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Robert Kurzban and C. Athena Aktipis

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Robert Kurzban
C. Athena Aktipis
University of Pennsylvania, Philadelphia

A modular view of the mind implies that there is no unitary "self" and that the mind consists of a set of informationally encapsulated systems, many of which have functions associated with navigating an inherently ambiguous and competitive social world. It is proposed that there are a set of cognitive mechanisms—a social cognitive interface (SCI)—designed for strategic manipulation of others' representations of one's traits, abilities, and prospects. Although constrained by plausibility, these mechanisms are not necessarily designed to maximize accuracy or to maintain consistency with other encapsulated representational systems. The modular view provides a useful framework for talking about multiple phenomena previously discussed under the rubric of the self.

Keywords: *evolutionary psychology; self/identity; self-presentation; social cognition*

> The notion of a single unified self "inhabiting" the brain may indeed be an illusion.
>
> —Ramachandran & Blakeslee (1998, p. 227)

What if there were no unitary self to be "interested," "deceived," "regarded," "evaluated," "enhanced," "verified," "protected," "affirmed," "controlled," or even "esteemed"? If there were no such self, what should we do with theories such as those that make reference to self-affirmation (Steele, 1988), self-evaluation (Tesser, 1988), or self-verification (Swann, 1983, 1985)? If there is no singular "self" that is meaningful in the context of theories that use this term, it might be time to rethink the areas of inquiry these theories address (Kurzban & Aktipis, 2006; Rorty, 1996; Tesser, 2001; see also Katzko, 2003, for a recent discussion).

Here, we propose that the ontology of the self is deeply connected to the issue of the extent to which the mind is modular, consisting of a large number of functionally specialized information-processing devices, each of which processes only a narrow, delimited set of inputs (Barrett & Kurzban, 2006; Coltheart, 1999; Cosmides & Tooby, 1994; Sperber, 1994). Modular architectures result in systems that are potentially computationally isolated from one another. This makes statements about "the" self problematic—what, precisely, is the referent (Leary, 2004a)?

We assume here that modular systems' properties reflect their evolved functions (Pinker, 1997; Tooby & Cosmides, 1992). In particular, some phenomena discussed in the context of the self, we believe, can be construed as the result of the operation of a set of cognitive mechanisms designed to serve strategic social functions. We refer to this potentially large but integrated collection of subsystems as the social cognitive interface (SCI). We suggest that the SCI (a) is designed for strategic—especially persuasive—social functions; (b) contains representations that are encapsulated, isolated from many other cognitive systems; and (c) is not necessarily designed to maximize accuracy.

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Our approach here is as follows. First, we review the issue of modularity, with an emphasis on the important issues of preserving truth and consistency (or not) within the cognitive system. Next, we lay out some proposals, focusing on the SCI and its function. Finally, we discuss how the modular view informs questions about the self and how the hypothesized SCI, coexisting with other systems with other functions, helps to illuminate certain phenomena that, seen from the perspective of modularity, change from puzzling to transparent.

MODULARITY

Fodor's (1983) introduction of the concept of modularity into cognitive science provided a set of properties for assessing the degree to which a system is modular (e.g., automaticity, encapsulation, etc.). Importantly, Fodor viewed modularity as a property that a system might have to a greater or lesser extent and concluded that only peripheral systems, such as vision and audition, rather than "central" systems, such as reasoning and decision making, would turn out to be modular to an interesting extent.

We diverge from Fodor's (1983) views and endorse more recent versions of the modularity thesis (Barrett & Kurzban, 2006). First, we take *modularity* to mean functional specialization (Barrett, 2005; Cosmides & Tooby, 1994; Pinker, 1997; Sperber, 1994, 2005; Tooby & Cosmides, 1992; Tooby, Cosmides, & Barrett, 2005). Second, we assume that given this construal of modularity, it is not restricted to peripheral processes but exists throughout the cognitive architecture (Cosmides & Tooby, 1994; Pinker, 1997; Sperber, 1994; Tooby & Cosmides, 1992). This view of modularity can be seen as simply an entailment of a computational theory of mind coupled with the evolutionary view: The mind consists of computational mechanisms designed by natural selection to carry out functions. How modular (i.e., functionally specific) any given mechanism is, of course, is an empirical question. For reasons discussed at length elsewhere, the evolutionary approach suggests that functions are likely to be specific (Tooby & Cosmides, 1992).

The past two decades have yielded a large number of productive research programs directed by modularity viewed as functional specificity. Importantly, many of these programs have not been restricted to low-level processes. Perhaps the best known putatively specialized system is language (Chomsky, 1965; Pinker 1994), but modular systems have been proposed to discharge "high-level" functions such as detecting cheaters (Cosmides, 1989; Cosmides & Tooby, 1992; Fiddick, Cosmides, & Tooby, 2000); reasoning about complexities surrounding the social world (Kurzban & Leary, 2001), including how others think and their beliefs (Baron-Cohen, 1995; Leslie, 1994; Scholl & Leslie, 1999); and statistical inference (Gigerenzer & Hoffrage, 1995). Modular systems have been proposed in domains of emotion (Buss, 1992; Öhman & Mineka, 2001; Rozin, Haidt, & McCauley, 2000) and kin recognition (Lieberman, Tooby, & Cosmides, 2003), as well as many others (see, e.g., Hirschfeld & Gelman, 1994). In each case, researchers have demonstrated that computational systems of interest are specialized for performing particular sorts of tasks, even if the tasks are not precisely identical to the tasks for which the system in question evolved (Sperber, 1994). So, for example, a system designed to recognize human faces might, in principle, be able to recognize a broader class of entities (Moscovitch, Winocur, & Behrmann, 1997), even if recognizing faces is the function for which such a system evolved (Duchaine & Nakayama, 2006; Duchaine, Yovel, Butterworth, & Nakayama, 2006).

Crucially, a necessary entailment of functional specialization is informational encapsulation. Because evolved specialized mechanisms are designed to process information in particular ways, they process information relevant to the tasks for which the mechanism is designed but not other kinds of information (Barrett, 2005). That is, functionally specialized systems are necessarily encapsulated with respect to (i.e., do not process) certain kinds of information.

Encapsulation is easiest to see in sensory systems. The only inputs to which photoreceptors are designed to respond are particular wavelengths of the electromagnetic spectrum. Photoreceptors are designed to be encapsulated with respect to other kinds of information, either in the world (sound waves) or representations "higher up" in the cognitive system. Note that by *encapsulation* we do not mean to import the metaphorical entailment that a given representation exists "inside" a system and is, therefore, necessarily unavailable to other systems (Tooby et al., 2005). We intend the weaker claim that any given mechanism processes only those inputs that meet the mechanism's formal input conditions (Barrett, 2005). In a similar manner, modularity construed this way should not be taken to entail that any given mechanism necessarily takes only a very narrow range of inputs. A mechanism might function to integrate information, which will necessarily mean that different types of information are taken as inputs. Pinker's (2005) example of an Internet search engine is useful here. These systems have circumscribed functions but have access to a vast array of informational inputs distributed across the entire Internet.

