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The Evolutionary Unconscious:

From 'Selfish Genes' to 'Selfish Goals'

John A. Bargh

Yale University
Department of Psychology

Julie Y. Huang

University of Toronto
Rotman School of Business

Evolutionary social cognition (e.g. Ackerman, Huang, & Bargh, 2012; Kenrick et al., 2010; Neuberg et al., in press) seeks to link the human information processing adaptations gleaned from eons of natural selection to social cognitive tendencies in the present day. It seeks to answer the question of how evolved mental structures from the distant past play out in contemporary social environments to influence social judgment and behavior. Certainly, basic motivational systems to stay alive, and to reproduce offspring into the next generation, would afford the human (and any other) species a survival advantage. While positing these two motives is almost tautological, it is the consideration of the relative strength of the two basic motives that makes things a bit more interesting.

The essential theme of Richard Dawkins' highly influential work, *The Selfish Gene* (1976), is that when it gets down to brass tacks, the genes' survival (reproduction) trumps the survival of the individual host organism. Dawkins describes how every organism is comprised of multiple genes, each of which can be seen as using that organism as a survival machine. According to his theory, genes shape the design of their host organism in order to maximize their chances of replication into future generations, and not necessarily to increase the welfare of their host (unless doing so is relevant for replication). He argues with much varied evidence across the animal kingdom that it is the genes that are ultimately in charge, in that the imperative to reproduce and propagate into the next generation trumps the survival of the individual host organism, when the two are in conflict. For example, we are much more 'altruistic' in giving up resources and risking our own safety in order to help our nearest genetic neighbors, and our self-sacrifice is a function of the genetic similarity (more help to

children than cousins, more to cousins than strangers, etc.).

Here (see also Huang & Bargh, in press) we draw an analogy between the genes' ultimate control, often trumping even the self-interests of their host organism, and the ultimate control over human judgment and behavior exercised by one's currently active goal pursuit, often trumping the self-interests and central beliefs and values of the individual pursuing that goal. We will marshall evidence that it is the current goal's agenda that drives the show when the two (individual self versus current goal) are in conflict. We suggest that more than an analogy, this relative power of goals versus the self has its roots in the relative power of genes versus host organism, because goal-pursuits (executive mental processes) are the present-day agent or proxy for genetic influences of the past.

From Genes to Goals

Dawkins (1976, p. 131) explicitly drew a link between genetic influences and purposive goal pursuits. Essentially, he argued, genetic influences are from too long ago and cannot possibly anticipate future environmental conditions tens of thousands of years into the future to be able to provide guidance within the organism's specific environmental circumstances. Thus instead genes equip the individual organism with minimal, basic motivations that are most probable to aid survival and reproduction, and leave the system 'open-ended' (see also Mayr, 1976) so that early experience can fill in the fine-tuning to most successfully adapt that individual to the current conditions that happen to be in force when and where he or she is born. A wonderful example of this kind of mechanism is language acquisition (Pinker, 1994), in which the toddler rapidly

learns the local language and even dialect around age 3 – but any newborn can be taken to any part of the world and any culture, and learn that particular language perfectly. (We suggest that this natural absorption of the local language extends to the rapid and natural absorption of the local cultural values and norms – rules of safe social conduct – as well.)

For Dawkins, then, our goal pursuits, and executive processes more generally, are the present-day agents that carry out genetic influences from the past. They operate to guide our social cognitive processes mainly through the direction of selective attention (Neuberg et al., 2004) to certain aspects of the environment and not others, to goal and motivationally relevant stimuli, which then complete the process by serving as activating stimuli (primes) for associated mental representations. The content of these mental representations contains not only relevant semantic knowledge about the stimuli but also appropriate goal relevant behaviors for acting on those stimuli. The cycle operates thus: Genes -> Goals -> Attention -> environmental stimuli -> specific stimulus-related goals and expectations/anticipations driven by the particular set of stored knowledge activated. We will return to a more detailed description of this interactive goal-environment mechanism in Section 3.

An evolutionary perspective on unconscious motivations, and unconscious or automatic social-cognitive processes more generally, is consistent with and uniquely accounts for four major developments in social cognition research: (1) the observed high similarity between conscious and unconscious motivation outcomes and processes, (2) the direct and automatic connection of internal social automatic mental processes and external behavioral tendencies, (3) the unconscious operation of goal

structures itself, capable of detecting goal relevant stimuli and transforming it using organs of executive processes to further the goal pursuit, and (4) the overriding of chronic self-related values and interests in the service of the active goal pursuit.

