

Research article

To achieve or not to achieve? Comparative mindsets elicit assimilation and contrast in goal priming

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Abstract

Goal priming typically leads to goal-consistent behavior. This uniform pattern is surprising given other types of priming effects, which have been found to be more variable. On the basis of previous research on judgment priming effects, we predicted that a comparative mindset to focus on similarities versus differences also affects the direction of goal priming. Two studies show that assimilation to a primed goal results if participants focus on similarities, whereas a focus on differences leads to contrast. In Study 1, participants induced to focus on similarities behaved more neatly after being primed with neatness rather than the goal to be carefree. For participants induced to focus on differences, the opposite pattern emerged. In Study 2, a similarity focus led to assimilation to an achievement prime, whereas a difference focus resulted in contrast. These findings highlight the importance of comparative processes in goal striving and demonstrate that assimilative goal-priming effects are less invariable than existing research suggests. Copyright © 2011 John Wiley & Sons, Ltd.

Goals are a primary determinant of human behavior. Whether we go out on a Friday night or stay in the office, for example, depends on whether a goal to achieve or a goal to affiliate dominates our thinking. What, however, influences which of these alternative goals assumes dominance? One answer to this question is suggested by recent theorizing that emphasizes that goals can be fruitfully conceptualized as knowledge structures (Aarts & Dijksterhuis, 2000; Bargh, 1990; Shah & Kruglanski, 2000). As such, goals share many of the cognitive features that characterize the formation, organization, and activation of other types of knowledge structures. From this perspective, whether our behavior is guided by achievement or affiliation thus depends on the relative accessibility of both goals.

Consistent with this view, a growing body of evidence (Dijksterhuis, Chartrand, & Aarts, 2007) demonstrates that priming—the primary experimental tool for increasing accessibility—also influences goal-related behavior. In fact, goals can be primed so that related behaviors are more likely to be enacted. In a prominent example of such goal-priming effects, exposing participants to achievement-related words and thus priming an achievement goal led participants to exert more effort and to perform better on a subsequent achievement task (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001). Similarly, participants can be primed to pursue a goal to form a person impression (Chartrand & Bargh, 1996) or to affiliate with others (Lakin & Chartrand, 2003).

In all these cases, priming a goal leads participants to engage in goal-consistent behavior. That is, behavior is

assimilated towards the primed goal. This apparent consistency of goal priming effects may seem surprising—at least in light of research on other types of priming effects. In the case of judgmental priming effects (Higgins, Rholes, & Jones, 1977), for example, assimilation appears to be less inevitable. Here, it has been demonstrated that priming a concept does not always lead to assimilation. Under specific conditions, participants may also contrast their judgments away from the activated concept (e.g., Moskowitz & Skurnik, 1999; Mussweiler & Damisch, 2008; for a review, see e.g., Förster & Liberman, 2007). If goals are indeed similar to knowledge structures such as traits and stereotypes, goal priming effects might also be highly variable.

On the other hand, several characteristics distinguish the activation and operation of goals from those of less complex cognitive representations (for more extensive reviews, see Fishbach & Ferguson, 2007; Förster, Liberman, & Friedman, 2007). For example, unlike other constructs, goal activation critically depends on the expectancy and value of goal-directed behavior in a given situation. In other words, goal priming effects rest on a fit of situational affordances (e.g., whether a situation allows successful goal pursuit) and attributes of the actor (e.g., whether a person is committed to the goal; see e.g., Förster, Liberman, & Higgins, 2005). This should make it more difficult to experimentally prime goals, let alone to find evidence for moderators of the direction of goal-priming effects. Once activated, additional qualities of goals render them less susceptible to influences by other processes—goal pursuit has been shown to be highly robust.

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For example, whereas the accessibility of other primed constructs dissipates quickly, goals may remain activated until they are fulfilled (Bargh et al., 2001; Förster, Liberman, et al., 2005), contributing to persistence in goal pursuit. Another reason for robustness lies in the self-regulatory power that shield goals against alternative goals. Activated goals heighten the accessibility of goal-conducive memory contents and effectively inhibit the accessibility of opposing goals and goal-obstructing memory contents (Förster, Liberman, et al., 2005; Shah, Friedman, & Kruglanski, 2002). Thus, from this perspective, contrast in goal pursuit might have been elusive not only because of methodological reasons but also because of the nature of goal activation itself.

Previous research has demonstrated contrast in goal priming as a function of interindividual differences. For example, when primed with a relationship partner who holds certain goals for them, participants may behave in the opposite way if they are unwilling to be controlled by that person (Chartrand, Dalton, & Fitzsimons, 2007). Such an effect may also occur when people are primed with a goal for which they have a chronically low motivation (Hart & Albarracín, 2009). These findings may be best understood as habitual reactions towards relationship partners or as consequences of chronic goal-specific attitudes. In contrast, here we argue and show that the same goal prime can variably lead to assimilation or contrast independent of stable personality characteristics and goal associations. In particular, we provide evidence that a processing mindset to focus on similarities or differences in comparisons moderates the direction of goal-priming effects.

The possibility that goal priming may also lead to contrast can be derived from research on the influence of such mindsets on judgmental priming effects. Classic judgmental priming studies show that priming the trait concept "hostility", for example, usually renders subsequent judgments of an ambiguously described target person (e.g., "Donald") more hostile (Srull & Wyer, 1979). Recent research (Mussweiler & Damisch, 2008) demonstrates that the influence of concept priming on judgments depends on whether judges are induced to adopt a comparative mindset that focuses on similarities or differences while being primed. Assimilative priming effects are particularly likely if participants adopt a similarity focus. However, when adopting a difference focus, they are more likely to judge the target person as less in line with primed concepts—a contrast effect emerges.

