How Does Our Unconscious Know What We Want?

The Role of Affect in Goal Representations

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Reference:

INTRODUCTION

Human goal pursuit is often assumed to involve, and arise from, conscious process: We think before we act, put our mind to something, and then keep our eye on the prize. This intimate relationship between consciousness and goals resonates in most theories on goal pursuit: To attain a desired state, one needs to deliberate, form intentions, choose the proper means, and reflect on one's progress towards that state. According to this view, consciousness is what gets motivational, goal-directed behavior going and forms a prerequisite for successful attainment of a desired state.

But when asked for the reasons behind their intentions, strivings and pursuits, people are notoriously bad in coming up with explanations (Wegner, 2002; Wilson, 2002). Why do we want to be successful scientists? What makes us decide to go for a drink this very moment? Most of the time, we can merely guess. This explanational void suggests that although people may – at least sometimes – be aware of setting and pursuing their goals, they do not always have conscious access to the actual source of their goal-directed behavior. This opens up the possibility that people's goal pursuits are in fact put in motion by external sources, without conscious intentions.

In line with this reasoning, Carpenter – followed by James more than a century ago – suggested that mere thoughts of behavior are enough to put them in motion (see Dijksterhuis & Bargh, 2001). Within social psychology, this idea of ideomotor action has developed in two distinct theoretical explanations. Based on findings in cognitive psychology suggesting that the cognitive representations that are activated upon the perception of specific actions are also the ones that are activated during the execution of the corresponding motor responses, it has been suggested that perceiving or activating the mental representation of an action can directly lead to its execution (see for an overview Dijksterhuis & Bargh, 2001). In addition to this behavior-priming explanation, it has been proposed that ideomotor effects stretch even

further and that people's goals are mentally represented too, causing activation of these representations to be followed not by execution of simple motor responses, but by motivational, goal-directed behavior without conscious intentions (see Moskowitz, Li, & Kirk, 2004).

Over the last two decades, a growing number of studies that have provided evidence in support of this hypothesis. Resorting to priming techniques to manipulate goal accessibility, these studies have reported goal-priming effects on cognitive and behavioral measures that are indicative of goal pursuit, such as the ability to overcome obstacles and sustained activation of the goal representation (see for an overview Moskowitz et al., 2004). Hence, the question of whether goal pursuit can be instigated by external primes seems to be settled. The challenge for researchers today is to figure out how it works. How do we get from accessible cognitions to motivational behavior?

In the present chapter, I will make an attempt to address the mechanisms by which priming of mental goal-representations can instigate motivational, goal-directed behavior by taking a closer look at goal-representations themselves. What do these mental representations look like? How do they develop? And most importantly: how can our brain recognize an accessible mental representation as a desired state that is worth pursuing and translate this information in motivational behavior? I will argue throughout the chapter that goal priming can lead to goal-directed motivational behavior without conscious deliberations or intentions because a goal representation contains a positive affective component that signals that the primed goal is desired and worth pursuing, which is sufficient to put motivational behavior in motion. In order to better understand what functions should be fulfilled by mechanisms that make nonconscious goal pursuit possible, we first briefly turn to theories of goal pursuit and the role they assign to consciousness.

CONSCIOUSNESS AND THEORIES ON GOAL PURSUIT

Goals are widely defined as desired states one aims to attain, with states referring to outcomes or behaviors (see e.g., Gollwitzer & Moskowitz, 1996). According to most contemporary theories on goal pursuit, these goals are the result of a deliberative process in which the desirability of the goal is determined and a conscious intention to realize the goal is formed (see e.g., Baumeister & Vohs, 2004). Although people may readily retrieve previously stored knowledge about the potential goal state from memory in order to decide whether to pursue it or not, it is generally assumed that goal pursuit cannot arise without such a conscious fiat (see e.g., Gollwitzer, 1990).

The most important criteria that serve as input for this decision to pursue a goal were formulated by Tolman (1932) as expectancy and value. The product of the value of a certain goal state and the expectancy of successfully attaining it (and/or the goal state yielding the anticipated affect) can be viewed as the main antecedent of motivational behavior. Whether one engages in the process of goal-setting or considers to adopt a potential goal that is suggested or implied by others, one has to consider the expected value of the potential goal state, and – if this state is judged to be desirable – determine whether one has means of realizing it (Bandura, 1986; Fishbein & Ajzen, 1975; Gollwitzer, 1990; Locke & Latham, 2002).

Once a goal has been set or adopted, the goal has to be enacted. Goal enactment first requires a decision-making process that is similar to that of goal setting or adoption, in which people have to select the proper means to attain the goal. Second, progress towards the goal has to be monitored in order to secure attainment of the goal and potentially shift to different means or strategies (e.g., Carver & Scheier, 1998). Be it explicitly or implicitly, most theories of goal pursuit assume that all these aspects of goal pursuit (setting, adopting, and monitoring of goals) rely on conscious processes (see for a more elaborate discussion Custers & Aarts, 2005a).