1. Similarity of Conscious and Unconscious Motivation

The contemporary research on unconsciously operating goal pursuits reveals a high degree of similarity with what is known about conscious goal pursuit from a century of research on the latter (see Bargh, Gollwitzer, & Oettingen, 2010) – in processing outcomes as well as particular processing stages; in subjective, phenomenal qualities of experience during the pursuit as well as consequences for affective states and future motivational strength. Primed goals – triggered by the incidental processing of goal-related stimuli in one's environment and not by conscious intentions -- operating without the person's knowledge or explicit intent nonetheless proceed through the same sub-stages as known from research on their consciously pursued versions, as is shown in the case of the impression formation goal (McCulloch et al., 2008). They produce the same tendencies towards completion, overcoming obstacles in the way, and resumption after interruption, as Lewin (1926) first noted for conscious goal pursuits (see Bargh, Gollwitzer, Barndollar, Lee-Chai, & Troetschl, 2001). They use the same executive process organs of working memory and selective attention in order to transform incoming information to suit the purposes of the currently active goal (Bargh, 2005; Marien et al., 2012; Neuberg et al., 2004). They become stronger and more likely to be chosen to be pursued in the future after successful attainment of the goal and weaker and less likely to be pursued after failure (Bongers et al., 2008; Chartrand et al., 2010;

Chartrand & Bargh, 2002), as has been well established for consciously pursued goals by Bandura's extensive research program into self-efficacy effects (e.g., Bandura, 1977, 1986). In rigorous experimental research Custers and Aarts (e.g., 2005, 2008) have shown that it is the mere associative pairing of positive affect with the goal representation – as presumably happens upon successful goal completion (Bandura, 1986) that by itself increases goal strength, and similarly negative affect to decrease goal strength, with this effect on future motivational tendencies an entirely unconscious one (i.e., not requiring of reflective, deliberate conscious thought processes to occur).

How to explain the high similarity observed between conscious and unconscious motivational processes, outcomes, and effects? Traditionally cognitive psychology has viewed unconscious or automatic processes as developing out of an extensive period of skill acquisition (e.g., Anderson, 1981; Newell & Rosenbloom, 1981) in which an initially conscious process becomes more efficient over time, needing less (limited) conscious attentional resources and guidance with greater amounts of consistent experience (see especially Shiffrin & Schneider, 1977). The original conception of the 'subconscious' by Jastrow (1906) was precisely this type of explicitly and exclusively 'conscious-first' formulation of how an unconscious process could come into being. Thus, every mental process starts out as conscious and deliberate, and over time can recede into the unconscious with frequent and consistent practice.

But this model does not fit with the qualities observed for unconscious goal pursuit. For one thing, frequent and consistent experience with an initially conscious process is held to cause the *proceduralization* of the process so that its components do not require attentional resources and no longer have the phenomenal, in-awareness

qualities of experience – the ‘bells and whistles’ -- of the original conscious process (e.g., Anderson, 1981). Yet unconscious goal pursuit does produce the tensional, experiential states of resumption and effort increase and also the affective consequences associated with success versus failure at the pursuit (see review in Bargh et al., 2010). And it does draw upon and deplete executive process resources of limited attention and working memory to attain its ends (Marien et al., 2012). So the skill acquisition or ‘sublimation’ model cannot easily account for the extensive similarities in conscious and unconscious goal pursuit. It also is out of sync with evolutionary biologists’ (such as Dawkins’) arguments regarding the primitive and fundamental nature of unconscious purposive behavior in the animal kingdom, because none of those goal pursuit structures were assumed to be conscious first, and only becoming unconscious only after extensive experience and practice. Rather, they were probably unconscious all along.

It is therefore much more likely that the similarities arise because an originally (over evolutionary time) *unconsciously* operating motivational system can now be accessed and manipulated by (later evolving) conscious mental processes. That is, there is one motivational system, but it can be put into motion both by conscious and unconscious mental events. There are not two, or more than two, motivational systems (i.e., a separate Unconscious) as posited by Freud, and the existing system is not an exclusively conscious one that only becomes unconscious with deliberate practice, as held by contemporary cognitive science models of nonconscious process development.

Indeed, cognitive neuroscience studies of the brain regions involved in motivated behavior support a model wherein the same underlying mechanisms govern both

unconscious and conscious forms of goal pursuit. Pessiglione and colleagues (2007) showed that people automatically increased effort on a hand-grip task when the reward cue (amount of money to be won on that trial) was presented subliminally, the same as what occurred when the reward cue was presented to conscious awareness. They also found that the same region of the basal forebrain moderated task effort level in response to both the consciously perceived and the subliminally presented reward signals. The authors concluded that “the motivational processes involved in boosting behavior are qualitatively similar, whether subjects are conscious or not of the reward at stake” (p. 906).

The hypothesis that the unconscious motivational structures and circuits were primary is consistent with evolutionary theory, in terms of how natural selection operates to produce changes over time. Changes are made incrementally, not wholesale, and ‘good tricks’ that work are re-used and co-opted (exapted) instead of having to be reinvented (evolved) anew each time (Dennett, 1991; Mayr, 1976; Allman, 2000; Bargh & Morsella, 2008). M. Anderson (2010) presents a variety of domains of converging evidence for this basic principle of ‘neural re-use’ in brain evolution, and his formulation is highly consistent (and explanatory) of recent research on embodied cognition – or more precisely, how abstract social and psychological concepts come to be metaphorically associated with underlying concepts regarding the physical, concrete world (see Anderson, 2012 Topics). Social and psychological concepts tend to be associatively built (‘scaffolded’; Williams, Huang, & Bargh, 2009) upon, (i.e., ‘re-use’) analogous physical concepts (as in *close* relationships, a *warm* father) instead of there existing a separate vocabulary for the psychological realm of experience (Lakoff &

Johnson, 1980; Mandler, 1993).

