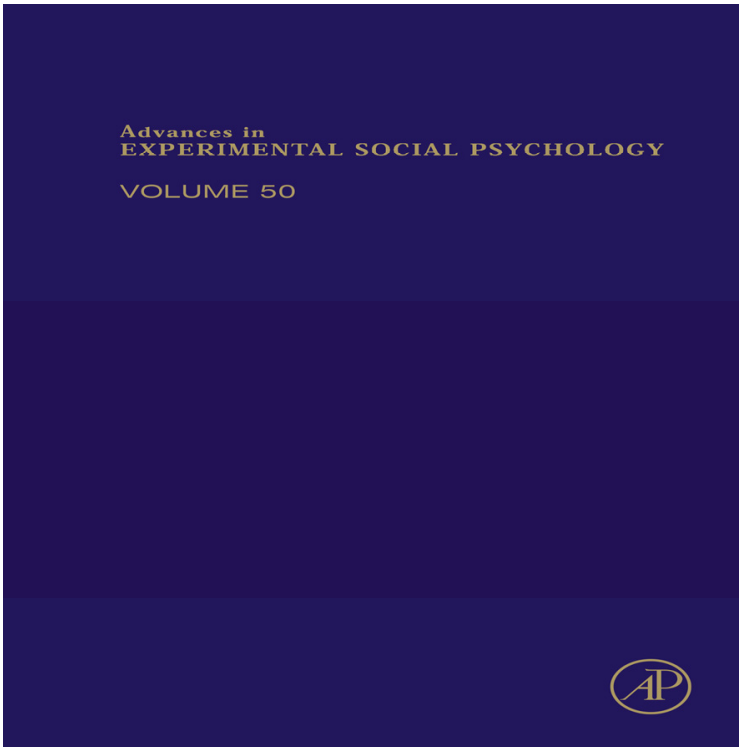




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CHAPTER ONE

# Recent Research on Free Will: Conceptualizations, Beliefs, and Processes

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## Contents



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## Abstract

This chapter summarizes research on free will. Progress has been made by discarding outmoded philosophical notions in favor of exploring how ordinary people understand and use the notion of free will. The concept of responsible autonomy captures many aspects of layperson concepts of free will, including acting on one's own (i.e., not driven by external forces), choosing, using reasons and personal values, conscious reflection, and knowing and accepting consequences and moral implications. Free will can thus be understood as form of volition (action control) that evolved to enable people to live in cultural societies. Much work has shown that belief in free will (as opposed to disbelief ) is associated with actions that are conducive to functioning well in culture, including helpfulness, restraint of aggression, learning via counterfactual analysis, thinking for oneself, effective job performance, and appropriate gratitude. Belief in free will increases in response to misdeeds by others, thus emphasizing the link to personal responsibility. Research on volition indicates that self-regulation, intelligent reasoning, decision making, and initiative all deplete a (common) limited energy source, akin to the folk notion of willpower and linked to the body's glucose supplies. Free will is thus not an absolute or constant property of persons but a variable, fluctuating capability—one that is nonetheless highly adaptive for individuals and society.

The notion that people have free will has been invoked in multiple contexts. Legally and morally, it explains why people can be held responsible for their actions. Theologically, it was used to explain why a supposedly kind and omniscient god would send most of the people he created to hell (Walker, 1964). Yet, for such an important concept, there remains wide-ranging disagreement and confusion over its existence and its nature. For example, philosophers still debate whether humans truly have free will and, if so, under what conditions human volition deserves to be considered free (Kane, 2011). In psychology, most theorists believe that humans engage in self-control, rational choice, planning, initiative, and related acts of volition. The debate is not whether these things occur but merely whether these should be called free will.

This chapter will provide an overview of recent psychology experiments concerned with free will. There are three main and quite distinct sets of problems, each with associated lines of research. The first is concerned with how people understand the idea of free will. The second concerns the causes and consequences of believing in free will. The third focuses on the actual volitional processes that guide human action.

