Abstract: Huang & Bargh's (H&B) definition of goals is ambiguous between "specific goals"—the end-state of a token action I am about to perform—and "unspecific goals"—the end-state of an action-type (without specifying how this would be achieved). The analogy with selfish genes pushes the authors towards the former interpretation, but the latter would provide a more robust theoretical framework.

The central rhetorical device of the target article is the similarity between selfish genes that often work against the interests of the organism that carries them and our selfish goals that often work against our interests. Although this selfish genes/selfish goal analogy is supposed to be merely illustrative (and the authors presumably do not endorse any strong version of evolutionary epistemology), I will argue that the analogy does more harm than good. More precisely, I will argue that Huang & Bargh's (H&B)'s definition of goals as "mental representations of desired end-states" (sect. 2.2, para. 2) is ambiguous, and the selfish gene analogy pushes the authors to resolve this ambiguity in the less promising direction.

The definition of goals as "mental representations of desired end-states" is ambiguous between what could be called "specific goals," where the represented end-state is the end-state of a token action I am about to perform, and "unspecific goals," where it is the represented end-state of an action-type that would satisfy my desire (without specifying how that would be achieved). To use an example, if I am hungry, I can have an unspecific goal of filling my stomach with something (which is left unspecified) or a specific goal of eating that particular piece of chocolate cake right in front of me. The ambiguity is not just a feature of the definition H&B give, but they also use examples of these two different kinds of goals interchangeably throughout the article.

The specific goal interpretation of the Selfish Goal Theory makes the analogy with selfish genes very straightforward. Goals in this sense are self-contained entities that strive to be fulfilled, often at the expense of our interests. And this sounds very similar to the conception of genes as self-contained entities that replicate themselves. Leaving the huge debate in evolutionary biology aside about just how self-contained entities genes are and whether they should really be taken to replicate themselves (but see Godfrey-Smith 2000; Nanay 2002, 2011), what really matters for the purposes of the target article is that in only a smallish portion of the examples do H&B use a specific goal in the sense of being self-contained.

In the majority of the examples, the goal is very much unspecific and it is specified by mental states that are not part of the goal itself.

The difference boils down to a difference in what general picture of motivation one endorses. If we accept the self-sufficient specific goal picture, then the only mental state that is needed to motivate us to act is this specific goal. If I have a specific goal of eating this particular chocolate cake, this motivates me to act. But here is a more flexible model that H&B often slide into (and they are right to do so). Two things are needed for motivating us to act: an unspecific goal (of, say, wanting to eat something) and a separate representation of something edible in front of us. If this unspecific goal and this "action-oriented representation" are combined, the action is performed.

Just what the "action-oriented representations" are (for example, whether they can be perceptual states) I would like to leave open. They are representations of the objects in the agent's environment that could be used to achieve the unspecific goal. They are not themselves "representations of a desired end-state"—they are representations of means of achieving this desired end-state. And they do not themselves motivate us to act. We are only motivated to act if we have both an unspecific goal and an "action-oriented representation" (see Jeannerod 1997, who calls these "visuomotor representations" and Nanay 2013 who calls them "pragmatic representations").

Which picture of motivation should we choose? H&B themselves seem to be conflicted about this—they seem to go back and forth between these two frameworks, depending on the examples they analyze. But the overall selfish gene analogy pushes them towards the self-sufficient specific goal picture. I argue that this is a mistake and the logic of many of their own examples would demand that they use the more flexible unspecific goal plus action-oriented representation picture.

Everything H&B say can be formulated in this framework: The unspecific goal can be unconscious, and the action-oriented representation can also be (and most often it is) unconscious (Dehaene et al. 1998; Goodale 2011; Jeannerod 1997; Nanay 2013). So we get a more nuanced picture about the relation between the conscious and the unconscious processes that lead to action. To put it very simply, both the unspecific goal and the action-oriented representation can be unconscious. And often both of them are.