But if one assumes that goal pursuit can be instigated and carried out outside conscious awareness, one is obliged to explain how goals can be set or adopted and finally enacted without conscious deliberations and intentions. In the remainder of this chapter, I will present evidence supporting the idea that a goal representation not only contains directional information about the goal state (i.e., information about the state that is to be attained), but also information about the subjective or incentive value of the goal, which renders conscious deliberation in principle obsolete. I will argue that affective information plays a role in instigating motivational processes that propel the execution of instrumental actions and maintain the accessibility of the goal-representation in the service of the primed goal which makes persistent, flexible action possible. First, I will scrutinize the existing evidence for nonconscious goal pursuit to see whether there is support for a moderating role of value in goal priming effects on behavior.

NONCONSCIOUS GOAL PURSUIT

The Role of Accessibility

In order to demonstrate and investigate how the environment can influence people's behavior outside their awareness, researchers have mainly relied on priming techniques to simulate this process. With these techniques, it is possible to manipulated the accessibility of mental representations and investigate subsequent cognitive and behavioral effects without participants being aware of their true source. In one of the first studies that demonstrated priming effects on overt behavior, Bargh, Chen and Burrows (1996) primed participants with words related to the stereotype of the elderly. They did so by hiding words as "bingo", "Florida", and "grey" in a word search puzzle that participants had to solve. Upon completion of the experiment, the experimenters recorded the time it took participants to walk from the lab to the elevator. It was found that participants who were exposed to elderly-related words walked more slowly than participants in the control condition, who completed a similar word-

search puzzle that did not contain such words. Because the word "slow" was not amongst the words presented, this suggests that behavior was the result of the activation of the elderly stereotype (which includes the trait "slow"). Importantly, none of the participants were aware of the effect of the manipulation on their subsequent behavior. The construct "slow" that was activated through the stereotype, then, apparently influenced behavior outside people's conscious awareness.

This behavior, however, does not appear to be driven by any motivation or goal. First of all, there are no signs that are indicative of motivation (e.g., persistence, goal-directedness) and second, the act of walking slowly does not seem very desirable in itself or instrumental in attaining a higher goal (but see Cesario, Plaks, & Higgins, 2006). Rather, these kinds of priming effects on behavior have been explained as the result of a direct link between perception and action. Because of an overlap in mental representations that are used to observe as well as execute actions, observing or activating the mental representation of an action can directly lead to its execution (see Dijksterhuis & Bargh, 2001). In order to demonstrate motivational effects of priming, it is necessary to test the resulting behavior for features that are characteristic of goal-directed, motivational behavior.

Such a demonstration was provided in a different line of studies by Bargh and colleagues (Bargh, Gollwitzer, Lee Chai, Barndollar, & Trötschel, 2001). In several experiments, priming effects on cognition and behavior were tested for motivational qualities. In one experiment (Bargh et al., 2001, Experiment 4), the goal to achieve was rendered accessible by exposing participants to performance-related words in a word-finding task. During a second word-finding task, participants were after 2 minutes asked to stop working over an intercom. It was found that primed participants more often continued working on the task than non-primed participants. This experiment demonstrates that people become more persistent as a result of merely activating the mental representation of achievement. Several

other experiments revealed that behavior resulting from goal-priming possessed other features that are characteristic of goal pursuit, such as the ability to overcome obstacles (see also Custers, Maas, Wildenbeest, & Aarts, 2006). Furthermore, it was shown that the accessibility of a primed goal-representation does not decay after priming as would be expected for representations of other mental constructs.

These basic findings have been replicated and extended in a number of ways. It has been shown that primes as diverse as significant others, social category members and other people's behavior can activate goals ranging from cooperation and achievement to making money and having casual sex (see for an overview Moskowitz et al., 2004). Thus, the question of whether goal-priming works seems to be settled. In order to find out more about the underlying mechanisms, however, it may be worth looking at the boundary conditions of these effects.

<div align="center">People Do Not Pursue All That is Primed</div>

Some research suggests that people do not simply pursue anything that is primed, but that goal-priming effects are moderated by the subjective desirability of the goal. For example, in one of his studies, Shah (2003) primed participants with a significant other (i.e., their father) after which they participated in a task that was allegedly diagnostic for analytical reasoning. It was found that priming increased performance and persistence on the task, but only for participants who were close to a father who positively valued analytical reasoning. If one assumes that participants who were closer to their father were more likely to share his values, this research suggests that subjective desirability moderates goal-priming effects.

Similar findings come from research by Aarts and colleagues (Aarts, Gollwitzer, & Hassin, 2004). In their studies on goal contagion, they investigated whether people would adopt the goal to make money when it was rendered accessible through reading a description of another person's behavior. They found that when participants read a description that

implied the goal to make money, they worked harder in order to earn an additional income, but that this effect was more pronounced when they were currently in need of money. These findings suggest that people only pursue a primed goal when the goal is desirable, in this case, as a result of their current needs.

Moreover, Aarts and colleagues (2004) found in another study that the intensity priming effects on motivational behavior is decreased when existing goals are perceived in a negative light. Participants either read a short story describing the behavior of guy looking for a one-night stand with an old friend from high school, or a control story. For some of the participants who read the story implying the one-night stand the story was changed slightly in that the information was added that the guy was expecting a baby. It was found that compared to the control condition, the goal to seek casual sex proved to be contagious, in that the participants – all heterosexual males – spend more effort on helping the female experimenter. This effect, however, disappeared when the guy in the story was expecting to become a father. Under these conditions the accessible goal was rendered undesirable and was no longer pursued by the participants.

