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Positive Affect as Implicit Motivator: On the Nonconscious Operation of Behavioral Goals

Ruud Custers and Henk Aarts
Utrecht University

Recent research has revealed that nonconscious activation of desired behavioral states—or behavioral goals—promotes motivational activity to accomplish these states. Six studies demonstrate that this nonconscious operation of behavioral goals emerges if mental representations of specific behavioral states are associated with positive affect. In an evaluative-conditioning paradigm, unobtrusive linking of behavioral states to positive, as compared with neutral or negative, affect increased participants' wanting to accomplish these states. Furthermore, participants worked harder on tasks that were instrumental in attaining behavioral states when these states were implicitly linked to positive affect, thereby mimicking the effects on motivational behavior of preexisting individual wanting and explicit goal instructions to attain the states. Together, these results suggest that positive affect plays a key role in nonconscious goal pursuit. Implications for behavior-priming research are discussed.

Keywords: motivation, affect, incentive value, effort, automaticity

The mind is designed to realize states or behaviors that we desire. In everyday life, our goals can materialize quite rapidly and spontaneously. For example, on entering our office on a Monday morning, we may desire to contact a friend or may start to vigorously search for the newspaper to do the latest crossword puzzle. Thus, we suddenly may want to engage in an activity or exert effort to reach a desired behavioral state. Although this notion seems quite trivial and obvious, one of the most intriguing questions in psychology is what motivates people to accomplish such activities, or, in other words, to pursue behavioral goals.

Grasping the cause of one's own motivational behavior can be a cumbersome venture. One reason for this is that many of our goals originate in the unconscious, and, hence, the actual source of our motivational behaviors may not be accessible to verbal report (Bargh, 1990; Wegner, 2002; Wilson, 2002). A growing number of studies suggest that goal pursuit can arise from mental processes that are put into motion by features of the social environment outside of conscious awareness. Central to the idea of automatic goal pursuit is the assumption that goals are represented in mental structures that include the context, the goal, and actions that may aid goal pursuit, and they can therefore be primed by the environment (Aarts & Dijksterhuis, 2000; Bargh & Gollwitzer, 1994; Kruglanski et al., 2002). As a result, people can indicate that they want to perform an action without awareness of the source causing this wanting or goal (e.g., Aarts, Custers, & Wegner, 2005; Fitzsimons & Bargh, 2003; Shah, 2003; Wegner & Wheatley, 1999). Furthermore, priming of goal representations can promote effort to attain these goals (Aarts, Gollwitzer, & Hassin, 2004; Bargh, Gollwitzer, Lee Chai, Barndollar, & Trötschel, 2001; Hassin, 2005). For example, Bargh et al. (2001) established that activation of goals (e.g., to perform well) via exposure to words such as *succeed* and *win* exerts an unconscious influence on action in a subsequent situation (e.g., word search task) in that better test scores are achieved. These findings indicate that people are capable of pursuing goals nonconsciously.

An important and intriguing question arising from these findings is what makes us automatically want to and actually pursue a goal that is primed. From a cognitive point of view, one could argue that the activation of the mental representation of a behavioral state that one desires to attain suffices to produce associated actions. However, how can we nonconsciously determine whether states are desirable to pursue? That is to say, how can we want to initiate and persist in goal-directed behavior without awareness of the guiding force of the primed desired state? A possible answer to this question comes from motivational perspectives that incorporate affective information in the representation of goals. Several theorists in various fields of psychology have argued that the positive valence of a state forms a crucial part of the goal representation and plays an important role in motivational processes underlying goal-directed behavior (Carver & Scheier, 1981; Peak, 1955; Pervin, 1989; Young, 1961). In other words, they stress that a goal representation not only specifies the state that is desired but also contains the information that it is desired. This article aims to advance this idea by scrutinizing the representation of behavioral goals and to offer a mechanism by which activation of a goal representation automatically produces goal-directed, motivational behavior and, thus, needs and desires may become manifest in daily life.

Specifically, our main hypothesis is that the nonconscious operation of a behavioral goal or desired behavioral state depends on whether the mental representation of the respective state is associated with positive affect, which automatically signals the person that the state is desired and worth pursuing. Our purpose is to

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Correspondence concerning this article should be addressed to Ruud Custers or Henk Aarts, Department of Social and Organizational Psychology, Utrecht University, PO Box 80140, 3508 TC, Utrecht, the Netherlands. E-mail: r.custers@fss.uu.nl or h.aarts@fss.uu.nl

investigate some key assumptions derived from this conceptualization. First, we hypothesize that when behavioral states are associated with positive affect, people more strongly want to attain these states. That is, they perceive these states as a goal to pursue. Second, we assume that activation of behavioral states associated with positive affect causes people to want to produce these behavioral states automatically—that is, without awareness of the source of this wanting. Third, we assume that activated, positively valenced behavioral states cause actual goal-directed, motivational behavior: If the nonconscious operation of a goal is indeed based on the association between the respective behavioral state and positive affect, then people should automatically work for this state if they have the opportunity to attain it.[1]

The Mental Representation of Behavioral Goals

Goals are desired states that one aims to attain (Aarts & Dijksterhuis, 2000; Geen, 1995; Gollwitzer & Moskowitz, 1996). In contemporary cognitive approaches to goal-directed behavior, a goal is conceived of as a mental representation of a behavioral state or effect resulting from more concrete action (Hommel, Muesseler, Aschersleben, & Prinz, 2001; Jeannerod, 1997; Kornblum, Hasbroucq, & Osman, 1990). This representation, often referred to as a standard or reference value, is the point at which activity is directed and plays a crucial role in attaining and monitoring progress toward the goal (Carver & Scheier, 1998; G. A. Miller, Galanter, & Pribram, 1960; Powers, 1973; Schank & Abelson, 1977; Vallacher & Wegner, 1985). Activation of the representation of behavioral states—for example, doing crossword puzzles or contacting a friend—can activate representations of associated actions and corresponding motor programs lower in the hierarchy (e.g., searching for the newspaper or making a phone call). Furthermore, a representation of the state one aims to attain is crucial in determining the discrepancy from the current state, which informs the person of the progress toward the goal. Thus, to the extent that a goal is backed up by available means and proper opportunities, a representation of what to attain is all that is needed for goal-directed behavior.

Typically, in most experimental research on goal-directed behavior, participants are explicitly instructed to perform a specific behavior (e.g., Brandimonte, Einstein, & McDaniel, 1996; Custers & Aarts, 2003; Locke & Latham, 1990; Monsell & Driver, 2000). For example, in goal-setting research, participants are usually instructed to accomplish a given target behavior that may vary in difficulty or specificity. In actual fact, then, participants do not need to ponder the question of whether the behavioral state is desired; they simply can follow the instructions provided by the experimenter, which spell out the state that is desired. Therefore, this type of research seems to merely conceptualize a goal as the knowledge required to realize the state (Dickinson & Balleine, 1995).

A similar argument pertains to theories that emphasize conscious deliberation and choice in the adoption of goals and guidance of goal-directed action (Ajzen, 1991; Deci & Ryan, 1985; Gollwitzer, 1990; Locke & Latham, 1990). They assume that people consciously assess the desirability of an attainable behavioral state before it is conceived of as a goal to pursue in a given situation. That conscious involvement is required to determine whether a behavioral state is desired and worth pursuing implies that—logically and psychologically—desire is not necessarily a direct property of the representation of the goal state itself.

