

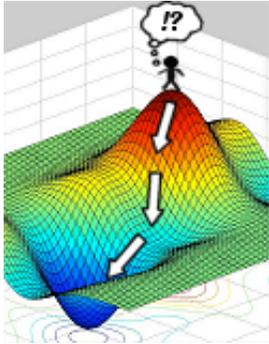
The Ghost in the System: Where Free Will Lurks in Human Minds

By Jay Michaels & Robin Vallacher, on 21-10-2009 15:49 **NEW!**

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By late January 2002, the FBI had strategically secured what documents remained at Enron's Houston headquarters following evidence that employees were destroying documents that implicated them in wrong-doing in what was one of the greatest accounting scandals in United States history. Company staff fed reams of papers through shredders, one employee even taking home some of the scrapped documents to use as packing material (**CNN**, 2002). With the Enron scandal a prominent fixture in the news throughout late 2001 and into 2002, certainly those shredding the documents were responsible for their actions and should be held accountable. After all, they knew what they were doing, they chose to do it, and the actions they performed required both thought and a conscious decision to not engage in alternative actions. In acting with self-awareness, personal choice, consciousness, and a sense of purpose, the employees demonstrated the hallmarks of what is commonly regarded as free will.

The Free Will Debate: Psychological Science versus Psychological Reality

As compelling as this conclusion is, it doesn't sit well with scientific psychology. Of course, if free will is defined as choice, higher-level thought, or goal-directed behavior, then there is no problem. Free will simply becomes an umbrella term for these well-documented features of human experience. But free will has other connotations that fly in the face of scientific assumptions about the sources of human thought and action (e.g., **Bargh & Chartrand**, 1999; **Skinner**, 1971). The most troublesome connotation is that freely chosen actions are somehow decoupled from the causal forces that are presumed to underlie any action. Regardless of physiological processes, developmental history, or current circumstances, the person is "free" to choose any course of action among the alternatives that present themselves. This view of human behavior is simply untenable from a scientific perspective. If psychologists believed that thoughts, feelings, and actions could spring from nowhere without warning, they would be resigned to ascribing human experience to chance, or worse, to the philosophically untenable notion of the homunculus (the little man inside the head) and the infinite regress it implies.

Scientific psychology, at least in its contemporary form, does not deny that people think and make conscious choices. However, any choice that a person makes reflects the interactions of multiple influencing forces, from genetics and neurotransmitters to family size and cultural traditions. The precise cause and effect relation leading to a person's conscious action can seem mysteriously lost because of these many complex forces, but that does not mean human experience operates independently of deterministic factors. The alternative, from a scientific perspective, is to posit a "ghost in the machine" that controls a person's conscious will in ways that are immeasurable and cannot be tested.

Science is one thing; the reality of social life is another. In the social mind, free will is synonymous with personal control and responsibility. If people believed that every thought, feeling, and action resulted from causal processes over which they had no control, they would be hard-pressed to blame the Enron employees for their actions, let alone send them to prison and otherwise hold them accountable. People can certainly be influenced by external forces (e.g., authority, social pressure, stress), personal history (e.g., insecure attachment, poverty, trauma), and biological processes (e.g., hormones, neurotransmitters, neurological mechanisms), but ultimately people are held responsible for what they do. We pass harsh judgment on people who engage in immoral or illegal behavior, condemning them to severe punishment if the behavior is sufficiently offensive. By the same token, we admire others who resist temptations, act heroically, or defy malevolent authority—even if science can specify the conditions and personality characteristics that make such behavior understandable, even inevitable.

The assumption of free will goes beyond crime and punishment or virtue and reward. It colors our daily interactions in mundane settings. We react to one another as if we are origins rather than pawns, capable of choosing how to think and behave as we navigate the field of forces in everyday life. We give a certain amount of latitude to people who point out external reasons (e.g., social pressure), internal states (e.g., anxiety), and past events (e.g., insecure childhood) for their behavior, but at some point such explanations are seen as excuse-making, rationalization, or lack of willpower.

