

The Evolved Self, Self-regulation, and the Co-evolution of Leadership

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Abstract Much has been written about the self, yet its evolution and functioning are matters of controversy in evolutionary psychology. The article argues that it is an evolved capacity, essential for co-evolutionary processes, including cultural development, to occur. A model of self-regulation is offered to explain its adaptive functioning, elaborating William James' I-me distinction, and drawing upon contemporary analyses in social psychology and neuroscience. The model is used to illustrate how adaptive behavior is facilitated by the exercise of self-control, to defer and re-order goals, revise perceptions of the world, modify conceptions of the self, and alter repertoires of learned action sequences, heuristics, and habits. It also identifies potential areas of dysfunction, mediated by self-deception and misperception. Through this lens one can see how leadership is a historically co-evolving function of social systems, changing to meet altered circumstances. The recursive relationship involves interaction between changing leader–follower relationships, within which leaders' self-regulation is a central process. Individual differences in leaders as agents are thus also critical. The article concludes by considering the need for insight in order to steer these co-evolving functions in directions that help us as a species to master the global challenges and threats we face in our times.

Keywords Adaptation · Culture · Co-evolution · Leadership · Organization · Self-regulation

A question shared by a number of contributions to this issue is what kinds of models of man are viable in the light of evolutionary research, and how can they enhance our understanding of decision making in the socioeconomic arenas of contemporary life. In this article I wish to argue that the self is an essential central component to any answer to this question, yet it is a notion that has long been absented from economic theory and has become marginalized in much of psychological science. My argument is that consideration of the self is not an optional add-on but that it is an evolved capacity that uniquely explains many of the dilemmas we face as a species, and whose workings we need to understand to solve them. The logic here is that

- (1) The functioning of the self is a major differentiator of humans from other species.
- (2) Any model of man that excludes the self is incapable of analyzing the relationship between psychological states and actions or decisions.
- (3) The inputs to the self change historically, as do the prevailing models of man we internalize and act upon.
- (4) Understanding the processes of self-regulation is central to understanding how human interests and perspectives are shaped by environmental contingencies, and how individuals act as agents in shaping the external world.
- (5) Leaders are key agents in social evolution, by influencing the parameters of selection and socialization that shape cultures at all levels.
- (6) The self-regulation of leaders is a critical explanatory element in cyclical co-evolution of society and agency.

The framework I present has to do with what is constant and what is variable in the adaptation of our species to environmental change. Cultures and sub-cultures are the

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collective media of adaptation, transacting between the endogenous forces of human nature and the exogenous forces of the environment (Sperber 1996; Wilson 1998). Increasingly, humans have been the architects of their own environments, i.e., as “niche constructors” (Laland 2007), with leaders playing a major role in the divergence, success, and failure of these social experiments.

Self-regulation is a flourishing field of social psychology, focusing on the adaptive process by which individual actors are able to control their own responses to the world around them and to their own goal states (Karoly 1993; Vohs and Baumeister 2004). Positive examples of self-regulation are deferred gratification of desires, the control of impulses, planning and preparation for anticipated future events and states, and management of mood. These we take for granted in daily living, but it is failings in self-regulation that perhaps most emphatically underline its importance, such as chronic procrastination, drug and alcohol excesses, addictive gambling, eating disorders, impulsive criminality, suicide, uncontrolled rage, and rape (Sayette 2004; Baumeister et al. 2007; Steele 2007). We face self-regulatory challenges every day of our lives, especially in a world of excessive choice, where we continually have to fight small battles with our intentions, resolutions, wants, and frustrations (Iyengar 2010).

The relevance for leadership is evident. Leaders need to effect self-control at a number of levels to be effective. Ergo, individual differences in the self-regulatory processes of leaders have the utmost relevance for the future of society and its institutions (Hogan et al. 1994). It would not be overstating the case to assert further that self-regulatory capacities of agents at all levels of society, especially political leaders of nation states, are implicated in the question of whether our species will overcome the monumental tragedy of the commons that faces our planet (Diamond 2005).

It is with these considerations in mind that I offer a new integrating framework for understanding self-regulation, which I shall subsequently apply to the topic of leadership. A prior step is to achieve a clear perspective on the self and its status in science.

The Evolved Self

Although self and identity are of interest in some sub-fields of social psychology, it is ignored or treated as a non-issue by many evolutionary theorists and researchers, and it is almost completely absent in economics, anthropology, and many areas of applied psychology.

Yet (Vohs and Baumeister 2004, p. 3) assert that “the evolution of self-regulation will prove to be one of the defining features of human evolution.” This follows from

the reasoning that it is our capacities of self-control that most separate us from even our closest evolutionary primate cousins. In the words of the English social philosopher Hazlitt (1819), “Man is the only animal that laughs and weeps, for he is the only animal that is struck with the difference between what things are and what they ought to be.” It is the central premise of this article that the evolution of the ego as a self-aware executive function delivered this capacity.

Donald (2001) has persuasively argued that evolutionary theorists have undervalued the role of consciousness as a necessary condition for the mimesis that he identifies as the central process underlying the emergence and development of human culture. Yet the position of this article is that consciousness uninhabited by awareness of self is a chamber that can no more than reverberate with experience—insufficient to bear the weight of cultural evolution. From a developmental standpoint Tomasello (1990) also argues that awareness is necessary for the ontogeny of culture, especially by means of “intersubjectivity,” though he does not make explicit the corollary that self-awareness is a logical necessity for this process to occur.