However, what if there is no room or need for such conscious intervention? In other words, what if an organism does not or cannot rely on consciousness to be informed that a particular state is desired? In that case, there would have to be something about the goal representation itself that indicates that the represented behavioral state is desired. On the basis of a wide variety of evidence showing that affective processes play a fundamental role in motivating human action and can run quite fast without reaching conscious awareness (e.g., Berridge, 2001; Dijksterhuis & Aarts, 2003; LeDoux, 1996; Pervin, 1989; Tesser, Martin, & Cornell, 1996; Zajonc, 1980), we propose here that this function is fulfilled by positive affect. Specifically, we argue that nonconscious operation of a goal or desired behavioral state is possible if the state is associated with positive affect and thus directly guides organisms to want, initiate, and persist in the effectuation of the state (see also Aarts & Hassin, 2005).[2]

The Role of Positive Affect in the Nonconscious Operation of Goals

The idea that positive affect associated with a behavioral state has direct motivational properties is the hallmark of incentive theory. In general, incentive theory (Bindra, 1974; Bolles, 1972; Toates, 1986) proposes that stimuli or states associated with positive affect form an incentive for which the organism will work. This notion is inspired by the discovery that animals repeatedly expend effort to produce specific behavioral states (e.g., running to a bar to press it) when these states are followed by mild electric shocks in so-called brain pleasure centers. Behavior to attain these states is highly persistent and even occurs when animals have to cross a shock grid to get to the bar or are hungry and can choose between food and the possibility to self-stimulate their brain (Hoebel, 1976; Olds & Milner, 1954, 1956; Sem-Jacobsen, 1976; Shizgal, 1997; Spies, 1965). These findings thus show that the mere linking of positive affect to originally neutral behavioral states provokes immediate goal-directed behavior in the sense that organisms exhibit enhanced motivation to accomplish the states when they have the opportunity to do so.

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[1] Affect can be conceptualized as a quality or valence assigned to an entity (e.g., Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Zajonc, 1980) but may also be viewed as a feeling state that people experience (e.g., Russell, 2003; see Isen & Diamond, 1989). Throughout the article, we use the term *affect* in line with the former conceptualization.

[2] The direct association between stimuli and affect is also extensively examined in research on approach and avoidance tendencies. However, approach and avoidance tendencies are considered as ballistic, hardwired responses and are mostly studied as simple motor responses that occur in the mere presence of physical objects (e.g., Cacioppo, Gardner, & Berntson, 1999; Strack & Deutsch, 2004). Hence, these responses are not directed at goal states per se. For example, one cannot have a paper as goal. One can, however, have the goal to write, review, accept, or reject a paper, but these goals pertain to desired behavioral states involving the paper. Thus, whereas research on approach and avoidance tendencies analyzes the reflexive pushes and pulls to positive and negative stimuli, the current study addresses the role of positive affect in the nonconscious operation of goal-directed, motivational behavior.

Recent studies in neuroscience provide initial clues as to how this happens. This research shows that the mesolimbic dopamine system is involved in the processing of the affective valence of a behavioral state to produce goal-directed, motivational behavior (Berridge, 2001; McFarland & Kalivas, 2003; Salamone & Correa, 2002). The mesolimbic dopamine system is active when the organism engages in states that evoke positive affect, such as eating, having sex, and making money. It is interesting that this system is also triggered by cues that refer to these states (Schultz, 1998). Although the exact mechanism that produces goal-directed behavior is only partly understood, research suggests that, through connections with the dopamine system, primed behavioral states associated with positive affect excite cortical brain structures that encode the state's incentive salience (desiredness) and modulate the effort that will be invested in attaining it (Berridge, 2003; Joel, 1999; O'Reilly, Braver, & Cohen, 1999).

Possible Ways of Goal Development

If behavioral states that become attached to positive affect can operate as a goal nonconsciously, how then do these associations establish in humans? Research on incentive learning and goal-directed behavior indicates that there are several ways goals may develop. For instance, expectancy-value approaches to needs and motivation suggest that a process of weighing pros and cons of a specific behavioral state paves the way to a final positive impression of that state, on the basis of which the goal is set to produce the state (Gollwitzer & Moskowitz, 1996). With increased practice, the contemplative decision process gradually changes into a more automatic one via memory of past satisfactory experiences. That is, over time, the process of reflecting on pros and cons ceases once the representation of the positive or desired behavioral state is stored in memory and is readily retrievable to motivate goal-directed behavior (Aarts, Verplanken, & Van Knippenberg, 1998; Bargh, 1997).

Furthermore, several theorists posit that the mere attainment of a given goal itself yields positive affect (Bandura, 1986; Higgins, 1987; McDougall, 1931). To test this idea, Moors and De Houwer (2001) instructed participants to produce a specific behavioral state (i.e., to produce the color blue on the computer screen) by stopping rapidly alternating colors (blue and yellow) with a key press. Results revealed a classic affective priming effect (see Fazio, 2001): Immediate access to positive words was facilitated and access to negative words was inhibited after the goal state (e.g., blue) was produced. This suggests that attainment of a given behavioral state activates the representation of positive affect, which can then become associated with the state at issue to dictate subsequent goal-directed, motivational behavior.

Although behavioral states become linked to positive affect through repeated enactment on a given behavioral goal, such positive affective shaping can also occur through coactivation of the representations of behavioral states and positive affect during execution as well as observation of the behavior. Research on evaluative conditioning shows that activities acquire a more positive valence when they are paired with positive affect. Zellner, Rozin, Aron, and Kulish (1983), for example, showed that consuming tea became more positive when the tea consumption had previously been presented with sugar, which has a pleasant taste. Moreover, these positive shaping effects of behavioral states can also be established when people merely observe another person displaying a positive facial expression while performing that state (De Houwer, Thomas, & Baeyens, 2001). Indeed, such observational or social learning is thought to be a basic way infants learn which behavioral states are desired and which ones are not (N. E. Miller & Dollard, 1941). Thus, behavioral states can operate as a goal when these states become (implicitly or explicitly) associated with positive affect during execution or observation of the states (for a discussion on explicit and implicit processes in affective shaping, see De Houwer et al., 2001).

In conclusion, there is evidence that positively shaped behavioral states can induce a need or act as an incentive capable of facilitating motivational activity, such as wanting and effort, to readily pursue these behavioral states. Theoretically, then, linking neutral behavioral states to positive affect should increase people's wanting to attain the state and motivate people to engage in effortful behavior if they have the opportunity to accomplish the state. It is important to note that we argue that these effects can occur automatically—that is, without conscious awareness of the source of the motivational activity. Accordingly, our primary hypothesis is that the nonconscious operation of behavioral goals depends on whether the mental representations of the specified behavioral states are associated with positive affect.

The Present Research

To systematically test this hypothesis, we conducted a series of studies in which we linked positive, as well as neutral and negative, affect to originally neutral (though attainable and cognitively available) behavioral states. Study 1 was designed to provide initial support for the suggestion that linking behavioral states to positive affect automatically increases people's wanting to attain these states. Studies 2A through 2C were conducted to rule out alternative explanations for this basic effect. In these studies, we linked behavioral states to negative affect to distinguish between evaluative and motivational processes by making use of control-system theories (Carver & Scheier, 1998; Hyland, 1988; Stagner, 1977), according to which goal-directed, motivational behavior emerges if there is a discrepancy between the current and the desired state. In addition, we tested the hypothesis that increased wanting to attain behavioral states results from the direct association between the states and positive affect. Finally, Studies 3 and 4 explore whether shaping behavioral states more positively increases behavioral effort directed at attaining these states and how individual wanting and explicit (conscious) instructions to engage in the states play a role in these effort-enhancing effects.

We linked affect to the behavioral states by implementing a paradigm used in affective or evaluative conditioning research. Evaluative conditioning refers to the phenomenon that the valence of a stimulus (the conditioned stimulus [CS]) changes in the direction of a valenced stimulus (the unconditioned stimulus [US]) with which it is paired (De Houwer et al., 2001). This change in valence can occur without awareness of the contingency between CS and US, as has been demonstrated by research that presented the CS or US subliminally (Krosnick, Betz, Jussim, & Lynn, 1992; Niedenthal, 1990; see also Dijksterhuis, Aarts, & Smith, 2005).

