6 Reconstrual of "Free Will" From the Agentic Perspective of Social Cognitive Theory

Albert Bandura

The doctrine of "free will" was promoted by medieval theologians to explain the prevalence of evil given a benevolent and omniscient Creator, and has been debated by philosophers for millennia. Proponents of free will granted humans the power of free choice in the likeness of absolute agency. Free will is an enigmatic, autonomous causative force shrouded in conceptual ambiguity about what it is, where it comes from, and how it manages to operate autonomously in the midst of environmental pressures. The metaphysical analytic preoccupation with the incompatibility of free will and determinism diverted attention from more fruitful analysis of the capacity of humans to bring their influence to bear on events (Nahmias, 2002). Reframing the issue of free will in terms of the exercise of agency, operating principally through cognitive and other self-regulatory processes, holds greater promise of providing new insights into the constructive and proactive role that cognition plays in human action.

The capacity for personal influence must be analyzed in the broader context of the model of human nature in which it is rooted. The conceptions of human nature regarding the capacity to exercise some measure of control have changed markedly over time. In the early theological conceptions, human nature was ordained by original divine design. Evolutionism transformed the conception to one in which human nature is shaped by environmental pressures acting on random gene mutations and reproductive recombinations. This nonteleological process is devoid of deliberate plans or purposes.

The symbolic ability to comprehend, predict, and alter the course of events confers considerable functional advantages. The evolutionary emergence

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of language and abstract and deliberative cognitive capacities provided the neuronal structure for supplanting aimless environmental selection with cognitive agency. Human forebears evolved into a sentient agentic species. Their advanced symbolizing capacity enabled humans to transcend the dictates of their immediate environment and made them unique in their power to shape their circumstances and life courses. Through cognitive self-guidance, humans can visualize futures that act on the present, order preferences rooted in personal values, construct, evaluate, and modify alternative courses of action to secure valued outcomes, and override environmental influences.

The present chapter addresses the issue of free will from the agentic perspective of social cognitive theory (Bandura, 1986, 2006). To be an agent is to influence intentionally one's functioning and the course of environmental events. People are contributors to their life circumstances not just products of them. In this view, personal influence is part of the determining conditions governing self-development, adaptation, and change.

There are four core properties of human agency. One such property is *intentionality*. People form intentions that include action plans and strategies for realizing them. Most human pursuits involve other participating agents so there is no absolute agency. They have to negotiate and accommodate their self-interests to achieve unity of effort within diversity. Collective endeavors require commitment to a shared intention and coordination of interdependent plans of action to realize it (Bratman, 1999). Effective group performance is guided by collective intentionally.

The second feature involves the temporal extension of agency through *forethought*. This includes more than future-directed plans. People set themselves goals and anticipate likely outcomes of prospective actions to guide and motivate their efforts anticipatorily. A future state has no material existence, so it cannot be a cause of current behavior acting purposefully for its own realization. But through cognitive representation, visualized futures are brought into the present as current guides and motivators of behavior. In this form of anticipatory self-guidance, behavior is governed by visualized goals and anticipated outcomes rather than being pulled by an unrealized future state. The ability to bring anticipated outcomes to bear on current activities promotes purposeful and foresightful behavior. When projected over a long time course on matters of value, a forethoughtful perspective provides direction, coherence, and meaning to one's life.

The third agentic property is *self-reactiveness*. Agents are not only planners and forethinkers. They are also self-regulators. Having adopted an intention and action plan, one cannot simply sit back and wait for the appropriate performances to appear, as Searle (2003) notes in his analyses of the explanatory gap. Agency thus involves not only the deliberative ability to make choices and action plans, but the ability to construct appropriate courses of action and to motivate and regulate their execution. This multifaceted self-directedness

operates through self-regulatory processes in the explanatory gap to link thought to action (Bandura, 1991a; Carlson, 2002).

The fourth agentic property is *self-reflectiveness*. People are not only agents of action. They are self-examiners of their own functioning. Through functional self-awareness, they reflect on their personal efficacy, the soundness of their thoughts and actions, and the meaning of their pursuits, and they make corrective adjustments if necessary (Bandura, 1986). The metacognitive capability to reflect upon oneself and the adequacy of one's thoughts and actions is the most distinctly human core property of agency.

Much of the theorizing about human self-regulation (Carver & Scheier, 1981; Lord & Levy, 1994) is founded on Powers' (1973) control theory, which is an outgrowth of the cybernetic model of how mechanical devices are self-regulating via negative feedback. The principal driving force is the negative feedback loop. In this regulatory process, deviations from a programmed state detected by a sensor automatically triggers activity that drives the system toward the programmed state to maintain equilibrium in the face of environmental perturbations. The cybernetic system embodies a hierarchy of interconnected feedback loops with upper level loops providing the reference signals that serve as goal settings for subordinate loops. The applicability of robotic self-regulating models to human self-management is critically addressed elsewhere in some detail (Bandura & Locke, 2003; Locke, 1994).

Humans operate as an open, proactive system rather than solely as a reactive cybernetic one (Bandura, 1991a, 1997). They motivate themselves by *discrepancy production* not just discrepancy reduction. They adopt goals and standards that create a state of disequilibrium and then enlist the strategies and effort required to realize them. After attaining the standard they have been pursuing, those with a high sense of efficacy generally set themselves further challenges that create new disequilibrating discrepancies to be mastered. However, goal adjustments do not follow a neat pattern of ever-rising standards following accomplishment, nor are individuals driven automatically to reduce disparity between sensed feedback and inner referent.

Consider the complexity of self-regulative agency. People act proactively in choosing and changing the goals they aim for: They juggle multiple goals and often have to choose between conflicting ones, respond in a variety of possible ways to performance shortfalls, set their slate of options for serious consideration based on judgments of their efficacy, process feedback through their knowledge base and preconceptions, devise functional strategies, override prepotent influences that divert one from a chosen pursuit, and engage in a lot of self-reflective metacognitive activity concerning the adequacy of their self-efficacy appraisals, operative strategies, adopted goal challenges, and outcome expectations. Moreover, they must manage stressors, self-debilitating ideation, and affective self-evaluative reactions to their performances that can undermine self-regulatory efforts.

In short, people have to navigate through complex environments of innumerable variations, novelties, ambiguities, and unpredictability. Much of this environment involves dynamic changes requiring adaptive flexibility in multiagent transactions in which the participants are both actors and acted upon. They not only can observe what they are doing, but do something to affect the course of events. In even more consequential exercise of agentic capability, individuals create environments not simply react to them in preprogrammed ways. Being a self-governing human is a quite different matter from being a self-regulating thermostat.

ORIGINS OF PERSONAL AGENCY

The newborn arrives without any sense of selfhood and personal agency. Agentic capabilities must be socially constructed through transactional experiences with the environment. The developmental progression of personal agency proceeds from perceiving causal relations between environmental events, through understanding causation via action, and finally to recognizing oneself as the agent of the actions. Infants exhibit sensitivity to causal relations between environmental events even in the first months of life (Lent, 1982; Mandler, 1992). They most likely begin to learn about action causation through repeated observation of contingent occurrences in which the actions of others make things happen. They see inanimate objects remain motionless unless manipulated by others (Mandler, 1992). Moreover, infants personally experience the effects of actions directed toward them, which adds salience to the causative functions of actions.

Recognition of action causation is socially enhanced by linking outcomes closely to infants' actions, by using aids to channel infants' attention when there is a temporal disconnect between their actions and the outcomes they are producing, and by heightening the salience and functional value of the outcomes (Millar, 1972; Millar & Schaffer, 1972; Watson, 1979). As infants begin to develop behavioral capabilities, they not only observe, but directly experience that their actions make things happen. With the development of representational capabilities, infants can begin to learn from probabilistic and more distal outcomes they bring about by their actions.

Development of a sense of personal agency requires more than simply producing effects by actions. Infants acquire a sense of personal agency when they recognize that they can make things happen and they regard themselves as agents of those actions. This additional understanding of oneself as the doer extends the perception of agency from action causality to personal causality. The differentiation of one's own actions as distinct from those of others is the product of a more general process of the construction of an agentic self. Proprioceptive feedback from one's activities and self-referent information from

visual and other modalities in transactions with the environment aid in the early perception of an experiential person. Personal effects resulting from self-directed actions further identify oneself as the recipient experiencing the effects. Thus, if touching a hot object brings pain, feeding oneself brings comfort, and entertaining oneself with manipulable objects generates enjoyment, such self-produced outcomes foster recognition of oneself as an agent. One becomes differentiated from others through rudimentary dissimilar experiences. If stubbing one's toe brings pain, but seeing others stub their toe brings no personal pain, one's own activity becomes distinguished from that of other persons.

The construction of personhood is not entirely a matter of private reflection on one's experiences. There is a social aspect to this process. As infants mature and acquire language, those around them refer to them by personal names and treat them as distinct persons. With the development of language, social self-referent labeling accelerates self-recognition and development of self-awareness of personal agency. By about 18 months, infants have self-referent verbal labels and apply them only to pictures of themselves (Lewis & Brooks-Gunn, 1979). They differentiate themselves from others in their verbal labeling. As they become increasingly aware that they can produce effects by their actions, by about 20 months, they spontaneously describe themselves as agents of their actions and their intentions as they engage in activities (Kagan, 1981). Before long, they begin to describe the psychological states accompanying their actions. Based on their growing personal and social experiences, they eventually form a symbolic representation of themselves as a distinct person capable of making things happen.

There is also a great deal of intentional guidance in fostering infants' agentic capabilities (Heckhausen, 1987; Karniol, 1989; Papousek & Papousek, 1979). Parents create highly noticeable proximal effects of infants' actions, segment activities into manageable subskills, and provide infants with objects within their manipulative capabilities that enable them to produce effects by their actions. They set challenges for their infants just beyond the infants' existing competencies. They adjust their level of assistance across phases of mastery, offering explicit guidance in earlier phases of skill acquisition but gradually withdrawing aid as infants become more competent in mastering tasks on their own. These types of enabling strategies are highly conducive to the development of personal agency during the initial years of life. AQ1

The self is the person, not a homunculan overseer that resides in a particular place and does the thinking and acting. Personhood embodies one's physical and psychosocial makeup with a personal identity and agentic capabilities that operate in concert through a variety of special-purpose biological systems. Although the brain plays a central role in psychological life, personhood does not reside solely in the brain, any more than the heart is the sole place of circulation (Schechtman, 1997). For example, the musculature of a gymnast honed through countless hours of practice is part of the self but not solely of the brain. Transplanting the

brain of an extraordinary gymnast into an octogenarian's body will not produce a self as a dazzling gymnast as a single organ view would imply.