Sometimes we have an unspecific goal and this influences the action-oriented representation we form (say, we are hungry and look around in the fridge to see what we can eat). Some other time, the action-oriented representation comes first and this triggers the unspecific goal (say, you walk past a café and see a delicious cake in the window that makes you want to eat). H&B themselves analyze those very interactions in the target article, but they can only be made sense of if there are two mental states that can interact in these two different ways (and not just one), that is, in the more flexible unspecific goal plus action-oriented representation framework. They would be better off using this way of framing their claims instead of the more catchy but ultimately misleading (and from an evolutionary biology perspective) of biological point of view, somewhat suspicious) analogy with selfish genes.

The selfish goal meets the selfish gene
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Abstract: The connection between selfish genes and selfish goals is not merely metaphorical. Many goals that shape contemporary cognition and behavior are psychological products of evolutionarily fundamental motivational systems and thus are phenotypic manifestations of genes. An evolutionary perspective can add depth and nuance to our understanding of "selfish goals" and their implications for human cognition and behavior.

Huang & Bargh (H&B) draw an analogy between selfish genes and selfish goals. Just as genes "selfishly" build organisms to promote their own replication (and not necessarily in the best interests of the organism within whom these genes reside), goals "selfishly" shape cognition and behavior to promote their own attainment (even though this may retard progress toward other goals that individuals might hold dear). The analogy is both clever and useful, and underscores important insights such as the reconfiguration principle (the idea that an activated goal constrains individual's information processing in predictably goal-centric ways).

But the connection between selfish genes and selfish goals is not merely metaphorical. An evolutionary perspective on human motivation implies deep connections between the selfish replication of genes and the selfish impact of goals on human psychology. Key principles of goal-directed cognition can be understood more completely, and their implications predicted more thoroughly, when located within an evolutionary perspective.
Commentary/Huang & Bargh: The Selfish Goal

The human mind has the capacity to generate a nearly unlimited number of goals. Many of these goals have no obvious implications for, or connection to, genetic reproduction (e.g., the goal of reading, and indeed writing, this commentary). But a great many other goals are linked to specific motivational systems that evolved because, in ancestral populations, they promoted adaptive, cognitive, and behavioral outcomes that facilitated replication of the genes that built these systems. These fundamental motivational systems—which include motives governing food intake, self-protection, disease-avoidance, social affiliation, mate seeking, mate retention, and child-rearing—reflect a relatively small set of specific fitness-relevant challenges recurrent across our evolutionary history (Aunger & Curtis 2013; Bernard et al. 2005; Kenrick et al. 2010).

These fitness-relevant challenges are qualitatively distinct and require distinct kinds of behavioral responses in order to be successfully met. (As many of us are painfully aware, behavioral strategies that facilitate the initial attraction of a mate may be useless when it comes to maintaining a long-term relationship with that mate.) Indeed, behaviors that facilitate progress toward meeting some fitness-relevant challenges may actually retard progress toward others. The context-contingent activation of goal states plays a vital role in promoting adaptive behavior, and it does so by constraining the perceptual, cognitive, and decision-making processes that govern behavioral responses. It does this not just by facilitating specific goal-consistent perceptual attentions and cognitive biases, but also by inhibiting other attentions and biases that might otherwise energize behavioral progress toward other (less immediately pertinent) goals instead. The reconfiguration principle is rooted in the soil of these evolved motivational systems.

The evolutionary perspective is useful not merely because it provides an ultimate rationale for goal-directed constraints on cognition; it is useful because it provides a deductive framework within which hypotheses can be generated (and empirical discoveries made) about exactly how specific goal states constrain specific aspects of cognition. There is an enormous body of empirical literature that documents numerous ways in which the activation of evolutionary fundamental goal states adaptively constrains a wide range of cognitive phenomena, especially in the realm of social cognition (Neuberg et al. 2013; Neuberg & Schaller, in press).