These findings show that comparative processes can contribute to conceptual priming effects. Much recent research has shown that comparative processing mindsets determine whether comparisons lead to assimilation or contrast (Mussweiler, 2003). If judges adopt a similarity focus during comparison and focus on ways in which target and standard of comparison are similar to one another, then assimilation results. If, however, judges adopt a difference focus and focus on ways in which target and standard differ from one another, then contrast occurs. Besides judgmental priming, the importance of these comparative processing mindsets is observable in diverse psychological domains in which comparisons play a causal role, such as self-judgments (Häfner, 2004; Hanko, Crusius, & Mussweiler, 2010; Mussweiler, Rüter, & Epstude, 2004a), group and person perception (Corcoran, Hundhammer, & Mussweiler, 2009; Corcoran &

Mussweiler, 2009), emotional contagion (Epstude & Mussweiler, 2009), in evaluative conditioning (Corneille, Yzerbyt, Pleyers, & Mussweiler, 2009), product evaluations (Raju, Unnava, & Montgomery, 2009), or persuasion (Tormala & Clarkson, 2007). What we propose has not been shown for goal priming yet, but such effects have, for example, been found for specific performance standards (Bittner, 2011; Haddock, Macrae, & Fleck, 2002), and this lends credibility to our assumption that the direction of goal priming effects might also depend on whether a focus on similarities vs. differences is activated.

Additional evidence implies that the assimilative and contrastive consequences of judgmental priming stem from spontaneous comparisons with comparison standards made accessible by the priming procedure. Priming a trait concept leads to the spontaneous activation of standards that are associated with this concept. For example, priming aggressiveness renders aggressive standard persons accessible (Mussweiler & Damisch, 2008). The prime-consistent standards are then compared with the target person and these comparisons contribute to assimilative or contrastive judgmental priming effects depending on participants' comparative foci (Mussweiler & Damisch, 2008). Given that goal priming procedures are highly similar to judgmental priming procedures, they should render comparison standards accessible that are associated with the primed goal. For example, priming achievement should activate highly achievement-motivated persons.

That goals are closely associated with comparison standards is also implied by research that emphasizes the interpersonal nature of goal priming. Here, it has been suggested that certain goals may be closely associated with specific individuals, and the activation of these individuals can elicit goal-related behavior (e.g., Aarts, Gollwitzer, & Hassin, 2004; Fitzsimons & Bargh, 2003; Shah, 2003). This may be the case because once activated, a person is likely to exert a powerful influence on our psychological functioning via social comparisons. In fact, social comparisons occur so spontaneously, effortlessly, and inevitably that they are engaged in whenever a social standard is accessible (Mussweiler, Rüter, & Epstude, 2004b). As social comparisons have clear motivational consequences (e.g., Crusius & Mussweiler, in press; Lockwood & Kunda, 1997), such a comparison may well contribute to the effects of goal priming. Thus, the effects of an achievement prime may be determined by spontaneous social comparisons with the highly achievement-oriented comparison standards that have been activated by the priming.

According to this reasoning, the direction of goal-priming effects—whether they lead to assimilation or contrast—may depend on whether participants focus on similarities or differences during the comparison. Assimilation should thus be less of an invariable consequence of goal priming: A difference focus could be a boundary condition producing contrast.

To test this reasoning, we applied a procedural priming logic (Mussweiler, 2001). Prior to goal priming, participants were procedurally primed to focus on similarities versus differences. Previous research has shown that this task induces an informational focus on similarities versus differences that carries over to subsequent tasks (Mussweiler, 2001). Subsequently, they engaged in a goal-relevant performance task. Similarity-primed participants should assimilate their task

performance to the primed goal. Difference-primed participants, however, should contrast their task performance away from the primed goal. We examined this possibility with distinct goals, namely neatness (Study 1) and achievement (Study 2).

STUDY 1

To manipulate their comparative mindset, participants listed either similarities or differences between the halves of a picture. A Scrambled Sentences Task (Srull & Wyer, 1979) then primed them with a goal to be neat or with an alternative goal that has opposite behavioral implications, namely the goal to be carefree. Then, participants completed a coloring task, which could be done in a more or less neat manner. A similarity focus should lead to assimilation, such that those primed with a neatness goal complete the task more neatly than those primed with the goal to be carefree. A difference focus, however, should lead to contrast, such that those primed with a neatness goal act less neatly than those primed with a carefree goal.

Method

Participants

We recruited 72 participants (43 women, 2 undisclosed gender) on the University of Cologne campus. They received chocolate and the chance to win 40 Euros in a lottery as compensation.

Materials and Procedure

Upon arrival, participants received a booklet containing the instructions and dependent measures. They expected to take part in several unrelated studies. To obtain a baseline measure of neatness, participants first completed a coloring task (Spears, Gordijn, Dijksterhuis, & Stapel, 2004) that was described as a test of creativity. We informed participants that, for reliability reasons, this test would be administered twice, interrupted by two unrelated tasks. Participants were asked to colorize an abstract picture consisting of several differently sized, partly overlapping circles.

After finishing the first coloring task, participants proceeded with the procedural priming task, which induced a comparison focus on similarities versus differences. This task was presented as a measure of perceptual style. Participants were given a picture depicting a jungle scene which was intersected by a vertical line (Mussweiler & Epstude, 2009). About half of the participants were asked to compare the halves of the picture by listing similarities. The other half were asked to compare the two sides by listing differences.