Nor are there multiple independent selves. Human behavior is socially situated, highly contextualized, and conditionally manifested. Adaptive functioning requires both appropriate generalization in the face of bewildering situational variation and perceptive discrimination to avoid dysfunctional overgeneralization. People, therefore, vary in their behavior conditional on circumstances that reflect the diverse aspects of their lives. They wrestle with conflicting goals and courses of action. But these are instances of the same being doing different things under different life conditions, not different selves doing their separate things. Positing multiple selves plunges one into deep philosophical waters. It requires a regress of selves to a presiding superordinate self who selects, and manages the collection of selves, for selected purposes. Given but a single body, the choices finally made and the execution of a chosen course of action requires singleness of agency. The fragmentation of agency into multiple selves poses additional conceptual problems. Once you start fractionating the self, where do you stop?

Social cognitive theory also calls into question conceptions positing a duality of self as agent and as object in self-reflectivity. This seeming ontological separation involves shifting the perspective of the same agent rather than partitioning an self. The shift in perspective does not transform one from an agent to an object. One is just as much an agent reflecting on oneself as in acting on the environment. There is no reified self behind the reflecting.

Ismael (2007) specifies processes governing the synchronic unity of the self-representational system in action. The unifying activity includes construal and integration of information from diverse sources into a single voice through the mind-set of personal experiences. To add to the complexity of the integrating process, some of the information is potentially conflicting. This analysis provides added value because it extends beyond the individual level to the achievement of unity among different constituents within a social system. The latter level of analysis is especially relevant to the exercise of collective agency in which unity is formed from social diversity in the pursuit of common purpose.

Identity formation is an important aspect of human agency. Personal identity refers to a sense of individuality and one's self-characterization. It affects how people structure their lives and relate to the everyday world around them. The psychological issues of interest in self-representation center on the organization and continuity of personal identity in the midst of notable changes over time and across different spheres of life. The transactions of everyday life also require a distinctive social identity that matters in how one is treated.

The continuity of personal identity resides more in psychological factors and the experiential continuity of one's life course than in physical constancy. An amnesic remains the same physically, but has no sense of personal identity. Identity is preserved in memories that give temporal coherence to life, in the

connectedness of human relationships and one's life work over time, and in continuance of belief and value commitments that link the present to the past and shape the future.

Our theories place heavy emphasis on phenomenological continuity. In social cognitive theory, personal identity is also rooted in agentic continuity. People not only construe themselves as a continuing person over different periods in their lives; through their goals, aspirations, social commitments, and action plans, people project themselves into the future and shape the courses their lives take (Korsgaard, 1996). In short, they agentically construct continuities.

Continuity in personal identity is not solely a product of an intrapsychic autobiographical process that preserves a sense of personhood over time. Others perceive, socially label, and treat one as the same person over the course of life despite physical changes. Personal identity is partially constructed from one's social identity as reflected in how one is treated by significant others. In keeping with the model of triadic reciprocal determination, an enduring personhood is the product of a complex interplay of personal construal processes, agentically constructed continuity, and influences from the social reality in which one lives.

MODES OF AGENCY

Social cognitive theory distinguishes among three modes of agency: individual, proxy, and collective efficacy. In personal agency exercised individually, people bring their influence to bear on their own functioning and on environmental events. However, in many spheres of functioning, people do not have direct control over conditions that affect their lives. They exercise proxy agency through socially mediated influence. They do so by influencing others who have the resources, knowledge, and means to act on their behalf to secure the outcomes they desire (Baltes, 1996; Brandstädter & Baltes-Gotz, 1990; Ozer, 1995). Children work through parents to get what they want, marital partners through spouses, employees through labor unions, and the general public through their elected officials. However, people often turn to intermediaries in areas of functioning in which they can exercise direct control but choose not to because they have not developed the competencies to do so, they believe others can do it better, or they do not want to saddle themselves with the task demands, stressors, and onerous responsibilities that personal control requires. This socially mediated mode of agency introduces other players and time lags between one's goals and intentions and attainment of desired behavioral outcomes.

People do not live their lives in individual autonomy. Many of the things they seek are achievable only by working together through interdependent effort. In the exercise of collective agency, they pool their knowledge, skills, and resources, and act in concert to shape their future (Bandura, 2000). In

this multiagent mode of collective agency, participants have to achieve unity of effort for common cause within diverse self-interests and coordination of distributed subfunctions across a variety of individuals. The distinctive blend of individual, proxy, and collective agency varies cross-culturally. But everyday functioning relies on all three forms of agency to make it through the day, wherever one lives.

TRIADIC RECIPROCAL DETERMINATION

People do not operate as autonomous agents. Nor is their behavior wholly determined by situational influences. Rather, human functioning is a product of a reciprocal interplay of intrapersonal, behavioral, and environmental determinants (see figure). This triadic interaction includes the exercise of personal influence as part of the determining conditions (Bandura, 1986). The notion of "free will" is recast in terms of personal contribution to the constellation of determinants operating within the dynamic triadic interplay.

In the analytic decomposition of triadic determination, different subspecialties of psychology have centered their inquiry on particular segments of the reciprocal interplay.

In the reciprocative relation between intrapersonal and behavioral determinants, people's biological endowments, conceptions, values, goals, and affective states influence how they behave. The natural and extrinsic effects of their actions, in turn, affect their thought processes and affective states. In the reciprocative relation between behavioral and environmental determinants, behavior alters environmental conditions and is, in turn, altered by the very conditions it creates. In the reciprocative relation between intrapersonal and environmental

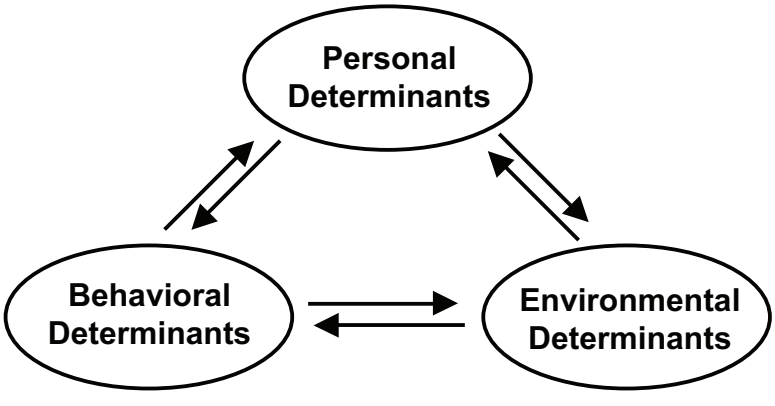

Figure 6.1.

determinants, social influences in the form of social modeling, instructional practices, and various modes of social persuasion alter personal attributes. In the reciprocal impact of this segment, people can affect their environment without saying or doing anything. They elicit reactions from the social environment simply by their physical characteristics, such as their ethnicity, gender, race, age, physical attractiveness, and their socially conferred roles and statuses. The social reactions thus elicited, in turn, affect the recipients' conceptions of themselves and others in ways that either strengthen or reduce the environmental bias.

Psychosocial accounts of human functioning often portray individuals as reactors to environmental events impinging upon them. In the neurophysiological quest for the localization and neural circuitry underlying cognitive activities and affective reactions, individuals are transported in a prone position into a neuroimaging device in which they are greeted with stimuli to which they have to react instantly. Such an arrangement allows little leeway for deliberative proactive control of action, much of which must be psychosocially negotiated and temporally regulated in everyday life. Social cognitive theory distinguishes among three different types of environments: imposed, selected, and created. The imposed physical and sociostructural environment impinges on people whether they like it or not. They have little control over its presence, but they have some latitude in how they construe it and react to it. However, for the most part, the environment is only a potentiality that does not come into being until it is selected and actualized by the actions that are taken. This constitutes the selected environment. Under the same potential environment, some people take advantage of the opportunities it provides and its rewarding aspects. Others get themselves enmeshed mainly in its debilitating and aversive aspects. We are all acquainted with problem-prone individuals who, through their irksome conduct, breed negative social climates wherever they go. Others are equally skilled at bringing out the best in those with whom they interact. People also construct physical and social environments that enable them to exercise some measure of control over their lives.

Gradations of environmental controllability require increasing levels of personal agency. Use of imposed environments calling for simple actions with scarcely any options in an invariant environment limits the generalizability of findings to common life conditions in which people have some leeway to select and construct environments and shape the course of events. We will revisit this issue when considering neurophysiological studies of the cognitive control of action.

Many factors enter into the production of given outcomes. Because of the multiplicity of interacting influences, the same factor can be part of different blends of codetermining conditions (Bandura, 1986). Moreover, reciprocality does not mean symmetry in the strength of bidirectional influences. Nor is the patterning and strength of mutual influences fixed in reciprocal determination. The relative magnitude of the personal contribution to the codetermination

within the triadic system varies depending on the level of agentic personal resources, types of activities, and situational circumstances. Nor does reciprocality mean holistic simultaneous influence (Bandura, 1983). A given determinant and its reciprocal effects do not spring forth concurrently. It takes time for a determinant to exert its influence. Because the triadic determinants do not operate simultaneously as an unravelable holism, the temporal lags between events enable one to clarity how they function interactively.

Most human commerce with the environment is socially situated in interpersonal transactions. This is becoming increasingly so with the revolutionary advances in communication technologies. People are now spending much of their time in the cyberworld, where they not only have a vast array of options to choose from at their fingertips, but they are posting their own constructions in this virtual environment for response from others. In an interpersonal transaction, individuals are each other's environments. Consequently, the status of psychological constructs change in the flow of social embeddedness. Person A becomes the agent acting on the environment (Person B) if one enters the transactional analysis on the A side. But Person B's status changes from an environment to an agent acting on the environment (Person A) if one enters on the B side one step later in the ongoing transaction. Thus, the same event can change from an agentic influence to a behavioral expression, and to an environmental outcome, depending arbitrarily on different entry points in the ongoing transaction between the individuals involved.