Together, these findings suggest that goal priming effects are moderated by the subjective desirability of the goal or *goal strength*. This strength can be either increased by for example needs, or decreased if the goal is presented in a negative light. Apparently, there is no one to one relation between priming and goal pursuit. Somehow, the effect of accessibility on goal pursuit is gated by processes that take into account the desirability of the goal. But if we assume that these processes also operate outside of awareness, how can our unconscious "make decisions" about desirability that are by the majority of contemporary theories of goal pursuit assumed to require conscious deliberation?

HOW DOES OUR UNCONSCIOUS KNOW WHAT WE WANT?

One way to answer this question is to propose that the process of forming an intention to adopt and pursue a goal can take place outside awareness. This has resulted in the proposition of concepts such as nonconscious will (Bargh et al., 2001), implicit intention (Wood, Quinn, & Kashy, 2002), or implicit volition (Moskowitz et al., 2004). Although these terms certainly make excellent counter-intuitive titles, they merely stretch the applicability of inherently conscious concepts featured in existing models to the unconscious level. This strategy has certainly helped to put the exciting notion of nonconscious goal pursuit on the scientific agenda, but it tells us little about how the unconscious can do what – until recently – was assumed to require conscious involvement.

Another approach is to make an inventory of what people can do unconsciously and construct a hypothesis in line with that knowledge. According to almost all models of goal pursuit, whether a goal is pursued or not depends on the expected value of the goal state. The best candidate for a mechanism that could determine the expected value of a primed goal outside conscious awareness would be one that relies on affective processes. It is known that affective processes play a fundamental role in motivating human action and can run quite fast without reaching conscious awareness (see e.g., Berridge, 2001; LeDoux, 1996). Thus, if goal representations would contain an affective component that reflects the expected value of the goal, this information could be used to nonconsciously determine whether a primed goal is desired or not, which renders conscious deliberation redundant.

<div align="center">Positive Affect as Implicit Motivator</div>

Support for the idea that positive affect associated with a goal state equips it with motivational properties comes from research on incentive theory. Incentive theory (see e.g., Berridge, 2001) proposes that stimuli or states associated with positive affect form an incentive for which the organism will work. These theories grew out of several remarkable findings in different animal labs that shed new light on the role of reinforcement in learning

processes following the s-r habit paradigm (Skinner, 1953; Watson, 1925). For instance, operant stereotypes or misbehaviors were discovered during operant conditioning experiments. One such behavior is auto-shaping (Brown & Jenkins, 1968). It has, for example, been observed that pigeons, for which free presentation of food was repeatedly paired with a light signal, started to vigorously pick at the light bulb although this behavior was not explicitly reinforced. This phenomenon, in which an animal shapes itself, occurs because the positive affect aroused by the food has now become linked to the light bulb, which therefore serves as an incentive for which the animal is motivated to work.

Incentive Theory

The idea that the positive affective valence of a behavior or activity motivates actions that are instrumental in realizing that behavior has been around for quite some time. That positive affect can be a powerful motivator was revealed by Olds and Milner (1954), who devised an apparatus by which rats could stimulate so called pleasure centers in their own brain with small electric shocks by means of pressing a bar. The effect was astonishing. The rats were found to push the lever so vigorously that some literally collapsed after several thousands of presses. Moreover, hungry rats even neglected the opportunity to eat and others crossed electrified shock grids in order to engage in pressing the bar. This demonstrates that if a particular neutral behavioral state (i.e., pressing the bar) becomes associated with positive affect, it becomes a desired state or goal for which the organism will exhibit enhanced motivation to accomplish it.

Dopamine and Motivation

Besides behavioral evidence, neuroscience provides more and more cues as to how affect may be involved in motivation. Recent studies show that the mesolimbic dopamine system, particularly the nucleus accumbens that was targeted in the self stimulation studies of Olds and Milner (1954), is associated with motivated behavior (see for an overview Berridge,

2007). The dopamine system responds very rapidly to delivery of rewards or engaging in behaviors that evoke positive affect, such as eating food and making money. This system is also activated instantly by cues referring to desired states, which shows that priming goal representations sets off neurological processes that are crucial for motivated behavior. Although the exact mechanism that produces goal-directed behavior is only partly understood, recent findings do suggest that dopamine is responsible for translating cues for incentive value in motivation.

<center>Evidence For the Role of Positive Affect</center>

Nonconscious Processing of Reward Signals

Recently, it has been demonstrated that reward information can be processed and subsequently increase motivational activity, even when it is presented below the threshold of conscious perception. Pessiglione et al. (2007) had participants engage in a task in which they could earn money by squeezing a hand grip. Before each trial, a picture of the maximal reward that could be earned – either that of a one pound or a one penny coin – was presented on the screen. It was found that even when this picture was presented subliminally, participants squeezed more forcefully than when they were exposed to a lower reward. This demonstrates that people are able to translate reward signals into motivation outside conscious awareness (see also Bijleveld, Custers, & Aarts, in preparation).

Measuring the Affective Valence of Preexisting Goal Representations

In line with this finding, researchers have started to directly test the idea that the affective valence of goal representations is involved in translating primed goals in motivational, goal-directed behavior. Using implicit measures to determine the automatic affective responses that are triggered by words describing potential goals, they were able to test whether this affective valence moderates goal-priming effects on behavior.