Participants then completed the goal priming manipulation, a Scrambled Sentences Task, which was introduced as a language ability task. For each item, participants had to form a grammatically correct sentence using five out of six words, which were presented in a scrambled order. Prime words were embedded in 20 of a total of 30 items. In the neatness goal condition, prime words were related to neatness, for

example *ordentlich* (neat), *aufräumen* (to tidy up), *sortieren* (to sort sth.), *bügeln* (to iron), *Sauberkeit* (cleanliness), *gründlich* (thorough), and *gewissenhaft* (conscientious). In the carefree goal condition, prime words were related to being carefree, for example *lässig* (casual), *formlos* (informal), *achtlos* (carefree), *zwanglos* (relaxed), *vage* (vague), *spontan* (spontaneous), and *oberflächlich* (superficial).

After the goal priming manipulation, participants completed the coloring task a second time. A funneled debriefing questionnaire confirmed that none of the participants guessed the true connection between the priming and coloring tasks.

Results and Discussion

How neatly participants colored the picture following goal priming served as our central dependent variable. Two independent coders, blind to both condition and the timing (pre-priming or post-priming) of the drawing, rated the neatness of participants' drawings on a scale from 1 (*not neat*) to 7 (*very neat*). The coders were asked to base this summary judgment on the degree to which participants overshot the lines and how neatly they filled the area of the drawing. The coders' ratings for each picture (Cronbach's $\alpha = .90$) were averaged to form one neatness score.

The post-priming neatness score was subjected to a 2 (comparison focus: similarities vs. differences) \times 2 (goal priming: neatness vs. carefree) ANCOVA with the pre-priming score entered as a covariate to control for baseline differences in neatness (the pre-priming score was unrelated to the independent variables, $F_s < 1$). Figure 1 depicts the baseline adjusted means of the post-priming neatness score. As expected, participants with a similarity focus were neater when primed with a neatness goal ($M = 3.28$) than when primed with a carefree goal ($M = 2.62$), $F(1, 67) = 5.09$, $p = .03$, $\eta_p^2 = .07$. In contrast, participants with a difference focus were less neat when primed with a neatness goal ($M = 2.77$) than when primed with a carefree goal ($M = 3.47$), $F(1, 67) = 5.43$, $p = .02$, $\eta_p^2 = .08$. This pattern yielded a significant comparison focus \times goal priming interaction $F(1, 67) = 10.52$, $p = .002$, $\eta_p^2 = .14$. Apart from the significant

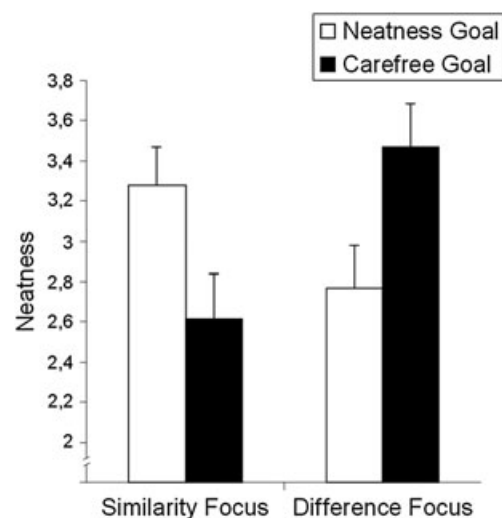


Figure 1. Means and standard errors of post-priming neatness scores (controlled for pre-priming neatness) as a function of the experimental conditions (Study 1)

covariate, $F(1, 67) = 128.34$, $p < .001$, none of the remaining effects reached significance ($F_s < 1$).

These findings demonstrate that the direction in which an activated goal influences goal-related behavior depends on participants' comparison focus. Participants with a similarity focus assimilate their goal-related behavior towards the activated goal. Those with a difference focus, however, contrast their goal-related behavior away from the activated goal. Thus, goal priming does not always lead to assimilation.

STUDY 2

Our second study was aimed at replicating and extending this initial demonstration with a different goal, namely, achievement. In line with previous goal-priming research (e.g., Bargh et al., 2001; Shah, 2003), we used two different measures of participants' goal pursuit: performance and persistence in a goal-related task. Again, participants were procedurally primed with a focus on similarities versus differences prior to the goal priming and behavior task. Participants were then primed with either an achievement goal or no goal before solving an anagram task. We expected that participants with a similarity focus would assimilate their performance and persistence towards the activated goal whereas those with a difference focus would contrast away from this goal.

Methods

Participants

The study was run on the Internet. We invited participants ($N = 111$; 88 women) via e-mail and advertisements in the University of Cologne's computer labs. Participants had a 5% chance to win a 20 Euro gift voucher.

Materials and Procedures

The experiment was described as a study of "the relationship of perception and cognition" containing "perceptual tasks and cognitive ability tests." The first task was similar to the procedural comparison priming used in Study 1. Participants consecutively compared three pairs of pictures: two drawings of a river scene, two city skyline photos, and two underwater photos. In the similarity (difference) focus condition, participants were asked to list three similarities (differences) for each pair. Then, participants completed a computerized word search puzzle similar to the one described by Bargh et al. (2001). The puzzle consisted of a 20×13 matrix composed of clickable letters. The matrix contained a total of 13 words that were located horizontally, vertically, and diagonally, embedded within random letters. The valid solutions to the puzzle were listed next to the matrix. When participants had found one of the words, they had to click each of its letters within the matrix.

In all conditions, the puzzle contained six words that were unrelated to achievement: *Pflanze* (plant), *Haus* (house), *Spatz* (sparrow), *Lampe* (lamp), *Stapel* (pile), *Violett* (violet). In the achievement prime condition the words *Leistung*

(achievement), *gewinnen* (to win), *zielstrebig* (determined), *Eifer* (eagerness), *Erfolg* (success), *siegen* (to prevail), and *anstrengen* (to strive) were added. In the control condition, these words were replaced by the words *erfahren* (to experience), *ansehen* (to look at), *anschaulich* (vivid), *Sympathie* (liking), *Sonne* (sun), *Musik* (music), and *spielen* (play), which were neutral with respect to achievement.