For much of our evolutionary history, humans did not possess conscious information processing capabilities – it was a relatively late evolutionary development (Deacon, 1998; Dennett, 1991; Donald, 2001; Ewald, 1998). The evidence that only a subset of processes and regions of the brain are associated with consciousness, plus the fact that humans share much of this unconsciously-operating nervous system with earlier-evolving members of the animal kingdom (some of whom arguably lack consciousness), leads to the conclusion that conscious processes are a phylogenetically later adaptation of the brain. As Dennett (1991, p. 171) pointed out, "Since there hasn't always been human consciousness, it has to have arisen from prior phenomena that weren't instances of consciousness."

Prior to the advent of conscious processing capabilities, then, the original human motivational structures operated unconsciously to guide our behavior in adaptive ways (a tautology given the principles of natural selection). With the additional conscious processing capabilities, those original motivational structures are now capable of being activated and guided by intentional and deliberative conscious processes as well; but as the same underlying system is in use, the same outcomes and phenomenal qualities are also produced. Positing an original, evolved unconscious motivational system thus accounts for the observed great degree of similarity between conscious and unconscious motivational processes and outcomes.

2. Unconscious Behavioral Guidance Systems

Another prediction can be derived (and retroactively tested) from the foregoing

logic. If it is the case that unconscious mental systems evolved in order to guide behavior in adaptive ways, then these unconscious systems – and here we include mechanisms that produce discrete behavioral events (as in imitation and mimicry; see Chartrand, Lakin, & Leander, 2013) as well as motivational effects extended over longer periods of time – were shaped by the forces of natural selection. But natural selection can only operate on overt behavioral responses to the environment, not on internal cognitive processes for which there is no direct outward behavioral manifestation. This leads to the postdiction (because the evidence already exists, but heretofore has not been explained in this way) that each of the basic forms of social automaticity that have been discovered in the past quarter century should be found to link directly to behavioral impulses and tendencies. If they represent evolved adaptations, then they must have direct, unconscious influences on outward behavioral tendencies.

Automatic Evaluation

As it turns out, in line with the above prediction, each of the basic forms of social automaticity have indeed been found to produce adaptive behavioral tendencies in an automatic and unconscious (not requiring of consciously formed intent or direction) manner (Bargh, 1997; Bargh & Morsella, 2010). Attitudes were shown capable of unconscious, automatic activation (e.g., Fazio, 1986) long before it was discovered that automatic attitude activation produced immediate, adaptive approach (for positive attitudes) and avoidance (for negative attitudes) muscular tendencies (Chen & Bargh, 1999). Moreover, this link between automatic evaluation and muscular readiness has recently been successfully exploited in therapeutic techniques for the treatment of addictions, with patients making incidental avoidance arm movements in response to

addiction-related stimuli across hundreds of trials, which has the consequence of significantly reducing their cravings and use of the substance (Wiers et al. 2010).

However, the original (and still dominant) model of automatic attitude formation was one of skill acquisition, positing the necessity of frequent and repeated activation of the attitude over time (Fazio, 1990) for it to become automatic. This is inconsistent with a model in which the (evolved) unconscious influence is primary and not requiring of a first conscious processing stage. That meant further evidence was needed that even novel attitude objects would be evaluated automatically as positive or negative, and furthermore, that these original immediate evaluations would also produce adaptive approach or avoidance muscular action predispositions. Again, although their predictions were not generated from this kind of evolutionary model, two studies by Duckworth et al. (2001) showed both that entirely novel attitude objects were automatically evaluated as positive or as negative, and that these evaluations were automatically linked to muscular approach versus avoidance tendencies, in harmony with the present thesis that automatic evaluative processes are an evolved adaptation.

Automatic Social Perception

A second form of unconscious behavioral guidance system is mimicry or imitation of the behavior of others, the general principle being that the perceived behavior of others naturally produces tendencies to behave in the same way. While this appears to be noncontroversial in the case of natural, unconscious imitation or mimicry of the physical, directly observed behavior of others (Chartrand & Bargh, 1999; Chartrand et al., 2012 for review), the extension of the perception-behavior link (Dijksterhuis & Bargh, 2001) to more symbolic social-perceptual cues is not as widely accepted at present

(e.g., Doyen et al., 2012). In this latter line of behavior priming research (e.g., Bargh, Chen, & Burrows, 1996; Dijksterhuis & van Knippenberg, 1998), verbal stimuli associated with the particular behavior, or stereotyped set of behaviors, are the perceived stimuli hypothesized to automatically produce behavioral tendencies. Even within this currently disputed domain of research, however, there is consistent and reliable evidence that social perception unconsciously leads to social behavioral tendencies when the perceived content makes contact with one's self-concept; that is, becomes part of one's "active self" (see Bargh et al., 2012, for review). And the issue about whether symbolic vehicles such as verbal stimuli can also reliably prime social behavior aside, the important point here is not in question: what we see and hear others do unconsciously creates 'chameleon-like' tendencies for us to do the same thing. And as Asch (1961) argued long ago now, when one is unclear as to what is the safe thing to do in a given situation, what others are currently doing is likely a good bet.

