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The Unconscious Will: How the Pursuit of Goals Operates Outside of Conscious Awareness

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People often act in order to realize desired outcomes, or goals. Although behavioral science recognizes that people can skillfully pursue goals without consciously attending to their behavior once these goals are set, conscious will is considered to be the starting point of goal pursuit. Indeed, when we decide to work hard on a task, it feels as if that conscious decision is the first and foremost cause of our behavior. That is, we are likely to say, if asked, that the decision to act produced the actions themselves. Recent discoveries, however, challenge this causal status of conscious will. They demonstrate that under some conditions, actions are initiated even though we are unconscious of the goals to be attained or their motivating effect on our behavior. Here we analyze how goal pursuit can possibly operate unconsciously.

As humans, we generally have the feeling that we decide what we want and what we do. These self-reflections remind us that we are not bound to the present environment for our actions: We can envision ourselves in different places, in alternative futures, doing different things. We only have to decide to do so, and we can go see a movie tonight or hang out with friends in a bar. It is up to us. Our behaviors seem to originate in our conscious decisions to pursue desired outcomes, or goals.

Scientific research, though, suggests otherwise. In a remarkable experiment conducted more than 25 years ago (*1*), research participants were instructed to freely choose when to move their index fingers while the timing of the action itself, of its preparation in the brain, and of when the person became aware of the decision to act were measured. Although the decision did indeed precede the action, the preparation of the finger movement in the brain was well on its way by the time people consciously decided to act. Apparently, when people are persuaded to consciously set a goal to engage in behavior, their conscious will to act starts out unconsciously.

The finding that the pursuit of the goals that we consciously set and adopt is prepared unconsciously, at least in the earliest moments before we act on them, is intriguing. Recent research in social cognition, however, goes even one step further. This research shows that goals themselves can arise and operate unconsciously. Social situations and stimuli in the surroundings activate or prime goals in people's minds outside of their awareness, thereby motivating and guiding them, for example, to work harder on a task (*2*), to reach out a helping hand to others even when facing obstacles (*3*), or to ensure that they can socialize and hang out with friends (*4*). Thus, goals and their pursuit can be influenced by unconscious sources, and these goals do not need to be consciously set and adopted before their influence begins to operate (Fig. 1).

Fig. 1. The painting *Achilles Slays Hector* by Peter Paul Rubens depicts a scene from the *Iliad* in which no reference whatsoever is made to conscious decisions or intentions (*52*). Instead, the pursuits of Achilles and the other characters are determined by external factors, such as fate or the gods. Here we argue that although people may have the feeling that their behavior is the result of their conscious decisions, their goal pursuits too are often directed by external sources of which they are not conscious.

A Brief Chronology

The notion that the pursuit of goals can occur unconsciously is reminiscent of Sigmund Freud, who proposed that our (often sexual) desires are suppressed and banished to the dark corners of the mind but pop up in hysteria and under hypnosis. Whereas Freud's complex theory on the unconscious was largely unfalsifiable (*5*), researchers in the behaviorist tradition built more-testable theories, according to which neither consciousness nor cognition but rigid responses to environmental stimuli determine behavior.

Obviously, the environment plays a crucial role in directing behavior. However, acting on fixed stimulus-response rules—such as smashing a beeping alarm clock in the morning—is not the whole story. A substantial part of human behavior can only be explained by assuming that people have goals in mind that direct their behavior in a dynamic world (*6*). Cognitive scientists indeed proposed that the flexibility to produce the same desired outcomes under varying circumstances comes from our capacity to mentally represent what we want and do: to build and store mental representations of goals. These goal representations function as beacons for behavior, motivating action and guiding its course (*7*).

For a long time, it was generally assumed that many of the mental processes that make goal pursuit possible require consciousness. But in the past decade or so, the scientific study of goal pursuit has discovered that these processes can also operate without conscious awareness, and hence, human behavior may originate in a kind of unconscious will. This recent evidence that goal pursuit can occur without people being conscious of the active goal or its influence on their motivation and behavior has been met with resistance and skepticism, perhaps partly due to its far-reaching implications for our understanding of consciousness and for our view of what it is to be human (*8*). Furthermore, scientists have not come to grips with the potential redundancy of consciousness in (seemingly) volitional behavior, because the mechanism by which the activation of goal representations can produce goal pursuit unconsciously is not fully understood. Understanding this mechanism is especially important because unconscious goal pursuit is proposed to play a key role in many aspects of social life, such as consumer and health behavior, moral behavior, and social discrimination (*9*).