Dynamics of Freedom in Mental and Social Systems

How, then, are we to understand the conflict between the scientific assumption of causation and the equally strong (and socially adaptive) assumption of free will in everyday life? To some extent, the belief in free will reflects people's lack of insight into their psychological processes (e.g., **Mandler**, 1975; **Nisbett & Wilson**, 1977) and their corresponding reliance on information processing strategies to determine the source of their own and others' behavior (e.g., **Bem**, 1967; **Wegner**, 2002). People ascribe



personal agency to themselves and others when the genuine sources of behavior are too subtle or temporally distant to be given much credence or noticed in the first place. In the criminal justice system, for instance, factors such as extreme stress and obvious mental impairment are recognized as mitigating factors and are often taken into account when assigning personal responsibility for wrongdoing. That excludes a wide range of less obvious social factors and invisible biological processes that may be equally relevant in promoting socially undesirable patterns of thought and behavior.

But people go beyond using free will as a default explanation for behavior with subtle causes. Even when external forces are salient, an individual is held personally responsible if he or she knew what he or she was doing and made a conscious choice to act in that fashion (cf. **Baumeister**, 2008; **Harvey**, 1976). We suggest that a more fundamental explanation of the attribution of free will can be derived from the perspective of *dynamical systems* theory. In recent years, this approach to understanding phenomena in the physical sciences has been adapted to identify basic operating rules that are manifest in diverse aspects of human experience, from self-concept to social change (cf. **Vallacher & Nowak**, 2007).

In generic terms, a *dynamical system* is simply a set of interconnected elements that influence one another over time. In social systems, the elements correspond to individuals; in mental systems, the elements correspond to thoughts, feelings, and memories. In each case, the influence among elements promotes the *emergence of higher-order units* that provide coherence for the constituent elements. In a social system, the mutual influence among interacting individuals promotes the *emergence* of higher-order norms and beliefs, which then coordinate and constrain the activities of the individuals comprising the group or society. In a mental system, the specific cognitive elements that succeed each other in the stream of consciousness influence each other to achieve a common higher-order meaning. These higher-order meanings emerge from the *self-organization* of the different cognitive elements, creating attitudes, social judgments, and values from a collection of individual thoughts, experiences, and behaviors. Once a higher-order state has emerged via *self-organization*, it tends to resist change. Dynamically, the state functions as an “*attractor*,” in that the elements are, over time, “attracted to” the coherent meaning provided by the higher-order state.

In a system governed by *attractor* dynamics, active processes are engaged in service of maintaining a stable and coherent higher-order state. A new and incongruent element may temporarily disrupt the state, but over time the system will return to its *attractor*, even if this means rejecting the incongruent element or changing its importance or meaning. The stabilizing tendency of *Attractors* is readily apparent in cognition, affect, and action. In a cognitive system, inconsistent information that challenges a coherent attitude or value is reinterpreted to reduce the inconsistency or, failing that, is discounted as unimportant or suppressed in subsequent thought. In an affective system, a person’s overall mood is typically stable over long periods of time. Momentary events, even life-altering ones such as winning the lottery or losing a loved one, will perturb a person’s mood only for awhile. Over time, the person’s mood will return to its previously organized (*attractor*) state (e.g., **Gilbert, Wilson, Pinel, Blumberg, & Wheatley**, 1998).

Action systems, too, can be understood in terms of *attractor* dynamics. People act in accordance with goals, values, and personality traits that promote consistency across time and circumstance. These constructs, however, are not confined to rigid unchanging behavior. Rather, a goal or a trait is a relatively high-level identity for behavior that can be instantiated through a variety of lower-level acts (cf. **Shoda, LeeTiernan, & Mischel**, 2002; **Vallacher & Wegner**, 1987). In dynamical terms, the goal or trait functions as an *attractor* that stabilizes behavior at a superordinate level while promoting a flow of behavior on a moment-to-moment basis at a subordinate level. A dynamical system may have more than one *attractor*, each providing a unique organization of the system’s elements. In such a “multi-stable” system, the system’s behavior may display a sudden and qualitative (nonlinear) change in response to a seemingly trivial factor. In a mental system, for example, a person’s attitude regarding a personally important topic (e.g., relationship partner) may resist the influence of contradictory information (e.g., rumors of infidelity) until a threshold or “tipping point” is reached, at which point the system displays a dramatic change from one coherent state (e.g., liking, trust) to another (e.g., dislike, suspicion).