Once participants had solved the puzzle, they proceeded with an anagram task, which served to measure task performance and task persistence. The task was described as a measure of intellectual performance. Participants were asked to produce as many German words as they could using a subset of letters from an eight-letter anagram. Participants entered each solution consecutively by typing it into a form and clicking a submit button. If they entered a correct solution, the word was added to a list shown on the screen. Participants were told that they should press another button when they could no longer generate new solutions. In addition to the number of correct solutions, we recorded the number of invalid and repeated entries, as well as the amount of time participants spent working on the task, as measures of task persistence.

Finally, participants completed a funneled debriefing questionnaire probing for suspicion about the experimental procedures. None of the participants was aware of the true connection between the experimental tasks.

Pretest

To ensure that this internet-administered procedure was suited to replicate the achievement goal priming effect reported by Bargh et al. (2001), an independent sample ($N = 83$) completed only the priming and anagram task of the main study without being procedurally primed with a focus on similarities versus differences. As expected and in line with Bargh et al. (2001), participants primed with achievement listed more anagram solutions ($M = 20.55$) than those in the no-prime condition ($M = 15.76$), $F(1, 81) = 3.85$, $p = .05$, $\eta_p^2 = .045$.

Results and Discussion

Participants' task performance in the main study is presented in Figure 2. As predicted, participants with a similarity focus generated more correct anagram solutions when primed with achievement ($M = 23.97$) compared with no-prime controls ($M = 17.29$), $F(1, 107) = 8.31$, $p = .005$, $\eta_p^2 = .072$. In contrast, participants with a difference focus generated fewer correct anagram solutions when primed with achievement ($M = 21.00$) compared with no-prime controls ($M = 25.95$), $F(1, 107) = 3.83$, $p = .05$, $\eta_p^2 = .04$. In a 2 (comparison focus: similarities vs. differences) \times 2 (goal priming: achievement vs. control) ANOVA, this pattern produced a significant interaction, $F(1, 107) = 11.50$, $p < .001$, $\eta_p^2 = .10$, which qualified a tendency toward a comparison focus main effect, $F(1, 107) = 2.76$, $p = .10$. There was no goal priming main effect, $F < 1$, ns.

Following Shah (2003), we operationalized persistence in the anagram task as the time participants devoted to the task (see Figure 2). Participants with a similarity focus spent more time working on the anagram task when primed with an achievement goal ($M = 5.85$ minutes) compared with the control

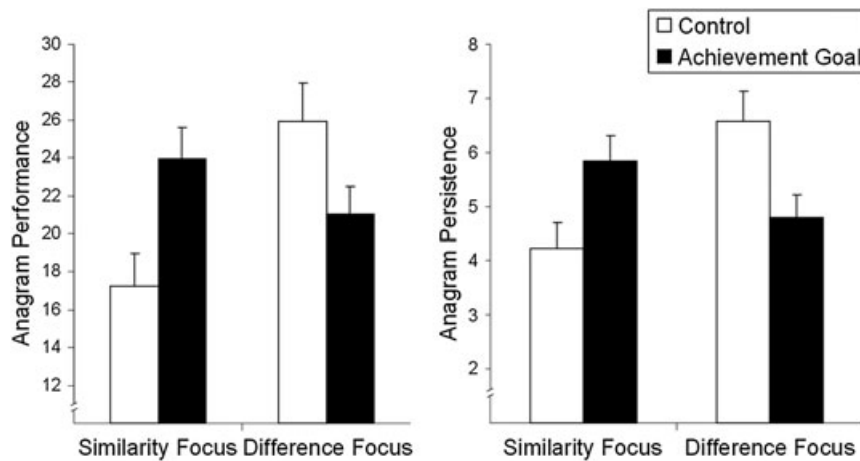


Figure 2. Means and standard errors of anagram performance (number of correct solutions) and persistence (the time participants worked on the task in minutes) as a function of the experimental conditions (Study 2)

priming ($M = 4.23$ minutes), $F(1, 107) = 6.21$, $p = .01$, $\eta_p^2 = .06$. In contrast, participants with a difference focus spent less time working on the anagram task when primed with an achievement goal ($M = 4.79$ minutes) compared with control priming ($M = 6.56$ minutes), $F(1, 107) = 6.31$, $p = .01$, $\eta_p^2 = .06$. This pattern yielded the expected interaction in a 2 (comparison focus: similarities vs. differences) \times 2 (goal priming: achievement vs. control) ANOVA, $F(1, 107) = 12.50$, $p < .001$, $\eta_p^2 = .11$. None of the main effects reached significance, $F_s < 1.79$, $p_s > .18$. Interestingly, the same interaction pattern emerged for an additional indicator of participants' persistence: The number of invalid anagram solutions, such as repeated entries or invalid words (e.g., foreign language words, words that used the same letter more than once) participants submitted, $F(1, 107) = 5.44$, $p = .02$, $\eta_p^2 = .05$.