Automatic Goal Pursuit

Returning to the main theme of this chapter, evolved genetic influences from the distant past exert their influence in the present-day largely through goal programs, or adaptive motivations that apply to a variety of situations and which guide behavior over extended time periods. We argue that these motivational structures were originally unconscious and are in present-time made use of consciously and intentionally (with awareness) as well. These motivational structures most directly and concretely carry out the dictates of the 'selfish genes' through behavioral tendencies in the service of basic evolved (and gene-serving) motivations to survive (including safety, shelter, and disease avoidance) and reproduce (including social belonging, attraction and

attractiveness, and and extension of survival and safety concerns to reproduction-relevant others such as partners and children). We will flesh out this argument with evidence in the next section.

In summary, the fact of direct environmental, automatic influence on social behavior via the previously discovered forms of social automaticity was not foreseen or predicted, and the subsequent research did not have to turn out this way. When each of the forms of social automaticity were found in research, there was no theory or prediction at the time that each would (or should) directly link to behavior. Only with the passage of some time and further research was this discovered to be the case. Yet in hindsight, this direct influence on behavior is in harmony with the premise that these unconscious behavioral guidance systems constituted successful adaptations, ones that helped guide human behavior in safe and productive grooves prior to the availability of conscious forms of guidance.

3. Mechanisms of Motivation: The Goal-Environment Interaction

How does unconscious goal pursuit operate without conscious guidance? If purposive goal pursuits are the proxy for genetic influences in the animal kingdom, as Dawkins argued, then they operate unconsciously in many if not most organisms (who presumably lack the qualities and capacities of human consciousness). Dawkins' own examples of goal structures operating on environmental stimuli were exclusively unconscious in nature, such as servo-regulators and thermostats, which react automatically to discrepancies between environmental conditions and the desired steady state of the organism. He restricted himself to unconsciously operating goal

structures and programs because he wanted his principle to apply to genetic influences generally and thus not be dependent on the special, relatively unique powers of consciousness.

Like Darwin (1859), Dawkins (1976) did not discuss human beings at all, leaving it up to his readers to decide whether the offered description of natural processes across the organic kingdom would also apply to humankind. Scientifically, there is no reason not to make that assumption, given the presumed continuity of human psychology with the other natural sciences (Pinker, 1994), and so one should find evidence of unconscious motivational influences in human beings (and for the same reasons should be surprised if there were no such evidence). From Freud's (e.g., 1901) case studies through the "New Look" in perception (Allport, 1955; Bruner, 1957; Erdelyi, 1974) to modern social-cognitive work on unconsciously operating motivational-cognitive structures (e.g., Aarts & Custers, 2008; Bargh, 1990; Dijksterhuis & Aarts, 2010; Huang & Bargh, in press; Kruglanski, 1996; Marien et al., 2012), there is now abundant experimental as well as clinical evidence to support the extension of Dawkins' argument to humans.

Selective attention to opportunity conditions and (then) goal-relevant information

Supporting the notion that unconsciously operating goal processes are capable of influencing individual-level outcomes, experiments from both evolutionary psychology and social cognition highlight early-stage orienting mechanisms (e.g., selective attention and perception) which serve as 'building blocks' for subsequent human behavior (Aarts, Custers, & Marien 2010; Balcetis & Dunning 2006; Maner et al. 2008; Neuberg et al. 2004). Given that a person is effectively steered towards particular sets of actions (and

simultaneously away from others), these processes can be seen as operating in self-interested ways, just as a gene encodes organism-level behavior that reliably promotes replication of that gene, and not necessarily the health or well-being of the host organism itself.

A wide variety of situational features have been shown experimentally to unconsciously activate relevant goals, from social contexts such as having power (Chen, Lee-Chai, & Bargh 2001; Custers et al. 2008), to material objects such as dollar bills or briefcases (Kay et al. 2004; Vohs et al. 2006), scents (Holland, Hendricks, & Aarts 2005), and even the names of significant others in one's life (Fitzsimons & Bargh 2003; Shah 2003). In the everyday world, the presence of a goal-relevant object usually signals the presence of an opportunity for pursuit (e.g., when a person encounters a piece of cake, usually, he or she has an opportunity to eat it). The context-sensitivity of goal activation highlights how goal processes can unconsciously prepare a person for pursuit the instant that potential opportunities arise.

For instance, implementation intentions, in which one commits oneself to a goal-furthering action in advance by mentally associating a specific concrete goal-pursuit action with an expected future event ("when, where, and how" the action will take place), have been shown to be highly effective means to attain otherwise difficult ends (diet, exercise, difficult health regimens; Gollwitzer 1999; Webb & Sheeran 2006). Implementation intentions effectively delegate control over one's future behavior to the environment, so that a specified reliably-occurring (e.g., routine) future event becomes the automatic trigger of that desired behavior (Gollwitzer 1999). In this way a temporary or strategic automatic effect is created in the service of conscious goal pursuit.