Here we review research demonstrating that goals and the motivation to pursue them can arise unconsciously, and we propose a mechanism for how this may happen. This proposed mechanism is based on the idea that, in principle, the mind

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(and the brain in which it resides) is designed for action, and continuously and largely unconsciously processes behavioral-relevant information to readily "tell" its owner what she wants and should do to deal with the opportunities and challenges presented by the environment. Thus, setting, pursuing, and realizing goals can occur without conscious interventions.

Evidence for Unconscious Goal Pursuit

Unconscious goal pursuit was first systematically examined in social psychological experiments that made use of so-called "unrelated studies" setups. Bargh and colleagues (*2*) used such a setup to prime the goal to achieve—a desired outcome most people strive to attain—in U.S. students without them becoming aware of being influenced. Students were seated at a table to work on two seemingly unrelated language puzzles. For some students, the first puzzle included words related to achievement (such as win or achieve), and for others it did not. Students who were exposed to achievement words were found to outperform the others on the second puzzle. Furthermore, achievement priming was found to prompt behavioral qualities that are characteristic of motivational states or volition, such as persistence in solving puzzles and increased flexibility on the Wisconsin Card Sorting Task (*10*), a standard measure of flexibility in cognitive processing (*11*). Extensive debriefing revealed that the students did not perceive an influence of the first task (in which they were exposed to consciously visible achievement-related words) on their responses to the second. Hence, the effect of achievement priming on subsequent performance and cognitive flexibility was likely to be the result of unconscious processes.

Several experiments using the unrelated studies setup have replicated these goal-priming effects with different goals and different primes. It has been found that reading words related to cooperation causes people to work together in economic games (*2*) and that perceiving words describing occupations associated with making money (such as stockbroker) or inferring this goal from another person's actions (such as a person operating a slot machine) makes them work harder when money is at stake (*12*). Furthermore, it has been shown that people's pursuits are influenced by subtle cues in the environment outside their awareness: Upon entering an office, people become more competitive when seeing a leather briefcase placed on the desk (*13*), talk more softly when looking at a library picture on the wall (*14*), and clean their table more when there is a vague scent of cleaning agent in the air (*15*). Together, these results show that goal pursuit is influenced and controlled unconsciously by social features that have become associated with goals, either through direct practice or through social norms, communication with important others, or the media.

The studies on unconscious goal pursuit alluded to above, however, are sometimes criticized for allowing participants to be aware of the primes. Even though participants report being unaware of the influence of the goal priming on their behavior, they still could have formed conscious intentions at the moment when they consciously perceived the goal information. Hence, their goal pursuit may still have been caused by their conscious will.

To offer even more compelling evidence for unconscious goal pursuit, researchers have recently resorted to more stringent methods such as subliminal stimulation, which prevents conscious perception of the primes. Subliminal stimulation refers to the presentation of stimuli with an intensity that is too low to reach the threshold of conscious awareness. Typically, people cannot consciously detect these stimuli, but they are nevertheless influenced by them. Whether subliminal stimulation can convey meaningful information has been debated for quite some time (*16*). However, recent findings provide compelling evidence that subliminal primes affect people's responses (*17*), activate semantically related knowledge (*18*), and even influence cognitive control in tasks (*19*). Building on these findings, research has demonstrated effects of subliminal stimulation on goal pursuit, such as increased task performance after priming of achievement-related words (*20*), enhanced fluid consumption in a taste task after priming of drinking-related words (*21*), and an increase in instrumental behavior leading to specific goals (such as helping another person by providing useful comments) after priming of names of significant others (such as a good friend) or occupations (such as nurse) associated with these goals (*12*, *22*).

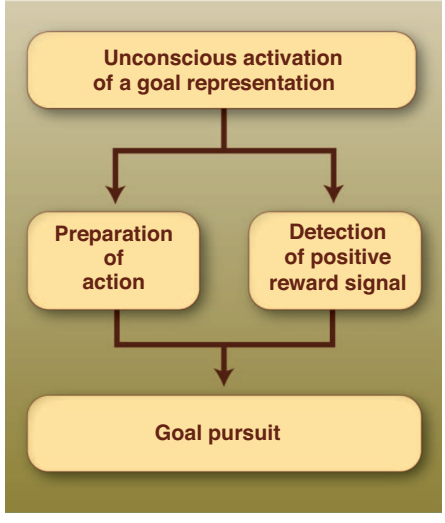

Fig. 2. The proposed mechanism for unconscious goal pursuit.