In addition to taking a hand in shaping their external environment, people live in a psychic environment largely of their own making. The self-management of inner life is also part of the agentic process. This line of inquiry is providing new knowledge into people's capability to regulate their own thought patterns and affective states by enlisting a variety of cognitive and behavioral strategies (Bandura, 1997; Lazarus & Folkman, 1984; Rosenthal & Rosenthal, 1985; Wegner, 1989). In these efforts, self-regulation of one's consciousness is the object of study. In clinical applications of this knowledge, people improve the quality of their functioning and emotional well-being by exercising control over ruminative perturbing and dejecting thoughts. This control process is well captured in the Chinese proverb, "You cannot prevent the birds of worry and care from flying over your head, but you can prevent them from building a nest in your head." Anderson and his colleagues (Anderson et al., 2004) have identified neural systems underlying the intentional control of consciousness.

Any retrospective causal analysis must include the triadic interplay of determinants rather than a truncated regression solely to the external environmental facet acting autonomously and unidirectionally. Humans are not like billiard balls propelled solely by forces external to them. Billiard balls cannot change the shape of the table, the size of the pockets, or intervene in the paths they take, or even decide whether to play the game at all. In contrast, humans not only think, but, individually and collectively, shape the form those external

forces take and even determine whether or not they come into play. Murray Gell-Mann, the physicist Nobelist, underscored the influential role of the personal determinants when he remarked, "Imagine how hard physics would be if particles could think" (Gruman, 2006). Environmental influences, of course, contribute to the development of personal attributes. But here, too, they are the product of the triadic interplay of personal, behavioral, and environmental factors rather than created by an autonomous environmental force. In short, personal influence is a significant player, not only in the proximate determining conditions, but in the prior chain of determination as well.

INTERPLAY OF HUMAN AGENCY AND SOCIAL STRUCTURE

Human functioning is rooted in social systems. Therefore, personal agency operates within a broad network of sociostructural influences. These social systems are devised to organize, guide, and regulate human affairs in diverse spheres of life by authorized rules, sanctions, and enabling resources (Giddens, 1984). Social systems do not arise by immaculate conception. Social cognitive theory rejects a duality of human agency and a social structure as a reified entity disembodied from individuals. Social systems are the product of human activity. The authorized rules and practices of social systems, in turn, influence human development and functioning. However, in the dynamic interplay within the societal rule structures, there is a lot of personal variation in the interpretation, adoption, enforcement, circumvention, and opposition to societal prescriptions and sanctions (Burns & Dietz, 1992).

It has been shown that sociostructural influences operate, to a large extent, through psychological mechanisms to produce behavioral effects (Bandura, 1995, 1997; Baldwin, Baldwin, Sameroff, & Seifer, 1989; Elder, 1995). However, as previously noted, in agentic transactions people are producers of their lived environment not merely a personal conduit through which sociostructural influences operate.

TRIADIC DETERMINATION AND FREEDOM

The exercise of human agency raises the issue of freedom and determinism. Humans are not just reactive to external input in a preprogrammed, robotic way. As noted in the functional properties of human agency and triadic codetermination, intrapersonal influences are significant contributors to the course of events. In a similar vein, Ismael (2006, 2007) builds a strong case that deliberation brings into play a variety of intrapersonal influences that can break the chain of determination from external conditions to action. Moreover, within the triadic

codetermination, deliberative thought not only alters the relation between environmental influences and behavioral outcomes, but fosters courses of action that proactively shape the physical and social environments.

When viewed from a social cognitive perspective, freedom is not conceived just passively as the absence of constraints and coercion in choice of action, but proactively as the exercise of self-influence in the service of selected goals and desired outcomes. For example, people have the freedom to vote, but whether they get themselves to vote and the level and form of their political engagement depends, in large part, on the self-influence they bring to bear. In addition to regulating their actions, as previously noted, people also live in a psychic environment. The self-management of one's inner life frees one from unwanted trains of thought. Because personal influence is an interacting part of the determining conditions, freedom is not incompatible with one's actions being determined. People are partial authors of the past conditions that developed them as well as the future course their lives take. Analyses of freedom are typically framed in a contentious dualism pitting determinism against randomness of causation. The model of triadic reciprocity provides a nuanced view in which individuals are contributors to the determining conditions.

The cultivation of agentic capabilities adds concrete substance to abstract metaphysical discourses about freedom and determinism. People who develop their competencies, self-regulatory skills, and enabling beliefs in their efficacy can generate a wider array of options that expand their freedom of action. They are also more successful in realizing desired futures than those with less developed agentic resources (Bandura, 1986). The development of strategies for exercising control over perturbing and self-debilitating ideation is intrapsychically liberating.

There is no absolute freedom. Paradoxically, to gain freedom individuals have to negotiate consensual rules of behavior for certain activities that require some relinquishment of autonomy. Without traffic laws, for example, driving would be chaotic, perilous, unpredictable, and uncontrollable for everyone.

The exercise of freedom involves rights as well as options and the means to pursue them. At the societal level, people institute, by collective action, regulatory sanctions against unauthorized forms of societal control (Bandura, 1986). The less social jurisdiction there is over certain activities, the greater is the contribution of personal influence to choice of action in those domains. After protective laws are built into social systems, there are certain things that a society may not do to individuals who choose to challenge conventional values or vested interests, however much it might like to. Legal prohibitions against unauthorized societal control create personal freedoms that are realities, not illusory abstractions.

Societies differ in their institutions of freedom and in the number and type of activities that are officially exempted from social control. For example, social systems that protect journalists from criminal sanctions for criticizing

government officials are freer than those that allow authoritative power to be used to silence critics or their vehicles of expression. Societies that possess a judiciary independent of other government institutions ensure greater social freedom than those that do not.

AGENTIC MANAGEMENT OF FORTUITY

There is much that people do designedly to exercise some measure of control over their self-development and life circumstances. But there is a lot of fortuity in the courses lives take. Indeed, some of the most important determinants of life paths occur through the most trivial of circumstances. People are often inaugurated into new life trajectories, marital partnerships, and occupational careers through fortuitous circumstances (Austin, 1978; Bandura, 1986; Stagner, 1981). In their insightful volume *The Travels and Adventures of Serendipity*, Merton and Barber (2004) document the workings of fortuitous events in life trajectories.

A fortuitous event in social encounters is an unintended meeting of persons unfamiliar with each other. The physical sciences acknowledge indeterminacy at the quantum mechanical level in the physical world. Fortuitous events introduce an element of indeterminacy in the behavioral sciences. The separate paths have their own determinants, but they are causally unconnected until their intersection, at which point the encounter creates a unique confluence of influences that can alter life courses. The intersection, where the transactions take place, occurs fortuitously rather than by design within the deterministic context (Nagel, 1961). Consider an example of a fortuitous event at an address on the psychology of chance encounters that altered the course of lives (Bandura, 1982). An academic publisher entered the lecture hall as it was rapidly filling up and seized an empty chair near the entrance. He ended up marrying the woman who happened to be seated next to him. With only a momentary change in time of entry, seating constellations would have altered and this intersect would not have occurred. A marital partnership was thus fortuitously formed at a talk devoted to fortuitous determinants of life paths!

A seemingly insignificant fortuitous event can set in motion constellations of influences that change life courses These branching processes alter the continuity and linear progression of life-course trajectories. The profusion of separate chains of events in everyday life provides myriad opportunities for such fortuitous intersects. Even if one knew all of the determinate conditions for particular individuals, one cannot know in advance the intersection of unconnected events. Fortuitous intersects introduce probabilistic uncertainties that complicate long-range predictions of human behavior.

Most fortuitous events leave people untouched, others have some lasting effects, and still others branch people into new trajectories of life. A science of

psychology does not have much to say about the occurrence of fortuitous intersects, except that personal proclivities, the types of settings in which one moves, and the types of people who populate those settings make some types of intersects more probable than others. Fortuitous occurrences may be unforeseeable, but having occurred, the conditions they create operate as contributing factors in causal processes in the same way as do prearranged ones. Hence, psychology can advance knowledge on the effects of fortuitous events on life paths. Several lines of evidence identify personal attributes and the properties of the environments into which individuals are fortuitously inaugurated as predictors of the nature, scope, and strength of the impact that such encounters are likely to have on personal lives (Bandura, 1982, 1986).

Fortuity does not mean uncontrollability of its effects. People can bring some influence to bear on the fortuitous character of life. They can make chance happen by pursuing an active life that increases the number and type of fortuitous encounters they will experience (Austin, 1978). Chance favors the inquisitive and venturesome, who go places, do things, and explore new activities. People also make chance work for them by cultivating their interests, enabling beliefs, and competencies (Bandura, 1998). These personal resources enable them to make the most of opportunities that arise unexpectedly. Pasteur put it well when he noted, "Chance favors only the prepared mind." Even that distinguished lay philosopher, Groucho Marx, insightfully observed that people can influence how they play the hand that fortuity deals them, "You have to be in the right place at the right time, but when it comes, you better have something on the ball." Self-development gives people a hand in shaping the courses their lives take. These various proactive activities illustrate the agentic management even of fortuity.

GENETIZATION OF HUMAN BEHAVIOR

We are currently witnessing an extensive genetization of human behavior. Social roles and human practices are increasingly being proclaimed as driven by prehistoric biological programming.

Biology provides the information-processing systems and physical potentialities and sets constraints. But in most spheres of functioning, biology permits a broad range of cultural possibilities. Boyd points out (Dreifus, 2005) that humans evolved in the tropics but hunt seals in the Arctic. Genes did not teach them how to build a kayak; their culture did. As Gould (1987) has correctly observed, the major explanatory dispute is not between nature and nurture as the issue is commonly framed. Rather, the issue in contention is whether nature operates as a determinist that has culture on a "tight leash," as Wilson (1988) contends, or as a potentialist, that has culture on a "loose leash," as Gould (1987) maintains.