Furthermore, similar to its conscious counterpart (Anderson & Pichert 1978; Hastie & Park 1986), an unconsciously operating impression formation goal causes greater selective attention to behavioral information inconsistent with the target's general and emerging pattern of behavior (Chartrand & Bargh 1996; McCulloch et al. 2008). Highly accessible goal constructs provide "orienting value," automatically guiding the individual's attention to relevant stimuli in the environment (Bruner 1957; Roskos-Ewoldsen & Fazio 1992), which increases the probability that these objects will be used to achieve that goal.

Goal-facilitating objects can also appear more accessible along different dimensions, for instance, by appearing closer in proximity to the pursuer or even larger in size. Balcetis and Dunning (2010) demonstrated that people perceive the spatial orientation of desirable objects (which are the objects that help people achieve their goals; Ferguson & Bargh 2004) as being closer, compared to undesirable objects that are the same actual distance away. Similarly, Veltkamp and colleagues (2008) established that participants who were subliminally primed with a gardening goal overestimated the size (height) of goal-instrumental objects (e.g., a shovel), but not of goal-irrelevant objects (e.g., a pen).

Use of executive process structures and working memory

Mainstream accounts of executive control or working memory within cognitive science long held that all of the contents of working memory were accessible to conscious awareness – indeed, until recently, 'working memory' and 'conscious awareness' were used as synonymous terms (e.g., Smith & Jonides 1998). Yet for goal

pursuits to operate unconsciously, in real-time interaction with the fluid and dynamic external environment, active goals must make use of flexible working memory structures that operate on and often transform incoming informational input to serve the goal's agenda (Cohen et al. 1990).

The original studies (Bargh et al., 2001; Chartrand & Bargh 1996) found that primed, nonconscious goals produced the same outcomes, not only behavioral but cognitive (e.g., memory structures) and motivational (e.g., resumption of interrupted tasks; Lewin, 1926) as well, and did so using the same subgoals and brain regions as during conscious pursuit of the same goal (McCulloch, Ferguson, Kawada, & Bargh, 2008; Pessiglione et al. 2007). Bargh (2005) argued that logically these similarities could only be obtained if unconscious goal pursuit made use of the same executive functions and working memory as used in conscious goal pursuit, in order to selectively attend to some features of the environment over others and transform those to suit the current needs of the task. Several recent studies have documented and validated this prediction.

Hassin and colleagues (2008; Hassin, Bargh, & Zimerman, 2009) showed that a nonconsciously operating achievement goal served to increase working memory capacity on the serial reaction time task, and also to significantly improve performance on the Wisconsin Card Sorting Task, both standard measures of executive functioning. Across six experiments, Marien, Custers, Hassin, and Aarts (2012) subliminally primed a variety of goals (e.g., socializing, academic performance) and found that they all took attentional capacity (executive processing resources) away from an ongoing conscious task (e.g., proofreading). In a major review of this literature, Dijksterhuis and Aarts

(2010) concluded that unconscious goal pursuit makes use of attention and executive processes in furtherance of the goal, just as does conscious goal pursuit, but in the absence of conscious awareness of the pursuit.

Evaluation or "valence" of goal-relevant stimuli

People's everyday judgments of other people, objects, and events are strongly influenced by how those stimuli relate to the goals they are pursuing. This principle has been a staple of social and motivational psychology since the seminal writings of Kurt Lewin (1935, p. 78) who defined the *valence* of an environmental object or event in terms of whether it helps or hinders the attainment of one's current goals and the satisfaction of one's current needs.

Active goal influence is so powerful that it can change evaluations of friends, enemies, and even significant others—the very people about whom one's opinions presumably remain stable over time. Fitzsimons and Shah (2008) found that participants who were unconsciously primed with an achievement goal evaluated friends who had helped them with their academic pursuits more positively compared to friends who had not helped them academically. This momentary favoritism towards goal-instrumental friends was not observed for unprimed control participants (see also Fitzsimons & Fishbach 2010).

Many studies have shown that one way that nonconscious goal pursuit furthers goal attainment is by changing the valence or positivity of environmental stimuli, making goal-facilitating objects (including people who are helpful in one's attainment of the goal) more positively evaluated. Because this positive evaluation is linked with stronger approach motivations (Chen & Bargh, 1999) this naturally increases approach

motivational tendencies towards those goal-facilitating objects and people (Ferguson, 2008; Fitzsimons & Shah, 2009). For example, Fitzsimons and Fischbach (2010) found that when the achievement goal was primed, participants reported that they liked their study friends more than their party friends, but when the socializing goal was primed, they now liked their party friends more. However, while such changes in evaluation may further pursuit of the current goal, they may not be in the long-term best interest of the individual (Bargh & Huang, 2009). Hill and Durante (2011) found that the nonconscious activation of the mating goal caused women to view the health consequences of tanning booths and dangerous diet pills as less negative and personally threatening, leading them to report, while that goal was active, stronger intentions to use them.

The goal-driven nature of these interpersonal evaluations is reminiscent of the successful intervention by Sherif and colleagues (1961) in the classic “Robbers’ Cave” study. The Rattlers and the Eagles were two warring groups of boys at a summer camp who antagonized each other with increasing violence until they were given an important shared goal. In a situation where everyone’s cooperation was needed (e.g., freeing a truck that was stuck in the mud to get food for the entire camp), a Rattler’s help became instrumental for an Eagle's goals (and vice versa). Changing the campers' goals dramatically changed how Rattlers and Eagles perceived one another, and transformed summer-long rivals into close friends.