Other evolutionary writers have dismissed or discounted the significance of the self. For Dennett “our *selves* have been created out of the interplay of memes exploiting and redirecting the machinery Mother Nature has given us” (Dennett 1995, p. 367), while Pinker (1997, p. 558) decides not to engage with the issue, asserting that the self is “an imponderable”—a conundrum that we are not equipped to solve. Dennett’s position implies that the possession of the gift of language plus memory is a sufficient condition for a sense of self to emerge, while Pinker seems to consider the idea a distraction rather than a central problem.

Kurzban and colleagues (Barrett and Kurzban 2006; Kurzban and Aktipis 2007) have taken the topic more seriously, and concluded, in line with the evolutionary orthodoxy of “the modular mind” that it is distributed among modules and embodied in the representations of what they call the social cognitive interface (SCI). Quite apart from the problems attendant on the introduction of a new entity, this resolution does not capture the importance of the idea of the self as reflexively aware agency. Nor does Klein et al.’s (2002) identification of the self with forms of representational memory, which they arrived at from their neuropsychological investigations of amnesiac and autistic patients.

Evolutionary psychologists Byrne and Whiten (1988) have identified “Machiavellian intelligence,” i.e., the ability to read the minds, motives, and intentions of others, as the key success factor in human versatility and achievement. This, they argue, is the key driver for the development of our prodigious brains, and a prime instrument of our species’ extraordinarily efficacious capacity

for fluid and complex social organization. The psychologist Nicholas Humphrey (1980) was the first (after William James) to give consideration to the ontogeny of the self as an evolved organ underpinning this capacity, on the reasoning that in order to read other minds one first requires the ability to read one's own.

It has been suggested that this capacity is a late addition to human evolution. *Homo sapiens sapiens*—modern man—is reckoned to have emerged around 200,000 years ago, but the artifacts of his creative intelligence—i.e., signs of an evolved, and indeed evolving, culture only started to appear in the latter part of this interval, appearing fully around 40,000 years ago. This is what Jared Diamond (1991) has called “The Great Leap Forward,” when humans radially migrated out of Africa to populate the globe, demonstrating the power of a new kind of intelligence in the form of an astonishingly rich and vivid plethora of art and symbolism.

Hominid species had already taken the art of tool and weapon construction to high levels of craft, but this period marked a quantum change in their form. A sudden proliferation of decorative arts gave visible manifestation to a fundamentally new set of relationships with the object world, including possession, veneration, and idealization—sentiments that require a sense of personal identity. Additionally, awareness of one's own mortality is a corollary of personal identity, and a key driver of many human innovations, constructions, and investments.

Psychologists have devoted much attention to measuring the gap between us and other primates, especially the great apes (Candland 1993; Tomasello 1999). Observation of feral children and attempts to endow chimpanzees with language reinforce the view that the gap is vast and cannot be closed by even the most ingenious and inventive schooling (Heyes 1998). Other higher primates are capable of bodily self-recognition, limited symbolic communication, and expression of feeling states, but lack any capacity to represent themselves in past or future states—what may be called “conceptual” self-consciousness (Leary and Buttermore 2003).

This raises the question of what neuroanatomical development facilitated this evolutionary step. Mithen (1996) has hypothesized that the modular elements of mind became permeable to each other, allowing the self-concept to emerge. Mithen admits there is no paleontological residue to substantiate his theory, and this proposition, though attractive, remains highly speculative. This question lies beyond the scope of this article, but it does seem as if the neuroscience of the self and self-regulation will become an increasingly important horizon (Heatheron 2011).

My aim here is to analyze the nature of self-regulation and its effects on economic and social behavior. I shall seek to build upon the work of Leary and Buttermore

(2003) as the only published analysis of the self as an evolved organ. Leary provides a more extended analysis of the nature of the self in modern humans in his book *The Curse of the Self* (2004), where he argues that the functions of the self have changed radically over human history. In the environment of evolutionary adaptedness (EEA)—the environment in which humans evolved—the cultural life of our ancestors would have left relatively little work for the self to perform. Certainly it is a powerful tool for finding partners, detecting cheaters, reading intentions; but in the highly collectivist and circumscribed world of hunter-gatherers much experience is attributed by individuals and groups to external agencies (gods, elders), and much individual choice (roles, relationships, duties) is delegated to norms, beliefs, and authority (Crook 2007).

The title of Leary's book captures the idea that the further we progress away from our evolutionary origins, the greater burden the self has to bear. The less we believe that any deities will intervene in our affairs, the longer we live, and the more self-determination we have about how to live, the more weighed down we are with choice (Iyengar and Lepper 2000). In effect, we have become responsible for almost everything that happens to us: the qualities of our lives, intimate relationships, thought processes, and emotions. Many of the disorders of modern life are attributable to this enlarged scope for our sense of personal responsibility, not least mental distress and irrational and ill-advised behaviors that people enact to satisfy the demands of the unfettered ego.

The Structure and Functioning of the Self

Many of the controversies stem from unnecessary assumptions about the self's ontological status as an entity (Metzinger 2009; Kurzban 2010; Hood 2012). It is hard to create any kind of meaningful argument about the structure of an entity that has never been observed, measured, or mapped neurologically, though this work is in train (Heatheron 2011). Self-consciousness seems to be neurally distributed in the right-side cortical areas, though this is immaterial to the issue of the functionality of the self as a form of focused, continuous, and integrated experience—the overwhelming sense of agency that motivates and colors human action and reaction.