Although in nearly all studies on evaluative conditioning the CS and the US are presented at such time intervals that they can be consciously perceived (but see Krosnick et al., 1992; Niedenthal, 1990), we chose in our studies to present the behavioral states or CSs subliminally for two important reasons: First, this procedure rules out the possibility of demand characteristics, because participants cannot consciously detect the presented behavioral states during the affective shaping procedure. Second, effects found as a result of this procedure would support our assumption that states associated with positive affect automatically instigate motivational activity, as participants cannot be aware of the source of the association with positive affect. Furthermore, we chose to present the CS before the US (i.e., forward conditioning), because this procedure is known to produce stronger affective shaping effects than backward conditioning (CS after US; see De Houwer et al., 2001). Thus, our procedure, on the one hand, maximizes the chance of rendering the states more positive and, on the other hand, enables us to study whether the shaped association between behavioral states and positive affect influences goal-directed, motivational activity automatically.

Study 1

In an adaptation of the evaluative conditioning paradigm, participants were provided with a dot-detection task that required them to focus on the computer screen. Unbeknownst to the participants, behavioral state words (or nonwords) were repeatedly and subliminally presented as CSs, followed by supraliminally presented (and thus consciously perceptible) positive (or neutral) affect words that served as USs. This 2 × 2 between-subjects design enabled us to test the effects of activating the behavioral state, positive affect, and the interaction between both. Following previous work on automatic goal pursuit (Fitzsimons & Bargh, 2003; Shah, 2003), as a goal measure participants indicated whether they wanted to accomplish the behavioral state. The prediction for Study 1 was that participants exposed to behavioral states paired with positive affect would more strongly want to attain the behavioral states than participants in the other three conditions.

Method

Participants and design. Fifty-six undergraduates at Utrecht University were randomly assigned to the cells of a 2 (CS: nonword vs. behavioral state) × 2 (US: neutral vs. positive) between-subjects design and received €4 for their participation.

Materials. To establish behavioral states that were regarded as relatively neutral by our research sample of undergraduate students, we conducted a pilot study ($N = 23$) in which a small sample of undergraduates indicated how negative or positive they would feel about engaging in various mundane activities. On the basis of this pilot study, we selected 6 neutral ($M = 5.22$ on a 9-point scale) activities: *puzzelen* (doing puzzles), *studeren* (studying), *omkleden* (changing one's clothes), *schrijven* (writing), *wandelen* (going for a walk), and *verhuizen* (moving house). These activities thus composed the experimental behavioral states in this study that we aimed to shape more positively. Furthermore, on the basis of another pilot study ($N = 20$), we selected 5 positive ($M = 7.62$ on a 9-point scale) adjectives—*aardig* (nice), *goed* (good), *grappig* (funny), *prettig* (pleasant), and *plezierig* (enjoyable)—as well as 10 neutral ($M = 4.84$) adverbs—*rondom* (around), *aldus* (thus), *enfin* (finally), *opeen* (on each other), *vrijwel* (nearly), *althans* (at least), *verder* (moreover), *bijna* (almost), *voorts* (furthermore), and *zowat* (about). The neutral words were divided into a 5-word filler list and an experimental list that were equal in mean valence.

Procedure. Participants worked in separate cubicles in which the experiment was presented on a computer with an 85-Hz screen. They were told that they were participating in a study designed to examine people's goals to engage in several activities and how these goal pursuits come and go. For this purpose, participants had to respond to activities that appeared on the screen by indicating whether they actually wanted to engage in that activity. They were told that, allegedly to make the task more complex, all kinds of words would be presented on the screen and that they had to count how many dots would be briefly presented above or below these words before they indicated their wanting to engage in the activities. In actuality, this feature of the procedure ensured us that participants paid attention to the screen during the affective shaping event (see below). After reading the instructions, participants completed three practice trials, which were, after a 1-min break, followed by six experimental trials.

Trials. In each trial, wanting was measured for a particular behavioral state, after this state or a nonword had been paired with either neutral or positive USs. The pairings consisted of the following events: First, a cross was presented on the screen for 500 ms, signaling the beginning of the trial. Next, a row of *X*s, which served as a premask, appeared on the screen for 500 ms, immediately followed by the CS—either a behavioral state or a nonword (e.g., *MRJLNSLF*)—that was displayed for 23 ms (two cycles on an 85-Hz screen). After that, another row of *X*s appeared as a postmask for 100 ms, followed by the US—either a neutral or a positive word—which was presented for 150 ms. Finally, 23 ms after this word had disappeared, a dot was or was not presented for 23 ms. The masking procedure ensured that the CSs could not be consciously perceived. However, without such masking, the dots could quite easily be detected. The time between pairings was 2,500 ms. After the last pairing, an activity appeared in a box on the screen after a delay time of 2,500 ms. Participants had to respond to the question, "Do you want to accomplish the activity?" by pressing the "yes" or "no" button. Finally, participants were asked how many dots they had seen, and, after they had answered, a new trial started.

Each trial contained 5 experimental pairings and 5 filler pairings. In the experimental pairings, depending on the condition, a behavioral state or a nonword was used as the CS and neutral or positive words served as USs. In the filler pairings, the CS was always a nonword and the USs were always neutral, just as in all pairings in the practice trials. The order of presentation of all experimental trials was randomized. In addition, the presentation of the 10 pairings within the trials was randomized.

Debriefing. After the six trials, participants were thoroughly debriefed and checked for awareness of the subliminally presented behavioral states. The debriefing indicated that all participants were unaware of the presentation of the behavioral state words and none of the participants realized the true nature of the study. Furthermore, none of the participants indicated that the words presented on the screen during the dot-detection task had influenced their responses on the goal measure. Thus, if effects on the goal responses occur, they seem to operate outside of participants' conscious awareness (Bargh & Chartrand, 2000).

Results

The proportion of "yes" responses across the six wanting questions was subjected to an analysis of variance (ANOVA), according to the design. Analysis revealed the predicted interaction effect, $F(1, 52) = 6.06$, $p = .02$, $\eta^2 = .10$. We found no main effect for CS, $F(1, 52) = 0.34$, *ns*, or for US, $F(1, 52) = 2.03$, *ns*. Tests for simple main effects revealed that when nonwords were presented as CSs, wanting in the positive US condition did not differ from wanting in the neutral US condition, $F(1, 53) = 0.48$, *ns*. However, when behavioral states were presented as CSs, participants for whom these states were linked to positive USs reported more strongly that they wanted to attain those states than did participants for whom these states were linked to neutral USs,

$F(1, 53) = 8.93$, $p < .01$. Within the neutral US condition, there was no effect of CS, $F(1, 53) = 2.15$, but within the positive US condition, participants for whom behavioral states were presented as CSs showed increased wanting compared with participants who were presented with nonwords as CSs, $F(1, 53) = 5.23$, $p = .03$. Figure 1 presents the means for each cell in the design.

Discussion

The results of Study 1 support our predictions. Participants for whom behavioral states were paired with positive words more strongly wanted to attain these states compared with participants for whom states were presented together with neutral words and participants who were exposed to nonwords paired with positive words. Moreover, compared with the control condition, subliminal presentation of behavioral states or presentation of positive words alone did not increase wanting. In other words, wanting or goal pursuit of behavioral states only increased when these states were linked to positive affect. Furthermore, this effect was automatic in the sense that participants were unaware of the affective shaping and thus the source of their goals, as was revealed by the awareness check and the debriefing.

Study 2A

In Study 1, the pairing between behavioral states and the positive words (adjectives) can be conceived of as having a descriptive relation (e.g., "Doing puzzles is nice"). It may be argued, then, that the affective shaping effects on wanting depend on this descriptive relation. According to our present conceptualization of the nonconscious operation of goals, it should be the association between states and positive affect that renders the states more desired or wanted to attain. To establish more compelling evidence for this *pure affective valence* argument, we used in Study 2 positive nouns instead of adjectives as the pairing words (e.g., doing puzzles–*sun*).

Furthermore, we argued that the increase in wanting in Study 1 provides support for enhanced motivation aimed at attaining the positively shaped behavioral states. However, this increase could also be interpreted as reflecting mere evaluations. On the basis of the literature on evaluative conditioning (see De Houwer et al., 2001), one may suppose that the evaluation of the behavioral state changed in a positive direction as a result of our conditioning procedure. It could therefore be argued that participants simply relied on this changed liking to indicate whether they wanted to attain the behavioral state. If this was the case, then the observed effects portray evaluative processes rather than motivational processes.