In one of their experiments, Custers and Aarts (2007) subliminally primed participants with the concept of socializing and going out (presumably a goal for most of the students who participated) in an alleged letter-detection task and measured the effort they expended in order to realize that activity. They did so by telling participants after the letter-detection task that they would engage in a mouse-click task in which they would have to click with their mouse along several paths on the screen supposedly to study people's mouse movements. Crucially, participants were told that they might be participating in a second task in which they could win tickets for a popular students party in the city center. The reasoning behind this was that participants who were motivated to attain the goal would speed up their clicking behavior on the mouse-click task in order to be able to get a chance to win the tickets. Finally, after an extensive filler task, participants engaged in the Extrinsic Affective Simon Task (EAST; De Houwer, 2003), in which the affective valence of the potential goal of socializing and going out was assessed.

In the EAST, which is conceptually similar to the Implicit Association Task (IAT; Greenwald, McGhee, & Schwartz, 1998) participants have to respond to white and colored words that appear on a computer screen with a left or right key-press. Specifically, they are instructed to respond to white words based on their affective valence (e.g., press left for negative and right for positive words), but to base their responses to the other words on their color (e.g., press left for blue and right for green words). Hence, depending on the color of these words, people have to respond with a key that is also used for positive or negative responses to the white words. The idea behind the task is that responses to colored words should be faster if their valence is congruent, compared to incongruent with the response that is required based on color.

Words related to the goal of socializing and going out were presented as colored words. For each participant, an individual EAST-score was computed. It was found that

participants expended more effort to attain the goal state when the EAST-score reflecting the valence of the goal was more positive, but only when the goal was primed. If one assumes that goals are mentally represented as (behavioral) states associated with positive affect, these results replicate the main finding in research on nonconscious goal pursuit that enhancing the accessibility of a goal representation motivates behavior aimed at realizing a desired state. Moreover, these effects can not be explained in term of mere behavioral priming, as the findings demonstrate that this effect is conditional on a positive affective valence of the goal state. Only when a primed state preexists as a desired state associated with positive affect does goal priming induce motivational behavior. In other words, goal priming does not create goals. It merely causes preexisting goal representations to gain control over behavior.

Comparable findings have been reported by Ferguson (2007). She measured implicit attitudes towards the word "equal" using an affective priming task. Subsequently, participants were exposed to 60 words which they had to explicitly evaluate. Hidden amongst them for all participants was again the word "equal". Apart from implicitly measuring the affective valence of the concept "equal" and assessing its explicit evaluation, these two tasks ensured that the potential goal of being equal was rendered accessible. In a subsequent task it was tested how people reacted to inequality. It was found that the more positive people's evaluation of the concept "equal", the less they were inclined to support unequal government policies.

Creating Goal Representations by Linking Neutral Behaviors to Positive Affect

Although the evidence presented above demonstrates a relation between the affective valence of goal representations and goal pursuit after priming, this evidence is only circumstantial when it comes to the causal role of positive affect in goal pursuit. That is, the correlations referred to above may be spurious in that another variable correlating with affect may produce the effect. In order to provide solid evidence for such a causal role of positive

affect, one would have to simulate or manipulate the positive affective valence of potential goals.

One way to potentially do this would be to make use of operant conditioning: have people repeatedly engage in certain actions and after each time present them with a reward that elicits positive feelings. Such a method, though, would be accompanied with several problems. Although after various trials the mental representation of the activity would probably become associated with positive affect, participants would also develop conscious expectancies, predictions and theories about the relation between the activity and the reward. With such a method, then, it would still be the question whether the positive affect itself does the trick.

These problems could, however, be circumvented by making use of evaluative conditioning techniques, which change the affective valence of mental representations in a more direct way. In evaluative conditioning research, pictures or descriptions of objects or behaviors are presented in temporal proximity with affective stimuli (e.g., affective words or photographs; for an overview see De Houwer, Thomas, & Baeyens, 2001). As such, this type of conditioning relies more on co-activation of the mental representations of the stimulus that is being conditioned (CS), and the affective stimulus (US), than the actual experience of the affect. Co-activation is simply assumed to create a mental association between the two. Hence, evaluative conditioning techniques could be used to directly change goal representations, without having to have people actually pursue and attain those goals.

In a series of experiments, Custers and Aarts (2005b) manipulated the affective valence of potential goals through co-activation with positive affect. It has been demonstrated that changes in valence of the CS can be established even when the US and/or the CS are being presented subliminally (see De Houwer et al., 2001). Therefore, in order to rule out the possibility that participants were aware of what was being manipulated, the potential goal that

was being conditioned (CS) was presented subliminally whereas affective stimuli were presented supraliminal and could hence be consciously perceived.

In a first experiment, effects of the affective valence of potential behavioral goals on participants' wanting to engage in those activities (Custers & Aarts, 2005b; Study 1) was examined. Participants first completed an alleged dot-detection task, in which potential behavioral goals (e.g., doing puzzles; going for a walk; which could all be expressed in one word in Dutch) or non-words were subliminally flashed on the screen, immediately followed by visible positive or neutral words. After this manipulation, participants' motivation to engage in the behaviors was assessed by having them respond to the potential behavioral goals that appeared on the screen, indicating quickly whether they wanted to engage in those behaviors or not. Results showed that participants' motivation to attain engage in the behaviors was higher when potential goals were subliminally flashed together with positive words, than when states were paired with neural words, or nonwords were presented with positive or neutral words. These findings demonstrate that priming of a neutral potential goal in itself does not increase motivation. It is the co-activation with positive affect that turns the neutral behavior into a desired state, which increases wanting.