## 1. SOCIAL PSYCHOLOGY'S CONTRIBUTION TO THE FREE WILL DEBATE

What is the role for experimental social psychology in studying free will? Philosophers and others have debated the grand question of whether people have free will or not. In particular, philosophers have focused heavily on the debate about whether free will is compatible with the idea of determinism. Determinism is the belief that all events are completely caused by

prior events or circumstances, so that a single future course of events throughout the universe is already, ineluctably determined. To some extent, social psychologists have continued this debate, but we think that is not an optimal use of their skills. No experiment is likely to prove or disprove the reality of free will in general. Neither can such methods address the correctness of determinism or its compatibility with free will.

Instead of continuing the debates about the reality of free will and its compatibility with determinism—thus essentially doing amateur philosophy—social psychologists would be most effective by adopting clear working definitions of the concepts associated with free will and then proceeding to the laboratory to create a body of knowledge about volitional processes, beliefs about freedom, and behavioral consequences. The strength of experimental social psychology lies in testing causal hypotheses about human behavior, and its contribution to debates about free will (and other grand topics) is likely to emerge from that sort of activity. We assume there is a human reality behind the idea of free will, and psychological research can elucidate how it functions. (Hence we shall cover work on self-control, rational choice, and the like.) Psychological research can also measure or manipulate differences in beliefs about free will and build an understanding of the content of that belief and how it functions. (Hence we shall also cover research on beliefs about free will.)

The history of social psychology would seem to provide an emphatic endorsement of the approach we advocate. There has been little or nothing in the way of social psychology that could have any impact on the question of whether the future is already set in stone (i.e., determined). However, abundant work has illuminated volitional processes. Choice has been a powerful variable (e.g., Linder, Cooper, & Jones, 1967), as has control (e.g., Glass, Singer, & Friedman, 1969; Langer, 1975). Reactance has long emphasized that people seek to maintain freedom and resist infringements on their ability to choose (Brehm, 1966).

Nonetheless, the issue of free will goes beyond academic debate. For some, it inspires extreme, highly emotional reactions (viz. Miles, 2011). We suspect that is because the implications of human choice address fundamental questions about human nature and social interaction. The argument that humans lack free will seemingly denies the reality of many of the most fundamental human experiences, including choosing and controlling, as well as moral responsibility. The discourse becomes all the more inflammatory because different sides tend to be arguing about quite different conceptions of free will, as the next section will elucidate.

## 2. UNDERSTANDING FREE WILL

Arguments about free will are difficult to resolve in part because of the various definitions scholars employ to describe the concept. Thus, what one side invokes as compelling evidence may be considered irrelevant by its opponents. Indeed, we ourselves would answer the question of whether people have free will in different ways depending on which definition is used. Some opponents of free will believe that its essence is exemption from causality (so that to be free, an action must not be shaped by any causes, see Bargh, 2008), or that free will entails causation by a soul or other supernatural entity (Bargh & Earp, 2009; Cashmore, 2010; Montague, 2008). In contrast, many supporters of free will treat it as the capacity to make uncoerced choices, which seems far less controversial than claims of non-causality or soulful causation (Monroe & Malle, 2010; Stillman, Baumeister, & Mele, 2011).

Adding to the confusion, people are often referring to not only different definitions of free will but to different parts of the definitional question. The question "what is free will?" is comprised of two separate, though related questions: (1) What is the reality (or truth) of free will, and (2) What do people think free will is? These two questions are not unrelated. However, as we have argued above, psychologists are best suited to answer the second question without presuming an answer to the first. Indeed, psychologists have successfully studied effects of many beliefs without having to take sides as to whether those beliefs are correct or false (e.g., studies of the effect religious belief on behavior).