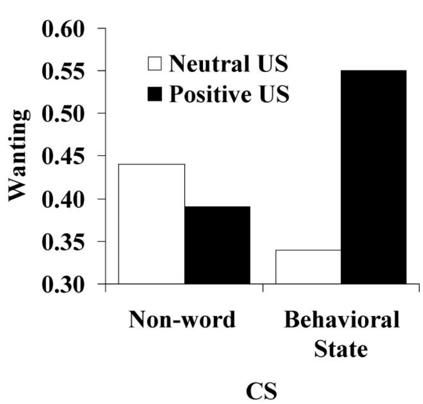

Figure 1. Proportion of states wanted to attain as a function of conditioned stimulus (CS) and unconditioned stimulus (US) in Study 1.

To more effectively distinguish between liking and wanting, we included in this study a condition in which behavioral states were linked to negative affect. If participants' responses reflect liking, negative shaping should yield an effect similar to that of positive shaping, only in the opposite direction. However, if their responses do indeed reflect wanting, a different pattern is expected. According to research on action control, an organism will only engage in goal-directed activity if there is a discrepancy between the desired state and the actual state (Carver & Scheier, 1998; Gollwitzer & Moskowitz, 1996; Hyland, 1988; Stagner, 1977). For example, one can only be motivated to engage in doing puzzles when one has not yet attained this state (e.g., when participating in an experiment and not in a puzzle task). Once the goal is attained, the discrepancy is abolished and motivational activity is aborted. The opposite is true for undesired states. That is, motivational activity directed at avoiding such a state—that is, not wanting to realize or refraining from realizing a negatively valenced behavioral state—only occurs when the current and the undesired state coincide and is aborted once a discrepancy is established. As all the behavioral states we use in our studies are discrepant with participants' current states (participating in an experiment), we expect motivational activity to emerge only as a result of positive, not of negative, shaping, because in that case a discrepancy already exists with a state that is to be avoided.

On the basis of the reasoning outlined above, we predict an increase in wanting for positively shaped states, compared with neutral states. Furthermore, if these effects are based on motivational processes, as we hypothesize, no decrease compared with neutral states should occur for negatively shaped states. A decrease in the negative shaping condition would indicate that our findings merely reflect liking.

Method

Participants and design. Ninety-three undergraduates at Utrecht University were randomly assigned to one of the three (shaping: negative, neutral, or positive) conditions of a single-factor between-subjects design and received €4 for their participation.

Materials. The same behavioral states as in Study 1 were used. On the basis of another pilot study ($N = 32$), we selected 5 highly positive ($M = 8.21$ on a 9-point scale) nouns: *zon* (sun), *vriend* (friend), *strand* (beach), *lach* (smile), and *thuis* (home); 10 neutral ($M = 5.57$) nouns: *deur* (door), *balpen* (ballpoint), *emmer* (bucket), *ingang* (entrance), *kist* (crate), *raam* (window), *term* (term), *voetpad* (sidewalk), *hendel* (lever), and *lade* (drawer); and 5 highly negative ($M = 1.93$) nouns: *ziekte* (disease), *pijn* (pain), *afval* (garbage), *verdriet* (sorrow), and *dief* (thief). Positive and negative words did not differ in extremity, $F(1, 31) = 1.05$, *ns*. Again, a positive list was constructed of the 5 positive and 5 of the neutral words, whereas the negative list included 5 negative and 5 neutral words. The neutral list contained all 10 neutral words.

Procedure. The procedure, the construction of the trials, and the dependent variable were identical to those of Study 1. Again, at the end of the experiment participants were debriefed and checked for awareness of the behavioral states. As in the previous study, the debriefing showed that participants were unaware of the presentation of the behavioral state words and did not realize the true nature of the study.

Results and Discussion

An ANOVA revealed the predicted effect of shaping, $F(2, 90) = 3.63$, $p = .03$, $\eta^2 = .08$. Contrast analyses showed that wanting was higher in the positive shaping than in the neutral shaping condition, $F(1, 90) = 6.43$, $p = .01$, and the negative shaping condition, $F(1, 90) = 4.04$, $p = .05$. There was no difference between the negative and the neutral shaping conditions, $F(1, 90) = 0.23$. Means are displayed in Figure 2.

These results first of all replicate the findings of Study 1: Participants who were exposed to behavioral states paired with positive words showed increased wanting compared with participants who were exposed to states paired with neutral words. Moreover, these results were obtained with nouns instead of adjectives, which demonstrates that the effect does not depend on a descriptive relation between the states and the positive words.

Furthermore, as expected, no decrease in participants' willingness to pursue the behavioral states was observed when these states were paired with negative words compared with the neutral shaping condition. This shows that the participants' responses to the goal measure do represent wanting and not just liking—that is, the effect of positive shaping established in Studies 1 and 2A is indeed an indication of motivational processes.

However, although the pattern of results in Study 2A supports a motivational account, the absence of a decrease in wanting in the negative shaping condition could be due to other causes. One obvious possible reason is that, because of the nature of our shaping procedure, the conditioning failed in the negative shaping condition, and therefore participants were equally motivated to pursue the behavioral states as in the neutral shaping condition. In research on evaluative conditioning, for instance, it is not common to combine the pairing task with a dot-detection task, and this additional attention task may have different processing effects for positive pairings than for negative pairings. In addition, it might have been the case that the selected negative words were not negative enough to make a difference with the neutral condition (cf. De Houwer et al., 2001).

To support our motivational account, we would have to show that our shaping procedure produces equally large changes in valence for positive and negative shaping. Hence, we designed Study 2B, in which we used the same shaping procedure and the same positive and negative USs as in Study 2A. However, this time we used a within-subject design, which is more common practice in evaluative conditioning research. In line with this research (De Houwer et al., 2001), we predicted that negative shaping would lead to more negative evaluations and positive shaping to more positive evaluations as compared with evaluations of neutrally shaped states. Moreover, we expected shaping effects of negative and positive shaping to be equally strong.

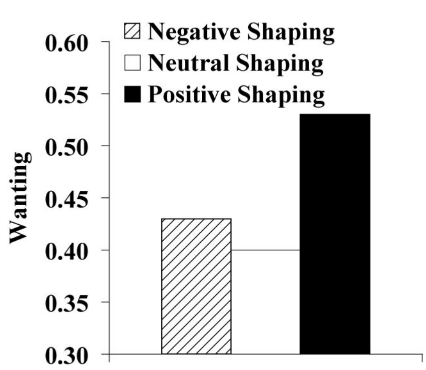

Figure 2. Proportion of states wanted to attain as a function of shaping (Study 2A).

Study 2B

Method

Participants. Forty undergraduates at Utrecht University participated in the experiment, receiving €4 in return.

Materials. On the basis of the pilot study of Study 1, 6 additional neutral mundane activities—*lezen* (reading), *werken* (working), *koken* (cooking), *kaarten* (playing cards), *tekenen* (drawing), and *opruimen* (tidying up)—were selected and added to the 6 neutral behavioral states used in Studies 1 and 2A. These 12 neutral states ($M = 5.10$ on a 9-point scale) were divided into three lists of 4 states that did not differ on mean evaluation, $F(1, 22) < 1$. Furthermore, a list of 15 nouns was made that contained the 5 negative, the 5 positive, and 5 of the neutral nouns of Study 2A.

Procedure. The procedure was identical to those used in Studies 1 and 2A, only this time there were 12 behavioral states and participants were given a 1-min break after the sixth trial. Furthermore, at the end of each trial, participants had to indicate their evaluation of the behavioral state on a 9-point scale, ranging from *very negative* (1) to *very positive* (9; see De Houwer et al., 2001, for this type of measurement).