Dynamics and the Reality of Personal Freedom

If thoughts, feelings, and behaviors are constrained by *attractors*, why do people insist that they have free will? Why, in other words, do people believe they are free when their decisions and actions are essentially lower-level means of maintaining and expressing a higher-order coherent state? The general answer is that an *attractor* is rarely the object of attention but rather provides the boundary conditions within which people experience specific thoughts, feelings, and behavior that succeed each other in time. An *attractor* for thinking, for example, is not characterized by a single and static thought, but rather by a range of thoughts that converge on a common meaning or theme. Indeed, the higher-order state itself might not be expressed at all, operating instead as an implicit guide to mental process, its presence apparent only in the person’s pattern of thought, feeling, and action. On a moment-to-moment basis, where people spend most of their time mentally, the mind is dynamic, generating thoughts and emotions that seemingly arise out of nowhere in an almost whimsical fashion. The person thus feels in charge of his or her conscious thoughts, even though the succession of thoughts is directed by the underlying *self-organization* of mind and its *attractors*.

Because the specific mechanisms in service of the *attractor* operate outside of awareness, the person feels as if some global property of mind—his or her insight, perhaps, or conscious will—is the source of moment-to-moment thoughts and feelings. Of course, the person can introspect on the nature of his or her thought process, but doing so transforms the stream of thought, with the person’s focus shifting to the mechanisms of thought rather than their products. Such introspection, moreover, requires another set of

mechanisms which are implicit in their operation. The person can then reflect on those mechanisms, but this again transforms the stream of thought and involves yet other tacit mechanisms, and so on, in an infinite regress that is as productive as chasing one's own shadow. In short, the processes responsible for constraining the flow of thought in service of an *attractor* are tacit in their operation—people look through these processes, not at them. Because *attractor* dynamics are invisible during their expression, people feel as though they are directing the show and can willfully change course at any time.

Thought and behavior are not always in service of *attractor* dynamics, however. In an unfamiliar situation or when considering novel action alternatives, for example, the person may lack a coherent higher-order state that constrains the flow of consciousness (cf. **Vallacher & Wegner**, 1987). In the absence of an *attractor*, the person's trajectory of thought and behavior follows one of two scenarios. On one hand, it may be under the control of the social or physical context surrounding the actor. This scenario reflects the “power of the situation” mantra that permeates certain quarters of social psychology. Sometimes, however, the context provides weak or conflicting guides for mind and action. In this case, the person's thoughts and behaviors are unconstrained, capable of taking off in very different directions depending on slight variations in initial conditions (e.g., a trivial feature of the situation, a random thought, or a spontaneous lower-level action).

This latter scenario comes very close to capturing the true essence of free will. (Interestingly, a system that is not constrained by an attractor is said to have many “degrees of freedom.”) But this is not the type of free will that people find desirable (cf. **Dennett**, 1985). To navigate the demands and choices of social life, people need a frame of reference that provides a coherent and stable platform for decision-making and action. Having a surplus of choices can undermine a person's sense of control, promoting a corresponding decrement in his or her feeling of free will. **Harvey and Jellison** (1974), for example, found that people had a greater sense of personal freedom and control when they could choose from six as opposed to twelve alternatives. Too much freedom of choice—or conversely, too little constraint—can be aversive, reducing a person's freedom to a sense of uncertainty and indecision. Faced with this prospect, people look for and embrace cues to higher-order meaning that provide a coherent framework for thought and action—even if this means adopting the perspective of influence agents and authority figures (**Vallacher & Wegner**, 1987). In effect, the lack of constraints on moment-to-moment dynamics promotes what existentialist philosophers call an “escape from freedom” (e.g., **Fromm**, 1941).

