day duration design, we did not repeat the treatments or tell study participants what they were. However, we did ask them to think about those tasks in the expectation that such thinking would trigger the goal-directed priming and conscious goals from the previous day. We do not know whether the same results would have been obtained without such a request. Several other method questions that we encountered need to be further addressed.[4]

First, there is the question of how much it matters to miss a prime word. Averaged across both pilot and main studies, the performance of participants (7) who missed only one prime word was 25.5% lower than performance of those who missed none (prime conditions). The performance of participants (5) who missed two or more prime words was 49.30% lower than performance of those who missed none (prime conditions). These results imply that it is consequential, in terms of lowered performance, whether study participants miss any prime words.

It would be interesting to explore why such a relationship exists. One possibility is that individuals may miss primes if the primes conflict with their achievement orientation. For example, if an individual had a low mastery–high avoiding goal orientation, achievement primes may be more readily missed. Some of the research on latency response rates to primes that conflict with a subsequent stimuli (e.g., Fazio, Sanbonmatsu, Powell, & Kardes, 1986) may be relevant. If individual differences influence reactions to achievement primes, this could provide a moderator role in a larger model of goal priming and task performance.

Second, another issue that needs further study is that of the participants' awareness of the priming manipulation. In Bargh and colleagues' studies (Bargh & Chartrand, 2000; Chartrand & Bargh, 2002), no participants seem to have shown any awareness. One factor that may explain this difference is that we presented our awareness question in writing, whereas Bargh et al. (2001, p. 1017) apparently presented their questions orally. In the case of oral-awareness questioning, social desirability–conformity, accuracy in recording, or simply time issues (e.g., handling 288 participants in Bargh et al., 2001) may affect the results. Perhaps completing awareness questions in writing, as we did, gives one more time to reflect, is largely free of social desirability issues, and one can freely put down what one feels or thinks and is fairly accurate in a sense that whatever is written down is what is taken into consideration.

Perhaps the awareness issue needs to be addressed by using more sophisticated forms of questioning. Kouider and Dupoux (2004), in a series of experiments—different than those done by Bargh and colleagues (Bargh & Chartrand, 2000; Chartrand & Bargh, 2002)—used subliminal (vs. supraliminal) priming and found that participants who were thought to be unaware in previous studies were, when questioned more carefully, actually aware of the priming. It would also be interesting to examine mechanisms through which awareness of the priming manipulation impacts performance. For instance, does awareness of priming increase performance because of a demand effect or decrease performance because of participants' potential perception of being manipulated? Both alternatives have implications for research and application.

Third, more work is needed on the percentage or absolute number of primed words that would potentially be generalizable across studies. Past work has shown a range of prime words used from 53% to 67% (Bargh & Chartrand, 2000; Bargh, Chen, & Burrows, 1996; Chen, Lee-Chai, & Bargh, 2001). Agreement on ratio or number would allow for more consistency in future research.

Applied Implications

We have offered numerous ideas for potential future studies above; thus, it may be premature to present firm applied implications. However, if our findings hold, it suggests that work moti-

[4] The next two factors we describe—full and correct completion of the priming task and participants' awareness of the subconscious goal intervention—turned out to be important in the studies reported here but not in the previous priming studies (e.g., Bargh et al., 2001). We reported and explained our preliminary research in the master tutorial session at the annual SIOP conference in Chicago, April 2003. At the time, our results had been nil because we were not aware of the importance of priming completion, in addition to awareness issues. Copies of the master tutorial presentation (including results) are available from the corresponding author.

vation could be enhanced by applying both subconscious and conscious goals together.

Here is a possible example: industrial selling. Setting conscious sales goals in industrial selling is done routinely (O'Reilly & Pfeffer, 2000). Trying to prime sales people, in addition to setting conscious goals, may lead to an interaction effect in terms of increased sales performance. In terms of how to do this, perhaps at the training session, sales people may be asked to read the sales manual or product manual before sales quotas (industry language for goals) are set. One manual would be seeded with appropriate prime words (e.g., *sell, customer satisfaction, service, achieve, produce, sales, quantity*) and another would be seeded without such words, that is, it would be more neutral.

Priming and conscious goals could also be combined in research and development (R&D). Work in R&D labs typically involves training sessions and is bound to have some final conscious goal (new product, new medication) as well as goals along the way (get to some stage of product development, conduct medical trials). In a similar vein, as suggested above for sales, materials used in R&D training or product strategy meetings could have innovation-relevant words inserted (e.g., *create, innovate, new, invent, imagine, dream-up*) for half of the scientists but not for the other half. Assigning specific goals for, say, the next phase of the product development would follow.

One perhaps can think of more examples in which the above practice-related reasoning can be applied (e.g., coaching in sports, improving studying, managerial training). However, before we use priming in practice, possible ethical issues would need to be recognized. One that readily comes to mind is whether priming would lead people to be manipulated without their knowing it. If future research shows that there is more awareness in priming than what is presently suggested (e.g., Bargh et al., 2001), then there would be no problem. However, if the priming does turn out to be totally subconscious and automated, such ethical issues will have to be addressed.

Conclusion

Locke and Latham (2005, p. 28) remind us that "inductive theory building takes time, especially when starting from scratch." Our work here connected subconscious and conscious goals for the first time. Thus, if we were to summarize the reported research in one sentence, we would say that we view it to be just a beginning, albeit, we feel, a potentially promising one.

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