Design. In each of the 12 trials, 15 pairings were presented, which always contained five negative, five neutral, and five positive words as USs. Within subjects, we varied the way the CSs were assigned to the negative, neutral, and positive words across trials. In the *negative shaping condition*, the behavioral states were paired with the five negative words, whereas nonwords were paired with the neutral and negative words. In the *neutral shaping condition* and *positive shaping condition*, the behavioral states were paired with the neutral and the positive words, respectively, whereas nonwords were paired with the other words. Within each trial, the order in which the 15 pairings were presented was randomized, as was the order of the trials themselves.

For each participant, the three sets of four states were assigned to the three conditions in one of the six possible combinations. Thus, a 3 (shaping: negative, neutral, or positive) within-subject × 6 (combination) between-subjects design was created.

Results and Discussion

We found no effect of combination on evaluations, $F(5, 34) = 1.62$, and no Combination × Shaping interaction, $F(10, 68) = 1.47$. However, the ANOVA revealed a significant effect of shaping, $F(2, 68) = 4.73$, $p = .01$, $\eta^2 = .12$. Inspection of the means revealed that, compared with the neutral shaping condition, evaluations were more positive in the positive shaping condition and more negative in the negative shaping condition (see Figure 3). To further substantiate this suggested pattern, we conducted several follow-up analyses. First, we tested the linear effect of shaping on evaluation. The analysis showed that as a function of shaping (negative, neutral, positive), evaluations increased in positivity, $F(1, 34) = 10.32$, $p < .01$, $\eta^2 = .23$. Furthermore, linking states to negative and positive affect produced equally strong effects.

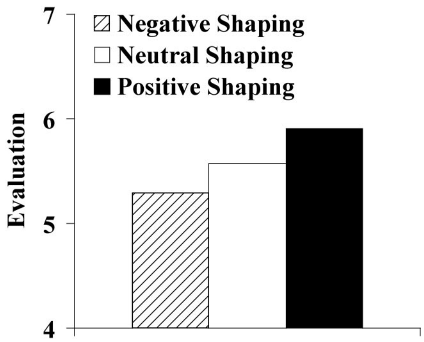

Figure 3. Mean evaluation as a function of shaping (Study 2B).

That is, the absolute difference from the neutral state condition was equally large for the negative and the positive shaping conditions, $F(1, 34) = 0.03$, *ns*. To test the specific hypothesis that evaluations in the positive and negative shaping conditions differed from those in the neutral condition, we tested the specific contrasts. Evaluations were indeed more positive in the positive shaping condition, $F(1, 39) = 2.54$, $p = .06$ (one sided), and more negative in the negative shaping condition, $F(1, 39) = 2.79$, $p = .05$ (one sided), compared with the neutral shaping condition.

These results clearly indicate that our paradigm is capable of replicating the standard evaluative conditioning effect, even though participants had the additional task of detecting dots during the shaping procedure. Thus, because the same shaping procedure and the same USs were used in Study 2A, the results of the current study suggest that negative shaping in Study 2A indeed changed the valence of the behavioral states. Therefore, the findings of Study 2B support the idea that the effects established in Studies 1 and 2A demonstrate motivational processes, not only evaluative processes.

Study 2C

It should be noted that the enhanced motivation to attain the positively shaped behavioral states was established in between-subjects designs. As a consequence, participants in the positive shaping conditions were repeatedly exposed to positive words before they indicated their wanting, whereas participants in the neutral shaping condition only saw neutral words. A critic might argue that this exposure to positive affect triggered motivational processes in itself, which materialized into wanting directed toward the behavioral states when these states were activated simultaneously (see Ashby, Isen, & Turken, 1999; De Houwer et al., 2001, for a similar discussion of this topic). Obviously, this is a different mechanism than the one we propose—that is, enhanced motivation should occur because the behavioral state is directly associated with positive affect. An effective way to rule out this account is to present neutral and positive words in each trial and only pair positive words directly with behavioral states in the positive shaping condition (see also Study 2B). Accordingly, we designed Study 2C to replicate the previous findings on wanting in a within-subject design.

Method

Participants. Thirty-nine undergraduate students of Utrecht University participated in this experiment, receiving €4 in return.

Materials. The same 12 activities as in Study 2B were used. Furthermore, a list was created consisting of the five positive words and the five neutral words used in Study 2B.

Procedure. The procedure was identical to that of Study 2B. However, the dependent variable was again the measurement of wanting used in Studies 1 and 2A.

Design. In each of the 12 trials, 10 pairings were presented, which always contained 5 neutral and 5 positive words as USs. Thus, as in Study 2B, the affective valence of the presented nouns was the same in all conditions. Within subjects, we varied the way the CSs were assigned to the positive and neutral words across trials. In a trial in the *positive shaping condition,* the behavioral state was paired with the five positive words, whereas a nonword was paired with the five neutral words. In a trial in the *neutral shaping condition*, the behavioral state was paired with the neutral words and the nonword with the positive words. Finally, to test the effect of the presentation of the behavioral state on enhanced motivation, we included a *no shaping condition*, in which nonwords were linked to both positive and neutral words. Thus, in each trial participants were exposed to neutral and positive words. In some trials, behavioral states were directly followed by positive words or neutral words. In others, no behavioral states at all were presented. Within each trial, the order of presentation of the 10 pairings was randomized, as was the order of the trials.

For each participant, the three sets of four behavioral states were assigned to the three conditions in one of the six possible combinations. Thus, a 3 (shaping: no shaping, neutral shaping, or positive shaping) within-subject × 6 (combination) between-subjects design was created.

Results and Discussion

We found no effect of combination on wanting, $F(5, 33) = 1.06$, and no Combination × Shaping interaction, $F(10, 66) = 1.47$. However, the ANOVA revealed a significant effect of shaping, $F(2, 32) = 2.71$, $p = .04$ (one-tailed), $\eta^2 = .15$. Inspection of the means (see Figure 4) revealed that wanting was higher in the positive shaping condition than in both the neutral and the no state conditions. To test our specific hypothesis, we tested the contrast of the mean in the positive shaping condition against those in the neutral shaping and the no shaping conditions together (in weights: 2, −1, −1, respectively). The mean wanting was significantly higher for those participants for whom the behavioral states were paired with positive words than for those for whom the states were paired with neutral words and for participants who saw no behavioral states at all, $F(1, 33) = 4.99$, $p = .03$.

In short, then, these results show that linking behavioral states to positive affect increases motivation to attain the states because of

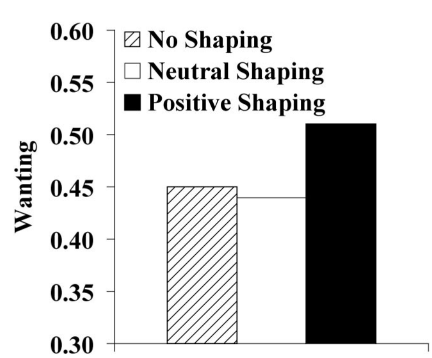

Figure 4. Proportion of states wanted to attain as a function of shaping (Study 2C).

the specific association of behavioral states with positive affect, not because of the repeated exposure to positive words (which either surrounded the behavioral states or did not).

Study 3

So far, our results demonstrate that linking behavioral states to positive affect yields motivation, in the sense that it enhances people's wanting to perform or engage in those behavioral activities. Positive shaping of behavioral states thus causes these states to act as an incentive or goal. Furthermore, the subliminal presentation of the behavioral states did not allow participants to become aware of the source of these effects—in other words, the shaped incentive value of the states guided their goal responses without their awareness. In Study 3 we wanted to push our idea one step further by assessing effects on a behavioral measure, expenditure of effort, to accomplish these behavioral states.