It is important to note that in most studies on subliminal goal priming, people are asked in retrospect to indicate whether they were motivated to pursue the primed goal. The general finding of these checks is that although people's reported motivation often correlates with their behavior (people who worked harder reported that they were more motivated), these reports are not influenced by the primes. This suggests that the reason that subliminal priming of the goal affects goal pursuit is not that people become conscious of their motivation to pursue the goal after it is primed. Participants may become conscious of their motivation after the behavior is performed and when they are explicitly asked to reflect on it. In other words, the reported conscious experience of pursuing goals may be an inference rather than the cause of goal pursuit (*23*, *24*).

In sum, a large body of research indicates that the pursuit of goals can be evoked outside of awareness. People become motivated to initiate and exhibit behaviors available in their repertoire when goals that are represented as desired outcomes are primed, even though they are not aware of the primed goal or its effect on their motivation and behavior. But how can this happen?

A Mechanism for Unconscious Goal Pursuit

To understand how the pursuit of goals occurs unconsciously, it is important to examine the functions that make motivated, goal-directed behavior possible. Fortunately, behavioral scientists have worked hard to reduce the processes involved in goal pursuit to a few basic principles. Whereas these principles have been modeled in different psychological terms, most models of goal pursuit share the three following basic features: a person (i) takes a possible outcome or goal in mind; (ii) considers whether the actions and resources to attain the outcome are available; and (iii) assesses the value of the outcome (that is, the extent to which it is rewarding or desirable) (*25*). Thus, whether people set an outcome that comes to mind as a goal to pursue depends on its attainability and desirability.

The assessment of this attainability and desirability of a goal is considered to require consciousness by most dominant theories on goal pursuit. Yet the evidence for unconscious goal pursuit suggests that this does not have to be the case. The notion that goal pursuit can operate unconsciously sounds ridiculous to some people but sensible to others. Sensible or not, the increasing evidence on this issue is fairly silent about the mechanisms that allow people to pursue goals without conscious awareness. We will now discuss a mechanism for unconscious goal pursuit and demonstrate that people can unconsciously detect the reward value of a primed goal and prepare feasible actions that make the goal attainable. We will then show how these two processes work together to produce goal pursuit outside people's conscious awareness (Fig. 2).

Unconscious action preparation and execution. People may often become conscious of the actions

they prepare and execute, but their conscious knowledge of what exactly they do to reach a goal is surprisingly limited (*26*). Consider the muscle contractions and relaxations that make our arm grab a cup of coffee. Computational models have been proposed that describe how motoric processes and sensory feedback work together to control this behavior (*27*), but on a conscious level we have no idea how we do it. We just think of grabbing the cup and it happens.

We are able to initiate actions by thinking about their outcomes, because actions and their outcomes are associated on a perceptual, sensory, and motor level (*28*). Through prior learning, certain patterns of muscle contraction and relaxation have become associated with their observable outcomes (such as grabbing and lifting a cup). Because of these associations, bringing to mind the representation of an outcome prepares and controls perception and action to produce the outcome without much thought (*6*, *29*). This way, action follows from an ideomotor principle (*30*): The mere activation of the idea of a behavioral act or outcome moves and programs the human body without a conscious decision to act. Research on social cognition and neuroscience has indeed revealed that merely seeing or reading about a behavioral act or outcome immediately increases the tendency to realize it, even when this "idea" is triggered outside of conscious awareness (*31*, *32*).

The ideomotor principle does not hold only for the preparation and execution of simple goal-directed responses such as grabbing a cup, but also for cognitive control and more complex social behavior. For instance, in a recent experiment (*19*), participants had a goal to judge words in terms of either sound or meaning, depending on the visual cue preceding the word. Sometimes, the cue that corresponded to the opposite task was subliminally presented before the actual cue. It was found that the subliminally primed cue enhanced brain activity in the cortical areas related to the corresponding goal (involved in either auditory or semantic processing), whereas activity related to the consciously cued goal was reduced. The cognitive control system, in other words, responded to the subliminal cues by selecting and preparing the execution of the corresponding goal.

Research on how people perform more complex behavior has also demonstrated that when they frequently select a goal (such as going to work), they are not only able to orchestrate and execute actions that are instrumental in realizing it without conscious attention to their behavior (absentmindedly driving one's car to the office). Priming the goal immediately selects the actions themselves (*33*). As such, the attainment of many goals is a straightforward affair: People automatically select and execute behaviors available in their repertoire when a goal is primed, and unconsciously adjust their behavior based on perceptual input in the current situation to reach it (*26*, *34*).