Encapsulation Allows Representational Inconsistency

Informational encapsulation has crucial implications for fundamental aspects of cognition. One such critical implication is that a brain can simultaneously represent two mutually contradictory states of affairs. A frequently used example is the Müller-Lyer illusion, in which two equal-length lines appear to be unequal because of inward- and outward-facing arrows attached to each. A viewer can be shown the lines are of equal length, but they still appear unequal. Because the information that the lines are equal does not feed "down" into the visual representation, the visual system maintains its perceptual representation despite the propositional representation of the lines' equal length.[1]

Of course, people are aware of this illusion—the difference between phenomenological experience and propositional knowledge. The awareness of the contradiction does not undermine the focal point: Somewhere in the brain there is representation (a percept) of the lines as being of unequal length. It might be true that in some cases such contradictions are represented, and lead to a motivation to understand them, but this does not prevent the mutually inconsistent representations from coexisting.

In this case, the inaccuracy of the perceptual representation is (probably) a byproduct of the design of the visual system, which operates in a way such that it is possible to "fool" it. (For a recent, thorough discussion of this illusion, see McCauley and Henrich, 2006.) Is it possible, however, that in some cases the architecture is designed to maintain mutually contradictory representations? Work on "metarepresentations" is consistent with this view (Baron-Cohen, 1995; Leslie, 1994; Sperber, 2000b). Consider the ability to represent others' beliefs. Assume Sally believes ["the Mickey Mouse doll is in the basket"] and, simultaneously, that Sally believes [Anne—believes—"the Mickey Mouse doll is in the box"]. This representation about Anne's belief about the location of the doll can be kept inside this metarepresentation, prevented from participating in inferences outside the context of Anne's beliefs. The modular architecture allows inferences to be drawn about the effect of Anne's (false) beliefs about the location of the doll without, crucially, causing Sally to look for Mickey in the box, even though the representation ["Mickey is in the box"] exists somewhere in Sally's brain (Baron-Cohen, 1995; Cosmides & Tooby, 2000). Modularity allows mutually contradictory representations about the very same content to coexist (Pinker, 1997).

Encapsulation, therefore, unravels the apparent paradox of an agent having two contradictory beliefs at the same time (Ames & Dissanayake, 1996, p. 6). The crux of the problem from the point of view of modularity with statements such as "X believes P" is that such statements embody a false assumption: The representational unity of the cognitive system associated with agent X (Greenwald, 1997; Rorty, 1988). McLaughlin (1996), for example, in discussing two subsystems (S1 and S2) in the brain of a person, made the deceptively obvious point that "the person cannot, of course, be both S1 and S2" (p. 41). However, on a modular construal of the mind, "the person" is both S1 and S2, as well as many other modular systems. Referring to the person as the owner of beliefs breaks down on modular views.

To take just one example, consider an individual with a phantom limb, a condition in which patients report that they know that a limb is missing but simultaneously report phenomena located in the limb, such as pain. In this case, Ramachandran and Blakeslee (1998) indicated that one part of the patient's brain is unaware of the patient's missing arm, although "John 'the person' is unquestionably aware of the fact" (p. 45).[2] Here, John "the person" presumably means a modular system that is isolated from the system sending motor control signals to the former arm. Does John "believe" he has an arm? The question is rendered nonsensical because John is a collection of modules. According to Ramachandran and Blakeslee, the same brain simultaneously believes the arm is present and believes it is not (Kurzban & Aktipis, 2006).

Specialized Systems Might Not Be Designed to Preserve Truth

Although it has been proposed that the central function of cognition is to generate true beliefs (Fodor, 2000), this diverges from the adaptationist view, which is that natural selection favored genes that led to the development of cognitive mechanisms that contributed to reproductive success. Indeed, contribution to reproductive success is the sole criterion by which evolution by natural selection acts. Hence, the evolutionary test for a cognitive mechanism is that it generate adaptive behavior, not that it represent truth (e.g., Pinker, 2005), although the two might frequently (but not always) be closely linked. Thus, although some mechanisms might be designed to represent the true state of the world, others might not. As Rorty (1988) put it, "Nothing is as brilliantly adaptive as selective stupidity" (p. 16).

Representing things that are true is, of course, frequently useful, and it would be surprising if a large number of evolved systems were not designed to maintain representations that reflect the best estimate of what is true. Mechanisms designed to navigate space and predict the movement of objects in the world are potential examples. Representations of space serve functions associated with foraging, hunting, finding cached

food, and so forth, and might be expected to be accurate, although even perceptual systems might show systematic bias (Neuhoff, 2001).

Taken together, the ideas that certain cognitive systems' functions might not be designed to generate representations that are the best estimate of what is true, along with the tolerance for mutually contradictory representations that modularity affords, suggest a conclusion central to our overarching thesis. In particular, these two ideas imply that one cognitive subsystem can maintain a representation that is not the best possible estimate of what is true but can nonetheless be treated as "true" for generating inferences within the encapsulated subsystem. If a more accurate representation about the actual state of the world is represented elsewhere in the cognitive system, this presents no particular difficulty. Hence, there is no particular reason to believe that the mind is designed in such a way to maintain consistency among its various representational systems.

REINVENTING THE SELF—THE SCI AND ITS FUNCTION

Summarizing, we have suggested the following. First, the mind consists of a collection of specialized systems designed by natural selection and, furthermore, that individual systems are informationally encapsulated with respect to at least some types of information. Second, these systems have been selected by virtue of their functional consequences, not by virtue of their ability to represent what is true. Third, the encapsulation of modular systems entails that mutually contradictory representations can be simultaneously present in the same brain with no need for these representations to be reconciled or made mutually consistent.

To these ideas we add a number of additional assumptions. First, we assume that there are a number of facts about the world that are inherently difficult or impossible to know with certainty. Second, we assume that people make inferences about these facts based, at least in some part, on social interactions. Third, we assume that people's inferences about inherently ambiguous facts have important social consequences. To illustrate all three assumptions, consider that if I step on your toes, my intentions are inherently invisible, but your inference about them based on various cues (e.g., Where was I looking at the time?) will surely influence your subsequent social interactions with me.

These assumptions imply that humans might have a constellation of evolved cognitive subsystems designed to represent certain beliefs that are not necessarily the best estimate of what is true about the world or oneself. With some trepidation at introducing yet another three-letter abbreviation, for ease of exposition we call this collection of subsystems the SCI.

The Economics of Sociality

Humans, as exceedingly social creatures (e.g., Richerson & Boyd, 1998), are in competition to receive a vast array of available social benefits. People compete to be good mates (Buss, 1994), group members (Kurzban & Leary, 2001), participants in mutually profitable exchanges (Cosmides, 1989), friends (Silk, 2003), and so forth. Because there is competition for places in others' social worlds (Levine & Kurzban, 2006; Tooby & Cosmides, 1996), we should expect adaptations designed to persuade others that one has qualities that make one valuable in these areas. From this view, the fact that people seem particularly sensitive to comparative rather than absolute metrics of worth makes a great deal of sense (Festinger, 1954). Competition for social benefits is inherently a comparative process, so the associated psychology should be expected to reflect this (Festinger, 1954, 1957; Suls & Wheeler, 2000). Important determinants of who is chosen to fill various roles will naturally be relevant features such as skills, abilities, health, expected longevity, moral fiber, restraint, intelligence, kindness, status, and, no doubt, many other traits that might well differ by domain (Cottrell, Neuberg, & Li, in press).

Ambiguity of Social Value

Because many facts about the world are not objectively knowable, they are subject to negotiation and persuasion. Mate value, for example (Buss, 1994), is easily debatable because the value of component relevant traits are often difficult if not impossible to determine (Buss, 1994). Importantly, people communicate their estimate of their own mate value through their own behavior, and this information can subsequently influence others' judgments. Hence, mechanisms designed to evaluate others' characteristics might be susceptible to manipulation (Haselton, Buss, Oubaid, & Angleitner, 2005). If I act in such a way that I convey a belief that I have high mate value, this information can be taken into account by social observers. Thus, maintaining positive representations about one's status and skills and acting in a way that is consistent with these representations can influence others to think of one more favorably (Jussim, Eccles, & Madon, 1996; Madon et al., 2001; Schlenker & Leary, 1982a; Trivers, 2000).