In line with the previous studies, we used the conditioning procedure to shape a specific behavioral state more positively (in the present case, engaging in a number-sequence puzzle task; see *Method* section; most students in our research sample were familiar with this task, and, on average, they evaluated this task as neutral). After the conditioning procedure, participants engaged in a filler mouse-click task and were told that they would thereafter participate in a puzzle task, but only if there was still enough time left. It is known that goals cause people to vigorously work toward goal attainment (Heckhausen, 1991; Wicklund & Gollwitzer, 1982) and that this effort-enhancing effect becomes especially manifest when a person has to deal with time constraints that require an acceleration in performance to reach the goal (Aarts, Chartraud, et al., in press; Aarts et al., 2004; Latham & Locke, 1975; Payne, Bettman, & Luce, 1996). Note that our target dependent variable was not directly (semantically) associated with the goal of engaging in the puzzle task. Rather, the critical dependent variable was speed on a mouse-clicking task, something that may become (instrumentally) related to the goal of engaging in the puzzle task if one wants to have time left to take the opportunity to realize that desired state. On the basis of the wanting effects obtained in the previous studies, we expected that participants for whom doing puzzles was shaped positively would work faster on the mouse-click task than would control participants to get to the puzzle task.

Study 3 serves another important purpose. The assumption that positive shaping of the goal of engaging in the given puzzle task enhances effort to accomplish the goal implies that people do not strongly want to pursue the goal. However, individuals who already strongly want to engage in the puzzle task are likely to exhibit enhanced effort, regardless of positive shaping. Accordingly, in the present study we analyzed whether a person's strength of goal wanting moderates the affective shaping effects. One effective way of varying the strength of goal wanting is by inducing needs or taking advantage of relative deprivation, as has been done in recent research on motivational effects in drinking behavior (e.g., Aarts, Dijksterhuis, & De Vries, 2001; Strahan, Spencer, & Zanna, 2002). In the present study, we took a different route. We assessed participants' degree of wanting to engage in the number-sequence puzzle task, assuming that engaging in this task more strongly preexists as an incentive or desired state in some students than in others. As a consequence, the effort-enhancing effects of positive shaping of the goal should be more pronounced in participants who have a weak or no desire or goal to engage in the puzzle task than in participants who have a strong goal to engage in the puzzle task.

Method

Participants. Sixty-four undergraduate students at Utrecht University were randomly assigned to either the no shaping or the positive shaping condition and received €3 for their participation.

Procedure. The first part of the experiment consisted of three consecutive tasks: the dot-detection task, a mouse-click (filler) task, and a number-sequence puzzle task. Participants first engaged in the dot-detection task, which contained the shaping manipulation. This task was identical to that used in the previous studies, only this time participants had to indicate after each pairing whether a dot was presented, using the "yes" and "no" keys on the keyboard. In 50 pairings, the five positive and five neutral words used in Studies 2A–2C were all presented five times as USs. In the positive shaping goal condition, five words that, according to earlier pilot testing, strongly described the activity of engaging in the number-sequence puzzle task—*getal* (number), *reeks* (sequence), *puzzel* (puzzle), *logica* (logic), and *rekenen* (calculate)—were each presented subliminally on five trials in combination with the five different positive words. On the remaining 25 trials, five different nonwords were each presented in combination with the five different neutral words. In the no shaping condition, another five different nonwords were displayed in combination with the positive words instead of the words related to number-sequence puzzles.

After the shaping manipulation task, participants learned that this part of the experiment was almost completed and would be followed by one more task. Participants were also told that at the end of the session they would have the opportunity to engage in a number-sequence puzzle task but that this task would only be given if sufficient time was left. All participants then completed the second task of the experiment, a mouse-click task, in which they had to work through five screens by clicking on boxes according to a specified pattern (see Aarts et al., 2004). They did not know in advance how long the mouse-click task would take. Our main dependent variable was the effort expended to attain the desired state. This measure was operationalized as participants' speed on the mouse-click task. After completing the mouse-click task, all participants learned that there was enough time left to do the number-sequence puzzles.

The puzzle task consisted of six different trials in which participants were asked to indicate which number would be next in a sequence (e.g., 2, 3, 5, 9, . . .). Participants had 30 s to solve each sequence. After the time limit or after participants had typed in the answer, the computer program moved on to the next sequence. As a measure of performance, we calculated the proportion of correct answers.

Debriefing. At the end of the session, participants were debriefed. The debriefing showed that participants were unaware of the presentation of the behavioral state words. In addition, none of the participants indicated that the dot-detection task had influenced their performance on the mouse-click task.

The measurement of individual wanting. After the experiment, participants started on the second, unrelated study, which took about 30 min. At the end of this study, a short questionnaire was administered in which participants had to respond to various items dealing with the personal desire to engage in all kinds of mundane activities. Participants were told that the investigators wanted to know whether and how people differ on these activities and that this information was allegedly needed for upcoming research. The instructions further stressed the importance of providing honest answers and that all answers would be treated confidentially. Among these items, there was one question embedded that assessed the individual's wanting to engage in the number-sequence puzzle task, namely, "How strongly do you usually want to engage in doing number-sequence puzzles if you are provided with the opportunity to do so?" This question was accompanied by a 9-point scale ranging from *not at all* (1) to *very much* (9). The reason we did not measure individual wanting at the beginning of the experiment is that this wanting measurement, in itself, triggers thoughts about the goal of engaging in the number-sequence puzzle task (cf. Bargh & Chartrand, 2000). We did not expect to find any effects of shaping on this individual wanting measure, because participants were asked to report how much they usually wanted to engage in doing this kind of puzzle as opposed to their current wanting (see Studies 1, 2A, and 2C). Moreover, as this measurement took place 30 min after the shaping task and the puzzle task, it was less likely to be influenced by shaping than the measurements of wanting in the previous experiments, which directly followed the manipulation. Indeed, no effects of the shaping manipulation on individual wanting were found, $F(1, 62) = 0.77$ ($M = 4.92$).

Results and Discussion

Effects on effort. Our main dependent variable was the time it took participants to complete the mouse-click task. An ANOVA revealed a significant effect of shaping, $F(1, 62) = 3.99$, $p = .05$, $\eta^2 = .06$, showing that participants in the positive shaping condition worked faster on the mouse-click task ($M = 15.87$ s) than participants in the no shaping condition ($M = 16.89$ s).

The moderating role of individual wanting. As outlined above, the affective shaping effects on enhanced effort (speed-up on the mouse-click task) should be dependent on the extent to which the puzzle task preexists as a goal or state one wants to attain: After positive shaping of the puzzle task, people who relatively weakly want to engage in the task will show stronger behavior effects than those for whom the puzzle task is rather strongly wanted. Thus, the strength of the goal of engaging in the puzzle task is supposed to moderate the shaping effects on actual motivational behavior.

To test this effect, we subjected this behavioral measure to a moderated hierarchical multiple regression analysis (Baron & Kenny, 1986) in which the behavior was predicted by shaping (coded as no shaping = 1, positive shaping = 2), wanting, and the Shaping × Wanting interaction term. To reduce multicollinearity bias, we standardized all variables before we computed the cross-product (Dunlap & Kemery, 1987). This analysis showed that the prediction of behavior by shaping ($\beta = -.22$), $t(60) = -1.84$, $p = .07$, and wanting ($\beta = -.23$), $t(60) = -1.94$, $p = .06$, was improved by the inclusion of the interaction term ($\beta = .27$), $t(60) = 2.26$, $p = .03$.

To reveal the nature of the interaction effect, we computed simple slopes for the regression of the time spent on the mouse-click task on shaping for participants with weak individual wanting (one standard deviation below the mean) and participants with strong individual wanting (one standard deviation above the mean; see Cohen, Cohen, West, & Aiken, 2003, p. 273). First, there was a significant relation between shaping and behavior in the weak wanting condition ($B = -1.01$), $t(60) = -2.93$, $p = .01$, which demonstrates that for weak wanting individuals the speed on the mouse-click task increased as a function of shaping. However, no such relation was observed for the strong wanting individuals ($B = 0.11$), $t(60) = .31$, *ns*. Thus, the effect of positive shaping of the behavioral state of doing puzzles on expended effort on the mouse-click task was moderated by individual wanting to attain that state. Figure 5 illustrates this effect by presenting the regression slopes of expended effort on shaping for weak and strong wanting (Cohen et al., 2003).