Unconscious reward processing and motivation. The pursuit of goals does not only involve the preparation and execution of the proper behavior upon the priming of a goal representation. Because the world is a dynamic place that is full of opportunities and distractions, people should be both flexible (performing actions in new settings or switching from one goal to the other) and persistent (keeping one's eye on the selected goal) to optimize goal pursuit. People therefore also take into account the value or rewarding properties of the goal, because this tells them whether it is warranted to invest the effort or recruit the resources necessary for maintaining their behavior, overcoming obstacles, or deviating from routines to attain the goal. Hence, even though priming a goal prepares and programs actions unconsciously, whether this goal will flexibly control information processing and behavior depends on whether it is worth pursuing. This crucial step from preparing actions to actually pursuing a goal is assumed to require an act of conscious will (*35*, *36*). So, can people determine whether it is worth pursuing a given goal and invest effort in attaining it without the involvement of consciousness? Recent studies on the basic role of the processing of reward cues in human motivation suggest that yes, they can.

Neuroimaging research has discovered that reward cues are processed by limbic structures such as the nucleus accumbens and the ventral striatum. These subcortical areas play a central role in determining the rewarding value of outcomes and are connected to frontal areas in the cortex that facilitate goal pursuit (*37*). These reward centers in the brain respond to evolutionarily relevant rewards such as food and sexual stimuli, but also to learned rewards (such as money or status), or words (such as good or nice) that are associated with praise or rewards (*38*). This demonstrates that regardless of their shape or form, such positive stimuli induce a reward signal that is readily picked up by the brain (*39*).

Other recent research has demonstrated that subliminal primes that are specifically related to rewards can motivate people to increase the effort they invest in behaviors. In one study (*37*), participants could earn money by squeezing a handgrip. Before each squeeze, the money that could be earned was indicated by a 1-pound or 1-penny coin on the screen. Whereas on some trials the coin was clearly visible, on others it was presented subliminally. Thus, effects of conscious and unconscious reward cues could be compared within one experiment. It was found that people squeezed harder on high than on low reward trials, regardless of whether the reward was consciously visible or not. Moreover, this effect was accompanied by activation in the brain areas that play a role in reward processing and the recruitment of effort for action. Similar effects of unconscious (and conscious) monetary rewards have been shown in cognitive tasks that require flexibility and cognitive resources (*40*, *41*). These findings indicate that conscious and unconscious reward cues have similar effects on effort and flexible cognitive processing, which suggests that conscious awareness of rewards is not needed for goal pursuit to occur.

The observation that a variety of reward cues are encoded by the same brain system to motivate cognition and action and can be processed unconsciously has led to the proposal that a positive reward signal associated with outcomes plays a crucial role in unconscious goal pursuit (*42*). Specifically, when a desired outcome or goal is primed, activation of the mental representation of this outcome is immediately followed by the activation of an associated positive affective tag, which acts as a reward signal for pursuing the primed goal. The positive reward signal attached to a goal thus unconsciously facilitates the actual selection of the goal and the subsequent mobilization of effort and resources to maintain the goal, unless other (more rewarding) goals gain priority (*43*, *44*). This affective-motivational process relies on associations between the representations of outcomes and positive reward signals that are shaped by one's history (for example, when a person was happy when making money or performing well). In this case, the goal is said to preexist as a desired state in the mind. Priming this goal representation not only prepares the appropriate instrumental actions but also motivates behavior, rendering it persistent and flexible, directed at attaining the desired outcome.

We investigated the role of this positive reward signal in the effect of subliminal goal-priming in teenagers and young adults (*45*). They were seated in front of a computer, allegedly to test their computer mouse skills. Before starting on this test, some participants were subliminally exposed to words related to the goal of socializing on the computer screen, whereas others were exposed to words unrelated to this goal. At the onset of the mouse-skill test, they were told that if there would be enough time left after the test, they could engage in a lottery in which they could win tickets to a popular student party. Thus, spending more effort (by working faster) on the mouse-skill test was instrumental in attaining the goal to socialize. The participants indeed worked harder on the mouse-skill test when the socializing goal was primed, and this effect was stronger when socializing evoked a stronger positive reward signal in the minds of the participants (which was assessed in a separate implicit affective association task). Importantly, checks indicated that priming caused participants to pursue the goal independently of their reported motivation to attain it. This finding not only demonstrates that people invest effort as a result of subliminal goal priming but also that the resulting behavior is flexible, because people pursued an action that was available in their repertoire (skillfully using a computer mouse) but was novel to attain the goal. Similar effects of reward value have been documented for other, perhaps more consequential, behaviors. Priming an egalitarian goal, for instance, changes people's voting behavior to the extent that this goal is represented as positive or rewarding (*46*).