To capture this, Leary and Buttermore adopt Neisser's (1988) taxonomy of five “self abilities”. These are: ecological (relationship to environment), interpersonal (socially coordinating with others), extended (conceptions of past and future existence), private (thoughts, feelings, and intentions), and conceptual (abstract, symbolic, and moral reflections).

James ([1890] 1950, p. 291) was the first to venture into these waters, drawing a key distinction between “I” and “me” self-conceptions. The “me” he analyzes as “the Empirical Self,” the “sum total of (what a man) can call his.” This comprises three interrelated “me’s”: the material self (body and possessions), social self (including relationships, fame, honor, etc.), and spiritual self (feelings, thoughts, desires, and moral sensibilities). The “I” he calls “pure Ego” (sense of personal identity and continuity). Leary and Buttermore’s (2003) treatment could thus be said to elaborate the Jamesian model. Others have depicted the self as rather more like a raft of opportunities in the form of self-schemata (Markus 1977), possible selves (Yost et al. 1992), or provisional selves, especially through periods of transition (Ibarra 1999).

All of these are, to a degree, metaphorical, for clearly the only solid distinction one can draw is the one drawn by James; between Ego—the partially self-aware executive—and perceived personal identity. Rather than conceiving of these elements as entities, for which anatomical correspondences seem unlikely to be revealed, they are best considered as attention and control processes, originating in the right frontal and parietal lobes of the cortex (Feinberg and Keenan 2005), linguistically mediated by the autobiographical “self-memory-system” (Conway and Pleydell-Pearce 2000; Skowronski and Sedikides 2007).

One reason for the aversion of some evolutionary thinkers to self-theory is a fear that it smuggles in dualism through the back door—reinstating philosophically unacceptable notions of “free will.” This concern need not detain us, for as Wilson (1998, p. 131) has argued, “Free will as a side product of illusion would seem to be free will enough to drive human progress and offer happiness,” and “without it the mind, imprisoned by fatalism, would slow and deteriorate.” For Bandura (2008) free will is no more than the indeterminacy that comes from its status as an “open system,” which facilitates four key properties: intentionality, forethought, self-reactiveness, and self-reflectiveness.

So to summarize, evolutionary perspective places the self within a nexus of motivational systems that serve the ultimate goal of enhancing our reproductive fitness by means of more local and immediate proximate goals—felt appetites and biases (Buss 1990). The first cybernetic models of this process characterized it as a TOTE system—testing the environment, operating on the environment, re-testing for achieved congruence, and exiting the sequence once goal conditions have been met (Miller et al. 1960). Such a feedback system requires only sensors, comparators, and effectors to function. On these principles simple automata can be constructed with the power to orient, mobilize, and self-maintain, as do many primitive organisms.

A more sophisticated variant on this kind of modeling came from the work of William T. Powers in the 1970s whose insight was that the origins of control lie in perceptions (Powers 1973). This makes an important shift in our understanding of control systems from a position of objectivity to one of subjectivity. We operate on the *perceived* environment, and actions are initiated in order to increase the congruence between perceptions and reference levels. Powers’ analysis conceives of perceptual control systems as nested hierarchies, such that the outputs of higher-level systems form the inputs to lower-level ones. Through this lens, skilled performance appears as successive approximations of ever-finer comparisons and adjustments to reach goals or maintain states. The model shows the pathways that link grand designs with motor skills.

Carver and Scheier (1998) elaborated this control system model to the self, where self-regulation is conceived as constituting nested hierarchies of feedback loops. This is reminiscent of German action theory, which has conceived of training in similar terms of hierarchy of control through thought and experience (Frese and Zapf 1994). In application, the theory helps people to progress from the sensory-motor level to the conceptual level and ultimately to the strategic level of skills performance.

It is plain that the drivers of such control systems are purposes (Ackoff and Emery 1972), for the central structure at the heart of all these models are nested hierarchies of goals (Carver and Scheier 1998). Self-regulation theorists have debated the content of these goals. Higgins has proposed that self-regulation pursues goals of promotion (goal attainment) and prevention (loss avoidance), which evoke different cognitive and behavioral strategies (Higgins 2002). For Carver and Scheier this involves the switching of attention constantly between self and environment. Deci and Ryan (1991) note the multiplicity of self-related goals sought via what they call “self-determined actions.” This includes the important idea that not all adaptive actions are instrumental; many are sustained by desires for pure intrinsic self-gratification.

In a similar vein Kuhl (1992) distinguishes self-control from self-maintenance functions, and it is clear that a major component of self-regulation is the management of affective states (John and Gross 2004). In this context we may also note that there are times when instrumental goal-seeking behavior appears to be suspended, not just when we are unconscious or semi-conscious, but when we are in states of “flow” (Csikszentmihalyi 1975) or having “peak” experiences (Maslow 1964). Addressing this point, there is a little-recognized body of literature under the name of *reversal theory*, mainly used by sports and addiction researchers, that argues that we alternate between telic and paratelic, i.e., between goal-seeking and experiential states (Apter 1989). In the theory they are conceived of as

motivational states and type preferences, and Kuhl (1992) has similarly treated state versus action-orientation as individual difference variables. This may be empirically justified, but a more fundamental question is how the Executive Ego migrates through different states of directness. There is also the question of how enduring and patterned these states are, i.e., individual differences (Cervone et al. 2006).

A Model of Self-Regulation

Figure 1 presents a framework for understanding the nature of the self as an evolved set of interconnected processes for achieving mastery over goals, actions, states, and identity. The figure conceives of the self as a constellation of interacting sub-systems. The self-aware Ego (Duval and Wicklund 1972) initiates actions under the constraining guidance of goals and perceptions of inner and outer worlds.