In order to obtain more conclusive evidence for the primary and unique role of positive affect in motivational processes, in an additional study the effects of rendering neutral behavioral states more positively were compared to the effects of linking them to negative affect (Custers & Aarts, 2005b; Study 2a). Several theorists have argued that affect is not one single dimension that ranges from good to bad, but actually consists of two separate dimensions – a positive and negative one – that independently contribute to motivation and behavior in opposite directions (see e.g., Cacioppo & Berntson, 1999). Whereas positive affect is commonly associated with the preparation and instigation of motivated action, it has been proposed that negative affect attached to goal pursuits may reduce the motivation and

operation of the given pursuits. However, when states are neutral, linking them to negative affect would not decrease people's motivation to attain those states, as they would not be motivated to pursue them to begin with. Hence, Custers and Aarts predicted that co-activating neutral states with negative affect would not decrease participants' motivation to attain them. This is exactly what was observed: Compared to a neutral control condition participants' reported motivation to attain the originally neutral states increased when these states were linked to positive affect, but did not decrease when linked to negative affect.

In order to assess the motivational effects of positive affect on overt behavior, Custers and Aarts (2005b; Study 4) compared them to those of conscious goals. That is, they rendered the potential goal to do puzzles more positive making use of evaluative conditioning techniques, and compared this effect to a condition in which people only received the conscious goal to pursue this activity as well as to a third control condition. First, participants completed the manipulation in which words related to the neutral state of doing "number sequence puzzles" were linked to positive affect or not. For people in the other two conditions the goal was left neutral. Subsequently, participants were informed that they would engage in the mouse click-task explained earlier and a number-sequence-puzzle task, but that the latter task would only be given if there was sufficient time left. Additionally, participants in the conscious goal condition were told that the experimenter would appreciate it if they would get to the puzzle task (which explicitly attached desire to the goal state). It was expected that participants in both (conscious and nonconscious) goal conditions worked harder (i.e., faster) on the mouse-click task – which was in this setting a means to get to the puzzle task – because in both conditions the goals were rendered more accessible and desirable by respectively the explicitly instructions, or the conditioning procedure. It turned out that this was indeed the case: participants were faster on the mouse-click task in both goal conditions compared to the control condition. Thus, unobtrusively manipulating the affective valence of a potential goal

representation increases motivational behavior in the same way that a conscious goal or instruction does.

How do Goal Representations Develop?

If, as the work discussed above suggests, positive affect forms a crucial part of goal representations, how do these representations develop in life outside the lab? There are several ways in which positive affect can become associated with a potential goals state. The most trivial one is perhaps conscious goal setting itself. As weighing pros and cons of a specific potential goal forms an essential part of the goal setting process, a final positive impression is needed for the goal to be pursued (see Gollwitzer & Moskowitz, 1996). With increased practice, the contemplative decision process gradually changes into a more automatic one, aided by memory of past satisfactory experiences. That is, over time, the need for a conscious assessment ceases as the representation of the positive or desired goal is stored in memory, readily retrievable to motivate goal-directed behavior (see e.g., Aarts, Verplanken, & van Knippenberg, 1998).

Additionally, mere attainment of a given goal is known to yield positive affect in itself (Bandura, 1986; Higgins, 1987). In a test of this hypothesis, Moors and De Houwer (2001) instructed participants to produce a specific result (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: 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 effect activates the representation of positive affect, which can then become associated with the result to form a goal, even though the result itself would not have yielded any positive affect at all were it not for the instructions.

In fact, goals can arise any form of co-activation of the cognitive representation of a potential goal state and positive affect. Watching someone smile while eating blueberry muffins may, for instance, link that activity to positive affect, which creates a goal representation. Indeed, such observational or social learning is thought to be a basic way in which infants learn which behavioral states are desired and which ones are not.

But research on needs and deprivation suggests that the affective valence of objects and behaviors that are instrumental in lifting a state of deprivation is not static, but variable (see e.g., Berridge, 2001). Through incentive learning, organisms aquire the knowledge that certain behaviors (e.g., drinking) are more rewarding (i.e., produce more positive affect) when they are deprived (e.g, of liquid) than when they are satiated. Hence, the representation of drinking should have a more positive affective valence for deprived, but not for non-deprived people and activating the mental representation of drinking should only induce the motivation to drink for deprived people.

In a recent study, Veltkamp, Aarts and Custers (in press-a) found just that. In two experiments, high or low deprived participants where either subliminally primed with words related to drinking or not before motivation to drink was assessed. In the first experiment, it was found that without priming, low and high deprived participants did not differ in reported motivation (wanting) to drink. Compared to this control condition, however, priming increased motivation for high, but not for low deprived participants. In a second experiment, actual drinking behavior was measured in an alleged taste task. After the priming phase, participants were asked to sample and evaluate two drinks. The dependent variable was the amount of liquid that was consumed during tasting. Again, it was found that whereas low and high deprived participants consumed an equal amount of liquid in the control condition, priming increased the intake of liquid only for high deprived participants. These findings suggest that whereas deprivation alters the affective valence of deprivation reducing behaviors

(i.e., makes them more positive), these representations still need to be activated, at least under conditions of mild deprivation, for motivation to arise.