The intrinsic ambiguity of social life suggests that there might have been selection for psychological mechanisms designed to exert influence on others' representations about the social world in this way. This argument has been made in the behavioral ecology literature;

Dawkins & Krebs, 1978; J. Krebs & Dawkins, 1984.) When organisms are designed to take in information from the world and respond to it contingently, there is selection on other organisms to generate information that leads the target organism to respond in a desired way (Hauser, 1996), even if the information signaled does not accurately reflect the relationship for which the perceiver's perceptual and inference system was selected.

For example, some fish have perceptual systems that cause them to construe small wiggling objects as "food" and act accordingly because over evolutionary time, there was a reliable relationship between being small and wriggly on one hand and being edible on the other. The angler fish (*Lophius piscatorius*) violates this relationship with a morphological feature that is small and wriggles, acting as "bait," luring prey close enough to be eaten. Many things in the modern world similarly lure humans because they have properties that fit with evolved appetites, even if the object in question violates the relationship for which the appetitive system evolved (Burnham & Phelan, 2000). Because computational systems are proximate systems, designed to use cues that under "normal" conditions (Millikan, 1993) afforded adaptive inferences, they are subject to deception.

As social creatures that use socially communicated information (e.g., Boyd & Richerson, 1985), humans might well have systems designed for social manipulation (Byrne & Whiten, 1992; Whiten & Byrne, 1997). In particular, manipulative systems should be designed to exert influence on those aspects of the social world about which others can be persuaded. Unlike domains of physics and geography, there are many "facts" that are intrinsically unknowable or subject to debate.

We hypothesize that this is a primary function of the SCI: to maintain a store of representations of negotiable facts that can be used for persuasive purposes in one's social world.[3] For this reason, a crucial feature of the SCI is that it is not designed to maximize the accuracy of its representations, an idea consistent with the wealth of data on biases in cognitive processes (Greenwald, 1980; Riess, Rosenfeld, Melburg, & Tedeschi, 1981; Sedikides & Green, 2004). Instead, it is designed to maximize its effect in persuading others. As D. Krebs and Denton (1997) observed, "It is in our interest to induce others to overestimate our value" (p. 36). Humphrey and Dennett (1998) similarly concluded that "selves . . . exist *primarily* to handle social interactions" (p. 47).

There are, of course, limits to what others will believe. Because humans rely on socially communicated information, they have filtering systems to prevent being misled. Inaccuracy must be restrained. Thus, as a number of authors have pointed out, "Self-presentation is . . . the result of a tradeoff between favorability and plausibility" (Baumeister, 1999a, p. 8; see also D. Krebs & Denton, 1997; Schlenker, 1975; Schlenker & Leary, 1982a; Sperber, 2000a; Tice, Butler, Muraven, & Stillwell, 1995; Van Lange & Sedikides, 1998). The findings by Tice et al. (1995) that people are more modest in their self-presentation to friends than to strangers is interesting in this regard, suggesting that others' knowledge reins in the positive features one can plausibly claim.

This selection pressure might have led to an additional feature of the SCI: to maintain the appearance of consistency. This implies that one important design feature of the SCI is to maintain a store of representations that allow consistency in one's speech and behavior that constitute the most favorable and defensible set of negotiable facts that can be used for persuasive purposes.

The Press Secretary

The SCI is, thus, a Machiavellian spin doctor, designed for interaction with an inherently ambiguous social world. These ideas map directly onto ideas in the social psychological literature that people have "strategic" motives (Jones & Pittman, 1982) for manipulation of others and "expressive" motives (Baumeister, 1982) for convincing others about one's attributes. However, we maintain that these motives can be embodied in the functioning of the SCI without conscious awareness of such motives. Indeed, explicit representation of strategic or manipulative goals in the SCI could lead to the revelation of such goals to others (directly or indirectly) that could subsequently be detrimental to one's reputation (Trivers, 2000; see also Paulus, 1984).

The SCI makes beliefs accessible to others in the social world both explicitly, through verbal communication, and implicitly, through acting in ways that indicate that one has certain beliefs about one's qualities and attributes. For socially strategic creatures (Byrne & Whiten, 1992), it would not necessarily have been adaptive to make all information one held about the true state of the world (or oneself) available to those in one's social environment. By having a separate system designed to process the information that should be presented to the social world, individuals would be able to simultaneously (a) achieve social influence through the (often inaccurate or exaggerated) representations, (b) maintain the appearance of consistency because the encapsulated system could maintain internal consistency,[4] and (c) store accurate representations accessible by other systems with other functions (Trivers, 2000).

Our view can be understood in the context of a governmental metaphor of mind, versions of which have been offered by a number of authors. Some consider the self to be the president. Tooby and Cosmides (1997) suggested that you "think of your*self*—the self that you consciously experience as 'you'—as the President"

(Principle 3 section, para. 1), and they pointed out that the president cannot possibly know all that is going on in the federal government (i.e., the rest of the brain). In a similar manner, Greenwald (1980) likened the self to, in Baumeister's (1999b) eloquent phrasing, "a totalitarian government that rewrites history and edits the news so as to make itself look powerful, benevolent, and successful" (p. 22).

On our view, if the brain is construed as a government, the SCI, the entity that others in your social world talk to and the entity that talks back to others in your social world, is more like the press secretary than the president.[5] The press secretary does not make major decisions or necessarily know how they were made, has access to only limited information from both below (sensory) and above (decision-making operations), and is in charge of spin. The press secretary will not always know what motivated various decisions and actions, although the press secretary is often called on to explain them.

The press secretary model resonates with Nisbett and Wilson's (1977) classic work describing situations in which people do not seem to have introspective access to the reason for their behavior but, instead, must draw on "a priori causal theories" (p. 248) learned from one's cultural context. These socially acquired theories linking particular sorts of causes and effects drive verbal explanations when introspection is inadequate. We suggest, however, that explanations for one's behavior go beyond this idea and beyond Gazzaniga's (1992, 1998) related idea of an "interpreter," in which part of the brain tries to make sense of the individual's behavior to tell a coherent, cohesive narrative in the absence of the relevant causal information.[6] On the press secretary construal endorsed here, the SCI does not merely interpret; it collects and stores information about what one has done and engages in spin to make the individual's actions appear as positive as possible. And like the White House press secretary, the SCI can have limited access to information about the actual state of the world and the strategic motives underlying decisions (Trivers, 2000).

IMPLICATIONS OF A MODULAR AND EVOLUTIONARY VIEW OF THE SELF

The modular view we endorse here provides a possible explanation for maintaining unjustifiably positive representations. Here we discuss a number of phenomena, including simultaneously having representations of contradictory facts; maintaining unjustified propositional representations about one's traits, future, or control; mathematically inconsistent preferences; and so on. Because different modules are encapsulated with respect to one another, and because different modules can be active at different times, these inconsistencies are not mysterious on the modular view.

Believing One Possesses Positive Qualities and a Positive Future

Self-deception. We use the term *self-deception* here as philosophers have: when an agent simultaneously has the belief P and not-P (Demos, 1960).[7] Some definitions in psychology are similar, such as Gur and Sackeim's (1979), but theirs, for example, includes elements of motivation and awareness, which we omit.