To examine whether persistence (as measured by the time devoted to the task) statistically mediated anagram performance, we conducted a mediated moderation analysis (Muller, Judd, & Yzerbyt, 2005). In the first step, we regressed anagram performance on the comparison focus condition (similarities = 1, differences = -1), the goal priming condition (achievement = 1, control = -1) and the comparison focus \times goal priming interaction, revealing an effect of the interaction, $\beta = .31$, $t(107) = 3.39$, $p < .001$, a tendency toward a comparison focus main effect, $\beta = -.16$, $t(107) = -1.66$, $p = .10$, and no goal priming main effect, $t < 1$. Then, we regressed persistence on comparison focus, goal priming, and the comparison focus \times goal priming interaction, revealing an effect of the interaction, $\beta = .33$, $t(107) = 3.54$, $p < .001$ and no main effects, $|t_s| < 1.34$, $p_s > .18$. Finally, we again regressed performance on comparison focus, goal priming, and the comparison focus \times goal priming interaction, but adding persistence as predictor. This equation produced only a significant effect of persistence, $\beta = .71$, $t(106) = 10.51$, $p < .001$. Importantly, the effect of the comparison focus \times goal priming interaction was reduced and rendered non-significant, $\beta = .08$, $t(106) = 1.17$, $p = .25$; other effects $|t_s| < 1$. This indicates that persistence statistically mediated the joint effect of comparison focus and goal priming on the performance in the anagram task. To elucidate these findings, we computed the indirect effects within the similarity and difference focus conditions. Persistence statistically mediated the goal

priming effect in the similarity focus condition, Sobel $Z = 2.41$, $p = .016$, indicating that the increase in persistence caused by the goal priming was associated with higher performance. Persistence also mediated the effect of the goal priming in the dissimilarity condition, Sobel $Z = -2.43$, $p = .015$, indicating that the decrease in persistence caused by the goal priming was associated with lower performance.

It has to be noted that participants with a difference focus performed better and were more persistent than participants with a similarity focus. This may have occurred because a difference focus enhances creative thinking (Förster, Friedman, Butterbach, & Sassenberg, 2005), a skill that might aid in solving anagrams and may make them more enjoyable. It is important to keep in mind, however, that this baseline difference in the control condition is extraneous to our hypothesis, which pertains to increases versus decreases relative to this baseline.

Consistent with the results of Study 1, these findings again demonstrate that the direction of goal-priming effects depends on participants' comparison focus. Participants with a similarity focus assimilated towards the activated goal, such that those primed with an achievement goal performed better on the anagram task and were more persistent in their attempts to find solutions than control participants. Participants with a difference focus, however, contrasted away from the activated goal, such that those primed with an achievement goal performed worse and were less persistent.

It is noteworthy that in our pretest, in which no comparison focus was primed, participants assimilated to the primed goal (albeit with a somewhat smaller effect size than in the main study). This raises the question of what the default effect of goal priming is: assimilation or contrast? From a comparison perspective on goal priming, this question boils down to whether a comparison focus on similarities or on differences is the default. Research on comparison processes in other domains suggests that a similarity focus is more of a default (Mussweiler, 2003). This is the case because comparison standards—at least those that come to mind spontaneously or are self-selected—tend to be similar to a given comparison target. In social comparison, for example, people typically select others who are similar to themselves as comparison standards (Festinger, 1954). The notion that a similarity focus

tends to be the rule and a difference focus the exception is well consistent with the predominance of assimilation effects in goal-priming research (e.g., Bargh et al., 2001).

GENERAL DISCUSSION

The present research examined the influence of processing mindsets on the direction of goal-priming effects. Previously, goal priming typically led to goal consistent behavior. Drawing upon research on the role of comparative processes in judgmental priming effects (Mussweiler & Damisch, 2008), we hypothesized that such assimilative goal-priming effects are not invariable. This research has shown that conceptual primes render associated standards accessible that are then likely to be used for social comparison (Mussweiler et al., 2004b) and shape goal-directed behavior. The direction of this influence depends on whether participants adopt a comparison focus on similarities, leading to assimilation, or on differences, leading to contrast (Mussweiler, 2003).

Studies 1 and 2 show that the direction of goal-priming effects depends on the activated comparison focus. Participants primed with a comparison focus on similarities assimilated their goal-related behavior towards the goal. Those procedurally primed with a comparison focus on differences contrasted their behavior away from the activated goal. The present research establishes this pattern of assimilation and contrast for two different goal domains by priming a neatness goal (Study 1) and an achievement goal (Study 2). Importantly, these assimilative and contrastive effects appear on two distinct measures of goal pursuit, namely, performance and persistence. Participants with a similarity focus performed better and were more persistent in an anagram task if primed with an achievement goal.

These findings have a number of implications for the goal-priming literature and they extend previous research examining the role of comparative processes in other priming phenomena. They lend further credence to the notion that goals are knowledge structures that share many characteristics of other knowledge structures (Aarts & Dijksterhuis, 2000; Bargh, 1990; Kruglanski, 1996; Shah & Kruglanski, 2000). For example, whether our behavior is guided by one goal or another goal should depend on the relative accessibility of both goals. As comparison processes selectively alter the accessibility of knowledge (Mussweiler, 2003), they are likely to affect goal pursuit.

Furthermore, and in line with this reasoning, the present findings suggest that the consequences of goal priming are more variable than previous research suggests. Priming a goal may induce people to behave in a goal-consistent manner and thus show assimilation, as previous research attests (Bargh et al., 2001) but may also lead people to behave in a manner that is inconsistent with this goal and thus show contrast. The present studies establish participants' comparison focus on similarities versus differences as one moderator for the direction of goal-priming effects.