Humans have created societies of diverse natures: aggressive and pacific ones, egalitarian and despotic ones, altruistic and selfish ones, individualistic and collectivistic ones, and enlightened and backward ones. Evidence supports the potentialist view. For example, people possess the biological capability for aggressive acts but cultures differ markedly in aggressiveness (Alland, 1972; Gardner & Heider, 1969; Levy, 1969). There are also wide differences in aggression within the same culture (Bandura, 1973). Even entire nations, such as Sweden and Switzerland, have transformed from warring societies to pacific ones. The Swiss used to be the main suppliers of mercenary fighters in Europe. As they transformed into a pacific society, their militaristic vestige was evident only in the plumage of the Vatican guards. For ages, the Vikings plundered other nations. Their ruthlessness was captured in the prayer, "Deliver me, O Lord, from the fury of the Norsemen." After a prolonged war with Russia, the populace rose up and forced a constitutional change. It prohibited kings from starting wars (Moerk, 1995). This political act promptly transformed a warring society into a peaceful one. Sweden is now a mediator for peace among warring nations. Cultural diversity and the rapid transformative societal changes underscore that the answer to human aggression lies more in ideology than in biology.

GROWING PRIMACY OF HUMAN AGENCY IN THE COEVOLUTION PROCESS

Dobzhansky (1972) reminds us that humans are a generalist species that was selected for learnability and plasticity of behavior, not for behavioral fixedness. Although not limitless, changeability and agentic capability are the hallmark of human nature. Because of limited innate programming, humans require a prolonged period of development to master essential competencies. Moreover, different periods of life present new competency demands requiring self-renewal over the life course to meet the challenges of changing norms and life circumstances. To add to the necessity of changeability, the eras in which people live usher in technological innovations, shifts in socioeconomic conditions, cultural upheavals, devastating wars, and political changes that make life markedly different calling for new adaptations (Elder, 1994). These diverse adaptational changes are cultivated by agentic psychosocial means.

People are not just reactive products of selection pressures served up by a one-sided evolutionism. They are prime players in the coevolution process. Other species are heavily innately programmed as specialists for stereotypic survival in a particular habitat. In contrast, through agentic action, people devise ways of adapting flexibly to remarkably diverse geographic, climatic, and social environments. They devise ways to transcend their biological limitations. For example, humans have not evolved morphologically to fly but they are soaring through the air and even in the rarified atmosphere of outer space at breakneck

speeds despite the inborn constraint. Agentic inventiveness transcended genes and biological design in getting them airborne.

People use their ingenuity to circumvent and insulate themselves from selection pressures. They create devices that compensate immensely for their sensory and physical limitations. They construct complex environments to fit their desires, many of which are fads and fashions that are socially constructed by vigorous marketing practices. They create intricate styles of behavior necessary to thrive in complex social systems. Through social modeling and other forms of social guidance, they pass on to subsequent generations accumulated knowledge and effective practices. They transcend time, place, and distance as they interact globally with the symbolic environment of the cyberworld.

Through contraceptive ingenuity, which disconnected sex from procreation, humans have outwitted and taken control over their evolved reproductive system. They seek sex without procreation rather than strive to propagate their kind in large numbers. They are developing reproductive technologies to separate sex even from fertilization. Through genetic engineering, humans are creating biological natures, for better or for worse, rather than waiting for the slow process of natural evolution. They are now changing the genetic makeup of plants and animals. Unique native plants that have evolved over eons are disappearing as commercial horticulturalists are supplanting them with genetically uniform hybrids and clones. Humans are not only cutting and splicing nature's genetic material, but, through synthetic biology, they are creating new types of genomes. Humans are even toying with the prospect of fashioning some aspects of their own biological nature by genetic design.

The inventive power of human agency is largely ignored in evolutionary accounts of human behavior, especially in the more biologically deterministic views propounded in psychological evolutionism. Given the growing human modifications of evolved heritages and creative circumventing of endowed limitations, the notion in vogue that biological evolution provides the potential and culture can do only so much with it flies in the face of the extraordinary control wielded by inventive human agency. The psychosocial side of coevolution is gaining ascendancy through the agentic power to transform environments and what humans become. In short, we are an agentic species that can alter evolutionary heritages and shape the future.

Social cognitive theory does not dismiss the contribution of genetic endowment to human adaptation and change. On the contrary, this endowment provides the very neuronal structures and mechanisms for the agentic properties that are distinctly human. These include generative thought, symbolic communication, forethought, self-regulation, and reflective self-consciousness. The uniqueness of humans resides in these self-directing and self-transforming capacities. Neither the agentic human ascendance in the coevolution process nor the rapid transformational societal changes it spawns would be possible without the biological endowment of abstract cognitive capabilities. What is

disputable is the common practice of attributing human affairs to alleged vestiges of prehistoric conditions that are unknowable. Social cognitive theory highlights the forward-looking impact of our biological endowment, rather than backward-looking conjectures about adaptation to prehistoric conditions. The study of how humans are changing endowed heritages, circumventing biological constraints, and shaping their future through social and technological evolution has greater promise of providing new insights into the diverse patterns of human adaptation in contemporary times than spinning fanciful stories about prehistoric mating patterns in drafty caves.

NONAGENTIC THEORETICAL APPROACHES

In its brief history, psychology has undergone wrenching paradigm shifts. Behaviorists proposed an input → output model linked by an internal conduit that makes behavior possible but exerts no influence of its own on behavior. In this view, human behavior was shaped and controlled automatically and nonconsciously by environmental stimuli. This line of theorizing was eventually put out of fashion by the advent of the computer, which likened the mind to a biological calculator. Creative thinkers filled the internal conduit with symbolic representations, rules, and computational operations. The mind as a symbol manipulator, in the likeness of a linear computer, became the conceptual model for the times. The input → output model was thus supplanted by an input → linear throughput → output model. For decades, the reigning metaphor of human functioning was a linear computational system in which information is fed through a central processor that cranks out solutions nonconsciously according to preordained rules. The architecture of the linear computer at the time dictated the conceptual model of human functioning.

Computerized serial cognitivism was, in turn, supplanted by connectionist models that operate through interconnected, multilayered neuronal-like subsystems working simultaneously in parallel. Sensory organs deliver up information to a multitude of subsystems acting as the mental machinery that processes the inputs and generates a coherent output automatically and nonconsciously out of the fragmentary neuronal activity. The cognitive machinery operating through associated networks does the construing, planning, motivating, and regulating nonconsciously. The inputs from these special purpose miniprocessors have to be integrated and coordinated to be able to act in a purposeful, coherent way. Given the extensive neuronal interconnectedness, this rarely occurs in a single anatomical location. Without a coordinative function, it remains in foggy ambiguity how a decentralized system with miniprocessors doing their own thing can operate as a unified whole in pursuit of selected goals. Moreover, as indicated earlier, people are shapers of their environment, not just information processors of environmental inputs.

Green and Vervaeke (1996) report that originally many connectionists and computationalists regarded their conceptual models as approximations of cognitive activities. They include representations of goals and other internal states in the regulation of human behavior (Miller & Cohen, 2001). But some connectionists have become eliminative physicalists, likening cognitive factors to the phlogiston of yesteryear. In this view, people do not act on beliefs, goals, aspirations, and expectations. Rather, activation of their network structure at a subpersonal level makes them do things. In a critique of eliminativism, Greenwood (1992) notes that cognitions are contentful psychological factors whose meaning does not depend on the explanatory propositions in which they figure. As for the phlogiston analogy, this mysterious substance neither had any evidential basis nor explanatory or predictive value. In contrast, cognitive factors do quite well in predicting human behavior and guiding effective interventions. To make their way successfully through a complex world full of hazards, people have to make good judgments about their capabilities, anticipate the probable effects of different events and courses of action, size up sociostructural opportunities and constraints, and regulate their behavior accordingly. These belief systems are a working model of the world that enables people to achieve desired outcomes and avoid untoward ones.

Forethoughtful, regulative, and reflective capabilities are vital for survival and human progress. The theorizing at the psychostructural level of complexity and the accompanying verified knowledge of psychosocial regulation of behavior cannot be cavalierly dismissed as merely folk psychology of the phlogiston variety. Agentic factors that are explanatory, predictive, and of demonstrated functional value may be translatable and modeled in another theoretical language but are not eliminatable (Rottschaefer, 1985, 1991). Progress in the understanding of human behavior is better served by clarifying links across levels of complexity than by reductive dismissal of verified principles operating at the higher level.

The various nonagentic theories differ in what they place in the mediating system, whether it includes determinative functions, and the forms they take. The theories posit a noncausal conduit in radical behaviorism, a linear central processor in computerized cognitivism, and interconnected, neuronal-like subunits in parallel distributed connectionism. But they share the same bottom-up driven causation: Input → Throughput → Output. In each of these models, the environment acts on the biological machinery that generates the output automatically and nonconsciously. In the more radical forms of theorizing, what goes on inside a human agent is not subject to deliberative conscious control.

In agentic theories, cognitive factors in the form of self-views, beliefs, goals, expectations, and mind-sets influence how bottom-up inputs are encoded, organized, and remembered. These are internally generated inputs in the top-down regulation of behavior. Windmann (2005) reviews findings from diverse lines of research showing that higher cognitive processes, operating principally in

prefrontal cortical sites, affect how bottom-up input information is processed in perceptual and memory performance, affective reactivity, and decision making. Research using single-neuron recording is shedding new empirical light on the dynamic interplay between bottom-up input information and top-down regulation by neural representations of the outside world (Naya, Yoshida, & Miyashita, 2001; Tomita, Ohbayashi, Nakahara, & Miyashita, 1999).

Nonagentic conceptions strip humans of agentic capabilities, a functional consciousness, and a personal identity. As Harré (1983) noted in his analysis of computationalism, it is not sentient individuals, but their subpersonal parts, that are orchestrating activities nonconsciously. In actuality, however, people act on the environment. They create it, preserve it, transform it, and even destroy it, rather than merely react to it as a given. As will be shown later, these outcomes involve a socially embedded interplay between the exercise of personal agency and environmental influences.