A predominant view is that self-deception is a result of a motive to protect or enhance one's self-esteem (e.g., Taylor & Brown, 1988). We not only regard self-esteem as an index rather than a proximate motivation (see below), but also do not think there is a "real" self to be deceived. If the self is a collection of modular systems, each with its own functions, then two separate systems can simultaneously have mutually contradictory representations (see also Dijksterhuis, 2004; Greenwald & Banaji, 1995). In other words there is no motive for self-deception per se, but rather this phenomenon is a byproduct of the fact that distinct modular systems maintain representations that, by virtue of their distinct functions, can be contradictory.

In particular, as discussed above, some systems might be designed to represent close approximations of what is true. In contrast, other systems—such as the SCI—might be designed for favorable but not necessarily true representations. This leads naturally to the conditions necessary for self-deception as we have defined it.

The modular view thus bypasses many seeming difficulties with self-deception. McLaughlin (1996), for example, worries about how beliefs P and not-P "can be 'separated' in a way that keeps them from 'clashing' when P comes to mind" (p. 33; see also Davidson, 1982; D. Krebs, Denton, & Higgins, 1988). The current view is that modularity ends such worries because separation is trivial given informational encapsulation.

Self-deception, therefore, is suspect in precisely the way we discussed at the opening. There is no singular self to be deceived as much as there are simply modular systems discharging their functions. One need not posit a separate motive for "deceiving" one's self—it is more parsimonious to posit functionally specialized modular systems. Therefore, instead of talking about self-deception, the discourse should refer to mutually contradictory representations, the systems in which these are encoded, and associated functional explanations.

This view leads to straightforward predictions. Cases of contradictory representations in which one of the representations is biased should be present when one of

the representations in question is part of a system with a social/persuasive function (Trivers, 2000). In these cases, maintaining representations that are not the best estimate of what is true is to be expected. It should similarly not be surprising if separate, accurate representations are stored elsewhere in the cognitive system for use when realistic representations are desirable.

Positive illusions. Positive illusions are unjustifiably positive beliefs about one's traits, one's likely future, one's degree of control, and so forth (Taylor & Brown, 1988). The vast literature in this area suggests that overly optimistic views can have multiple benefits. As Taylor and Brown (1988) put it, "Self-enhancing perceptions, a belief in personal control, and optimism appear to foster motivation, persistence at tasks, and ultimately, more effective performance" (p. 199).

Such findings fit conveniently into the current framework. As long as a representation that is contrary to fact—or perhaps, not justified by facts—does not generate dangerous incorrect inferences or motivate behavior that is needlessly risky or costly, there will not be selection against mechanisms that generate such favorable beliefs. Regardless of why these illusions have their salutary effect, if these advantages outweigh the potential cost of the incorrect representation in the cognitive system, then a system that includes such biases could have evolved (Rorty, 1988).

Positive illusions might also derive from selection pressures associated with persuasion. If others can be made to believe that one is healthy, in control, and has a bright future, then one gains in value as a potential mate, exchange partner, and ally because of one's ability to generate positive reciprocal benefits in the future (Axelrod, 1984; Trivers, 1971). To the extent that there has been a history of competition for filling these social roles (Tooby & Cosmides, 1996), selection would have favored mechanisms that caused one to be convincing—without straining others' credulity—about being a good candidate to fill them.

Consider findings about, for example, smoking cigarettes. Smokers are overly optimistic regarding their risks (Weinstein, 1998), a finding interpretable as "protecting" one's self from unpleasant beliefs. Although this type of proximate motivation is plausible, we, like others, are skeptical (e.g., Leary & Downs, 1995; see below). Rather, positive illusions about smoking might reflect the action of a system designed to persuade others that one's value as a long-term social partner is minimally adversely affected. Of course, everything else equal, it would be best to have the correct beliefs about the dangers of smoking, *ex ante*, and behave accordingly. However, given that there could be reasons to begin smoking and that quitting smoking is very difficult (because of the physiology of addiction), then one can try to minimize the social harm caused by being a smoker by behaving as though smoking poses only modest risks.

Note this line of reasoning suggests a distinction between (a) "conscious" impression management, in which the SCI does have access to the relevant information but uses that information strategically; and (b) cases in which SCI does not have access to the relevant information (see Paulus, 1984, for the essence of this distinction). This suggests that methods such as the "bogus pipeline"—in which participants are led to believe that their true beliefs can be detected by an experimental apparatus (Jones & Sigall, 1971)—will not be effective at eliciting true belief in cases in which the relevant representations are encapsulated from what we are calling the SCI. Bogus-pipeline experiments, therefore, might be able to give important insight into domains in which encapsulation is incomplete (see Roese & Jamieson, 1993, for a review). Techniques such as the Implicit Association Task (Greenwald, McGhee, & Schwartz, 1998), in contrast, might be accessing the output of systems encapsulated with respect to the SCI to the extent that the SCI does have a strong influence on performance on the Implicit Association Task.

Self-Control and Future Discounting

The concept of "self-control" has the same problems associated with other concepts surrounding the self—what is doing the controlling and what is being controlled? A strong intuition underlies this concept—that self-control entails something like taking the course of action that is more beneficial in the long run but less enjoyable in the short run. The modular view explains these intuitions.

To see this, consider the concept of a "discount rate," the extent to which benefits are valued less the further in the future they come. For example, someone who chooses US$1 today instead of US$10 tomorrow has a very steep discount rate, valuing the immediate (small) reward more than the deferred (larger) reward. Decision-making systems designed for choices that must be made among outcomes in the present and those in the future necessarily embody some sort of discount rates (Rogers, 1994). Parallel logic applies to costs as well as benefits; we refer to benefits here for simplicity.

People must make a large number of decisions that weigh short-term gratification against long-term benefits. The psychology of addiction is an interesting case: Addicts satisfy their cravings even though they "know" (i.e., verbally report) that they are better off in the long run if they do not gratify that addiction (Kirby, Petry, & Bickel, 1999; O'Donoghue & Rabin, 1999).

How are these decisions made? One possibility is that there are multiple systems at work when an intertemporal choice is faced. McClure, Laibson, Loewenstein, and Cohen (2004) argued that some systems, perhaps those associated with the limbic and paralimbic systems, might embody a steep discount rate, whereas others, perhaps those associated with frontal and prefrontal regions, might embody a shallower discount rate. The final behavioral decision is, therefore, a consequence of the relative influences each system has in the particular circumstance. What feels like self-control, thus, might be the operation of mechanisms designed for shallow discount rates operating simultaneously with mechanisms with steep discount rates (Loewenstein, 1996; Metcalfe & Mischel, 1999; Shefrin & Thale, 1988).

This, of course, raises the issue of why different mechanisms have different discount rates embodied in their computations. This is a broad and complex question and probably has to do with humans' abilities to represent the future, plan for it, and use propositional knowledge to make decisions that are beneficial in the long term. These systems exist in the same brain as mechanisms—perhaps with a longer evolutionary history—designed with relatively steep discount rates embodied in their operation (Kagel, Battalio, & Green, 1995; M. Wilson & Daly, 2004). The ability to inhibit "prepotent" responses is the subject of large literatures in developmental psychology (Diamond, Kirkham, & Amso, 2002) and cognitive psychology and cognitive neuroscience (Botvinick, Cohen, & Carter, 2004; Thompson-Schill, Bedny, & Goldberg, 2005), as well as in the comparative literature (Boysen, Mukobi, & Berntson, 1999; Cheney & Seyfarth, 1985; Diamond et al., 2002; Kralik, Hauser, & Zimlicki, 2002). Broadly, at any given moment, complexes of different mechanisms might be activated and potentially perform computations to guide decision making. These mechanisms, embodying different discount rates, will, in all likelihood, often yield conflicting results; evolved architecture must therefore include a means of resolving these conflicts.