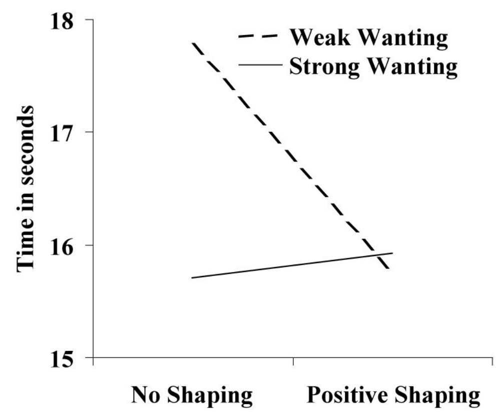

Figure 5. Time spent on the mouse-click task as a function of shaping and individual wanting (Study 3).

Furthermore, we investigated participants' performance on the six number-sequence puzzles. Participants solved about four out of six puzzles within the 30-s time limits. There was no effect of shaping ($M = 63\%$ solved), $F(1, 62) = 0.01$, *ns*. Also, we conducted a regression analysis to investigate the combined effect of shaping, individual wanting, and the Shaping × Wanting interaction on performance on the puzzle task. No significant effects emerged (all ps $> .10$).

In short, the results show that participants sped up their performance on the mouse-click (filler) task to move on to the puzzle activity when doing these puzzles was linked to positive affect. Furthermore, this effect was found to be moderated by the strength of individual wanting to attain that state: The effect of shaping was more pronounced for those who were weak in wanting. In addition, the enhanced performance effect did not occur for the puzzle activity itself. This demonstrates that shaping the behavioral state of doing puzzles more positively enhanced effort specifically directed at attaining the behavioral state, not the expenditure of effort in general. Note that the selective effects of shaping on the mouse-click task indicate that the goal to engage in the puzzle task did not necessarily influence the expended effort or performance on the puzzle task itself, because having the goal to engage in a behavioral activity does not necessarily improve the performance on that activity (e.g., Utman, 1997). Altogether, these findings are important because they indicate that linking positive affect to behavioral states not only strengthens people's wanting to accomplish that state but also motivates people to expend more effort on a task that is instrumental in achieving that state, provided this state is not already desired.

Study 4

Study 4 was designed to consolidate the effects of positive shaping on motivational behavior. First of all, this study was conducted to replicate the basic increased effort effect as a function of positive shaping. Furthermore, we aimed to provide additional evidence for our claim that the increase in speed on the mouse-click task is caused by the motivation to attain the puzzle task. For this purpose, we compared the effects of a positively shaped behavioral state—or nonconscious goal—with those of an explicitly desired state—or conscious goals. Research suggests that nonconscious goals and explicitly instructed goals that operate in the same direction produce the same behavior (Bargh, 1990; Bargh et al., 2001; Chartrand & Bargh, 1996). That is, nonconsciously activated goals can have the same effects on motivational activity as may be expected to result from consciously activated goals. For instance, Bargh et al. (2001, Study 2) covertly primed the goal to cooperate by exposing people to words such as *share*, *support*, and *cooperate* or explicitly suggested that acting cooperatively would be a desirable way to deal with a resource-dilemma game. They established that implicitly primed goals caused the same motivational activity as consciously activated goals in the sense that more cooperative actions were conducted. On the basis of these recent findings, we predicted that both the nonconscious goal and the conscious goal to engage in a puzzle activity facilitate motivation to accomplish the activity (i.e., enhanced effort in the form of working faster on the mouse-click task) compared with a control condition.

Method

Participants. One hundred one undergraduate students at Utrecht University were randomly assigned to one of the three conditions (type of goal: no goal, nonconscious goal, or conscious goal) of a single-factor between-subjects design and received €3 for their participation.

Procedure. The experiment consisted of three consecutive tasks: the dot-detection task, a mouse-click (filler) task, and a number-sequence puzzle task. Again, participants first engaged in a dot-detection task, which contained the shaping manipulation. The no goal condition and the nonconscious goal condition were exact replications of, respectively, the no shaping condition and the positive shaping condition of Study 3. That is, in the no goal condition, nonwords were presented as CSs, with neutral and positive USs, whereas in the nonconscious goal condition, words related to number-sequence puzzles were linked to the positive USs. At this point, the conscious goal condition was no different from the no goal condition.

After the shaping manipulation task, participants learned that the experiment was almost completed and would be followed by one more task. Participants were also told that at the end of the session they would have the opportunity to engage in a number-sequence puzzle task but that this task would only be given if sufficient time was left. Subsequently, participants in the conscious goal condition received the additional information that it would be desirable if they engaged in the puzzle task. Specifically, they were told, "We would appreciate it if you will do the number-sequence puzzles." All participants then completed mouse-click (filler) task, in which they had to work through 10 screens by clicking on boxes according to a specified pattern. Again, they did not know in advance how long the mouse-click task would take. The speed on the mouse-click task again served as the dependent variable. After this mouse-click task, participants completed the same puzzle task as in Study 3 and were debriefed.

Debriefing showed that participants were unaware of the presentation of the behavioral state words. In addition, none of the participants indicated that the dot-detection task had influenced their performance on the mouse-click task.

Results and Discussion

Our main dependent variable was the time it took participants to complete the mouse-click task. The effect of type of goal was significant, $F(2, 98) = 5.97$, $p < .01$, $\eta^2 = .11$. Contrast analysis revealed that participants in the nonconscious and conscious goal conditions were faster compared with those in the no goal condition, $F(1, 98) = 11.65$, $p < .01$, and $F(1, 98) = 4.92$, $p = .03$, respectively. No difference between the nonconscious goal and the conscious goal condition was found, $F(1, 98) = 1.27$, *ns*. Figure 6 shows the mean speed for each condition.

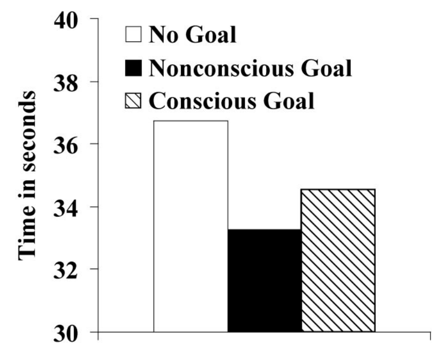

Figure 6. Time spent on the mouse-click task as a function of type of goal (Study 4).

Furthermore, we investigated participants' performance on the six number-sequence puzzles. There was no effect of type of goal ($M = 67\%$ solved), $F(2, 98) = 1.11$, *ns*.

First of all, these results replicate the findings of Study 3: Compared with the control condition, participants were faster on the mouse-click task when the behavioral state of doing number-sequence puzzles was linked to positive affect. Furthermore, the explicit goal to engage in the puzzle activity yielded a similar speed-up effect. Like in Study 3, however, we found no effects on the performance on the puzzle task. This demonstrates again that shaping the behavioral state of doing puzzles more positively or explicitly providing the information that doing puzzles is desirable enhanced effort specifically directed at attaining the behavioral state, not the expenditure of effort in general.

General Discussion

The results of six studies lend support to the notion that the nonconscious operation of a behavioral goal can emerge if the representation of the specified behavioral state is associated with positive affect. In Study 1, we found that the unobtrusive linking of behavioral states to positive affect enhanced people's wanting to accomplish these states. This increase was shown to represent motivational and not only evaluative processes (Studies 2A and 2B). Moreover, we showed that this effect was due to the specific association between the behavioral state and positive affect (Study 2C). Of importance, thorough postexperimental debriefing indicated that these effects on enhanced motivation were nonconscious: The increased wanting occurred in the absence of conscious awareness and access to the source guiding these responses.