It should be noted in passing that to elude a self-negating predicament, proponents of nonagentic theories implicitly exempt themselves from their theories of how other folks behave. For example, Skinner argued that humans are shaped and controlled by environmental forces under the illusion that they influence events. But he exhorted people to become operant agents shaping their society by applying his operant-conditioning methods. Radical postmodernists, who emphasize fragmentation and relativity, argue authoritatively for the correctness of their view that there is no one correct view. Eliminative physicalists contend that people's behavior is orchestrated unconsciously by their neural networks while mistakenly believing that they are exercising control. But eliminativists do not portray their own cherished treatises as the product of automatic writing by their neural network under illusory personal authorship.

PHYSICALISTIC THEORY OF HUMAN AGENCY

The mind is the embodiment of conscious cognitive states and processes rather than exists as something apart from the brain. The Cartesian substance dualism, which is almost universally rejected by cognitive scientists, forces one to address the formidable explanatory challenge for a physicalistic theory of human agency and a nondualistic cognitivism. Cognitions are high-level cerebral events involving deliberative, reflective, referential, and evaluative processes, not immaterial entities. It is not a hyphenated mind-body structure involving anatomically separate physical entities acting on each other in a Cartesian physicalism. Rather, it involves highly interconnected brain systems serving different functions subject to higher level control operating within the same material entity. In short, mind is part of hierarchically embedded systems not a separate entity acting on the body. The advanced symbolizing capacity, neuronally distributed

and richly interconnected to diverse sensory and motor systems, provides humans with the means to function as mindful agents.

Cognitive regulation operates at the higher level brain structures. Miller and Cohen (2001) review a growing body of neurophysiological and neuropsychological research verifying top-down cognitive regulation of rule-based and goal-directed behavior. The prefrontal cortex plays an especially influential role in cognitive regulation through its dense connections with a wide range of sensory and motor systems, and limbic structures governing affective and motivational processes. Research on neuromotor prostheses with individuals who have lost sensory and motor functions in paralyzed limbs provides a novel way of verifying deliberative regulation of action (Hochberg et al., 2006). A sensor, implanted in the motor cortex, delivers brain signals to a computer connected to a robotic arm enables a person to use thoughts to guide a prosthetic hand and robotic arm to perform the cognized actions. This type of research can add greatly to our understanding of the organization and temporal regulation of actions by goals and intentions in a top-down forethoughtful way.

Some of the neurophysiological studies of self-relevant cognitive activities include relocation of working memory and attentional resources between external events and self-generated thoughts in the service of self-regulation, and selective disengagement from prepotent external stimuli. These cognitive activities are accompanied by changes in activation mainly in prefrontal and parietal regions of the brain (Gusnard, 2005). Such lines of research are beginning to delineate some of the neurological structures essential for a functional personhood and the self-referential neural circuitry through which it is exercised. The brain is trained during socialization and identity formation in self-representation that is consequential in its operation. Thus, the neural circuitry subserving one's own intentions differs from the circuitry accompanying recognition of others' intentions (Becchio, Adenzator, & Bara, 2005). Given that the brain acts in terms of self-representation, self-referent processes warrant serious study rather than dismissal as a homunculan contrivance because some folks view the *self* not as the person, but as a reified manager residing in a particular place. For reasons given earlier, the neurophysiological bases of agentic activities will not be confined to an anatomically unique structure christened as a *self*. As the preceding studies show, neuroscience has moved beyond expunging an autonomous homunculus to research that advances understanding of the nature and function of higher level cognitive control, and the role played by self-referent processes in human functioning.

There is a difference between a reified self lodged in a control center and a self-representational system that comprises functional properties developed through extensive learning and socialization experiences. These include, among other properties, a personal identity, appraisal of personal capabilities, goals linked to values that give purpose and direction to one's activities, discerned conditional relations that permit forethoughtful actions, and self-reactive

capabilities rooted in personal standards of merit, responsibility, and morality. Life experiences are processed through this self-referential context rather than processed impartially as though one were devoid of any personal investment. The difference between humans as a self-representational system versus simply a bundle of associative networks operating subpersonally is illustrated in the impact of failure experiences on depressive dysfunctions. In the latter view, failures activate across the associative network memory of past failings with their accompanying negative affect. In the former view, failures activate a self-representation as an inefficacious and unworthy person (Teasdale, 1988). The detrimental representation gives rise to depressive dysfunctions through its impact on cognitive, motivational, affective, and decisional processes (Bandura, 1997).

Cognitive capabilities provide individuals with the means to function as mindful agents. Cognitive activities manifested in consciousness not only provide the means to make life personally manageable but worth living. Consciousness encompasses multiple functions that reflect the difference between being conscious of an activity and consciously engaging in purposeful activity (Korsgaard, 1989). It includes a nonreflective and reflective awareness facet, and a conceptual functional facet operating mainly through the linguistic medium. The functional aspect of consciousness involves purposeful accessing and deliberative processing of information for selecting, constructing, regulating, and evaluating courses of action. This is achieved through intentional recruitment and productive use of semantic and pragmatic representations of activities, goals, and other envisioned future events.

In his discerning analysis of experienced cognition, Carlson (1997, 2002) documents the central role that consciousness plays in the cognitive regulation of action and the flow of ideational events. There have been some attempts to reduce consciousness to an epiphenomenal by-product, to an executive subsystem in the information processing machinery, or to an attentional aspect of information processing. A currently popular solution for the consciousness problem posits an interpretive module that concocts fanciful stories about personal influence over one's behavior that is said to be actually subpersonally determined by low-level neural activity. In this conception, one can have consciousness but need not worry about its functional value because it is dismissed as merely epiphenomenal. Some eliminative physicalists simply redefine out of existence this nettlesome phenomenon that keeps intruding into the cognitive machinery. In the subpersonal accounts of consciousness, there is no experiencing person conceiving of ends and acting purposefully to attain them. These reductive accounts strip the prime features of humanness such as subjectivity, deliberative self-guidance, and reflective self-reactiveness. Without a phenomenal and functional consciousness, people are essentially higher level automatons undergoing actions devoid of any subjectivity or

conscious control. Nor do such beings possess a meaningful phenomenal life or a continuing personal identity derived from how they live their life and reflect upon it.

Consciousness is an emergent brain activity with higher-level control functions rather than simply an epiphenomenal by-product of lower level processes. It poses daunting explanatory challenges. Why do humans have a consciousness that operates as a reigning symbolic environment during virtually all of their waking life, if it does nothing? How mind arises from lower level brain processes remains an intractable problem. If the neuronal processes of common activities were automatically reflected in consciousness, it would be hopelessly cluttered with mind-numbing mechanical contents that foreclose any functionality. In driving a car, for example, one's consciousness is filled with thoughts of other matters rather than simply mirroring epiphenomenologically the ongoing neuronal mechanics of driving. What governs which events from among the profusion of ongoing neuronal activities make it into consciousness? We know that people can regulate what inhabits their consciousness through the use of cognitive and behavioral strategies (Bandura, 1997; McCaul & Malott, 1984; Wegner, 1989). There is much work to be done to clarify how lower level brain processes are intentionally recruited in top-down cognitive control to realize given purposes. In this daunting research agenda, researchers have to fend off the specter of homunculan causation.

Social cognitive theory subscribes to a model of emergent interactive agency (Bandura, 1986, 1999a). Cognitive processes are emergent brain activities that exert determinative influence. In emergence, constituent elements are transformed into new physical and functional properties that are not reducible to the elements. For example, the novel emergent properties of water, such as fluidity and viscosity, are not simply the combined properties of its hydrogen and oxygen microcomponents (Bunge, 1977). Through their interactive effects, the constituents are transformed into new phenomena. Van Gulick (2001) makes the important distinction between emergent characteristics of new phenomena and emergent causal powers over events at the lower level.

In the metatheory of cognitive functionalism enunciated by Sperry (1991, 1993), the patterns of neural activities characterizing interpretive and deliberative thought processes have a downward regulatory function over lower level brain processes that lead to action. It will be recalled from the earlier discussion that the evolutionary emergence of a language processing system provided the neuronal structure for the development of a conscious agentic species. Most human thinking operates through language drawing on a vast knowledge base. The core agentic capabilities of intentionality, forethought, self-reaction, and self-reflection operate as hierarchically organized determinants. Their structural and functional properties are central to the exercise of human agency.

SECOND-ORDER CONTROL OF NEUROPHYSIOLOGICAL PROCESSES

In acting as agents, individuals obviously are neither aware of nor directly control their neuronal mechanisms. Rather, they exercise *second-order control*. They do so by intentionally engaging in activities at the macrobehavioral level known to be functionally related to given outcomes. In pursuing these activities, over which they can exercise direct control, they shape their neural circuitry and enlist subpersonal neurophysiological events subserving their chosen pursuits. For purposes of illustration, consider the following analogy. In driving an automobile to a desired place, the driver engages in coordinated acts of shifting gears, steering, manipulating the gas pedal, and applying brakes. The assemblage of auto subsystems provides the intricate operational mechanisms, but they require distinctive higher order activation and regulation. In this multilevel interplay, the acts of driving, which the driver controls directly, regulate the mechanical machinery to get safely to where the driver wants to go. But the driver has neither awareness nor understanding of the correlative microcombustion, transmission, steering, and braking processes subserving the driver's purposes. The deliberate planning of where to go on a trip, what route to take, where to stay, what to do when one gets there and securing reservations for these diverse activities far in advance requires considerable proactive top-down cognitive regulation. The temporal structuring of behavior sets the course for one's activities. Proximal self-regulation provides the guides, strategies, and motivators in the here and now to get to where one is going (Bandura, 1991a). Having constructed a vacation plan, travelers cannot sit back and wait for lower level sensory-motor activity to consummate the vacation arrangements unconsciously.