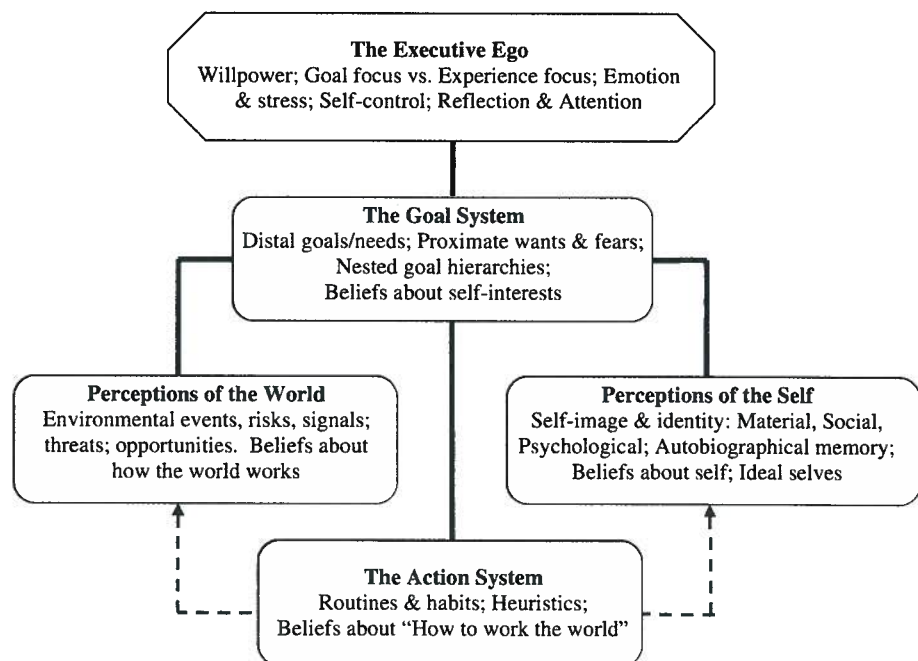
Let us look at the contents of these as systems before illustrating how they interact to achieve self-regulation.

The Ego is the overarching self-aware executive monitoring, controlling, selecting, mobilizing, and suppressing other systems (Baumeister 1998). As such is it less a homunculus within psychic space than a channel for focused consciousness and for the control of attention. It is the receptacle, treatment center, and voice for emotions and cognitions (Labouvie-Vief 2005). It is a limited channel, easily disturbed (Most et al. 2005), and its ability to

function can be characterized by qualities such as speed, acuity, and resilience. Ego functions, as Baumeister et al. (2000) have suggested, like a muscle, whose strength can be depleted and restored. Willpower is in common speech a summary concept for the strength of the Ego to maintain its self-regulatory intentions (Baumeister et al. 1994; Mischel 1996; Baumeister and Tierney 2012). Although a predominant function of Ego is the pursuit of instrumental goals, it is also able to intermittently free itself from this process, i.e., the paratelic state of being and free-flowing experience (Apter 1989), as may be experienced in meditation, absorption in music, physical activity, reveries, etc. Outcome studies and neuroscience research show that such states may well have a restorative value for the Ego (Davidson et al. 2003; Shapiro et al. 2002). One may hypothesize that paratelic states require enabling conditions in the other systems, such as an absence of pressure, e.g., strong unfulfilled goals, urgent perceptual disruptions, or self-discomfort.

The Executive Ego operates under the continual impress of emotions. Emotions drive the self-regulatory system, first and foremost as indicators of states of want (i.e., discrepancy between goals and situations), to which Ego enacts promotion or prevention strategies (Higgins 2002). A chief means of achieving this is reflective cognition, through which emotion may be transmuted by means of secondary control—primary control being actions initiated to promote/prevent desired/undesired states (Rothbaum et al. 1982). Ego's strategies for the management of emotions also depends on whether feelings are "incidental" or

Fig. 1 A model of self-regulation



“intrinsic” (Pham 2007), i.e., whether or not they are extraneous to the ongoing stream of goal-directed activity.

An evolutionary perspective accords a primary status to goals in the determination of action and the functioning of the Ego. It is logically separated from the Ego, since many vital goals are fulfilled by automatic systems that do not intrude into consciousness and require no active choice (Bargh 1982; Wilson 2002b). The Goal System, as we have seen, has breadth (diverse foci) and hierarchical depth. Evolutionary theory has provided significant insights into the structure of human goals and the distinction between the universal distal goals (reproductive fitness and its immediate corollaries), of which actors may be largely unaware, and proximate goals (felt desires, needs, and pressures) that are highly differentiated and individually attuned (Pinker 1997; Barrett et al. 2002).

Immediate proximate goals serve distal goals, though occasionally in a self-defeating manner; e.g., when evolved, fitness-enhancing needs become damaging to the organism, for example by being overfed as happens with overabundance of commodities that were scarce in the EEA (e.g., salts, sugars). Many addictions follow this dynamic—the hijacking of evolved preferences by novel and harmful stimuli. Goals self-regulate homeostatically, in dynamic equilibria, with adaptation levels shifting according to scarcity or abundance of stimuli (Helson 1964; Stagner 1977). This process happens autonomously, but the self regulates the process via expectations of fulfillment. It is for these reasons—the unawareness and autonomous functioning of large parts of the goal system—that in this model the Goal System is conceived as distinct but closely coupled with the perceptual systems.