The findings discussed above indicate that the pursuit of goals occurs "out of the blue" when a goal representation is primed and followed by the activation of a positive reward signal due to an established association. However, a preexisting association between a goal representation and a reward signal may not be the only source from which unconscious goal pursuit arises. Under some circumstances, unconscious goal pursuit emerges when goal representations are primed together with positive reward signals. This ability to respond to the mere coactivation of goal representations and positive affective cues is thought to play a fundamental role in social learning (*47*) and is considered as basic in motivational analyses of human behavior (*39*). Thus, when a child observes his mother smile when munching homemade cookies, a student hears a hilarious joke upon entering the classroom, or a person strolling around a mall hears people laugh while reading on a billboard "start your holiday here," this can cause the goal representations that are primed by those situations (eating cookies, achieving at school, booking a vacation) to acquire an intrinsic reward value, which prepares and motivates goal-directed behavior.

A recent study examined the effects of coactivating goal representations and positive reward signals on the preparation and motivation of behavior in more detail. In this study, healthy young adults had to squeeze a handgrip in response to a start sign while the timing and persistence of their behavior were measured (*48*). Before this task, words pertaining to the goal of physical exertion were subliminally presented or not, together with positive words that signal rewards (such as good or nice) or not. In line with the ideomotor principle, participants who were subliminally primed with the goal of exertion started to squeeze earlier. However, only participants for whom the goal was coactivated with a positive reward signal recruited more resources to execute this goal, as was evidenced by more forceful and persistent squeezing. Again, consciously reported motivation did not show any relation to the subliminal goal priming manipulation. Hence, activating a goal representation gives behavior a head start, whereas the accompanying reward signal motivates behavior outside awareness. Other studies have shown that this coactivation procedure yields effects that are similar to those of conscious goals (induced by conscious goal instructions or by making people aware of their current needs) in tasks that require flexibility and effort in novel situations (*42*, *49*).

Conclusion

The present review and analysis reveal that the basic processes necessary for goal pursuit—preparing and directing instrumental actions and assessing the reward value of the goal—can operate outside conscious awareness. Although it is often taken for granted that goal pursuit originates in conscious decisions, it can also arise from unconscious sources. This remarkable capacity for unconscious goal pursuit results from the design and workings of the brain and mind, which process and represent behaviorally relevant information in such a way that goal pursuit can be controlled by the social situation without conscious awareness of the activation and operation of the goal.

Earlier research has shown that action goals, such as moving a finger, that were initially consciously set are unconsciously prepared before they are acted on (*1*). The literature reviewed here suggests that the unconscious nature of the will has an even more pervasive impact on our life. Goals far more complex than finger movements, can guide behavior without being consciously set first, when they themselves are activated outside conscious awareness. These unconsciously activated goals cause people to invest effort and select actions available in their repertoire to attain the goal in novel settings without them being aware of the goal or its operation. Overall, the evidence on unconscious goal pursuit indicates that the control of unconscious goals is flexible and effortful, suited to meet the dynamics of the environment.

Understanding exactly how unconscious goals flexibly control behavior remains a challenge for future research. It has been argued that goals direct attention and behavior, even in the absence of conscious awareness of the goal (*44*, *50*). That is, the operation of higher cognitive processes supporting goal pursuit (also conceptualized as working memory or executive control) does not care much about the conscious state of the individual. This view concurs with recent insights that attention and consciousness are distinct (*51*).

The research discussed here suggests that conscious goals (often induced by explicit task instructions) and unconscious goals (induced by priming) have similar effects on tasks that rely on executive control. However, it is too early to conclude that consciousness is redundant in the pursuit of goals, as we do not yet know whether there are special cases in which consciousness (apart from attention) facilitates performance. In fact, we only know that we can become consciously aware of the decisions that we make and the goals we pursue without having a proper empirical test telling us how consciousness itself exactly influences our behavior. Future research will have to explore when consciously and unconsciously activated goals direct attention and information processing in similar or distinct manners to recruit the cognitive functions and brain systems that translate goals into behavior.

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