In sum, goal representations can develop in various ways that involve co-activation of a mental representation of a state or behavior and positive affect, regardless of whether this affect is the result of a conscious assessment, experiences upon goal attainment, or mere observation.

<div style="text-align:center">Positive Affect and Goal Enactment</div>

The research described above demonstrates that positive affect incorporated in goal representations promotes motivational goal-directed behavior. But how does positive affect guide actions on a concrete level? There is evidence to suggest that goals do not merely trigger instrumental actions through cognitive associations, but also facilitate goal pursuit through other processes which rely on the affective part of the representation.

Readiness for Goal Pursuit

An important way in which goals direct behavior is by biasing perceptual processes in favor of goal-related information. When one is, for example, motivated to drink, perceptual pronunciation of goal-related objects (e.g., a glass of water) in any way may be functional in the sense that it increases a person's chance of reaching the goal (Bruner, 1957). This accentuation would make lower order actions involving the object (e.g., grabbing, drinking) more likely to occur.

Evidence for such a biasing effect on perceptual processes was obtained by Veltkamp, Aarts and Custers (Veltkamp, Aarts, & Custers, in press-b). In line with research on functional perception, they hypothesized that objects related to goals that people are motivated to attain should be perceived as higher or bigger in size. In their classic study, Bruner and Goodman (1947), for example, established that children overestimated the size of coins as a function of their monetary value and that this effect was more pronounced for poor

than rich children. Following this rationale, Veltkamp et al. asked participants to estimate the height of stimuli (e.g., a piece of a puzzle) that represented objects that were functional in attaining (initially neutral) potential behavioral goals (e.g., doing puzzles). These behavioral states were either linked to negative, neutral or positive affective words in a within-participants design similar to that used in the evaluative conditioning procedure discussed above. It was found that compared to objects related to the neutral behavioral states, objects related to states linked to positive words were estimated to be higher, whereas no effect was found for objects related to behavioral state linked to negative words. Hence, positive affect incorporated in goal representation may lead to biased perceptual processes in favor of goal related objects.

Transfer of Affect from Goals to Goal-Related Objects

A second way in which positive affect may facilitate goal enactment is through transference of positive affect from goals to lower order actions. As noted earlier, goal and means are associated in a hierarchical mental structure. It has been proposed that, not unlike activation, positive affect may "flow" from goals to means and related object because of these associations (Kruglanski et al., 2002). In effect, positive affect associated with a goal representation would seep down to action representations lower in the hierarchy, furnishing them with motivational power, effectively creating sub goals.

Preliminary evidence for such a process was obtained in studies by Ferguson and Bargh (2004). In one experiment, they manipulated people's goal to drink. All participants were instructed to refrain from dinking in the three hours before the experiment. In the control group, participants were upon arrival in the lab submitted to an alleged taste test, in which they had to compare various drinks and should drink as much as possible. In the experimental group, participants had to taste different brands of pretzels, which should exacerbate their thirst. Subsequently, participants' implicit evaluations of goal-related objects and actions were

measured. It was found that goal-related objects that could be used to quench their thirst evoked more positive affect in thirsty than in non-thirsty participants.

Together, these findings suggest that goal priming not only facilitates goal enactment by rendering representations of instrumental actions more accessible, but also that positive affect associated with the primed goal biases perception towards goal-relevant objects by perceptually accentuating them. Moreover, the positive affect associated with the activated goal may "spill over" to lower goal-related actions and associated objects and thus facilitate (approach) reactions that are helpful in attaining the goal. As such, the selection of goal-directed actions may be driven by the cognitive part of the goal representation in that the representation of the desired state may render accessible representations of associated actions, but also by the affective part. This part biases perception towards goal-related objects and renders them more positive, which facilitates approach reactions that may be help to attain the goal.

<div align="center">Negative Affect and the Cessation of Nonconscious Goal Pursuit</div>

The work discussed above demonstrates that the positive affective valence of goals determines whether a goal that is primed by the environment is pursued or not. Hence, nonconscious goal pursuit is based on learned relations between the goal state and positive affect. Although such a mechanism would be adaptive in that it allows people to pursue the goals that have proven to yield positive outcomes in the past, it could backfire if these goals are activated in a setting in which they are undesirable. Would the positive affect associated with the goal lead people astray in those situations and facilitate pursuit of the goal with unfavorable consequences?

This may not always be he case. In the studies of Aarts and colleagues (2004), for example, goal priming did not instigate motivational processes and even reduced desirability of the goal when the goal (having casual sex) was presented in a negative light (the guy

pursuing the goal was going to be a father). One interpretation of these findings is that the negative contextual information may close down the motivational processes that would have been put in motion by the positive affect associated with the goal. That is, affective processes may not only be involved in the production of motivation, they may also cease it.

This idea is supported by recent neurological findings suggesting that negative information in modulates the activity of the dopamine system. Specifically, it appears that negative affect following the activation of a goal changes the effects of dopamine functioning in subcortical and cortical brain circuits involved in goal pursuit. Delgado and colleagues (2000), for example, gave participants the goal to guess whether the value of a card was lower or higher than the number 5. Each guess was immediately followed by a monetary reward or punishment. Neuroimaging data showed that, compared to a baseline condition, activation in the dopamine system was sustained following a goal reward but sharply decreased following goal punishment. These and other findings suggest that frequent priming of a goal in temporal proximity to the activation of negative affect may dampen activity in brain systems that control the motivation and resultant operation of the goal. If such a mechanism that takes in account changes in incentive value is hardwired in the brain, it may play an important role in modulating the effects of goal-priming.