Constraint and Freedom in the Free Will Debate

There is a certain irony to the dynamical perspective on free will. The dynamics of personal experience—people's moment-to-moment thoughts, emotions, and behaviors—are constrained by *attractors*, yet these constraints are also responsible for people's sense of personal freedom. *Attractors* provide a coherent and stable framework for disambiguating reality and deciding how one should act. In so doing, *Attractors* set the stage for a host of (deterministic) mechanisms that generate a rich and dynamic trajectory of mental experience. To the extent that an individual lives “in the moment,” however, the *attractor* may be invisible, enabling him or her to feel in direct charge of decisions, thoughts, and actions despite the tacit constraints that direct the flow of behavior and the non-conscious mechanisms that service these constraints. Observers, too, are typically mindful of what a person does on a moment-to-moment basis, ascribing freedom (and responsibility) to him or her for what transpires. In effect, “behavior engulfs the field” (**Heider**, 1944), with inferences about a person's character based on observers' sense that the person could have done otherwise at each point in time. Without this sense of free will, prosecution of transgressors—like those involved in the Enron scandal—would make little logical sense as there would be no clear way to distinguish deliberate from unintentional wrong doing.

In sum, the tendency for moment-to-moment thoughts, emotions, and behaviors to coalesce into stable patterns that constrain mind and action co-exists with people's sense of personal freedom. Free will is thus ultimately in the “I” of the beholder—whether people see freedom as real or as simply an illusion is up to them. We can be fairly certain, though, that the primary players in the free will debate will maintain and vigorously defend their stance on the free will issue, while demonstrating all manner of original and “free” thought.

Glossary

An **attractor** represents a small set of states that a *dynamical system* displays over time. In psychological systems, an *attractor* represents a restricted range of mental states and actions that is commonly experienced by a person. The states defining the *attractor* are mutually congruent in their subjective meaning (e.g., evaluation) and implications for action. Metaphorically, an *attractor* “attracts” the system's behavior, so that even very different starting states (thoughts, feelings, actions) tend to evolve toward the set of states defining the *attractor*. An external force can promote a temporary change in the state of a system, but over time the system will return to its *attractor*. The *attractor* concept provides a dynamic basis for familiar psychological constructs such as schemata, goals, attitudes, and personality traits. A schema constrains the dynamics of perception and thinking, causing the stream of thought concerning an object or event to converge on a specific set of values (e.g., interpretations, judgments, beliefs). A goal steers actions toward the attainment of a particular state, while resisting the temptations of other action possibilities. An attitude describes the thoughts, feelings, and actions that are most often experienced when one is in contact with the attitude object and to which a set of psychological mechanisms promote convergence after receiving contradictory information. A personality trait represents a person's tendency to behave in a consistent manner despite interpersonal and situational forces that mitigate such behavior or promote other types of

behavior.

A **dynamical system** is a set of inter-connected elements that change due to their mutual influences. In a mental system, the elements represent thoughts and feelings; in a social system, the elements represent individuals; in an international system, the elements represent nations. A *dynamical system* is characterized by bi-directional causality: the elements both influence and receive influence from the elements to which they are connected. Due to the mutual influence among elements, the system as a whole (e.g., a mind or a society) evolves over time in the absence of external forces (e.g., new information or an outside threat) and thus displays intrinsic (internally-generated) dynamics.

Emergence refers to the development of a higher-level property in a *dynamical system* due to the mutual influence among the system's inter-connected elements. In a mental system, the mutual influence among cognitive elements in the stream of thought can promote the *emergence* of a global attitude or belief. In a social system, the mutual influence among individuals can promote the *emergence* of a group norm or ideology. The higher-order properties that result from the interaction of lower-level elements provide coherence and coordination for the lower-level elements. Because of *emergence*, very simple systems can generate novel properties and behavior that cannot be reduced to the characteristics of the lower-level elements.

In a dynamical system consisting of inter-connected elements, the state of each element adjusts to the current state of other elements to which it is connected. Because of this mutual influence, higher-order units develop that represent the organization of the basic elements. No higher-order agent is required for such order to emerge. Hence, the process is referred to as **self-organization**.

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