A related question is why self-control is (often) viewed as a positive attribute and the reverse—immediate gratification—is (often) viewed negatively. One can imagine a world in which people were indifferent to the decisions others made with respect to long-term versus short-term trade-offs.

Self-control—making decisions that imply a shallow discount rate—carries the implication that one expects to live for a substantial period of time: Why defer consumption if death is imminent? In general, exhibiting a shallow discount rate implies that one believes that one has a future and is investing in it, making one a more attractive social partner. A related possibility, alluded to by Frank (1988), is that showing an ability to resist temptation makes one an appealing social exchange partner because this implies a similar ability to resist defecting in a social exchange, reaping immediate rewards at the cost of the future exchange relationship.

Thus, in addition to the benefits derived from inhibiting immediate consumption—such as the financial benefits of saving and the health benefits of going to the gym—others' inferences about one's discount rate in various domains might have sculpted cognitive systems to favor a more shallow discount rate for certain kinds of decisions. We therefore speculate that the mechanisms underlying shallow discount rates might have been designed to do so partially because of the social benefits of appearing more future oriented.

It is obvious that empirical work will be required to test this notion, but there is anecdotal evidence that implies that steep discount rates are taken to imply moral failing—"gluttony" rises to the level of one of the seven deadly sins in Christianity. Restraint and temperance are widely considered good and moral, whereas their opposites are condemned (J. Wilson, 1993). This point is illustrated by research indicating that negative attitudes toward people with a stigmatizing condition, particularly obesity, is made worse to the extent that it is seen as being under the individual's control (Crandall, 1994; Crocker, Cornwell, & Major, 1993; DeJong, 1980; Jones et al., 1984; Weiner, Perry, & Magnusson, 1988). This effect is observed even using implicit measures (Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003). People also seem to be inhibited from showing steep discount rates when they are in social settings. For example, some people tend to resist eating (e.g., Bhugra & Bhui, 2003) or even buying (Rozin, Bauer, & Catanese, 2003) unhealthy foods when they are in the company of others compared to when they are alone. Very generally, we predict that there should be domains in which cues that one is in the presence of others should increase individuals' tendency to inhibit behavior that entails a deep discount rate. Context, of course, matters. There might be some cases in which having a steep discount rate is socially desirable; in these domains, cues that one is being observed might be expected to have the reverse effect. For example, men discount the future more steeply when exposed to pictures of attractive women (M. Wilson & Daly, 2004), an effect which could be partially due to attempts to project a certain image on prospective mates.

Consistency, Justification, and the Social World

When a person's behavior violates consistency, he or she might be seen as a liar, hypocrite, mentally impaired, or worse (e.g., Swann, 1985). Furthermore, if I am motivated to induce people to believe P, and if I occasionally act in ways that are inconsistent with my belief P, then I

undermine my influence (Sperber, 2000a). Both of these facts point to the importance of projecting consistency to the social world, although of course there are times when it is reasonable (even expected) that one's beliefs will change (e.g., in light of new information). Maintaining consistency might represent a serious computational problem if the modular view we advance here is correct: If different modular systems with different underlying representations are active in different contexts, then this could lead to inconsistent behaviors.

Dissonance. Recall our claim that the existence of mechanisms designed to allow individuals to maintain and signal favorable and defensible representations of their characteristics would have led to selection pressures on perceivers to check for the accuracy of signalers' communications. This would include systems designed to check communication against what else is known as well as systems to check communication for within-individual consistency (Sperber, 2000a). This in turn would have led to selection to maintain consistency in one's communicative acts. If the SCI does not have access to the real causes of one's own behavior (Freud, 1912/1999; Nisbett & Wilson, 1977), then this might induce the construction of a narrative to give causal explanations that are sensible, a task which must be accomplished without necessarily having the benefit of all potentially relevant information (Gazzaniga, 1998). Consistency is important with respect to the information other people possess—inconsistency entails minimal cost as long as the relevant facts cannot be assembled by others.

This is relevant to the broad literature on cognitive dissonance (Festinger, 1957; Festinger & Carlsmith, 1959) and related literatures that emerged from this tradition (Aronson, 1968; Bem, 1967; Cooper & Fazio, 1984; Steele, 1988). Initial views on cognitive dissonance (Festinger, 1957) assumed that holding inconsistent representations was an aversive state that motivated dissonance reduction, which could be accomplished in a number of ways, including modifying one of the inconsistent representations (see Harmon-Jones & Mills, 1999, for a discussion of these theories).

From the perspective of modularity, Festinger's (1957) original broad conception seems unlikely because modular architectures are tolerant of mutually inconsistent representations. Furthermore, it is unlikely that there should be selection for a system designed to maintain consistency for its own sake, as maintaining discrepant representations can be functional for use in the context of different computations.

Although rarely pointed out, there are an extraordinarily large number of cases in which it is transparent that inconsistent representations are maintained with no effort to compensate in ways outlined in the initial theory (belief change, minimizing importance of discrepant representations, and so on). The most obvious cases are religious ideas, where beliefs thoroughly inconsistent with ontological commitments are deeply held. Indeed, it has been argued that it is precisely this discrepancy that causes these beliefs to be generated and transmitted (Boyer, 1994a, 1994b, 2001; Boyer & Ramble, 2001). Visual illusions fall in this category as well (for a similar observation, see Zajonc, 1960). Even eminent dissonance theorist Elliot Aronson (1968) suggested that "man cannot live by consonance alone" (p. 26).

More recent versions of the theory invoke social elements in addition to the simple motivation for cognitive consistency (e.g., Tedeschi, Schlenker, & Bonoma, 1971). Indeed, the social element of cognitive dissonance was evident from the beginning of this research enterprise. Seldom mentioned from Festinger, Riecken, and Schachter's (1956) well-known book, *When Prophecy Fails*, is that separation from the group was an important mediating variable in belief change. Festinger et al. suggested that "dissonances created by unequivocal disconfirmation cannot be appreciably reduced unless one is in the constant presence of supporting members who can provide for one another the kind of social reality that will make the rationalization of disconfirmation acceptable" (p. 205). In this case, the discordant representations (between belief in the apocalyptic prophecy and the fact that the world did not end) were maintained by virtue of the importance of seemingly irrational beliefs that seem to act as a glue in certain types of groups (Boyer, 2000). Thus, from the beginning, it was apparent that cognitive dissonance per se was not the whole story—dissonance reduction depended on social factors.

More generally, the modular view invites skepticism about there being a general need to eliminate inconsistencies. More recent accounts indeed place constraints on when dissonance effects should be observed (Aronson, 1968, 1999; Steele, 1988). The view from the standpoint of functional specificity implies that inconsistencies should be monitored and resolved under only circumscribed conditions. In particular, if the motivational system underlying consistency is designed to ensure that one is perceived as consistent (Tedeschi et al., 1971), then key ingredients should include the social features of one's actions: whether one's actions are or could be known and the attributions surrounding the act, including whether they were coerced or voluntary (Davis & Jones, 1960; Sherman, 1970). Other key factors that have been identified in this literature include the consequences of one's behavior (Cooper & Fazio, 1984) and the presence of arousal (Zanna & Cooper, 1974). For brevity, we do not treat these here as they are not central to our discussion (see also Aronson, 1968, 1999).