This hypothesis was specifically addressed by Aarts, Custers & Holland (2007). Making use of the same conditioning paradigm discussed earlier, they repeatedly co-activated pre-existing, positive goals in temporal proximity to negative affect. Effects were tested on a number of phenomena that are associated with the activations of goal representations. In a first empirical demonstration Aarts and colleagues (2007) subliminally primed undergraduates with the goal of partying (a goal they clearly perceived as a desired state) in temporal proximity of negatively valenced object words (e.g., war, trash), and tested effects of this affective goal treatment on the motivation to work to attain the goal in a goal-relevant task.

They found that participants worked less hard to attain the goal when it was co-activated with negative affect, compared to conditions in which the goal was primed without negative affect. These findings fit those of Winkielman, Berridge, and Willbarger (2005), who found that thirsty participants having the active goal of drinking who were exposed to subliminal faces with negative emotions (anger) showed a decreased motivation to drink. Together, these findings suggest that co-activation of a goal with negative affect ceases the motivation to pursue this goal and this negative affect can be triggered by events that are not necessarily related to the goal, such as emotions or objects that are perceived in the environment.

Building on the idea that accessible pre-existing goals are kept active over time, Aarts and colleagues (2007) also tested how the mental accessibility of a preexisting goal changes during a short time interval as a result of subliminally priming the goal in concert with negative affect. Specifically, they reasoned that the nonconscious activation of a desired goal triggers active maintenance (rehearsal) processes that can keep the goal alive in mind for several minutes. This in contrast to the activation of mere semantic knowledge, which shows a very rapid decay, usually returning to baseline within a couple of seconds. Thus, when a person becomes less motivated to pursue the goal (e.g., going out partying), its cognitive representation should, in principle, behave as any other semantic (nonmotivational) concept.

To test this hypothesis, Aarts and colleagues primed their participants either with the goal to party or not, and assessed the accessibility of the goal-related words (and goal-unrelated control words) in a lexical decision task 2.5 minutes later. Results showed that after that interval, the representation of the goal of partying was still more accessible in primed than in control participants, whereas no difference in the accessibility of the control words was observed. Importantly, for participants for whom the goal was primed and co-activated with negative affect, the activation level was not different from that of control participants. These findings suggest that when a preexisting goal is activated nonconsciously, the goal is

mentally maintained or rehearsed to keep it at a heightened level of accessibility, and that this process disappears quickly when one becomes demotivated to pursue it as a result of negative signals accompanying the activation of the goal. Hence, people's goal pursuits may not only be guided by positive affect incorporated in the goal-representation, but also be modulated by affective signals that co-occur with the stimuli that prime this representation.

DISCUSSION

The present chapter aimed to investigate how activation of mental goal representations can result in motivational, goal-directed behavior. Based on an analysis of the goal concept throughout psychology and its place in theories of goals, it was concluded that purely cognitive representations merely containing information about the state that is to be pursued cannot explain how goal-directed, motivational behavior emerges without conscious interventions. Given the evidence for the existence of such goal-priming effects, and based on the human capacity to process and use affective information efficiently and without conscious processes, it was hypothesized that affect incorporated in the goal-representation reflects the (expected) value of the goal, rendering conscious assessments and deliberations obsolete. The discussed research supporting this hypothesis suggests that positive affect can become associated to cognitive representations of the goal state through learning and as a consequence drive the instigation and enactment of goals. Furthermore, negative affect may be involved in modulating the motivational effects of pre-existing goals. Together, these findings uncover the underlying mechanisms of nonconscious goal pursuit by showing how one of the most crucial parts in models of goal pursuit – assessment of the (expected) value of the goal - can occur without conscious involvement and is enough for primed goals to take control over behavior. In other words, because of the affective part of the goal representation, our unconscious "knows" what we want.

 Distinguishing Between Different Mechanisms by Which the Environment Directs Behavior

The current analysis sheds new light on the currently fashionable topic of unconscious influences on human behavior. Most of all, it helps to further define and thereby distinguish nonconscious goal pursuit form other mechanisms, such as approach and avoidance reactions and behavior priming. Whereas behavior priming is an example of ideomotor action, relying on thoughts about or representations of behavior, approach and avoidance reactions can be categorized as sensorimotor actions: actions that are automatically put in motion by the sensory perception of a physical object in the immediate environment. As such, behavior priming is thought to rely on a purely cognitive mechanism, which involves the direct activation of motor programs that are associated with or incorporated in the representations of actions. Approach and avoidance reactions, on the other hand, rely on the affective signals emitted by perceived objects which trigger bodily reactions that either reduce or enlarge the physical distance between the object and the self. Whereas affect should not play a role in behavior priming, the content of the object representation should not matter much for approach and avoidance reactions.