Yet, empirical research on the definition of free will—specifically, how ordinary people understand the concept—has been largely absent from the literature. In the place of empirical evidence, detractors of free will have sometimes characterized people's concept of free will in sarcastic, flamboyant, even sometimes absurd terms. One suspects that these detractors were more interested in setting up a straw man for easy demolition rather than seriously seeking to construct a viable working model. One extreme view of people's belief in free will characterizes it as the work of supernatural agents. Bargh and Earp (2009) claimed that people's concept of free will is committed to substance dualism, "laden with the concept of a soul, a non-physical, unfettered, internal source of choice-making" (p. 13). Cashmore (2010) claimed that magical thinking lurks under the veneer of free will: "... we still believe (much as we pretend otherwise) that there

is a magic component to human behavior" (p. 4503). The biologist Montague (2008) defined the belief in free will as "the idea that we make choices and have thoughts independent of anything remotely resembling a physical process" (p. R584). According to him, the concept of free will is the "close cousin to the idea of the soul" and concluded that it is "not even in principle within reach of scientific description" and "not a useful scientific concept" (p. R584).

Slightly less extreme is the view that free will entails being a first or uncaused cause, so that the free action is completely independent of all internal or external causes and all prior events and circumstances. Bargh (2008) asserted that "freedom of the will depends on whether those choices are determined or not by identifiable forces," and went on to claim that freedom of the will "requires an absence of both external and internal determination of the action" (p. 130). In that view, the free will is an entity that can cause action without itself being subject to causes.

However, not all views on free will invoke such scientifically intractable assumptions. A recent program of grants for multidisciplinary research on free will defined free will as the capacity for free action (Haggard, Mele, O'Connor, & Vohs, 2010), which was in turn defined in two different ways. One definition invoked the possibility of multiple courses of action stemming from the same present, which thus postulates the wrongness of determinism. The other depicted free action as intentional action based on informed, rational deliberation by an agent who is not externally coerced or compelled to make a particular choice.

This first definition of free will in terms of multiple courses of action is sometimes formulated as the "ability to do otherwise" and is a common theme in many treatments of free will. On this view, having free will entails that an agent has the capacity to alter his or her behavior (all causes being identical). For example, people will agree that a pot of water if heated long enough must boil: it cannot choose to do otherwise. However, when contemplating a young woman who decides to have a vanilla ice cream, people maintain that she could have done otherwise (e.g., chosen chocolate), and that her behavior was not completely determined by previous events, including her preferences (Nichols, 2004). In most versions of this belief, free will is incompatible with determinism, because the belief assumes multiple possible futures, among which people choose. "Incompatibilists argue that free will requires the ability to do otherwise, which requires that alternative possible courses of choice and action be open to us" (Glannon, 2005, p. 69).

Mental causation is another theme of most conceptions of free will. According to this view, actions derived from a person's conscious thoughts are freely willed; actions derived from the unconscious are less freely willed. Indeed, in one series of studies, Shepherd (2012) tested this possibly and showed that people regarded behavior caused by conscious mental states, but not unconscious ones, as freely willed. The possibility that free will exists but is unconscious has not gotten much attention, however, suggesting that few thinkers regard it as a plausible model. Indeed, this belief is usually described as an error in perception. Wegner and Wheatley (1999) proposed that "people experience conscious will when they interpret their own thought as the cause of their action" (p. 1). In a sense, they depict free will as an error of perception.

In contrast, we think free will is simply another kind of cause. There are already a great many different causes throughout the sciences and social sciences. The causes by which an electron changes its orbit are not the same as those by which ice melts in the sun, or a metal spring's resistance changes with compression, or a bird chooses to sit on eggs, or a government loses an election, or a person makes an offer of marriage.

Free will is perhaps best understood as a cause that emerges at a rather high level of organization. Anderson (1972), a Nobel laureate in physics, argued that the various sciences exist in a kind of hierarchy, with physics as the most fundamental. At each level, new causes emerge that are not fully reducible (i.e., not fully explained by the causes of more fundamental sciences), even though these new laws cannot violate the laws of the more fundamental ones. Thus, the economic law of supply and demand is not reducible to physical forces such as electromagnetism and gravity, though it cannot violate those principles. In the same way, free will may not be found in basic chemical, physical, or even biological or brain processes, though it will certainly operate in synchrony with those.