Taking the second criterion first, acts that are coerced are not "counted" against one's consistency in the arena in question. This principle is invested in legal codes, and there is experimental evidence in favor of this view. For example, participants with greater choice in the context of writing counterattitudinal essays show, under some conditions, substantially more attitude change than those given less choice (Blanton, Cooper, Skurnik, & Aronson, 1997). These results imply that processes associated with dissonance reduction can be suspended when one can reasonably claim one's behavior was not driven by one's true beliefs and desires (Cooper & Fazio, 1984; Kunda, 1990)

Returning to the first criterion, acts that are private and unlikely to become publicly known might similarly be relatively immune to the kind of reorganization implied by dissonance-related theories. This idea resonates with Tice's (1992) suggestion that it is correct to "question whether internalization occurs reliably under private circumstances" (p. 447). Tice and Baumeister (2001) more recently suggested that "public behavior appears capable of changing the inner self" (p. 76), an idea that fits with Shrauger and Schoeneman's (1979) finding that "individuals' self-perceptions and their views of others' perceptions of them are quite congruent" (p. 565), but that these same self-perceptions are not necessarily congruent with others' actual perceptions. In other words, people try to maintain consistency with the way they think they are perceived (see also Baumeister, 1982; Baumeister & Cairns, 1992).

It is worth a brief digression to address the claim of Harmon-Jones, Brehm, Greenberg, Simon, and Nelson (1996) that anonymity does not, in fact, eliminate or limit dissonance effects. In their set of experiments, participants were told to throw out their written comments "to ensure participants perceived that they had complete anonymity" (p. 8). However, these comments were "retrieved from the trash" (p. 9), making one wonder if participants might have believed—correctly, as it turned out—that their responses were not as anonymous as they were told. Furthermore, the dissonance effects (reporting greater liking for an unpleasant beverage) were observed in Likert-type scale ratings that participants knew would be read by an experimenter. This experiment seems to constitute relatively limited evidence that dissonance effects are obtained under anonymous conditions and should be weighed against evidence pointing in the other direction (e.g., Tice, 1992).

In any case, our view resembles Aronson's (1968, 1999), which emphasizes self-consistency. Taken at face value (but see below), Aronson and colleagues' views turn on the idea that people want to maintain a close link between how they think of themselves and their behavior. Such a view does not suggest that others' perceptions of one's behavior should matter. One's beliefs about one's self, not beliefs about others' beliefs about one's self, are the crucial causal variable. Therefore, on a pure self-consistency view, actions discrepant from one's self-concept should elicit change independent of whether they are observed. This is important because to the extent that one is committed to the view that self-consistency per se is a motivating force, one is forced to predict changes when our view does not, namely, when one's behavior is unknown.

However, social elements can be detected in Aronson's treatment of his own model. For example, although Aronson (1992, p. 305) emphasized preservation of one's sense of self, Aronson, Fried, and Stone (1991) emphasized that it was "not practicing what they are preaching" (p. 1637) that can be expected to induce change. It is crucial to mark the distinction between "preaching" and the "self-concept." Preaching is a social act, and predicting change as a function of this manipulation entails a commitment beyond preserving the self-concept (Aronson, 1992, 1999; see also Thibodeau & Aronson, 1992). An emphasis on hypocrisy (Aronson et al., 1991; Dickerson, Thibodeau, Aronson, & Miller, 1992; Fried & Aronson, 1995; Stone, Aronson, Crain, & Winslow, 1994; Stone, Wiegand, Cooper, & Aronson, 1997) that turns on inconsistencies in publicly known information (see, e.g., Stone et al., 1997), especially public advocacy (Fried & Aronson, 1995), implies the view that the preservation of concepts surrounding the self is insufficient to induce dissonance effects without the added social element. This is obviously a crucial distinction in the context of our arguments regarding the function of the SCI, as our view shifts the emphasis from internal consistency (with respect to the self-concept) to consistency in how one's statements and behaviors are viewed.

In sum, "self-consistency" need not, in itself, necessarily be a deep, fundamental motive. Instead, people might be motivated to appear consistent, which in turn leads them to actually be consistent. This is a subtle but potentially important distinction. If selection for appearing consistent has led to a psychology designed to be consistent across contexts, then the predicted design features differ from those predictions derived from the view that there was selection to retain consistency within the cognitive system in and of itself. This view directs research toward mechanisms designed to maintain consistency among others' representations about one's beliefs and behavior.

Very generally, we take the phenomena associated with dissonance reduction to be manifestations of mechanisms designed to maintain a positive and consistent front to the social world, occasionally by changing relevant

representations in the SCI to correspond with previous behavior. However, we do not claim that our views can completely account for the entirety of the empirical corpus that has emerged from the research tradition begun by Festinger and colleagues, only that the modular view might help to make sense of the conditions under which dissonance effects are and are not observed. Our view does not seem able to shed light on some important empirically demonstrated effects, including those related to self-esteem (Stone & Cooper, 2003) and arousal (Zanna & Cooper, 1974).

Justification and rationalization. If the general view sketched here is correct, then any number of judgments might be made by processes inaccessible to consciousness whose outcome must then be justified or rationalized by information available to the SCI. In this sense, our view of the SCI as a press secretary dovetails with Haidt's (2001) view that communicating one's moral reasoning is a process that comes after one's position on a particular moral issue has been arrived at. On this view, moral principles do not guide reasoning but rather, moral reasoning is used to justify a judgment that is derived from other processes. Because morality is intrinsically an ambiguous area, people can bring to bear principles on a case-by-case basis as long as one can plausibly argue that a given principle applies (Kunda, 1990; T. Wilson, 2002).

Weeden's (2003) recent work on reproductive interests is analogous. His analysis implies the existence of a set of systems that compute which policies would advance one's reproductive interests, and, subsequently, these computations give rise to positions on issues related to reproductive behavior, particularly abortion. As in Haidt's (2001) view of moral decision making, the desired viewpoint is computed first, and convenient morality is subsequently developed to support the desired position. Weeden's work gives a sense of the origins of the computational systems that determine one's views in a particular case, locating them in evolved systems designed to compute where one's genetic interests lie (see also Pratto & Hegarty, 2000).

Motivation, Self-Interest, and Preferences

A central topic surrounding the self is that of motivation (Sedikides & Gregg, 2003; Sedikides & Strube, 1995; Swann, Griffin, Predmore, & Gaines, 1987). Elsewhere (Kurzban & Aktipis, 2006), we have argued that the existence of modular architecture entails that some modules will be more or less dominant depending on many factors, making the "motives" embodied by these systems more or less evident as mechanisms are dynamically activated and deactivated. The absence of evidence of a motivation at some point (e.g., hunger in a satiated organism) does not entail that other motivations are "dominant" over hunger in any broad sense. Asking which motive (accuracy, enhancement, consistency, etc.) surrounding the self is "the" dominant one is meaningless for a state-dependent, context-dependent modular organism (Tice & Baumeister, 2001)

We focus here on one key motive that has been at the heart of discourse in multiple disciplines, especially economics: self-interest. Although economic models of purely self-regarding preferences and behavior appear to be on the wane (Camerer, 2003; Gintis, 2000), the traditional view of humans as purely (economically) self-interested agents is still present. This can be seen, for example, in its use as a null hypothesis in recent major research enterprises (Burnham & Kurzban, 2005; Henrich et al., 2005), suggesting that *Homo economicus* is not yet extinct (Aktipis & Kurzban, 2004). Indeed, the persistence of the concept is evident in the fact that it had to be pointed out in a leading economic journal that "deviations from self-interest have a fundamental impact on core issues in economics" (Fehr & Fischebacher, 2002, p. C1).