The inputs to Ego are thus primarily goal states and the emotions that signal them. Ego is also governed by direct perceptions of its outer and inner worlds, which it matches to the comparators in the Goal System, such as desires. This process mobilizes the Action System. It requires less a simple mechanistic matching of conditions with criteria than a process of fuzzy approximation of purposes with states and outcomes, via imagery (Beach and Mitchell 1990). A key point is that perceptions are constructive rather than veridical—incorporating concepts and beliefs—while experience is a window selectively opened by attention (Sternberg 2006).

How people take risks illustrates this. Risk—quantified as the magnitude of possible loss \times probability—attaches as a perception to events and actions in ways that are highly subject to motivational and other biases. Our perceptual system thus generates possible and indeed desired models of the world, as well as empirically derived ones. Thus beliefs are an inextricable part of our worldview: especially our cognitive construction of cause-effect relationships

about how the world works and “how to work the world” (Sperber 2000; Willman et al. 2001).

The other set of perceptual inputs to Ego are those pertaining to the self—James’ three “me” facets, a taxonomy that is sufficient, exhaustive, and practical for present purposes. Self-perceptions also incorporate beliefs via representations, memories, and constructs of one’s material, social, and psychological identity, including possible and provisional selves (Ibarra 1999; Skowronski and Sedikides 2007). The capacity of the Ego to regulate these inputs—to keep troublesome thoughts out of awareness or to generate self-enhancing perceptions—is thus critical to wellbeing and adaptive behavior (Wegner et al. 1990, 1993).

The Executive Ego is fundamentally engaged in control operations: primary control to effect action on the world, and secondary control to effect the moderation of thoughts and feelings (Rothbaum et al. 1982). The strength and capability of Ego to achieve this amounts to what in common speech we regard as willpower (Mischel 1996; Baumeister and Tierney 2012). As Leary (2004) has noted, a key process by which Ego does this is self-talk. So far this behavior has only been given much attention by psychologists in areas such as the enhancement of sporting performance, though counterfactual thought can be regarded as a related process, i.e., the ability to regulate emotional states and one’s construal of the environment by considering alternatives to perceived realities (Theodorakis et al. 2000; Epstude and Roese 2008).

The Action System constitutes all elements of action, choice, and voluntary behavior, with feedback links to regulate all other systems. Actions that regulate goals are of special importance in evolutionary psychology, where it has been shown that distal goals are often served by being concealed from the Ego’s awareness. As Trivers (2000) has noted, self-deception is what allows self-interest to be pursued whilst being concealed from the Ego, enabling the self to maintain an unwavering consistency of purpose and performance. Illusions of control are similarly instrumental (Langer 1975), even when behavior may have a great deal more “automaticity” than it is helpful for the Ego to perceive (Bargh and Chartrand 1999).

In evolutionary terms one can see beliefs infusing all elements in the system: about self-interests, states of the world, the self, and actions and their outcomes, in order not to deflect the Ego from its ultimate purposes. Narratives are an example of how these are bundled together (Ibarra and Barbulescu 2010; Gottschall 2012). Our predilection for sense-making stories present a compelling alternative to a view of the world as replete with randomness, accidents, and coincidences, and the self as a manipulable servant to primal wants (Nicholson 2000, 2007). It may be noted in passing that this resembles the modeling of

psychodynamics by Freud, where the imperative self-serving demands of our animal needs (the Id) are concealed from the Ego to satisfy its requirements without violating the socialized Superego (Badcock 1998). An evolutionary perspective endows the self with more agentic power than does the Freudian model, but shares the same conception of ego defense mechanisms as serving “selfish” purposes (Nesse and Lloyd 1992).

Let us now consider the system as a working model, and look at its key functional processes. Some we have already mentioned—the executive functions of the Ego, controlling and disposing awareness, intention and action; maintaining goal focus; regulating memory and managing affect to achieve the organism’s evolved purposes. This model is fundamentally interactionist, purposive, and equilibrating. Any of the elements can change. The power of self-regulation as a conceptual framework is that it enables us to analyze how we achieve our distal fitness goals by deliberately inducing states of short-term disequilibrium. Human ambition follows this pattern: enduring rigors and privations in the short and medium term for the sake of distal achievements of status, power, and resources (Manderlink and Harackiewicz 1984).

The interactionist view (Mischel 1977) illustrates how equilibria can be attained by multiple routes:

- (1) By agency: actions that change the world, thus directly satisfying goals, altering the perceived world, and affecting states experienced by the self (Rothbaum et al. 1982);
- (2) By re-calibrating the Goal System and sometimes changing the goals themselves, especially those that are proximate (Bernard et al. 2005);
- (3) By revising self-perceptions and beliefs, such as self-esteem and self-efficacy (Bandura 1982; Kernis 1993); and
- (4) By altering perceptions of external reality and beliefs about states of the world, e.g., estimated probabilities and values of outcomes (Loewenstein and Lerner 2003).

The question is, under any given set of circumstances, which of these options will be activated. This raises an interesting challenge to our view of agency, for conceivably some actions and reactions are willed by the Ego, while for others, the Ego is a spectator to processes that occur automatically and sub-consciously (e.g., revised tastes) (Bargh 1982). An example would be interplay between self-perceptions and goals triggered by altered external perceptions, such as the phenomenon of a desire that disappears without being directly satisfied because of a fresh perception that it has become unobtainable (Harmon-Jones and Mills 1999).