Consider the second-order control over the intricate neurophysiological machinery. Individuals obviously do not intentionally direct their atrial and ventricular cardiac muscle fibers to fire and their aortic and pulmonary valves to open and close. However, by intentionally engaging in an exercise routine and controlling their activity level, they can enhance their cardiac function and regulate their heart rate without having the foggiest idea of how they indirectly recruited, by their intentional actions, the subserving neurophysiological mechanisms. They can also intentionally speed up and slow down their heart rate by generating frightening and tranquilizing thoughts. In short, enactments of functional activities at the controllable macrobehavioral level serve as the means for agentic recruitment of the subserving brain mechanisms at the microneural level. Framing the issue of conscious cognitive regulation in terms of direct control over the neurophysiological mechanics of action production casts the issue in the wrong terms at the wrong level of control.

Much of the psychological theorizing and research are devoted to verifying functional relations between actions and outcomes and the governing

sociocognitive processes. Because individuals have no awareness of their brain processes does not mean that they are just quiescent hosts of automata that dictate their behavior. Neuroimaging can shed light on the neural mechanisms of cognitive control and how controllable agentic action indirectly develops functional neuronal structures and orchestrates the neurodynamics for selected purposes.

PROACTIVE AGENTS VERSUS ONLOOKING HOSTS

One must distinguish between understanding how the biological machinery works in implementing cognitive algorithms by nervous systems, and how the biological machinery is orchestrated agentically for diverse purposes. To use an analogy, knowing the laws of chemistry and physics on how a television set produces images does not explain the endless variety of creative programs it displays. The creative neuronal activation must be distinguished from the neuronal mechanical action production.

People are contributors to their activities not just onlooking hosts of subpersonal networks autonomously creating and regulating their performances. People conceive of ends and work purposefully to achieve them. They are agents of experiences not just undergoers of experiences. In their transactions with their environment, cognitive agents are generative, creative, proactive, and reflective, not just reactive to external input. The sensory, motor, and cerebral systems are tools people use to accomplish the tasks and goals that give meaning, direction, and satisfaction to their lives (Bandura, 1997; Harré & Gillet, 1994). These tools do not come fully prestructured for complex skills. An aspiring violinist, for example, has to practice tenaciously to train the brain, build muscular strength and dexterity, and hone sensory acuity to realize a virtuoso performance. For example, the remarkably versatile brain has to be trained to execute the pyrotechnical wizardry of a Paganini violin concerto. It takes extensive guided practice to configure the brain circuitry to realize this achievement. Purposed action is not the only way to train the brain, however. Thoughts change the brain by cognitive practice in much the same way as does physical practice (Pascal-Leone, et al., 1995). Although the performance gains are lower, prior cognitive practice reduces the time needed to learn a skill by physical practice. There is much excitement about how the brain regulates behavior to the neglect of how individuals train the brain to serve desired purposes.

Research on brain development underscores the influential role that agentic action plays in shaping the functional structure of the brain (Diamond, 1988; Kolb & Whishaw, 1998). It is not mere exposure to stimulation but agentic action in exploring, manipulating, and influencing the environment that counts. By regulating their motivation and activities, people produce the experiences that form the functional neurobiological substrate of symbolic, social, psychomotor,

and other skills. An agentic perspective fosters lines of research that can provide new insights into the social and behavioral shaping of brain function. This is a realm of inquiry in which psychology can make unique contributions to the biopsychosocial understanding of human development, adaptation, and change. In nonreductive physicalism, all psychological phenomena have a physical basis. Research from an agentic perspective, however, goes beyond the anatomical localization and brain circuitry subserving human activities to advancing knowledge on brain development and its functional organization by behavioral means (Dawson, Ashman, & Carver, 2000).

NONREDUCTIVE PHYSICALISM

A theory of human agency raises the question of reductionism. One must distinguish among three different forms of reductionism (Ayala, 1974). In ontological reductionism, which is almost invariably adopted, mental events are physical states and processes not disembodied immaterial ones. Epistemological reductionism, across specialized scientific disciplines, contends that the laws governing higher level psychosocial phenomena are ultimately reducible to the laws operating at atomic and molecular levels. Methodological reductionism maintains that research on rudimentary processes will explain psychosocial phenomena at higher levels of complexity. In the heyday of behaviorism, for example, elementary processes were explored with animal analogues using mainly rats and pigeons. The knowledge gained through the study of rudimentary processes is generalizable to some aspects of human functioning, but there are limits as to what it can tell us about the complex human capacity for abstraction and symbolic thinking or the workings of societal systems.

It is the epistemological form of reducibility that is most in contention. The major argument against it is that each level of complexity—physical, chemical, biological, psychological, and social structural—involves emergent new properties that are distinct to that level. In this transformative process, the simpler constituent elements produce qualitatively new phenomena through their interactive effects. The new phenomena at each level of functional complexity must be explained by laws in its own right. Proponents of nonreductive physicalism are physicalists at the ontological level but nonreductionists at the epistemological level. Hence, physicality in the ontological sense does not imply reduction of psychology to biology, chemistry, or physics. Were one to embark on the epistemological reducibility route, the journey would traverse biology and chemistry and ultimately end in atomic subparticles. Because of emergent properties across levels of complexity, neither the intermediate locales nor the final stop in atomistic physicalism can fully account for human behavior.

As Nagel (1961) explains, there are several necessary conditions for reducibility: They include explicitness of theoretical postulates for each specialized

discipline, correspondence or connectability through theoretical terms in common, and derivability from the postulates of the reducing theory. Neither the concepts nor the predicates in psychological theories have representational counterparts in chemistry or physics. Nor do they have an adequate set of bridging principles linking the vocabularies of two theories that are necessary to fulfill the conditions of connectability and derivability. There are lively debates about the required preciseness in linkage between the reduced and reducing theories, whether empirically established links between the two suffice or whether the bridging principles must provide logically necessary conceptual links (van Gulick, 2001).

Consider even the reduction of psychology to biology. Much of psychology is concerned with discovering principles about how to structure environmental conditions to promote given personal and social outcomes and the psychosocial processes through which they produce their effects. This line of theorizing, much of it containing exogenous factors, does not have corresponding concepts in neurobiological theory. How the neuronal machinery works and how to regulate it by psychosocial means are different matters. Each explanatory system is governed by its own set of principles that must be studied in its own right.

For example, knowledge of the locality and brain circuitry subserving learning has little to say about how best to devise conditions of learning in terms of level of intellectual challenge; how to get people to attend to, process and organize relevant information; and whether learning is better achieved independently, cooperatively, or competitively. Psychological science provides a rich body of knowledge regarding the conditions conducive to learning and the psychosocial processes through which they operate. These social determinants reside in the structure of learning environments and in socially rooted incentive systems, enabling opportunity structures, and constraints (Bandura, 1986; Johnson & Johnson, 1985; Rosenholz & Rosenholz, 1981). These determinants operate through modeling, social norms, aspirations, and expectations conveyed in the practices of families, peer relations, school systems, and socioeconomic life conditions (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996, 2001). These are the collective social dynamics of human learning. They have no conceptual counterpart in neurobiological theory and, therefore, are not derivable from it. The optimal learning conditions must be specified by psychological principles. A full explanation of human learning must, therefore, encompass both the psychosocial principles and the subserving neurobiological principles.

System-level emergence calls for theoretical plurality across physical, chemical, biological, psychological, and social structural levels of function with linkage between them rather than reducibility to a single superseding theory. The issue of reductionism in an applied social science must also be evaluated in terms of functional criteria. Can laws at the subatomic or molecular levels tell us how to develop efficacious parents, teachers, executives, or tenacious social reformers? For reasons already given, a psychological level theory is required to provide such guidance.

DISMISSAL OF AGENTIC CONTRIBUTION TO HUMAN FUNCTIONING

The key argument against agentic capabilities is that human action is governed by intricate neural mechanisms that operate outside of one's awareness and control. Hence, thoughts are epiphenomenal events that create an illusion of control but actually have no effect on how one behaves. This is a highly truncated view of how humans exercise control. As explained earlier, people intentionally control functional activities at the macrobehavioral level that activate the subserving events at the microneural level.

Consider some other types of data allegedly demonstrating that conscious cognition has no effect on how one behaves. Rapid activities, such as proficient typing, are said to be much too fast for thought to control the fleet finger movements (Wegner, 2002). Thank goodness it does not have to do so. This line of reasoning fails to distinguish between the differential role that cognition plays during skill development and in its later routinized execution. Human learning is laborious without the aid of instructive thought and awareness of what one is doing. Skill development proceeds through several phases involving a number of different psychomotor functions (Bandura, 1986; Fitts & Posner, 1968). The first phase, in which cognitive factors play an influential role, involves formation of a conception of the skill. The conception serves several proactive functions. It specifies how relevant subskills must be selected, coordinated, and sequenced to suit particular purposes. It also provides the internal standard for translating symbolic conception into proficient performance (Carroll & Bandura, 1990). Without some notion of how the activity is best performed, novices are at a loss as to where to begin, what to do, and what to change. Conceptions are formed on the basis of knowledge gained through social modeling, inferences from response outcomes, and verbal modes of instruction.

These symbolic modes of learning shortcut the toilsome and potentially hazardous form of learning through the rewarding and punishing effects of trial-and-error action. There is considerably more to physical skills, of course, than motor mechanics. Performers have to read multifaceted situations, select effective strategies, anticipate likely outcomes, and improvise performances to suit changing circumstances. Flexible and strategic performance requires a high level of cognitive self-regulation.

Human action is regulated by multilevel systems of control. After proficiency is acquired with cognitive guidance, the skills become routinized and no longer require cognitive control. Their execution is regulated largely by lower level sensory-motor systems in recurrent situations. The actions are run off swiftly without conscious awareness or control. For example, when learning to drive a car with a manual transmission, thoughts about the required operations and the order in which to do them guide the driver's psychomotor learning. After driving becomes a well-integrated routine, people think of other matters

while busily driving. Indeed, attending to the mechanics of what one is doing after proficiency is achieved would seriously disrupt skilled performance.

Partial disengagement of thought from proficient action has considerable functional value. Having to think about every skilled action before carrying it out in recurrent situations would consume most of one's precious attentional and cognitive resources and create a monotonously dull inner life. However, when routinized actions fail to produce expected results, cognitive guidance again comes into play. Both the behavior and the changing environmental circumstances are analyzed to identify the source of the problem. New actions are constructed and tested. Control reverts to the lower sensory and motor control systems after an adequate course of action is found and becomes the habitual way of doing things.