Reconfiguration of chronic processing tendencies to serve the active goal

The transformational power of the active goal over cognitive and affective processes is further indicated by its ability to override otherwise chronic, automatic

encoding tendencies. For example, there is much evidence of the automatic manner in which other people are automatically encoded or categorized in terms of their race, age, and gender (e.g., Bargh 1999; Brewer 1988). Recent research, however, suggests that chronic goals to be egalitarian inhibit the same prejudicial biases previously assumed to be automatic and uncontrollable (e.g., Kunda & Spencer 2003; Maddux et al. 2005; Moskowitz et al. 1999).

A similar overriding effect of automatic, prejudicial processes occurs with temporarily active goals as well. Macrae and colleagues (1997) found that giving participants a task goal to detect the presence or absence of dots on facial photographs eliminated any automatic stereotype activation effects when minority faces were shown (since stereotype activation was irrelevant to participants' processing objective). Research also suggests that default negative racial IAT responses to African-American faces can be flipped into positive evaluations when participants are informed that those same faces belong to their online teammates (Van Bavel & Cunningham 2009). These findings are consistent with the notion that joint goals (which are introduced by new alliances) can override automatic processes, causing the recategorization of out-group members into in-group members.

Spencer and colleagues (1998) provide perhaps the most dramatic example of a nonautomatic process becoming automatic when it facilitates the current goal pursuit. Research suggests that conditions such as attentional load can prevent people from engaging in negative stereotyping processes. Spencer and colleagues reasoned, however, that negative stereotyping is a means through which one can enhance one's own self-esteem (at the expense of others), and therefore should persist even in

conditions which normally impede stereotyping effects given participants' active needs to restore their self-esteems. Indeed, by providing (bogus) feedback that participants had done very poorly on a task, the experimenters were able to elicit automatic stereotyping effects under conditions where such processes normally do not occur, thereby providing a particularly powerful demonstration of the active goal's ability to "selfishly" reconfigure a person's cognitive machinery in the service of its own pursuit.

Automatic strengthening and weakening of goal tendencies based on experience

Just as the probability of nonconscious goal activation increases with the reward or incentive structure of the environment (as sensed by the amount of positive affect associated with the goal representation), so too does the strength of the goal map onto one's success at pursuing it (Bongers et al., 2009; Chartrand & Bargh, 2002; Moore et al., 2011). Following the priming of the achievement goal, for instance, 'success' at an easy anagram filler task increases both positive mood and how hard participants work on a subsequent verbal task; 'failure' on a hard (impossible) filler anagram task has the opposite effects. Success also increases the positivity of automatic attitudes towards the goal, and failure decreases them (Moore et al., 2011); all of these effects serve to automatically perpetuate the goal into future situations by increasing the probability of pursuing goals that produce rewards that one is likely to be successful at attaining, and decreasing goals that are low in relative reward value and which one is less likely to obtain, either because of deficits in personal ability or because environmental situations somehow prevent attempts at the goal (Veling, Holland, & van Knippenberg, 2008).

Of course, evidence of the operation of unconscious motivations – that they can become activated outside of conscious awareness and intention by goal relevant

stimuli, then operate to attend to and transform goal relevant stimuli in the environment to produce then the same outcomes as with conscious pursuit of the same goal – is prima facie evidence for the unconscious operation of all of the above sub-processes as well. Participants in studies in which goals are primed and activated unbeknownst to them cannot know in advance which goal-relevant stimuli might be presented; in fact, they are not even aware of which stimuli are goal-relevant and which are not. Nevertheless, in each experimental demonstration of unconscious goal pursuit, the primed goal produced the goal-appropriate outcomes, just as with conscious goal pursuit. For the obtained results to have occurred, the active goal had to be ready for whatever goal-relevant environmental input might arise, and then operate on it when it did occur; unconscious goal pursuit therefore must involve the use of executive control and working memory functions as used in conscious goal pursuit (Frith, Blakemore, & Wolpert 2000; Hassin 2005).

4. Active Goal versus Self-concept as Ultimate Controller

The ‘selfish gene/ selfish goal’ analogy generates a fourth broad implication: that just as genes operate ‘selfishly’ to propagate themselves into the next generation, sometimes at the expense of their host organism when their interests conflict, so too do active goals operate to pursue their own agendas, sometimes in contradiction to their individual human hosts’ important self-values and self-interests.

Traditional psychological approaches to human motivation have assumed an agentic, conscious self at the helm, deliberately forming judgments, making decisions about which courses of action to take, and then guiding one’s behavior along those

intentional lines (e.g., Ajzen & Fishbein 1980; Bandura 1986; Baumeister, 1998; Locke & Latham 1990; Mischel 1973). In some prominent models, conscious choice of behaviors or goals to pursue was conceptualized as a bottleneck—nothing happened without one's awareness and conscious consent (e.g., Bandura 1986; Locke & Latham 2002, p. 705).