Most of the time, however, the different mechanism are not easily told apart. Recent studies by Cesario and colleagues (2006) for instance, suggest that the finding by Bargh and colleagues (1996) that people walk more slowly when primed with words related to the elderly is not totally based on a direct perception-action link, but at least partly the result of motivational processes. First of all, they replicated the effect by demonstrating that priming people with "elderly" caused them to behave more slowly as compared to priming them with "youth". Second, they demonstrated that slowing down after elderly priming was more pronounced for people who implicitly evaluated the elderly as more positive (and less negative) and that speeding up after youth priming was more pronounced when youth was more positive (and less negative). Cesario and colleagues interpreted these effects as a motivated preparation to interact: people with more positive implicit attitudes towards the

elderly would have a stronger goal to interact with members of this group and after priming behave in a way that would enable them to successfully attain that goal (i.e. behave more slowly). Hence, the effect that previously exemplified behavior priming appears to have at least partly been produced by motivational process. Thus, considering the affective valence associated with behaviors that are primed directly, or through concepts such as social stereotypes may help to determine whether motivational or non-motivational mechanisms are operating.

In a recent study, Aarts, Custers and Marien (2008) successfully differentiated between effects on preparation and motivation of behavior by manipulating the accessibility and affective valence of behavior representations related to exertion. Using the manipulation described earlier, all participants were exposed to supraliminally presented neutral and positive words. In the prime group, words related to exertion (exert, vigorous, strength) were subliminally primed prior to the neutral words, whereas in the prime + reward group these primes were presented prior to the positive words. In the control condition, no primes related to exertion were presented.

Subsequently, participants moved on to a task in which the effort they expended could be measured over time. Their task was to squeeze a handgrip for a time interval of four seconds when the word "squeeze" appeared on the computer screen. This task was repeated three times and the force participants exerted was measured by the computer. It was found that compared to the control condition, participants were faster to respond to the squeeze instruction in both the prime and the prime + reward condition, which indicates that in both conditions priming of the representation of exertion prepared the corresponding behavior. However, the total amount of effort expended in the task (mean force over the four seconds) was only increased in the priming + reward condition. This indicates that whereas activating a behavior representation leads to preparation of the corresponding action, motivation only

results when the activation of a behavior representation is accompanied by positive reward signals.

The important role of affect in goal-priming effects should not lead people to confuse them with basic approach or avoidance reactions. It is by now well documented that positive objects facilitate approach reactions (e.g., extending one's hand), whereas negative objects elicit avoidance reactions (e.g., retreating one's hand). Although at a metaphorical level approaching a goal may seem similar to approaching a delicious piece of cake in front of you, there are important differences. Basic approach and avoidance reactions do, for instance, not rely on other cognitions than those that are required to categorize it as good or bad, and knowledge of the location of the object. Affective categorization alone is enough to determine which of the two options apply: approach or avoid. Goal-directed behavior, on the other hand, *does* rely on cognitions. For one thing, goal-directed behavior is often triggered by mere thoughts of a certain goal state that is not present in the physical surrounding. As a consequence, cognitions about how to attain the goal are needed as extending or retreating a hand does not do the trick. Thus, although both approach/avoidance reactions as well as goal-directed behavior may be propelled by affective processes, the use of cognitive representations makes the difference.

Consequences for Behavior Regulation and Behavioral Change

Recognizing the crucial role of affect in goal-directed behavior may have important consequences for behavior regulation and attempts to change behavior. Much work on behavior regulation already takes into account the unconscious influences of affect in this process. Fishbach and colleagues, for example, have been studying the interaction between goals and temptations across several lines of research (Fishbach, Friedman, & Kruglanski, 2003). In this research, affect is generally the source of unwanted approach reactions that are evoked by objects in the environment (temptations). Although the field of behavior

regulations has contributed much to our understanding of the dynamics between motivation and environment, two implications of the current view on goal representations may be worth mentioning that may have important consequences for understanding behavior regulation and promoting behavioral change. First, the impact of the environment on our behavior may be far greater than assumed thus far. Objects in the environment may not only trigger approach reactions, they may also instigate goal-directed behavior that is potentially even more powerful. Thus, we may not only be tempted by a piece of pizza that is sitting right in front of us, we may even walk an extra block to buy a slice if the thought about it is triggered in our mind. Although on the whole the ability to pursue goals without conscious thoughts may serve us well, it may also lead us to pursue the things we associate with positive affect, even when we have consciously and rationally decided not to.

Second, the power of nonconscious goal pursuit may also be used to our advantage if we can harness it. The work of Moskowitz and colleagues for example (Moskowitz et al., 2004) demonstrates that chronic or temporarily activated egalitarian goals help people to control their prejudiced responses that are often assumed to be out of the reach of conscious control. From the current analysis of the role of positive affect in goal representations it follows that such goals cannot only be activated through priming techniques, but that the strength of these goals can potentially also be altered by linking them to positive or negative affect. Such strategies that are to a certain extent already employed in cognitive therapy may prove effective in changing the strength of people's goals.

Although people often have idea that their goal pursuits are the results of their conscious intentions, the work discussed in this chapter supports the idea that the processes underlying these intentions, specifically the assessment of the (expected) value of the goal can also occur without deliberation and directly give rise to motivational, goal-directed behavior. The mechanism which makes this possible is one that relies on the cognitive as well as the

affective information that is incorporated in the goal representation and takes into account

affective signals that accompany goal priming. Thus, by processing and storing this affective

representation along with other cognitive information about the goal, our unconscious keeps

track of what we want so we do not have to deliberate on each potential goal, over and over

again.

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