Furthermore, Studies 3 and 4 demonstrate another key property of goal-directed activity. These studies establish that a positively shaped behavioral state, compared with a neutral behavioral state, automatically evokes increased effort directed at attaining that state. That is, participants for whom a behavioral state was linked to positive affect worked harder than participants in the control group on an unrelated task instrumental in attaining the state, without conscious awareness of the source of their goal-directed behavior. Of importance, the same effect emerged when the behavioral state was given as a conscious goal (Study 4), which shows that unobtrusively linking positive affect to behavioral states indeed installed a goal participants were willing to work for. Study 3 demonstrates that positive shaping increased motivational activity to attain the behavioral state if the state was not already desired or wanted, which indicates that wanting and expenditure of effort are two sides of the same motivational coin. Although there may be other boundary conditions for the positive goal-shaping effects that are worth exploring (e.g., classic goal variables, e.g., difficulty and social acceptability of the goal), in general our findings are consistent with motivational perspectives that treat positive affect as a direct property of the representation of goals (Pervin, 1989; Young, 1961). Furthermore, our results demonstrate the importance of incentive salience in nonconscious goal-directed activity, thereby integrating current research on nonconscious goal pursuit with incentive theory (Bindra, 1974; Toates, 1986) and neuropsychological models that point to the role of the dopamine system in modulating the degree of wanting and effort in attaining positively valenced behavioral states (Berridge, 2003; Joel, 1999).

Conscious Versus Nonconscious Goal Operation

The results of Study 4 corroborate the finding that nonconscious goals produce goal-directed activity that is similar to that resulting from explicit instructions to realize that goal (e.g., Bargh et al., 2001; Chartrand & Bargh, 1996). Therefore, the present studies extend the experimental work on equal qualities of nonconscious and conscious goal pursuit. However, although nonconscious goals can yield the same behavior as explicit goal instructions, the behavior may very well be produced by a different process. In research on explicit goals, it is usually assumed that people consciously assess and adopt the desirability of the goal state before installing conscious intentions and deliberate strategies to attain that state (Deci & Ryan, 1985; Gollwitzer, 1990; Locke & Latham, 1990). Our results, however, suggest that nonconscious goal-directed activity is produced by a different mechanism that uses the affective valence directly attached to representations of behavioral states to automatically direct effort at attaining those states.

Suggestive support for the distinct and parallel operation of the mechanisms involved in conscious and nonconscious goal pursuit is provided by research conducted by Bargh et al. (2001, Study 2). In a resource-management task, participants who were either primed with a cooperation goal or not could harvest and replenish a common resource pool with or without the additional explicit instruction to cooperate. Bargh et al. found that the primed and the explicit cooperation goals had separate effects on participants' cooperative behavior. That is, goal priming and the explicit instruction to cooperate independently increased replenishing of the resource pool. The absence of an interaction between the two types of behavioral goals is consistent with the idea that nonconscious goal pursuit arises via a different route than conscious goal pursuit. Specifically, the emergence of nonconscious goal pursuit might have been propelled by positive affect associated with the representation of the primed behavioral state (an argument that, in general, is likely to hold for the act of cooperation; e.g., Van Lange, 1999). Thus, the present research not only shows behavioral similarities between nonconscious and conscious goal pursuit but also sheds new light on how the underlying mechanisms that produce these behavioral effects may differ.

The Role of Positive Affect in the Context of Auto-Motive Theory

Our results are in line with research on auto-motive theory (Bargh, 1990; Bargh et al., 2001). The auto-motive model postulates that an individual's goals tend to become chronic or habitualized over time through repeated and consistent selection of the goal in specific situations. As Bargh and Chartrand (1999) noted,

> Initially, conscious choice and guidance are needed to perform the desired behavior. . . . But to the extent . . . the same goal and plan are chosen in that situation, conscious choice drops out as it is not needed. (p. 468)

As we discussed in the introduction, repeated satisfactory selection and attainment of a given goal creates a mental association between the specified behavioral state and positive affect. According to the present work, subsequent activation of the behavioral state can lead to nonconscious goal pursuit, because the association with positive affect is capable of directly feeding the desire and mobilization of effort to attain the accessible state. There are studies that empirically corroborate this notion by showing that priming of behavioral states (e.g., succeeding, cooperating, earning money, socializing) that are assumed to represent positive, desired states causes activity that evidences features of goal directedness (Aarts et al., 2004; Bargh et al., 2001; Hassin, 2005; Levesque & Pelletier, 2003; Shah & Kruglanski, 2002; Sheeran et al., 2005).

However, it should be noted that the present results suggest that any behavioral state that is represented in mental structures—including the context, the given state, and actions associated with the state—can operate as a goal if the behavioral state becomes attached to positive affect. Thus, our findings may embody the principles of accessibility and desirability that are commonly hypothesized to drive goal-directed behavior: Accessibility of the behavioral state representation increases the probability of attending to and performing the behavior, whereas the association with positive affect provides the signal that the state is desired and worth keeping in mind and working for. This notion concurs with the implicit volition model of Moskowitz, Li, and Kirk (2004), which posits that any goal that is represented as a desired state can be triggered to then cause automatic goal effects on perception, judgment, and behavior. Theoretically, then, the present framework on the role of positive affect in auto-motives provides a context within which the emergence of nonconscious goal effects can be understood, even when no history of repeated selection and attainment of the same goal in the same situation exists.

Distinguishing Between Two Accounts for Priming Effects on Behavior

The current literature on behavior priming offers two accounts by which nonconscious activation of mental representations of behavioral states can produce actual, overt behavior. On the one hand, activation of a behavior representation can automatically produce the corresponding behavior itself through a perception–behavior link that is caused by a cognitive overlap of representations used in perception and action (for an overview, see Dijksterhuis & Bargh, 2001). On the other hand, goal-directed activity can result from the nonconscious activation of behavioral goals (for an overview, see Moskowitz et al., 2004). Although theoretically different, both frameworks appear to be used interchangeably in the literature to explain priming effects on behavior. Whereas Macrae and Johnston (1998), for example, favored explaining helping behavior resulting from priming the concept of helping in terms of the perception–behavior link, similar effects were interpreted by Fitzsimons and Bargh (2003) as evidence for the operation of a nonconscious goal in a setting in which participants were primed with significant others associated with helping.

Indeed, it is often hard to tell which of the two mechanisms is operating (see Bargh & Chartrand, 2000). The present analysis offers a framework that may aid in distinguishing between these two separate accounts for priming effects on behavior. That is, when a behavioral state is primed that is not (or is only weakly) associated with positive affect, behavior may occur, but only via the perception–action link. Such behavior should, however, not be persistent and hence be easily overruled by other processes (Dijksterhuis & Van Knippenberg, 2000; Macrae & Johnston, 1998). Conversely, activation of a behavioral state associated with positive affect may initially instigate behavior through a perception–action link but should be propelled and maintained by the motivation to reach that state if it cannot be directly attained. Thus, the current view may help to predict which mechanism operates under which circumstances and thus provide a starting point for research that leads to a better understanding of the two mechanisms and the ways they interact.

Concluding Remark

Although a growing number of studies provide evidence for the idea that nonconscious activation of behavioral goal states facilitates motivational activity to accomplish these states, the basic mechanism producing this motivational activity is not clearly addressed in the literature and perhaps therefore is not fully appreciated. In the present study, we have taken up the challenge to unravel this issue by proposing, testing, and showing that nonconscious operation of behavioral goal states can emerge if mental representations of the specific behavioral states are associated with positive affect. The present research thus may take out some of the homunculus-like spirit that at times arises in discussions of the existence of automatic goal pursuit. Positive affect acts as a common currency that allows one to rapidly and effortlessly compare qualitatively different options for behavior (Cabanac, 1992; see also Damasio, 1994) to get the best bargain for one's valuable effort. Although the exact mechanism by which behavioral states associated with positive affect produce goal-directed, motivational behavior is only partly understood, the bottom line is that our studies show that positive shaping of behavioral states causes these states to act as nonconscious goals. We feel that investigating the role that positive affect plays in the nonconscious operation of goals and further exploring this process in particular may advance our understanding of how people are able to act on goals without knowing the actual source of their motivated social behavior.

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