The present findings confirm that the processes that contribute to goal-priming effects partly overlap with those in judgmental priming. In particular, earlier research (Mussweiler

& Damisch, 2008) has shown that assimilative and contrastive effects of concept priming on judgments of ambiguous persons may be driven by comparisons of these people with spontaneously activated comparison standards. The present research suggests that a similar mechanism may also contribute to goal priming. As such, our findings also contribute to the social psychological comparison literature. Previous comparison research has mainly focused on affective and self-evaluative consequences of comparisons (e.g., Gilbert, Giesler, & Morris, 1995). In contrast, how comparison affects behavior has seldom been subject of empirical scrutiny (for an exception, see Seta, 1982). By altering goal pursuit, comparisons may have a subtle, yet powerful effect on people's behavior.

These findings beg to be placed in the context of other research in the behavioral priming literature. In one line of research, it has been shown that conceptual priming can lead to different behavioral outcomes by biasing the construal of ambiguous social situations. For example, morality primes caused participants to perceive their interaction partner in an ambiguous mixed-motive game as more cooperative—an assimilative judgmental priming effect (Smeesters, Warlop, Van Avermaet, Corneille, & Yzerbyt, 2003). Interestingly, even though the priming caused most participants to behave more cooperatively, highly selfish participants exploited the perceived weakness of their experimental partner, resulting in less cooperation. Similarly, when induced to focus on their ambiguously described experimental partner in an ultimatum game, competitiveness-primed participants perceived this partner to be more competitive, resulting in more cautious, and thus less competitive, behavior (Smeesters, Wheeler, & Kay, 2009). Thus, the construal of ambiguously described situations can be assimilated towards conceptual primes. These assimilative judgmental priming effects may then bear different behavioral implications depending on personality characteristics and other situational factors.

In our view, such assimilative judgmental priming effects are unlikely to underlie the present findings. Much research has shown that the susceptibility to judgmental priming effects rests on the ambiguity of the social situation (Higgins, 1996; Kay, Wheeler, Bargh, & Ross, 2004). Only if actors or situations are ambiguous primes can bias perceptions because they are used to disambiguate them. Although the depiction of Study 1's coloring task as a creativity measure may carry some ambiguity in terms of the primed concepts (no reference to the goals of being carefree or neat were made in the instructions), this is not the case for Study 2. Following previous research (Fitzsimons & Bargh, 2003; Shah, 2003), the anagram task was clearly described as a measure of performance and participants were explicitly instructed to generate as many solutions as they could. Thus, it is unlikely that they used the prime to disambiguate the task.

The present research also has some parallels to other findings from the behavioral priming literature, suggesting that comparative processes play a role in automatic behavior effects. For example, priming extreme exemplars (Dijksterhuis et al., 1998) or outgroup members (Schubert & Häfner, 2003; Spears et al., 2004) can result in contrastive automatic behavior. The social comparison literature shows that a difference focus is more likely for comparisons with standards that are extreme regarding the relevant comparative dimension

(Mussweiler et al., 2004a) or that belong to an outgroup (Mussweiler & Bodenhausen, 2002). In this respect, the aforementioned findings are in line with the notion that social comparisons can be important in automatic behavior effects. This possibility is further supported by evidence demonstrating that inducing a similarity versus difference focus resulted in behavioral assimilation versus contrast in response to a given set of concrete comparison standards, namely, supermodels (Haddock, et al., 2002). Notably, in these studies, contrast effects in automatic behavior were shown if concrete person exemplars (e.g. Einstein) rather than more abstract traits (e.g. intelligence) were primed.

Our research complements these studies in a number of ways. First, the present studies focused on goal priming rather than behavioral priming effects. We show that comparative processing goals not only affect automatic behavior, but also goal pursuit. Even though separating automatic behavior effects and goal priming effects may be a tricky issue because of some overlapping features (Förster et al., 2007), it is important to keep in mind that (in Study 2) the content and the procedure of the priming closely matched previous goal priming research (Fitzsimons & Bargh, 2003). Also, our behavioral measure was highly similar to the measures typically used in this literature (Chartrand et al., 2007; Fitzsimons & Bargh, 2003; Shah, 2003). Finally, and also in line with this previous research, we show that priming not only influences performance but also persistence in the goal task (Shah, 2003).

More importantly, however, we show that the influence of comparative processes on behavior is not restricted to situations in which potential social comparison standards are directly activated. Rather, our data show that comparative information processing mindsets also affect the priming of a more abstract concept like a goal. Thus, our studies go beyond this earlier research by providing evidence for the bolder claim that comparative processes contribute to behavioral changes in response to goal primes. Our findings hold the broader implication that—no matter how people are reminded of a certain goal—goal pursuit may be shaped by assimilative or contrastive comparisons.

Our findings are also conceptually and empirically distinct from data reported by Bittner (2011). Similar to the present studies, Bittner (2011) used Mussweiler's (2001) picture comparison task to induce a mindset to focus on similarities versus differences. These mindsets then affected whether participants' performance assimilated towards or contrasted away from concrete and explicitly set performance standards such as numeric anchor values. Our work differs from Bittner (2011) in the following ways: Rather than providing participants with concrete behavioral comparison standards (cf. also Haddock et al., 2002), we exposed them to abstract goal concepts (e.g. achievement). Furthermore, instead of setting explicit performance norms, we subtly primed goals in the unrelated task paradigm. Finally, by demonstrating how an induced similarity vs. difference focus influences not only task performance but also task persistence, the present research provides evidence for the motivational nature of the obtained performance effects.

We concluded that comparisons lead to assimilation as well as contrast in goal priming. This conclusion rests on previous

research showing that a procedural priming manipulation to focus on similarities versus differences causes assimilation and contrast in domains governed by comparisons (e.g., Corcoran & Mussweiler, 2009; Corcoran et al., 2009; Corneille et al., 2009; Epstude & Mussweiler, 2009; Häfner, 2004; Mussweiler et al., 2004a; Raju et al., 2009; Tormala & Clarkson, 2007). However, our data are silent on the question which standards have been made accessible by the priming and used in the comparisons. On the basis of previous findings showing that specific goals are closely associated with particular others such as relatives, friends, or co-workers (Fitzsimons & Bargh, 2003; Shah, 2003) we can speculate that such comparison standards may have contributed to our effects (cf. also Bittner, 2011).