But what does *self-interest* mean? Consider cases in which a parent delivers benefits to a child, receiving no (material) benefit in return. This extremely frequent behavior certainly does not maximize material individual self-interest. Modern economists' answer to this is to put "other-regarding preferences" in individuals' utility function, preserving the rational actor model by allowing preferences for others', especially one's children's, welfare (Becker, 1981; Becker & Barro, 1988; Kinder, 1998; Sears & Huddy, 1990). Inferring where individuals (perceive that their) interests lie from behavior is a potentially useful enterprise (Andreoni & Miller, 2002), but as has frequently been pointed out, such analyses are thereby committed to the assumption that all behavior is self-regarding, limiting the value of the concept. As Smith (2003) recently vividly put it, "Good theory must be an engine for generating testable hypotheses, and utility theory runs out of fuel quickly" (p. 467).

Compare this approach to accounts that make stronger predictions regarding the expression of mechanisms designed to deliver benefits to others. Hamilton's (1964a, 1964b) theory of kin selection, for example, can be used to make a number of testable predictions, a fact that has been profitably employed by psychologists (Daly, Salmon, & Wilson, 1997) and economists (Peters, Clark, Ünür, & Schulze, 2004; Peters & Ünür, 2001). Whether benefiting kin is "self-interested" becomes irrelevant on these analyses, which focus attention on the design of the computational mechanisms involved instead of the locus of "interest." Recent developments of models of social preferences over others' outcomes and the processes by which these outcomes

are reached are increasingly sophisticated and promising in their ability to generate predictions (Bolton & Ockenfels, 2000; Fehr & Fischebacher, 2002; Fehr & Schmidt, 1999; Gintis, 1998, 2000, Rabin, 1993; see Gintis, 2005, for a review).

However, even weakened forms of rational actor models are generally committed to consistency (Shafir & LeBoeuf, 2002), that people's preferences are consistent when the relevant choices are properly specified (Gintis, 2005; but see Gigerenzer, 1996). However, if systems with different functions—and, therefore, computations—are deployed in a context-dependent way, then consistency might not be observed because different systems will embody different preferences. For example, the exact same game (from a mathematical standpoint) is played differently if it is presented as a grid as opposed to a tree structure (Rapoport, 1997; Schelling, 1960; Schotter, Weigelt, & Wilson, 1994), possibly because the latter format recruits one's "theory of mind" (Baron-Cohen, 1995) to a greater extent than the former (McCabe, Smith, & LePore, 2000). In a similar manner, in the context of choices among gambles, people have been shown to violate transitivity, preferring A to B and B to C, but also C to A (Tversky, 1969), possibly because different pairs of choices activate different evaluative systems. Indeed, many violations of consistency have been documented, although disagreements remain about the correct explanation for them (see Rieskamp, Busemeyer, & Mellers, 2006, for a recent review).

In short, if different modules are activated under different contexts, preferences will differ depending on the representations (beliefs, desires, etc.) that are currently active (see, e.g., Kunda, 1990, p. 483). In a similar manner, if representations of only a particular form can enter into certain processes, the same information presented in different ways will lead to different operations being performed on them (Gigerenzer & Hoffrage, 1995). Thus, inconsistencies are not phenomena in need of special explanation but merely a manifestation of a modular architecture operating from within a single agent.

Abandoning the assumption that people obey basic logical axioms does not leave theorizing unconstrained. It simply shifts the focus from axiomatic systems toward theories about the design of adaptations, their functions, their inputs, and the contextual cues that will activate them (Barrett & Kurzban, 2006). This approach has been productive in areas such as logical reasoning (Cosmides, 1989; Cosmides & Tooby, 1992; Fiddick et al., 2000) and statistical reasoning (Gigerenzer, 1998; Gigerenzer & Hoffrage, 1995). Although the move from axiomatic systems makes theories potentially more cumbersome, the empirical evidence that weighs against the human mind as obeying principles of such systems, combined with the logic of functional specificity (Tooby & Cosmides, 1992), suggests that a more textured approach is required.

DISCUSSION

We began by asking what would happen if there were no unified self in the sense entailed by psychological theories that make use of this term. In the foregoing, we have recast self-deception, self-enhancement, self-protection, self-control, and self-interest as the operation of multiple functionally specialized modular systems operating in parallel, each one potentially encapsulated with respect to some kinds of information. The point of course is that if this view is broadly correct, then it entails that progress will be impaired to the extent that the self as a unitary entity is used as a basis for theory construction. In this final section, we address some remaining issues: the nature of "self-esteem" and the origins of the deep intuitions surrounding the unitary self.

Self-Esteem: Projecting or Protecting?

Suppose it were true that the human mind contained systems designed to generate, store, and publicly represent information about one's value as a good mate, exchange partner, ally, and so forth. What might such a system look like? Taken altogether, these systems might make individuals look "biased" toward positive illusions; beliefs that make one look good, including being the cause of success (but not the cause of failure); and having a long, healthy future. In short, they might resemble phenomena that have been explained as a desire to preserve one's self-regard or self-esteem.

Research on self-esteem has played an enormous role in psychology, recently described as "the largest body of research on a single topic in the history of all of the social sciences" (Scheff & Fearon, 2004, p. 74). It has been suggested that people are motivated to achieve and maintain a self that is positive in terms of morality, skills, attributes, and so on (e.g., Aronson, 1992; Sedikides, 1993; Steele, 1988). Our view parallels Leary's and others' views of self-esteem as a gauge, or "sociometer," that constitutes an index of one's acceptance in the social world (Leary, 1999, 2004b, 2004c; Leary & Baumeister, 2000; Leary & Downs, 1995; Leary, Tambor, Terdal, & Downs, 1995; LeDoux, Wilson, & Gazzaniga, 1979) in contrast to the idea that self-esteem, or positive self-regard, is a thing for which people are striving.

Protecting one's esteem or sense of self cannot, from first principles, be an evolved function because it does not, in itself, contribute to reproductive success. That is, feeling good because of, say, one's social standing, cannot, again, in and of itself, lead to greater fitness outcomes

because natural selection cannot "see" individuals' hedonic states. Rather, there are likely to be evolved mechanisms designed to cause one to strive toward fitness-relevant goals (Tooby & Cosmides, 1992), such as social inclusion, and to use representations such as those associated with self-esteem to monitor where one stands in the pursuit of these goals (Baumeister & Leary, 1995). That is, there might be motivational systems that cause people to try to be socially included (Baumeister & Leary, 1995; Levine & Kurzban, 2006) or uniquely socially valuable (Tooby & Cosmides, 1996). The affective consequences index success (Leary & Downs, 1995). This might be true for many different domains (Kirkpatrick & Ellis, 2001, 2006). If self-esteem is simply a gauge, then recent pessimistic views related to self-esteem as a research agenda might be more easily comprehensible (Baumeister, Campbell, Kreuger, & Vohs, 2003; Scheff & Fearon, 2004).