## 2.1. Layperson concepts of free will

One limitation to all of the descriptions of free will outlined above is the dearth of empirical evidence testing whether they accurately capture the way people think about free will. A multimethod approach by Monroe and Malle (2010, in press; see also Stillman et al., 2011) illuminated how ordinary modern citizens understand the concept of free will. Monroe and Malle (2010) first probed people's concepts by inviting them to report "what you think it means to have free will." The findings diverged strikingly

from the flamboyant claims about the folk concept of free will. Participants did not invoke aspects common to several expert definitions, such as substance dualism (i.e., causation by souls or other nonphysical entities; cf. Cashmore, 2010; Montague, 2008) and exemption from causality (Bargh, 2008; Bargh & Earp, 2009). Instead, students consistently offered a psychological definition of free will. They defined free will consistent with Haggard et al.'s (2010) second definition of free action: free will is (a) the ability to make a choice; (b) acting consistently with one's desires; and (c) being (reasonably) free of constraints (e.g., coercion, peer pressure, social status) (Monroe & Malle, 2010).

Moreover, two reaction time studies tested whether the connection between choice and free will relied on participants' explicit reports, as opposed to being implicit in people's understanding of behavior. In these studies, Monroe and Malle (2013a) asked people to make judgments about whether various behaviors (e.g., "John hit the woman behind him in line with his elbow." "Ava sunbathed nude on a public beach.") instantiated a given property (e.g., free will, choice, causal autonomy), and assessed the speed with which people made their judgments. In this way, Monroe and Malle (in press) were able to test which properties (e.g., free will, choice, intentionality, options, indeterminism) were conceptually related without having to depend on explicit reports. Properties that are conceptually related (implicitly) should be affirmed quickly, whereas properties that are not part of the same concept should be affirmed more slowly. The data revealed a clear pattern. People were able to make judgments quickly about whether an agent had free will or not. Indeed, the speed of this inference was comparable to the speed with which people are able to judge the gender of a target (see Malle & Holbrook, 2012, for gender RT's). Not only were people fast at judging free will, but people's speed to infer free will clustered with intentionality, choice, and options, whereas judgments of indeterminism and completely autonomous authorship were significantly slower ($p < 0.01$). Thus, to laypersons, free will is not mentally linked to questions of metaphysical causality as much as to making decisions and intentional action. Further studies by Monroe and Malle (in press) with community samples confirmed the centrality of choice, desire, autonomy, consciousness, and lack of constraints in layperson concepts of free will.

Further insight into layperson accounts of free will was provided by Stillman et al. (2011). They asked a student sample to furnish an account of an experience from their own lives. Half were told to describe an event "when you took action that you consider to have been of your own free

will" (original instructions, see p. 387), whereas the rest were told to choose an experience in which their actions were not a result of free will. These data thus complement the approach taken by Monroe and Malle (2010), which sought to get people to define and explain the term. Stillman et al. (2011) instead obtained accounts of how people understood some of their own previous actions as using or lacking free will. Consistent with the present analysis, free will was linked to conscious, deliberate reflection, and morally virtuous actions. Free actions were more likely than unfree ones to be described as producing positive outcomes and attaining goals, consistent with Dennett's (1984) assertion that free will is only worth having insofar as it helps people get what they want. Benefits to immediate self-interest were unrelated to free will, but benefits to delayed self-interest were significantly more common with free than unfree actions. This pattern is useful for the evolutionary argument, as most animals are able to do things for immediate benefit, but delaying gratification and sacrificing immediate gain for the sake of greater long-term gain is distinctively human and would be a highly adaptive aspect of free will, especially for beings like humans who live in a complex social and cultural environment.

Unfree actions were more likely than free ones to be linked to failure to reach goals and to performing actions that were detrimental to one's social group. These findings also fit well with the view of free will as something that evolved to enable people to function in culture. Last, Stillman et al.'s (2011) findings confirmed that people regard free action as not being driven by external factors or coercion and indeed even specifically as resisting such external influences and pressures.