This raises the challenging question of the limits to insight. We can enhance our already “special” powers of

self-determination by a deeper knowledge of our goals, both distal and proximate, yet not to an unlimited degree. Indeed, one could accuse much social psychology of the last century as having portrayed humans as more adaptable in relation to our goals than we actually are (Tooby and Cosmides 1992). It is becoming increasingly apparent that many of our purposes are rooted in heritable individual differences (Ilies et al. 2006). It may be easier to fool oneself with revised self-imagery than it is to revise one’s goals (Oyserman 2007). Distorted perceptions of reality may also provide convenient ways for appetites to rule reason.

Let us return to the topic of risk-taking behavior to illustrate the point. This model clearly implies that people are not so much risk-seeking as *risk-bearing* (Nicholson et al. 2005). True, there is a minority of sensation-seekers who satisfy their needs for stimulation and personal power through the frissons of close encounters with danger (Zuckerman 1994), but human loss aversion trumps such benefits for most people (Novemski and Kahneman 2005). The model implies that it is more accurate to say that we *bear* risk in order to achieve our goals, rather than seek it appetitively. As we found in work on financial traders in the City of London (Fenton-O’Creavy et al. 2005), people are prone to underestimate the levels of their risk exposure in order to pursue their short-term goals. Such goal-driven perceptual biases and distortions have been extensively documented in other fields such as addiction research and sexual behavior (Sayette 2004; Wiederman 2004). Moral “disengagement” serves the self-interests of the corrupt in like manner (Moore 2008).

Some general propositions about how adjustments are made can be derived from this model. For example, the amount invested in aspects of the self may lead self-enhancement strategies to take precedence over more mundane goal achievement (Alicke and Sedikides 2009); e.g., seeking reputational gain, even when to do so seriously impedes the achievement of other goals. Conversely, where individuals are under the imminent pressure of powerful unfulfilled goals, their need strength will dominate their inner and outer perceptual systems, as in conditions where humans are so deprived and degraded that they count their personal reputation for little and blot out from their perceptual arena all stimuli except those relevant to the primary goals (Most et al. 2005). Finally, there are examples where powerful perceptions and reactions take precedence over any ongoing goal-seeking behavior or personal considerations; for example, moments of personally endangering heroism during crises (Kelly and Dunbar 2001).

It is possible, indeed commonplace, for people to allow automaticity to reign in the flow of day-to-day goal achievement, self-management, and perceptual adjustment

(Bargh and Chartrand 1999). This is where individual differences may be most interestingly and valuably examined. Indeed, acts of control and willpower by Ego are distinguishing marks of leadership (Nicholson in press): individuals who are prepared to act as agents for the direction and coordination of others (Drath et al. 2008). Other distinctive orientations may be analyzed within this model: people's preferences for different kinds of tasks, relationships, or social roles (e.g., criminals, creative artists, addictive personalities, etc.).

Let us now focus on one distinctive set of these: those to do with positions of leadership.

Individual Differences and Leadership

An evolutionary conception of leadership sees it as a process—a property of social systems, that can be held by individuals, groups, or vested in systems and rules (Van Vugt et al. 2008; Spisak et al. 2012)—that I shall define here as *the coordination or direction of people's efforts towards collective goals*. A co-evolutionary perspective is concerned with the mutable parameters that govern leadership forms and outcomes, which I shall discuss in the final section.

First, let us look at the actions of leaders through the lens of the model of self-regulation. The model in Fig. 1 depicts two main sets of inputs to goal-directed behavior: perceptions of the world and perceptions of the self. The self-regulatory process—actions and mental events that maintain the system in equilibrium—can be seen as having the dual character earlier referred to as primary versus secondary control (Rothbaum et al. 1982).

In the realm of leadership this can be equated with versatility versus shaping. It is well established that a principal cause of leaders' failure is an inability or unwillingness to adapt to changing circumstances: in short, a lack of versatility (Kaplan and Kaiser 2006). It is less well documented that they can also fail through insufficient courage or ability to shape their circumstances. Adaptation does not consist solely of response flexibility, but also is to be found in persistence in engineering change. This has been variously called role innovation, shaping, and job crafting (Graen 1975; Nicholson 1984; Wrzesniewski and Dutton 2001); it is also a variety of niche construction (Laland 2007). Shaping is a key strategy for leaders, especially in the early period of their tenure, enabling them to build a platform for the accretion of power (Hambrick and Fukutomi 1991). It is commonplace to make early changes to the business's structures and processes, and to import a cadre of trusted lieutenants who reinforce their style and can help them secure their power base. Thus leaders are instruments of culture formation and change

(Schein 1985), arguably one of the most important sources of their impact (Kaiser et al. 2008).

Conversely, failure to have sufficient impact is the cause of some leaders' downfall (Burns 1978), yet one that is relatively little recognized. More commonly recorded are the failures when the leader's shaping of a business results in strategy, structure, and culture that do not meet the demands of the market environment. The necessity to do so is the fundamental proposition of what is called *contingency theory* in the field of management (Donaldson 2001). In evolutionary thought this interdependency between systems and sub-systems is a principle of what is called multi-level selection, where the value of expressed genes is determined by ecological factors, such as what member attributes can help a group to prosper under prevailing circumstances (Sober and Wilson 1998). A related idea is Dual Inheritance Theory, or gene-culture co-evolution (Richerson and Boyd 2005; Henrich and McElreath 2007) that cultures evolve to maintain congruence with the demands of the environment, recalibrating the conditions that govern selective pressures on population genetics via their consequences for the human bearers of those genes.