This approach suggests a shift in focus from protection of one's sense of self to the projection that one is valuable as a social interactant. These might not always be easy to tease apart. Careful empirical work will have to distinguish between two alternatives: (a) There are proximate mechanisms designed to maintain and enhance one's own view of one's attributes, skills, abilities, and so forth (Greenwald, 1980), which can be thought of as the standard view of self esteem; and (b) There are proximate mechanisms designed to build representations that enhance others' views of one's attributes, skills, abilities, and so forth, the view we put forth here. This agenda is complex because individuals tend to value similar attributes, skills, and abilities. Asymmetrical information, therefore, might aid in testing these hypotheses. When ego disagrees with others about the value of a trait or behavior, then the two hypotheses make divergent predictions. The view endorsed here implies that under some circumstances, people will be quick to claim to have traits valued by other even when they themselves have neutral or even negative views of the trait.

Some such research might already have been done, although we do not know of work that addresses this directly. Tesser's (1988) self-evaluation maintenance model is obliquely relevant. This line of work suggests that many processes associated with gauging one's skills and abilities are comparative rather than absolute (e.g., Erber & Tesser, 1994). This is suggestive of a system designed for a world in which the crucial task is to evaluate where one stands relative to social competitors so that one knows one's value in the relevant social "markets." Findings that self-esteem is tied to relative performance are suggestive, although not conclusive, evidence of a system designed to compete for access to benefits associated with the social world, rather than simply maintain a positive self-image.

Intuitions About the Self

People perceive the self as a unitary entity (Pinker, 2002; Restak, 1994). This intuition that the self is unitary can perhaps be seen in the fascination that scientists and the lay public have with neurological patients (Sacks, 1970) and perceptual illusions. Boyer (2001) has claimed that our attention is drawn to violations of our intuitive ontologies, our assumptions about the basic nature of entities in the world such as objects, plants, animals, and so forth (see also Sperber, 1975). Perhaps the phenomena in neuroscience and illusions are so compelling because they conflict with a deeply held ontological commitment to seeing ourselves and others as unitary.

The strength of the intuition about the self might be tied to the fact that our self is something that we feel conscious of (Allport, 1961; LeDoux et al., 1979). A thorough discussion of the relationship between the SCI and consciousness is beyond the scope of this article, but considering the SCI in functional terms might inform thinking on the function of phenomenology (Damasio, 1999). Briefly, there might have been selection for systems that represent the information that others are likely to have about one's own mental states (Aktipis, 2000). For example, if one is expressing emotions of happiness or indifference at the sight of an old friend, others are likely to make inferences about one's beliefs and intentions based on that observable behavior. It would likely be advantageous to have accurate representations of other's inferences from these broadcast signals. By allowing these representations to enter into inferences with the other representation in the SCI, one can maintain as consistent a persona as possible. Failing to integrate this publicly viewable information (facial expressions, etc.) would risk appearing inconsistent. Given the function of the SCI to act as the "press secretary," it should have access to all the publicly viewable information. Whether "consciousness" is necessary for any of this remains an open question; we suggest only that the phenomena we associate with our self and the phenomena we associate with consciousness might plausibly be linked to the SCI.

The idea that consciousness is not the "highest" level is neither radical nor new. Consider Jackendoff's (1987) "intermediate-level theory of consciousness," and his claim that our awareness in the domain of vision, for example, is the 2½-D sketch (Marr, 1982) rather than the higher level, viewer-independent 3-D sketch, or the lower level perceptual precursors. Our claim is that the SCI is neither the central executive nor the highest level of cognition but merely one of many subsystems, one designed for managing social interactions and the reputational effects of behavior.

CONCLUSION

Our primary goal in this article has been to point out that difficulties surrounding theories with the self can be aided by a view of cognitive architecture that is committed to functional specialization and modularity (Kurzban & Aktipis, 2006; Sperber, 1994). The modular view easily accommodates the evidence that mutually inconsistent representations are present in both normal and patient populations (Baron-Cohen, 1995; Leslie, 1994; Ramachandran & Blakeslee, 1998; Sperber, 2000b). The differing representations stem from the different functions embodied by different encapsulated mechanisms, and we have argued that a crucial family of functions include those traditionally referred to under the rubric of "self-presentation" (Goffman, 1959).

In particular, we have proposed the existence of an SCI, a set of systems designed by natural selection to maintain a set of favorable representations about one's skills, abilities, status, and so forth. We want to acknowledge conceptual precursors. Evolutionary biologists (Trivers, 2000), philosophers (Humphrey & Dennett, 1998; White, 1988), cognitive scientists (Minsky, 1985; Pinker, 1997), neuroscientists (Gazzaniga & LeDoux, 1978), and social psychologists (Tice & Baumeister, 2001) have all made proposals that incorporate key elements of the SCI. These include the idea that the mind is modular, that the self that talks and controls muscles is but one subsystem in the modular architecture, and that the self serves a primarily social function.

Our hope is that our extension of these ideas, including the integration of cognitive modularity with evolutionary functionalism, provides a useful framework that can help to explain a wide range of phenomena in social psychology surrounding topics traditionally discussed in the context of the potentially misleading and certainly polysemous term, the *self* (Leary, 2004a). It is in this sense that we believe psychologists should be less self-ish, eschewing the term when its use reifies an intuitively compelling but ontologically vacuous concept.

NOTES

1. Sperber (2005) used this example to make the same point. "I (that is, a whole person) have the information that the two lines in the Müller-Lyer illusion are equal (say, I have measured them), but my visual perceptual device has no access to this information and keeps 'seeing' them as unequal" (p. 55). In some cases, information does feed back down. The well-known patchy black-and-white image containing a Dalmatian, which once pointed out, cannot help but be seen, is an example.

2. Oddly, Ramachandran and Blakeslee (1998) later argued that these "experiments . . . flatly contradict the theory that the brain consists of a number of autonomous modules" (pp. 55-56) and that instead, the brain's "connections are extraordinarily labile and dynamic" (p. 56). The unusual opposition of modular and dynamic illustrates the multiple ways in which the term *modular* is used (Coltheart, 1999; Segal, 1996). Modern conceptions of modularity are perfectly consistent with cognitive flexibility (Barrett & Kurzban, 2006; Sperber, 2005)

3. This idea of strategic self-presentation, of course, has deep roots (Baumeister, 1982; Goffman, 1959; Jones, 1964; Jones & Pittman, 1982; Schlenker & Leary, 1982b; Tedeschi & Norman, 1985; see Schlenker & Pontari, 2000, for a recent review). Our proposal is that the motives discussed in these literatures are the result of the design of a particular modular subsystem.

4. Dennett (1991) advocated such a position, suggesting that the narratives people generate function "to encourage [an audience] to (try to) posit a unified agent whose words they are: in short, to posit a center of narrative gravity" (p. 419).

5. Humphrey and Dennett (1998) made a similar suggestion, using the term *head of mind*. As Humphrey and Dennett put it, "The analogy with a *spokesman* may not be far off the literal truth. The language-producing systems of the brain have to get their instructions from somewhere" (pp. 42-43; see also Tetlock, 1985).

6. For a recent extended discussion, see Hirstein (2005), in which many of the issues addressed here are discussed at some length, although without the concept of modularity.

7. We refer to an *agent* here despite our previous discussion of agents' (dis)unity. In discussions such as this, a certain amount of precision is sacrificed in terminology to avoid circumlocution when intuitions will deliver the intended semantics. We use *individual* to refer to a complete human being. Representations about social others (Hastie et al., 1980) presumably are representations of those others as (unitary, physically bounded) "individuals."

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