Even though thought is disengaged from the mechanics of routinized actions, cognition continues to play an influential role through its strategic function. For example, batters facing a baseball coming at them at 90 miles an hour must anticipate the likely pitch, predict it instantly from subtle pitching cues, and adjust the swing within a split second. They must do their thinking anticipatorily because there is no time for deliberation as the activity is being performed. Coaches amass detailed conditional probabilities of what pitchers are likely to toss in particular situations at particular times with particular batters and relay this information to their batters (Will, 1990). Pitchers are similarly provided with detailed predictive information about the strengths and limitations of the batters they face and what type of pitch to deliver to a particular batter in a particular situation. In the elaborate communications throughout the contest, the athletes try to anticipate and counter each other's strategies at each instant of play. In short, there is a lot of cognitive self-regulation in the contextual orchestration of routinized skills.

It is a common error to equate automation with unconsciousization. The automation of complex skills involves at least three major processes (Bandura, 1986). The first process is *mergerization*, whereby the essential elements of an activity are combined into progressively larger units. When a skill is being learned, the activity is fractionated and some thought must be given as to what to do at each step and transition point in an enactment. Once the routine is put together through the aid of thought and extensive practice, there is no longer any need to think about the subparts and how they should be spatially and temporally coordinated (LaBerge, 1981; Neves & Anderson, 1981). Thought is thus freed for other purposes.

The second process of automation is the establishment of *contextual linkages*. After dealing with the same situation repeatedly, performers eventually learn what works best in that highly predictable situation and respond automatically to predictive situational cues without having to think about what to do. The third process in the automation of skills is a shift in the *locus of attention* from the mechanics of the action to its correlated effects. Actions produce

observable effects that indicate what one is doing automatically and suggest needed performance corrections. For example, after driving is routinized, drivers attend to where the car is going. Should it drift off course, they instantly make corrective steering adjustments to get back on track. In shifting their locus of attention with automation, performers monitor the effects of their actions not mechanics of what they are doing.

As the foregoing discussion illustrates, human action is not the product of a unitary process. Most activities contain both cognitively guided and automatic aspects as well as top-down and bottom-up processing. Moreover, the level and form of cognitive guidance changes across phases of skill development and situational circumstances.

Studies by Libet (1985, 1999) are also frequently cited as telling evidence that subconscious neural activity precedes by some milliseconds the conscious intention to act. However, the studies have serious methodological problems that detract from the interpretability of the findings. On the consciousness side, the studies focus on amorphous affective states without discrete onset rather than on an explicit intention to act. Participants were asked to report when they first felt a "desire," "urge," or a "want," whichever was to their liking, and to move their finger or flick their wrist. These are not interchangeable affective states, nor are they intentions as claimed in the articles and citations of the studies. A *want* is a longing; a *desire* is a yearning; an *urge* is an impulse. Intentions represent a determination to act, not a longing or a yearning to do so. Participants were told to adopt a passive mind-set to watch for the appearance of an urge as it emerged "spontaneously" rather than to assert an intention to act. The focus is on self-monitoring of an emerging affective experience. Findings based on onlookers waiting for wants, desires, or urges to rise into view have questionable relevance to a proactive intentional stance.

The alleged "voluntary act" was embedded in a highly constraining and attentionally conflicting context. The activity was consciously prescribed rather than unconsciously decided. Knowing what to do engages second-order control that recruits the subserving lower level neurobiology. Participants had to divide their attention between sensing a desire or urge and an intrusive timing device requiring them simultaneously to fixate on a revolving spot on an analog clock dial, resist following it as it revolved speedily, restrain blinking, note the spot's position when they felt the urge, and commit the judged time to memory for retrospective report. The cognitive processing involved in judging, synchronizing, and remembering clock positions takes some time. The difference between the neural events and the reported affective state is in the milliseconds amidst these multiple conflicting attentional and cognitive demands that create time lags. The generation of an intention centrally, its appearance in awareness, and its temporal registry involve a three-step process with time lags at each step. The actual experience of awareness is undoubtedly much sooner than the recorded time.

Then there is the problem of gauging awareness. Awareness of a conscious event is not a pinpoint experience. Awareness is a progressive event with decisional thresholds of when participants feel sure enough to report a felt desire or urge. Subjective self-report thresholds further increase the latency. The ambiguity of the conscious events being monitored and their timing, multiple conflicting attentional demands, and fuzziness in the precise onset of awareness detract from the interpretability of the temporal ordering of events. If the alleged "intention" is an afterthought, there is the mystery of what sets off the initiatory neural activity. Evidence that preplanning precedes it underscores the need to examine systematically the cognitive activities accompanying the generation of an intention to act. Participants are not sitting idly with a blank mind waiting for an intention to emerge spontaneously. The cognitive activity leading up to a decision to act is part of the instigating condition.

Finally, there is the issue of ecological validity and generalizability. Performance of a purposeless, decontextualized, fractional movement over and over again in multiple sessions may have little to say about the cognitive regulation of action under less fragmented and denuded conditions with wide choice of what to do, often over an extended time course. Continuing with our vacationing motorist, the vacation plan, formulated through a lot of deliberative thought, sets the agenda for a host of preparatory activities and when they should be done. This requires a lot of proactive cognitive regulation. The writings on human agency underscore the influential role played by distal intentions in the cognitive organization and temporal regulation of one's activities (Ismael, 2006; Mele, 1992; Nahmias, 2005). Distal goals structure and give direction to one's activities. But their regulatory influence is best sustained by proximal subgoals that specify what must be done in the here and now to turn a distal vision into reality (Bandura, 1991a). In the case of our vacationer, implementation of the vacation plan does not necessarily require cognitive reminders before performing each preparatory act. In keeping with the dual-level control described earlier, once one knows what needs to be done with commitment to it, calendars, timepieces, and places cue the appropriate actions. For reasons given above, a prescribed isolated finger movement linked to an ambiguous conscious state of equivocal onset is not the type of experimentation on which to rest one's case that thought cannot initiate or regulate action.

A controversial paper by Nisbett and Wilson (1977) is also often cited as evidence that people's actions are governed by unconscious cognitive processes, whereas their conscious cognitions are simply post hoc conjectures about the causes of their actions. A detailed analysis of conceptual and methodological problems raised by their research is presented elsewhere and will not be reviewed here (Bandura, 1986). The present comment centers on the methodological flaw of using retrospective thoughts to confirm that antecedent conscious thoughts have no effect on how one behaves. In the studies, people are asked to explain, after the fact, the reasons for their behavior, or they were presented

with preselected factors and asked to judge how they may have influenced their behavior. This retrospective design violates the key temporal criterion that the cause precedes the effect. Tests of whether cognition affects action must assess the thoughts preceding the actions rather than asking participants after undergoing varied experiences to speculate about the causes of their behavior, often with probes that can bias recall by diverting attention from relevant factors or instructing people to judge the influence of irrelevant factors (Adair & Spinner, 1981). Recall can be easily biased, as Loftus (2005) has shown, by what questions are asked and how they are phrased.

In a comprehensive analysis of retrospective thought probes, Ericsson and Simon (1980) explain why the types of probing techniques used by Nisbett and Wilson are ill suited to elucidate the role played by conscious cognition in human behavior. Often the wrong contents are measured by the wrong probes at the wrong time. Ericsson and Simon summarize a great deal of evidence showing that when thoughts are assessed with refined procedures while the activity is ongoing, people verbalize cognitive processes that relate to how they behave.

Another argument against higher level organization and regulation of activities enlists examples of self-organizing systems in which seemingly coordinated activities arise from autonomous subsystems doing their own thing without any overall guidance. The social organization of insect colonies, in which different castes are innately programmed to perform special subfunctions, are often cited. The collective behavior of insects with an inborn repertoire to execute mechanically a specific action pattern in a particular milieu has little generalizability to the complex functional systems built and operated by humans. To cite but one example, it is a gigantic leap from innately choreographed rituals in an anthill to the extraordinarily innovative and intricately coordinated master plan at NASA to send astronauts to the moon and bring them back safely.

A national vision of space exploration inaugurated this daunting mission. Bringing it to fruition required elaborate central guidance in creating innumerable subsystems and integrating them to function as a complex, interlocking, holistic system. The moon launch required success on the first try rather than mindless trial-and-error groping year after year to evolve a reliable mode of excursion into the inhospitable atmosphere of outer space. The technological evolution relied, in large part, on cognitive ingenuity rather than on morphogenetics. Error elimination was achieved by drawing on specialized knowledge, creating theoretical and process models for computer simulations to test systems under varied possible conditions, and using the results of simulations and the performance of prototypes to redesign and refine the systems. Cognitively guided computational enactments have to supplant, for the most part, physical enactments because of the catastrophic consequences of malfunction in any one of the interlocking subsystems. Once the satellite is airborne, the crew, with the central guidance of their terrestrial overseers, has to solve any

unforeseen problems during the mission and the descent. "Houston Control" is not a capricious, epiphenomenal narrative spawned by subpersonal neuronal activity operating autonomously below the level of awareness.

MORAL AGENCY

The exercise of moral agency, rooted in personal standards linked to self-sanctions, is an important feature of an agentic theory of human behavior (Bandura, 1986). In the development of moral agency, individuals adopt standards of right and wrong that serve as guides and deterrents for conduct. In this self-regulatory process, people monitor their conduct and the conditions under which it occurs, judge it in relation to their moral standards and perceived circumstances, and regulate their actions by the consequences they apply to themselves (Bandura, 1991b). They do things that give them satisfaction and a sense of self-worth and refrain from behaving in ways that violate their moral standards because such conduct will bring self-condemnation. Thus, moral agency is exercised through the constraint of negative self-sanctions for conduct that violates one's moral standards and with the support of positive self-sanctions for conduct faithful to personal moral standards.

People have the capability to refrain as well as to act. In the face of situational inducements to behave in inhumane ways, they can choose to resist prepotent social pressures by exerting self-influence. The moral knowledge and standards about how one ought to behave constitute the cognitive foundation of morality. The evaluative self-sanctions serve as the motivators that keep conduct in line with moral standards. Moral thought is translated into moral conduct through this self-reactive regulatory mechanism (Bandura, 1991b).