To illustrate, consider the results of several research projects that have proceeded from observations about the specific ways in which specific categories of people have, in ancestral ecologies, posed threats to individuals' fitness. For example, male members of tribal out-groups historically posed a predatory threat to physical safety. In most contemporary human ecologies, this threat is small, yet the self-protection-motivational system that responds to predatory threats remains attuned to perceptual cues connoting out-group status, with consequences for social cognition. For example, when a self-protection goal becomes active (even if by incidental events irrelevant to intergroup interactions, such as watching a frightening movie or being in a darkened room), non-black perceivers are especially likely to have danger-connoteing stereotypes of African Americans implicitly activated into working memory (Schaller et al. 2003), to misperceive anger in the objectively neutral facial expressions of black men (Maner et al. 2005), and to identify racially ambiguous angry male faces as black (Miller et al. 2010).

These perceptual and cognitive biases are functionally distinct from the perceptual and cognitive biases that emerge when a person becomes concerned with disease. For example, when a disease-avoidant goal is active, individuals are more visually attentive to disfigured faces (Ackerman et al. 2009). They also become more likely to implicitly associate disease-connoteing semantic concepts with categories of people who appear superficially to deviate from a subjectively "normal" appearance— including people who are old, physically disabled, or obese (Schaller & Neuberg 2012). There are additional cognitive consequences of a disease-avoidant goal state, which follow from the fact that, historically, many cultural norms and traditions served as buffers against disease transmission (Faubrega 1997). Consequently, when a disease-avoidance goal is active, individuals are more attracted to conformists, judge norm violations to be more morally wrong, and endorse more conservative (i.e., more tradition-preserving) sociopolitical attitudes (Helzer & Pizarro 2011; Murray & Schaller 2012).

These last results highlight an important point: active goals (such as disease-avoidance) can constrain aspects of cognition that are transparently pertinent to the goal (e.g., attitudinal aversion to people who appear unhealthy), but they can also constrain aspects of cognition that, at first glance, may not seem so pertinent (e.g., conformist attitudes) — except when located within an evolutionary framework.

It is true that many goals are responsive just to the fleeting incentives of the here and now, and may have only minimal connection to evolutionary fundamental motives of the sorts we identified above. But it is also true that many goals are products of these evolved, fundamental motivational systems. These goals are not merely analogous to selfish genes. They are, instead, phenotypic manifestations of motivational systems encoded within and built by selfish genes. By carefully considering the implications of the causal connection between selfish genes and selfish goals, we can more expertly predict the consequences that these goals can have on human cognition and behavior.

Goals reconfigure cognition by modulating predictive processes in the brain

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Abstract: I applaud Huang & Bargh's (H&B's) theory that places goals at the center of cognition, and I discuss two ingredients missing from that theory. First, I argue that the brains of organisms much simpler than those of humans are already configured for goal achievement in situated interactions. Second, I propose a mechanistic view of the "reconfiguration principle" that links the theory with current views in computational neuroscience.

The brain mechanisms supporting the achievement of human-level goals are sophistications of the neuronal architectures used by our evolutionary ancestors for situated interaction. These simple organisms had to select adaptive action rapidly, and for this purpose, a brain design based on a staged perception-cognition-action pipeline was probably too slow. A better design could be a basic (but robust) control-theoretic loop with several operations deploying in parallel and influencing each other; for example, an "affordance competition" architecture that specifies and selects multiple potential action plans in parallel under the biasing influence of current goal and motivation contexts (Cisek & Kalaska 2010).

This embodied view encourages seeing all cognitive processes through the lens of action and goal achievement. Here, the main role of perception is signaling opportunities for achieving valuable goals through action, not providing an objective representation of the external environment (Gibson 1979; Proffitt 2006). Memory, too, is in the service of action and goals: it integrates patterns of past interaction with current perception to provide context for goal selection and achievement (Glennberg 1997; Verschure 2012).

From this perspective, the brains of simple organisms are already well configured for goal achievement in situated