Since then, three modern lines of research have cast doubt on the basic assumptions of conscious-centric control models. First, studies increasingly highlight the power of situational variables in determining behavior, including external influences that override internal sources of control such as self-values and personality (e.g., Darley & Latane 1968; Milgram 1963; Mischel 1973; Ross & Nisbett 1991). Second, research on the limits of introspective access demonstrates that people are often unaware of the reasons behind their actions and the actual sources of their evaluations and subjective feelings about the external world (Bar-Anan, Wilson, & Hassin, 2010; Nisbett & Wilson, 1977; Wilson & Brekke, 1994)—access they would be expected to have if they were consciously aware of making those choices and deciding what to do. Third, 'dual-process' models (e.g., Chaiken & Trope 1999; Kahneman 2010; Posner & Snyder 1975; Strack & Deutsch, in press) hold that external situational influences often operate in an automatic and implicit fashion to directly instigate the higher mental processes involved in information processing and behavior, thereby bypassing the consciousness bottleneck and obviating the need for an agentic 'self' in the selection of all behavioral and judgmental responses (Bargh 2007; Bargh et al. 2012).

Neuroscience evidence also supports the dissociation of action systems from awareness. That executive control structures can operate without the person's

awareness of their operation would require the existence of dissociable component processes within executive control or working memory structures (Baddeley 2003; Baddeley & Hitch 1974; Buchsbaum & D'Esposito 2008). Evidence of such dissociations has been reported in stroke patients with 'environmental dependency syndrome' caused by lesions in the frontal cortical lobes (Lhermitte 1986; Bogen 1995). The behavior of these patients was almost entirely driven by situational cues – for example, gardening in a public park (for hours) upon sight of a rake, drinking a glass every time it was filled with water despite complaining about being painfully full – with the patients entirely unaware of the oddity and irrationality of their behavior.

This evidence has led some to conclude that conscious intentions are represented in the prefrontal and premotor cortex, while the parietal cortex houses the representation used to guide action (Frith, Blakemore, & Wolpert 2000). [For additional evidence of the operation of action systems dissociated from conscious awareness, see Dijksterhuis & Aarts (2010), Milner and Goodale (1995), Morsella and Bargh (2010), and Wegner (2002).] We take such findings as additional support for the notion that the mechanisms guiding individual behavior evolved separately from the mechanisms furnishing conscious awareness of their operation.

As multiple goals within a single individual become active, operate, and turn off, the person pursuing those goals may appear to be acting inconsistently, or in a manner which seems contrary to his or her stable self-concept or self-interests. This is particularly evident at the stage of goal completion, where the mental representation of a goal becomes less accessible but ironically, the pursuer becomes more likely than usual to exhibit behaviors that contradict the recently completed goal.

In the “goal turn-off effect," once a goal pursuit attempt is completed, the goal de-activates (e.g., Atkinson & Birch 1970; Lewin 1926) and then for a time inhibits the mental representations used to attain that goal (Förster, Liberman, & Higgins 2005; Marsh et al. 1998); theoretically in order to allow other important goals to be pursued. When a goal is achieved its downstream influence on cognition and behavior disappears for a time, which can ironically produce behaviors contrary to those originally encouraged by that goal.

For example, research on “moral licensing effects” (Monin & Miller 2001) demonstrates how the operation and completion of conscious goals can produce judgments which can appear inconsistent with that individual’s recent behaviors or self-professed values. In one study, participants who were given the opportunity to disagree with blatantly sexist comments were ironically more likely than a control group to recommend a man than a woman for a stereotypically male job (Monin & Miller 2001). Similarly, in another study, supporters of then-U.S. presidential candidate Barack Obama were first given the opportunity to publicly endorse him (or not, in the control condition; Effron, Cameron, & Monin 2008). Afterwards, all participants judged the suitability of a job for White versus Black people, and allocated funds to organizations serving White or Black people. Compared to the control group, endorsing Obama caused participants to rate the job as more suitable for Whites than Blacks, and to allocate funding to White causes at the expense of Black causes. This latter effect held only for those participants who had scored high on a measure of racial prejudice.

In extreme cases, the tension between the behavioral imperatives issued by the currently active goal, and the other priorities of the person pursuing that goal (over time

and across situations) can produce trade-offs between what is 'good' for the goal being pursued versus what is 'good' for the individual. This dynamic is most evident in addictions (e.g., Baker et al. 2004) where the addict reports feeling helpless to resist the urge to consume the drug, and may engage in self-destructive behavior (as well as behavior that typically contradicts his or her important self-values, such as lying and stealing) in order to acquire the drug. Decades of research on drug abuse substantiate the similarity between addictions and more standard goal pursuits (e.g., Loewenstein 1996), as expressed colloquially by the phrase, ‘addiction hijacks the motivational system.’