This idea implies that leaders do no less than shape the course of human evolution. They have played a part in how the prohibitions and injunctions of religions adapt to local conditions of abundance, scarcity, risk and opportunity, whilst ministering to human needs for companionship and social contracts (to govern mate choice, free-riding, and conflict resolution) (Baumeister and Leary 1995; Cosmides and Tooby 1992; Wilson 2002a).

This functional view of leadership implies that it may take very different forms. At one extreme is the all-powerful ruler with limitless power and resources, subjugating powerless followers. At the other extreme is the bureaucratic ideal where "substitutes for leadership" (rules, procedures, and codes) hold sway to efficiently dispose responsibilities among consenting followers (Howell and Dorfman 1981). When power and resources are distributed, the leader's functions are restricted to system maintenance and trimming, or to dealing with external interfaces. In between lie various models, including co-leadership, top management teams, and leaders with various degrees of freedom and responsibility (Hambrick and Mason 1984; O'Toole et al. 2002). Adopting Mischel's (1977) terminology there are many different kinds of leadership situations and they differ in their "strength," i.e., the degree to which they impose constraints on a leader's behavior. In modern organizations leadership situations are predominantly "weak," i.e., there are many different ways of leading. Indeed, one can infer that seniority is generally positively correlated with "weakness," since power gives leaders discretion.

This implies that we should look to individual differences in leaders to understand their behavior, as indeed many

scholars have done (Hogan et al. 1994; Judge et al. 2002; Zaccaro et al. 2004) but clearly the characteristics of individual humans have many more leadership-relevant individual differences than trait dispositions. One comprehensive attempt to summarize these is McAdams and Pals (2006) “new Big Five”: evolved human nature (species universals); dispositional signature (personality traits); characteristic adaptations (goals, plans, values, and motives); life narratives (autobiographical memory), and culture (socialized elements). An analysis with a more explicit focus on self and identity is supplied by Mayer (2003), whose structural model has executive consciousness (what we are calling Ego) overseeing a tripartite systems set of energy lattice (emotional and motivational mechanisms), knowledge works (cognition and reasoning), and role player (expressive models and motor mechanisms).

Increasingly within the mainstream of individual difference psychology, attention has turned to the debt owed by a person’s psychological profile to their genotype; i.e., the heritability of traits (Ilies et al. 2006). This suggests that a) self-regulatory processes such as those modeled here will resolve themselves in very different ways according to the dispositions, abilities, and interests of the person, and b) stable patterns will persist over time. The first of these points is that stable individual differences will give particular prominence to goal preferences, ways of seeing the world, self-identity constructs, and repertoires of preferred heuristics and action strategies. The second point is that these are systemically interrelated such that each element is held in place by the others and hence quite resistant to modification (Baumeister 1998).

The self-regulation model presented here offers a fresh view about leadership action, effectiveness, and impact. It suggests that the power and discretion of leaders leads to ineffectiveness and failure by two routes. The primary cause is the absence of incentives for them to align their goals with external reality, (a) because they protected and indulged in their self-concepts and were unimpeded from following their impulses, preferences, and dispositions, and (b) because they are surrounded by people who are incentivized to provide images of external reality that are favorable and congruent with the powerful leader’s desires. As I have argued elsewhere (Nicholson 2010a, b) hierarchy plus win-lose promotion tournaments based on bosses’ top-down assessments of individual achievement reinforce impression management and information control to sustain the image of congruence between leaders’ goals, styles, and external reality.

The model is also, by implication, a checklist of remedies and strategies that leaders should undertake to be effective:

1. Know yourself—gather and pay attention to feedback so your self-concept incorporates realistic and flexible appraisal of your qualities and capabilities;
2. Know your situation—enact strategies that circumvent people who would reinforce your worldview so you can be aware of threats, changes, and opportunities;
3. Review your goals—use the intelligence you derive from the first two strategies to interrogate and revise your goals, bearing if necessary short-term deprivation for longer-term achievement;
4. Enlarge your action strategies—find partners and create systems that prevent your leadership from relying excessively on your personal capabilities and knowledge;
5. Protect your Ego—enact routines and disciplines (relaxation, meditation, etc.) that ensure you face your challenges with awareness, energy, and commitment.

The Co-evolution of Leadership

Now let us turn to the broader context of leadership in society, and the forms it has taken over the history of our species. The duality of leadership is that leaders are the products of their times, and simultaneously the architects of them. If we reach back across the history of our species then three distinct epochs of leadership are detectable. The first, and by far the longest, was the long era of hunter-gatherers, pastoralists, and proto-farmers, who populated the planet for 200,000 years (Megarry 1995; Tudge 1998). This was followed by the agrarian age, covering most of the last 15,000 years, in which resource power, facilitated by the novel phenomenon of “big men” accumulating wealth that could be transmitted between generations, propagated generations of emperors, war lords, and despots, whose remnants are still visible across many areas of the world (Harris 1979; Diamond 1997). The third epoch, the modern age, from at the most 3,000 years ago, but only achieving its refined form in the last 500 years, is marked by a rational-consensual model, in which the institutions of leadership openly acknowledge the rights of the governed.

Following Boyd and Richerson (1985; Richerson and Boyd 2005) and Sober and Wilson (1998) one can analyze this as a matter of multi-level selection—leaders are selected and promoted who enhance the fitness of the group under its current conditions. The question that evolutionary psychology raises in this context is how invariant is the human nature among which models of leadership and culture have to mediate? I would not want it to be supposed that the model of self offered above is a blank check for us to infer an infinite flexibility in human adaptive response, even if it does illustrate how a range of adaptive and maladaptive outcomes may arise. In the broad sweep of human history we can follow the anthropological review of Boehm (1999)

who sees them as arrayed on a continuum of democracy/despotism, driven by male dominance hierarchy.