Our reasoning holds that assimilative and contrastive comparisons with goal-related exemplars alter the relative accessibility of alternative goals, which then may or may not determine behavior. This reasoning is born out of previous research showing that comparisons selectively render knowledge accessible that are in line with the respective comparison focus (Mussweiler, 2003). Note, however, that in the current studies, we did not measure the accessibility of the primed goals. Thus, additional mechanisms may contribute to the effects. For example, a difference focus in comparison could also elicit a form of motivational reactance against the comparison standards and their goals. This may lead to contrast in goal pursuit, echoing the effects of chronic reactance against the goals of specific relationship partners (Chartrand et al., 2007).¹ Such a mechanism is compatible with a social comparison perspective on goal priming and poses an interesting question for future research in itself.

The present findings also allow us to speculate about further boundary conditions on whether goal-related behavior is assimilated towards or contrasted away from an activated goal. Which conditions induce a focus on differences and may thus promote contrast as a consequence of goal priming? As mentioned before, according to research on social comparisons, extreme comparison standards are more likely to lead to a comparison focus on differences (Mussweiler et al., 2004a), the same holds for standards that belong to a different social category (Mussweiler & Bodenhausen, 2002), or are not psychologically close to the target (Brown, Novick, Lord, & Richards, 1992). This suggests that priming a goal that is extreme, only associated with outgroup members, or that is unlikely to be shared by those who are close to us may produce contrast. Notably, these boundary conditions are unlikely to be limited to the effects of direct goal priming. In much the same way, indirect goal-activation via the priming of goal-related others (Fitzsimons & Bargh, 2003; Shah, 2003) is more likely to lead to contrast to the extent that the primed other is very distant from the self. These predictions are consistent with those of Bittner (2011).

Although these implications of a comparison perspective on goal-priming effects await empirical scrutiny, the present data show that goal-priming effects are more variable than previous research suggests. Whether to achieve or not to achieve is thus determined not only by the goal people have on the top

¹We thank an anonymous reviewer for this suggestion.

of their mind but also by how they process information associated with this goal.

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POST PUBLICATION NOTE

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REFERENCES

- Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: Automaticity in goal-directed behavior. *Journal of Personality and Social Psychology*, 78, 53–63.
- Aarts, H., Gollwitzer, P. M., & Hassin, R. R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology*, 87, 23–37.
- Bargh, J. A. (1990). Auto-motives: Preconscious determinants of social interaction. In E. T. Higgins, & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (Vol. 2, pp. 93–132). New York: Guilford.
- Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology*, 81, 1014–1027.
- Bittner, J. V. (2011). Implicit processing goals combine with explicit goal standards to motivate performance through underlying comparison processes. *European Journal of Social Psychology*, 41, 210–219.
- Brown, J. D., Novick, N. J., Lord, K. A., & Richards, J. M. (1992). When Gulliver travels: Social context, psychological closeness, and self-appraisals. *Journal of Personality and Social Psychology*, 62, 717–727.
- Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology*, 71, 464–478.
- Chartrand, T. L., Dalton, A. N., & Fitzsimons, G. J. (2007). Nonconscious relationship reactance: When significant others prime opposing goals. *Journal of Experimental Social Psychology*, 43, 719–726.
- Corcoran, K., Hundhammer, T., & Mussweiler, T. (2009). A tool for thought! When comparative thinking reduces stereotyping effects. *Journal of Experimental Social Psychology*, 45, 1008–1011.
- Corcoran, K., & Mussweiler, T. (2009). Comparative thinking styles in group and person perception: One mechanism - many effects. *Social and Personality Psychology Compass*, 3, 244–259.
- Cornille, O., Yzerbyt, V., Pleyers, G., & Mussweiler, T. (2009). Beyond awareness and resources: Evaluative conditioning may be sensitive to processing goals. *Journal of Experimental Social Psychology*, 45, 279–282.
- Crusius, J., & Mussweiler, T. (2012). When people want what others have: The impulsive side of envious desire. *Emotion*, 12, 142–153.
- Dijksterhuis, A., Chartrand, T. L., & Aarts, H. (2007). Effects of priming and perception on social behavior and goal pursuit. In J. A. Bargh (Ed.), *Social psychology and the unconscious: The automaticity of higher mental processes* (pp. 51–132). Philadelphia: Psychology Press.
- Dijksterhuis, A., Spears, R., Postmes, T., Stapel, D., Koomen, W., van Knippenberg, A., & Scheepers, D. (1998). Seeing one thing and doing another: Contrast effects in automatic behavior. *Journal of Personality and Social Psychology*, 75, 862–871.
- Epstude, K., & Mussweiler, T. (2009). What you feel is how you compare: How comparisons influence the social induction of affect. *Emotion*, 9, 1–14.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140.
- Fishbach, A., & Ferguson, M. J. (2007). The goal construct in social psychology. In A. W. Kruglanski, & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 490–515). New York: Guilford.
- Fitzsimons, G. M., & Bargh, J. A. (2003). Thinking of you: Nonconscious pursuit of interpersonal goals associated with relationship partners. *Journal of Personality and Social Psychology*, 84, 148–163.
- Förster, J., Friedman, R., Butterbach, E. M., & Sassenberg, K. (2005). Automatic effects of deviancy cues on creative cognition. *European Journal of Social Psychology*, 35, 345–360.
- Förster, J., & Liberman, N. (2007). Knowledge activation. In E. T. Higgins, & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 201–231). New York: Guilford.
- Förster, J., Liberman, N., & Friedman, R. S. (2007). Seven principles of goal activation: A systematic approach to distinguishing goal priming from priming of non-goal constructs. *Personality and Social Psychology Review*, 11, 211–233.
- Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology*, 41, 220–239.
- Gilbert, D. T., Giesler, R. B., & Morris, K. A. (1995). When comparisons arise. *Journal of Personality and Social Psychology*, 69, 227–236.
- Haddock, G., Macrae, C., & Fleck, S. (2002). Syrian science and smart supermodels: On the when and how of perception-behavior effects. *Social Cognition*, 20, 461–481.
- Häfner, M. (2004). How dissimilar others may still resemble the self: Assimilation and contrast after social comparison. *Journal of Consumer Psychology*, 14, 187–196.
- Hanko, K., Crusius, J., & Mussweiler, T. (2010). When I and me are different: Assimilation and contrast in temporal self-comparisons. *European Journal of Social Psychology*, 40, 160–168.
- Hart, W., & Albarracín, D. (2009). The effects of chronic achievement motivation and achievement primes on the activation of achievement and fun goals. *Journal of Personality and Social Psychology*, 97, 1129–1141.
- Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins, & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133–168). New York: Guilford.
- Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category accessibility and impression formation. *Journal of Experimental Social Psychology*, 13, 141–154.
- Kay, A. C., Wheeler, S. C., Bargh, J. A., & Ross, L. (2004). Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice. *Organizational Behavior and Human Decision Processes*, 95, 83–96.
- Kruglanski, A. W. (1996). Goals as knowledge structures. In P. M. Gollwitzer, & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 599–618). New York: Guilford.
- Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science*, 14, 334–339.
- Lockwood, P., & Kunda, Z. (1997). Superstars and me: Predicting the impact of role models on the self. *Journal of Personality and Social Psychology*, 73, 91–103.
- Moskowitz, G. B., & Skurnik, I. W. (1999). Contrast effects as determined by the type of prime: Trait versus exemplar primes initiate processing strategies that differ in how accessible constructs are used. *Journal of Personality and Social Psychology*, 76, 911–927.
- Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology*, 89, 852–863.
- Mussweiler, T. (2001). “Seek and Ye shall find”: Antecedents of assimilation and contrast in social comparison. *European Journal of Social Psychology*, 31, 499–509.
- Mussweiler, T. (2003). Comparison processes in social judgment: Mechanisms and consequences. *Psychological Review*, 110, 472–489.
- Mussweiler, T., & Bodenhausen, G. (2002). I know you are but what am I? Self-evaluative consequences of judging ingroup and outgroup members. *Journal of Personality and Social Psychology*, 82, 19–32.
- Mussweiler, T., & Damisch, L. (2008). Going back to Donald: How comparisons shape judgmental priming effects. *Journal of Personality and Social Psychology*, 95, 1295–1315.
- Mussweiler, T., & Epstude, K. (2009). Relatively fast! Efficiency advantages of comparative thinking. *Journal of Experimental Psychology: General*, 138, 1–21.