The pursuit of everyday goals have ‘selfish’ effects as well, and may cause an individual to desire things that one may not have wanted were one not actively pursuing the goal. For example, young omen primed with the mating goal express more positive attitudes towards and stronger intentions to engage in attractiveness-enhancing yet dangerously unhealthy behaviors such as spending time in tanning booths and taking diet pills (Hill & Durante 2011). Those behaviors may facilitate the currently active goal of mating (by increasing one’s sex appeal) but operate in the long term disinterest of the individual. Indeed participants’ attitudes towards these behaviors when the mating goal was not currently active were considerably more negative. In a similar vein, males who are unconsciously pursuing status goals express greater hostility to other males (Griskevicius et al. 2009). In this case, increased willingness to aggress furthers the active goal (by physically intimidating one’s competition) but ultimately jeopardizes the health of the individual pursuing that goal, both during pursuit and afterward

Conclusions

The present framework offers advantages in explanatory power as well as being in harmony and constrained by evidence and principles from other natural sciences, in particular evolutionary biology. The advantages in explanatory power include accounting for two major empirical developments in the study of social automaticity that are difficult to reconcile with the assumptions of contemporary models of cognitive science. First of these is the observed high similarity in not only the outcomes but also the subprocesses, experiential or phenomenal states, and neurological circuits involved in conscious and unconscious motivational processes, respectively. Second is the observed direct connection between internal social automatic processes such as concept activation by relevant external stimuli (e.g., stereotypes), on the one hand, and external behavioral tendencies on the other. That these internal automatic processes of social perception, evaluation, and motivation/ goal activation each directly moderate the current behavioral tendencies of the human perceiver is consistent with their being the product of natural selection, which only operates on outward behavioral tendencies.

The present evolutionary approach to unconscious processes – or in other terminology, the automaticity of the higher mental processes (see Bargh, 2007 for a set of reviews) – has the further advantage of, well, taking evolution seriously. Instead of a tabula rasa view of automatic or nonconscious processes in which they held to arise exclusively from each individual's own extensive past conscious experience (skill acquisition), the evolutionary approach to the unconscious recognizes that unconscious purposive and adaptive processes guided human behavior prior to the relatively recent (and no doubt extremely important) addition of conscious access to those processes,

and further, that these original unconscious goal pursuit structures – along with the other unconscious behavioral guidance systems outlined above – are still in operation in the present day (along with the experientially-derived ones). The human mind did not go through a sudden and dramatic reconfiguration when conscious processes emerged; rather the older and more primitive mental strata remain very much a part of every individual's brain, mind, and daily life.

As we argued here, human goal pursuit—whether operating consciously or unconsciously—constrains a person's information processing and behaviors in order to increase the likelihood that he or she will successfully attain that goal's end-state. These multiple, sometimes conflicting goals can produce different behaviors, judgments, and even self-representations in the same person that may appear inconsistent or contradictory across time, because they will vary as a function of which of these goals happens to be most active and motivating in the particular situation. Put another way, observed incoherencies in a person's actions may result because behavior is being selected (and is coherent) at a lower, less apparent goal level.

Yet these inconsistencies do pose a problem for individuals in a social world in which trust and predictability of behavior are at a premium and are essential for positive, cooperative relations with one's peers (e.g., Fiske, Cuddy, & Glick 2007; Tetlock 2002). And so while we have focused here mainly on the operation of goal processes (both conscious and unconscious) in the guidance of human higher mental processes, we close by noting that recent accounts of the purpose of conscious thought have argued that it is primarily for the management of the very public inconsistencies we argue are largely produced by unconscious goal operations (Baumeister & Masicampo 2010;

Mercier & Sperber 2011; see also Gazzaniga 1984). The conscious self, in this view, is not so much involved in the guidance of our purposive behavior so much as it is in the business of producing rationalizations and socially acceptable accounts for the actions produced at the goal level. Tetlock (2002) has argued that our accountability to others was so important over evolutionary time that we evolved the 'politician' (or 'defense attorney') social mindset in order to maintain good relations within our group.

Today, just as had Freud (1901) over a century ago in *The psychopathology of everyday life*, contemporary psychological theorists are invoking the concept of motivation (unconscious or conscious) in their explanations for why people behave in ways that seem to run against their self-interest and values – for example, by engaging in risky health behaviors in service of the fundamental reproduction/attraction goal (Hill & Durante, 2010). In political psychology, Jost and colleagues (2008) have focused on *system justification* effects, in which people perceive the current status quo regarding political power and division of resources as legitimate and fair—even those who are low status and for whom the system actually operates against their self-interests. The researchers explicitly appealed to the operation of an unconscious system-justification motive in order to account for these "relatively puzzling cases of conservatism, right-wing allegiance, and out-group favoritism among members of low-status groups", which can only be understood if they are "not even aware of the extent to which they are privileging the status quo and resisting change" (p. 596).

As an explanatory framework, the evolutionary approach to unconscious processes generally, and the selfish-gene to selfish-goal analogy particularly, adds coherence to several bodies of anomalous findings in social motivation and cognition. It

also helps to explain how an individual can behave in ways inconsistent with their apparent self-interest and against their own publicly professed values and attitudes. Just as genes have their own agendas separately from those of their host organism, active goal pursuits seek their desired end states often against the interests and values of their host individual. As proxies for genetic influences from the distant past, they are powerful enough even to reconfigure presumably chronic, automatic processes and make usually nonautomatic processes into highly efficient, automatic ones (as in the case of implementation intentions). This reconfiguration of the mental machinery by the currently active goal pursuit is revolutionary in its implications for the plasticity of cognitive structures and processes (see also Fiske, 2013), and is just one of what we hope will be many other insights this evolutionary approach will generate in the coming years.

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