Comparative ethology shows dominance hierarchies operating in conjunction with sexual selection to enhance the reproductive fitness in many mammalian species by aiding coordination and mate selection. Family systems and patterns of competition and cooperation differ across species in ways that constitute evolutionarily stable strategies for niche adaptation (Mock 2004). With species, primitive but distinctive forms of “culture” (tool use, social behavior, grooming styles, courtship, etc.) have been observed among chimpanzees, with tool use especially adaptive to local environmental conditions (McGrue 1992). Humans, as the supreme adaptive generalists, have proven themselves capable of constructing an enormous variety of sub-cultural models, but as Boehm has pointed out, not just among hunter-gatherers, but in most tribal peoples including pastoralists and primitive agrarian peoples, the prevailing model is democratic.

It does seem that humans are especially adept at operating with extremely fluid forms of hierarchy, with low power-distance between leaders and follows (Erdal and Whiten 1996; Whiten 1998). This certainly looks like the “natural” form that has prevailed throughout human history until comparatively recently. However, as Boehm (1999) argues, it would be a mistake to see this as exempting humans from a tendency toward agonistic (contested competition) domination, which indeed history does show is a strongly recurrent form in the last 10,000 years or so (Betzig 1986). This coincides with the invention of agriculture and fixed settlements, but the critical variable for the free play of dominant leadership is the ability these conditions conferred on humans to accumulate wealth, and the power that comes with it. Indeed, Boehm argues that our democratic ancestors were no less driven to dominate than were their despotic successors, but were held in check by what he calls “reverse dominance hierarchy,” constituted in the capacity for followers to create norms and apply sanctions that limit the power-hungry and “upstarts.” These persisted because of the benefits for social harmony and the smoothing of irregular food supply.

With this in mind let us look at contemporary leadership and the challenges it faces. We live in an age of unparalleled pluralism in societal and organizational forms, all founded by a mixture of agency and co-evolutionary processes. This is a critical point, for these may work in opposite directions. Experiments with captive monkey colonies demonstrate the adaptiveness of structure to context (Pierce and White 1999). Centrally sourced supply fosters an agonistic order of hierarchical dominance; dispersed supply creates a more diffuse democratic social order; a relationship replicated in an experimental study with human subjects (Pierce and White 2006). On this

logic, with the advent of globalization and other forces that diffuse rather than centralize the sourcing of essential resources, we should be witnessing the emergence of more democratic organizational forms and systems. This seems to be the trend in the twenty-first century. Companies like Google, Facebook, WL Gore, and many others on the leading edge of technical and environmental change are embracing non-hierarchical forms (Hamel 2008).

Yet to do so requires that the leaders they select and promote have congruent values and needs. How does one avoid the power hunger that Boehm calls “upstartism”? The answer is that followers have to have the power to sanction—not least by quitting and finding more congenial employers. But as Hogan (2010) has pointed out, in many firms followers are tantamount to being held captive—they cannot afford the costs of voluntary exit. Under these circumstances leaders have fewer incentives to be democratic. But our analysis of the self suggests that individual differences may yield quite different outcomes for the same set of circumstances (Cervone et al. 2006).

Models and Man and Evolutionary Economics—the Role of Agency

If evolutionary theory has been relatively silent on the role of the self in human affairs, economic theory of all types has been if not mute, then very impoverished in its conception. Agency theory (Eisenhardt 1989) correctly identifies the pursuit of interests as a determining force in human affairs, but thereafter the analysis becomes narrow and sterile, focusing chiefly on failures of control rather than radical possibilities that agency could connote. It also suffers from a fatal weakness in the conception of human interests which is unduly narrow and materialistic. Evolutionary theory reminds us that human interests are firmly rooted in the distal utility of reproductive fitness, from which there flows a direct and indirect lineage of a myriad range of diverse and open-ended proximate goals, including many related to the need to maintain a strong working ego and positively valued self-perceptions.

This is no theoretical nicety for the history of societies and economies, since the machinations of self-regulation, as broadly conceived in this article, have major consequences. Wars are fought—including mergers and acquisitions in the business arena—on the basis of leaders’ needs and egos as much as on resource-based considerations (Marks and Mirvis 1998). The future of humankind on this planet, no less, depends upon our capacity to harness agency to solve problems of coordination and redefine our goals. Yet a question on which evolutionary science has hitherto been reticent is whether insight into the dynamics of self-regulation, especially our capacity for self-

deception in its myriad forms, might enable us to achieve a number of critical tasks; principally, can we:

- Change the boundaries of “us” to escape tribal parochialism and the consequent tragedy of the commons?
- Shift the parameters of culture and selection to favor the emergence of leaders with a stewardship orientation?
- Deploy corrective disciplines routinely and systematically to the wide range of cognitive bias to which human judgment is subject?
- Engineer reverse dominance flat hierarchies that empower and keep the powerful in check, but without removing the capacity for taking courageous decisions?
- Really learn from failure, neutralizing our tendency to self-deceive about our reactions, countering the inexorable pull toward routines that are ego and group defensive?

Under the guidance of engineers, economists, and political scientists, societies look for technological, incentive, and governance fixes to the challenges facing humankind. Of course these are necessary, but the analysis I have presented here suggests we will have to dig deeper into our selves to wrestle with human nature and extract the willpower to make any social or economic solutions to our problems sustainable.

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