- Mussweiler, T., Rüter, K., & Epstude, K. (2004a). The ups and downs of social comparison: Mechanisms of assimilation and contrast. *Journal of Personality and Social Psychology, 87*, 832–844.
- Mussweiler, T., Rüter, K., & Epstude, K. (2004b). The man who wasn't there: Subliminal social comparison standards influence self-evaluation. *Journal of Experimental Social Psychology, 40*, 689–696.
- Raju, S., Unnava, H. R., & Montgomery, N. V. (2009). The effect of brand commitment on the evaluation of nonpreferred brands: A disconfirmation process. *Journal of Consumer Research, 35*, 851–863.
- Schubert, T. W., & Häfner, M. (2003). Contrast from social stereotypes in automatic behavior. *Journal of Experimental Social Psychology, 39*, 577–584.
- Seta, J. J. (1982). The impact of comparison processes on coactors' task performance. *Journal of Personality and Social Psychology, 42*, 281–291.
- Shah, J. Y. (2003). Automatic for the people: How representations of significant others implicitly affect goal pursuit. *Journal of Personality and Social Psychology, 84*, 661–681.
- Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology, 83*, 1261–1280.
- Shah, J. Y., & Kruglanski, A. W. (2000). Aspects of goal networks: Implications for self-regulation. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self regulation* (pp. 85–110). San Diego, CA: Academic Press.
- Smeesters, D., Warlop, L., Van Avermaet, E., Corneille, O., & Yzerbyt, V. (2003). Do not prime hawks with doves: The interplay of construct activation and consistency of social value orientation on cooperative behavior. *Journal of Personality and Social Psychology, 84*, 972–987.
- Smeesters, D., Wheeler, S. C., & Kay, A. C. (2009). The role of interpersonal perceptions in the prime-to-behavior pathway. *Journal of Personality and Social Psychology, 96*, 395–414.
- Spears, R., Gordijn, E., Dijksterhuis, A. P., & Stapel, D. A. (2004). Reaction in action: Intergroup contrast in automatic behavior. *Personality and Social Psychology Bulletin, 30*, 605–616.
- Srull, T. K., & Wyer, R. S., Jr. (1979). The role of category accessibility in the interpretation of information about others: Some determinants and implications. *Journal of Personality and Social Psychology, 37*, 1660–1672.
- Tormala, Z. L., & Clarkson, J. J. (2007). Assimilation and contrast in persuasion. *Personality and Social Psychology Bulletin, 33*, 559–571.