The question of whether freedom of action is a dichotomous category or a continuum is also regarded somewhat differently in layperson versus expert debates. Philosophers have tended to debate free will as an all-or-nothing question, as whether people have it or not. In practice, however, nearly all psychological variables and processes exist on a continuum. Indeed, Monroe and Malle (in press) asked participants whether free will is something that humans have at birth or instead develops with age. The majority of participants (71%) responded that the capacity for free will develops over the lifespan, in tandem with cognitive development and the ability to reason. Conversely, when asked whether something could "take away the capacity for free will," 94% of participants answered yes. When asked specifically what factors could take away free will, people reported coercion (63%), brain damage (40%), and physical limitations such as paralysis (37%). The implication is that ordinary people do not regard free will as an innate,

universal part of the human condition or something inherent in all human action. Rather, they see it as a fluctuating quantity.

## 2.2. What must free will theory accomplish?

The purpose of this chapter is to provide an overview of empirical research on free will, not to develop a scientific theory of it. Developing such a theory is, however, an important goal for future work (and presumably it would build on the research covered here). Moreover, the progress of most research programs moves at least in principle toward such integrative theory development. Hence, we briefly review here what we consider the goals of free will theory should be.

First, a scientific theory is a causal theory about processes in the natural world. Hence, a scientific theory of free will would be causal and would not depend on invoking exemption from causality. Insofar as there is indeterminacy in nature (as most scientists now believe), it may or may not be relevant to free will theory. Most scientists believe in quantum indeterminacy, but that indeterminacy is largely regarded as unhelpful for free will theory (e.g., Holton, 2006).

By the same token, a scientific theory would not invoke supernatural entities, including souls and divine beings. However, a scientific theory could go beyond nature, insofar as one distinguishes nature from culture. Free will could conceivably depend at least in part on cultural factors and causes. For example, people may believe that free will is, in part, for following the prescribed rules of a culture; however, free will may also be limited by such rules (e.g., as in a totalitarian regime).

We assume that the human psyche was shaped by evolution (though culture may have added new layers on top). Freedom of action would therefore have evolved, or at least the capacity for it was produced by natural selection (Baumeister, 2005; Dennett, 2002). A scientific account of free will would have to be compatible with what is known about evolution. In particular, the capacity for free action would have to produce benefits to survival and reproduction.

As already suggested, a scientific theory of free will would likely characterize freedom as existing along a continuum rather than being an all-or-nothing property of all human actions or minds. Hence the scientific theory would explain the difference between freer and less free actions, why some actions or agents are freer than others, and what inner processes contribute to producing the freedom of free actions. That is, a theory of free will would

characterize what makes some actions free relative to others and account for how people manage to produce the free actions.

## 2.3. Cultural animal framework

The emergence and functioning of free will must be placed in the context of some broad understanding of human nature. For that understanding, we invoke the attempt to produce a bottom-up account of human nature based on research findings in psychology by Baumeister (2005). That work led to the conclusion that human beings were produced by nature for culture. In other words, the human psyche is the product of evolution, to be sure, but evolution selected in favor of human traits that were conducive to culture. Culture can be defined as an organized system of social relations based on shared understandings and interactive roles and that enables people to live together and satisfy their needs. Thus, human beings evolved the capabilities needed to make and sustain these cultural systems and to function and flourish within them.

Because nature has never managed to produce organisms with eternal life, the need to sustain life yields emphases on survival and reproduction, which guide natural selection and motivate much (arguably almost all) behavior. Humankind has found a distinctive strategy for solving those perennial problems. Humans form complex groups that share information, develop systems of interlocking roles that perform complementary tasks, work together toward shared goals, and develop systems of exchange (including economic trade), morality, and government. The distinctively human traits—presumably including free will—are mainly adaptations to make that possible and to help individuals function better in that sort of social environment. That is, they allow the individual human to operate within a cultural framework, so that it can survive and reproduce, and perhaps flourish, within a system marked by shared information and understandings, rules, systems with interlocking roles, language, exchange, and morality.

In that view, free will should be understood not as a philosophical, theological, or biological property of all human action, but rather as a way of operating within culture. It is even doubtful how much free will a human would have living outside of culture. The individual may be innately prepared to learn some things—but still does have to learn them. Morality, logical reasoning, and rational calculation of enlightened self-interest are learned within a cultural context, even if the potential to learn them is innate. One could even argue that full-blown free will would only exist within a cultural context.