Moral agents commit themselves to social obligations and righteous causes, consider the moral implications of the choices they face, and accept some measure of responsibility for their actions and the consequences of their actions for others (Keller & Edelstein, 1993). The types of activities that are designated as moral, their relative importance, and the sanctions linked to them are culturally situated. Hence, societies, and even subgroups within them, vary in the types of activities and social practices they consider to be central to morality (Shweder, 2003).

The exercise of moral agency has dual aspects—*inhibitive* and *proactive* (Bandura, 2004a; Rorty, 1993). The inhibitive form is manifested in the power to refrain from behaving inhumanely. The proactive form is expressed in the power to behave humanely. In this dual nature of morality, people do benevolent things as well as refrain from doing harmful things. When individuals strongly invest their self-worth in certain principles and values, they will sacrifice their self-interest and submit to prolonged maltreatment rather than accede to what they regard as unjust or immoral (Bandura, 1999b; Oliner & Oliner, 1988).

Moral standards do not function as unceasing internal regulators of conduct, however. Various psychosocial mechanisms can be used to disengage moral self-sanctions from inhumane conduct (Bandura, 1991b). Selective moral disengagement is most likely to occur under moral predicaments in which detrimental conduct brings valued outcomes. The disengagement may center on sanctifying harmful conduct by moral justification, exonerating social comparison, and sanitizing language. It may focus on obscuring personal agency by diffusion and displacement of responsibility so that perpetrators do not hold themselves accountable of the harm they cause. It may involve minimizing, distorting, or even disputing the harm that flows from detrimental actions. And the disengagement may include dehumanizing, demonizing, and blaming the recipients of the injurious actions. Through selective moral disengagement, people who are considerate and compassionate in other areas of their lives can get themselves to support detrimental social policies, carry out harmful organizational and social practices, and perpetrate large-scale inhumanities (Bandura, 2004b [in press]).

In the nonagentic microdeterministic theories reviewed earlier, behavior is the product of nonconscious processes in which environmental inputs activate subpersonal modules that cause the actions. If people's actions are the product of the nonconscious workings of their neuronal machinery, and their conscious states are simply the epiphenomenal outputs of lower level brain processes, it is pointless to hold anyone responsible for the choices they make and what they do. Transgressors should not be held personally accountable for their crimes, police for abusive enforcement practices, prosecutors and jurors for biased sentencing practices, jailers for maltreatment of inmates, and the citizenry for the harmful social conditions that their public policies and practices breed. They can all disclaim responsibility for their actions. Their neural networks made them do it.

Analyses of neuroethics center mainly on the more parochial issues. They include the ethics of pharmacological manipulation of neural systems for self-enhancement and court-ordered management of offenders, the breaching of privacy through functional neuroimaging to detect personal characteristics and cognitive and emotional states, genetic counseling that foretells a disordered future in ways that can be self-fulfilling, and the like (Farah, 2002). The broader moral implications receive little notice, however.

The subpersonal workings of the biological machinery are nonethical. The nonconscious neural processes at the microlevel have neither a sense of personal responsibility nor morality. The issue of morality arises in the purposes to which behavior is put, the means that are used, and the human consequences of the actions. A deterministic thesis that humans have no conscious control over what they do, in fact, represents a position on morality. It is one of moral nonaccountability that is socially consequential. Would a nonagentic conception of human nature erode personal and social ethics that undergird a civil society? How

would people create and maintain a civil society if its members are absolved of any personal accountability for their actions?

The incompatibility of nonethical neuronal mechanisms producing ethical and socially responsible conduct poses a formidable challenge for nonagentic theories of human behavior. The proposed solutions usually provide a selective allowance for conscious regulation in the moral domain. In this way one can have automatonization with moral accountability. Libet (1999) voiced concern over the automaton view of human nature and the characterization of humans as blissful illusionists. He proposed a dual-control system in which individuals do not control the initiation of a voluntary act but they can consciously control whether to enact it or veto it. Hence, people can be held responsible for their conduct. Libet's critics vetoed his conscious control function with the regress argument that the conscious veto function is itself the product of preceding unconscious neural processes. Hence, individuals should not be held accountable for what they do not consciously control. This view strips unreservedly any capacity for self-regulative influence over behavior that is morally consequential.

Wegner (2002) also proposed a selective controllability for the pesky morality problem in terms of his conceptual model that Nahmias (2002) calls "modular epiphenomenalism." In this view, environmental inputs activate subconsciously both the neural mechanisms that cause the action and a specialized interpretive module structurally disjoined from the action production system. This complete structural disconnect is puzzling given the intricate neuronal interconnections in the brain (Nahmias, 2002). The interpretive module creates the illusion that one caused the action. This epiphenomenal sense of personal authorship is said to have no causal influence. So what good is an epiphenomenal "self-portrait" if it is merely a "loose end" that cannot affect how one behaves? To get ethicalness into this unconscious subpersonal system, the illusory self-view that one caused the detrimental conduct is invested with casual properties that "can have influences galore" (Wegner, 2004, p. 36). It makes one feel guilty, prompts restitutive acts, and gets one to behave responsibly on future occasions. Rather than resolve the moral incompatibility, the noncausal modularism creates, through unspecified processes, an anomalous epiphenomenon with behavioral causative power, which epiphenomena are not suppose to have. It is also peculiarly selective in its determinative function. The illusory feeling of personal control allegedly affects ethical behavior but can have no effect on other classes of behavior. If the causative power of the epiphenomenal self-view applies broadly, illusory agency begets actual agency for all types of activities. So, for the epiphenomenalists and eliminativists, it is back to the conceptual drawing board on how to make a conscious automaton accountable for its conduct.

Roskies (2006) reassures readers that they need not fear that neuroscience will undermine people's view of themselves as responsible agents. This is because people's judgments of responsibility are unaffected by whether they

subscribe to a deterministic or indeterministic view of the world. Given the profusion of interacting neurons, whether a neuron will fire and the type of action potential it generates is probabilistic rather than deterministically inevitable. Hence, Roskies contends that neuroscience cannot undermine freedom and moral responsibility because, at the present state of knowledge, it cannot tell us whether the brain is a deterministic machine. Whether the variability reflects indeterministic processes or complex deterministic ones has to be resolved by physical theory rather than at the level of neurons. For these reasons, in Roskies' view, the ostensible moral problem is the perception of a problem, which she regards as misguided. Neuroethicists and metaphysicalists are not the only ones who have addressed the ethical implications of a neuroscientfic view of human nature. Some folks on the outside have also weighed in with thought-provoking perspectives on this matter (Wolf, 1996).

Morality is not just a matter of perception, however. Simply believing in responsibility is neither personally nor socially consequential unless people have agentic capabilities not only to regulate their conduct, but to create social systems for managing their affairs with authorized rights and the power to implement societally prescribed sanctions. Moral conduct is regulated by three types of sanctions: legal sanctions, social sanctions, and self-sanctions (Bandura, 1986). Their effects are mediated through cognitive processes regarding anticipated risks and potential consequences.

Whether or not a neuroscientific view will erode moral responsibility depends on the form the theorizing takes and the types of experimentation it spawns. In a stimulus driven, bottom-up view in which human behavior is regulated by neuronal processes outside one's awareness and control with thoughts as functionless by-products, as epiphenomenalists and eliminativists contend, it is pointless to hold people responsible for what is beyond their control. If the neuroscientific view recognizes second-order control of brain processes, and the regulative influence of top-down deliberative conscious thought, people can be held accountable for what they do. The latter is a proactive deliberative model the former is a nonconscious reactive one.

The capacity for moral agency is founded on a sense of personal identity, moral standards, and behavioral regulation through self-sanctions (Bandura, 1991b). This ability is acquirable. Social judgments of detrimental conduct are made in terms of personal controllability of the actions. For example, it is within individuals' capacity to stop at a red signal light. A driver who caused a fatal injury by running a red light would be held accountable for his actions. In moral agency, individuals can exercise some measure of control over how situations influence them and how they shape their situations. In the triadic interplay of intrapersonal, behavioral, and environmental events, individuals insert personal influence into the cycle of causation by their choices and actions. Because they play a part in the course of events, they are at least partially accountable for their contribution to those happenings.

Research conducted within the agentic perspective has furthered our understanding of the determinants and processes governing the development and exercise of moral agency (Bandura, 1991b, 1999b). These are rooted in reflexive self-representation and self-reaction. The diverse lines of research clarify how individuals construct moral standards that give meaning and value from the mix of social modeling, the moral values conveyed by evaluative social sanctions to one's conduct and by tuitional means. The theory and verified knowledge specify the processes by which people select, weigh, and integrate morally relevant information in making moral judgments. They verify the self-regulatory mechanisms whereby moral judgments are linked to moral conduct through self-sanctions. And elucidate the psychosocial processes through which moral self-sanctions are selectively engaged and disengaged in the management of moral predicaments.

CONCLUDING REMARKS

Nonagentic theories of human behavior bear resemblance to the behaviorism of yore. In the contemporary reincarnation, stimulus inputs build and strengthen associations automatically and unconsciously. Neural networks become the embodiment of the history of reinforcement. Situational priming bears close likeness to activation by conditioned cues invested with eliciting and signaling properties through correlated experiences. Beliefs, goals, expectation, and other cognitive factors are dismissed as explanatory fictions. It would be the height of irony if the heralded cognitive revolution, which dispatched behaviorism with an indecorous burial, ended up resurrecting it from the presumed dead.

The value of a psychological theory is judged not only by the usual criteria of explanatory and predictive power. In the final analysis, its worth is evaluated by its operative power to solve problems and provide reliable guides for effecting personal and social change. What do nonagentic theories have to offer by way of social utility? They are nihilistic regarding people's capacity to affect the course of events in their lives and are heavily dependent on a stimulus driven approach to regulate behavior subterraneously in the host organism. Many decades ago, Skinner (1971a, 1971b) dubbed cognitive events as explanatory fictions, and attributed freedom, dignity, and the creative products of the mind to the work of environmental forces for which individuals mistakenly take credit. Have we come full circle?

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