## 2.4. Evolution of free will

Just as freedom exists along a continuum, its emergence in evolution (and presumably also in individual development) probably occurred gradually or in multiple steps rather than all at once. In fact, folk theorizing seems to have anticipated this trend. Monroe and Malle (2013a) found that 93% of people thought that at least some nonhuman animals have free will. To be sure, some animals were considered more promising candidates for freedom of will than others. People ascribed free will to animals to the extent that those animals were intelligent (e.g., able to solve problems and use tools) and social (prone to live in large, cooperative groups). These requirements for ascribing free will to animals are consistent with our view that free will involves thoughtful choice and evolved for cultural living.

If animals do indeed have rudimentary forms or precursors of free will, then it will be necessary to develop some model of animal volition and analyze how that evolved further to produce human free will. Animal agency evolved to accomplish simple tasks, and human volition, including free will, would be understood as a refinement or upgrade of that system to improve performance in the context of culture.

It may be difficult or even silly to select one moment in evolution at which freedom of action first appeared. But it may be heuristically useful to identify several key steps along the way and to attempt to account for the process by which actions became increasingly free. We assume that the psychological realities behind the idea of free will involve complex, highly organized processes of agentic volition. Hence, the steps by which that emerged would involve increases in the creature's capacity for self-governing, self-regulated, and possibly self-initiated action, linked to increases in biological complexity conducive to advanced organization.

Undoubtedly, one major step forward in biological organization relevant to free will is the formation of a central nervous system, with a brain at the center. We suspect that nobody attributes free will to plants. Animals with brains and central nervous systems have considerably more volition, not least because of the need to coordinate body parts for the sake of movement. It is generally agreed that the origins of the central nervous system involved locomotion and digestion—thus presumably moving around to get food (and perhaps to avoid being eaten). Somehow, evolution then refined that capacity to produce the human capacities to act on the basis of complex decision processes, to invest money, vote, marry, make and keep promises, express protest either violently or peacefully, own and manage property, and the like.

If we assume that free will is among the distinctively human traits that are adaptations for culture (see Baumeister, 2005), what would that tell us about free will and its functions? Culture includes systems that require people to follow rules, and so a capacity for self-regulation according to rules would be very useful. Culture is based on information, so the ability to communicate and alter behavior on the basis of communicated information is important. Rational choice would be highly useful to deduce implications for action from abstract guidelines such as laws and moral principles, as well as for functioning as an economic agent in a marketplace (another vital aspect of culture). In both cases, and perhaps more generally, the ability to base actions on ideas is central to being a civilized person. Developing the capacity to control action in this way presumably comprised the key steps in the evolution of free will.

## 2.5. Responsible autonomy

Instead of debating whether belief in free will can be conceptualized within the context of deterministic causality, or reconciled to it, we think a more useful approach for research psychologists is to elucidate the form and processes of volition that constitute what ordinary people understand as free will. Our approach therefore focuses on *responsible autonomy*. That is, in normal social life, the important and operative form of free will involves exercising autonomy and being responsible (Nahmias, Morris, Nadelhoffer, & Turner, 2005).

Autonomy is defined as self-government.[1] Defining free will in terms of autonomy thus means that the individual must be able to operate as a self-contained unit that can respond to the environment and function within it yet also attain some degree of independence from it, including presumably the ability to take itself out of that specific environment to seek out a different one. Autonomous beings must be able to take care of themselves. They have needs and desires originating from inside themselves, for which they seek satisfaction in the external world by autonomous action.

By adding responsibility to the definition, we place free will in a more explicitly social and cultural context. Most aspects of responsibility would

[1] We wish to be clear concerning our definition of autonomy, as many theories of free will use this term. This definition does not entail complete freedom from prior causes (e.g., Bargh, 2008; Bayer, Ferguson, & Gollwitzer, 2003; Montague, 2008); instead, actions are autonomous to the extent that they are not externally forced (Monroe & Malle, 2010; Stillman et al., 2011).

not apply to solitary beings. Responsibility entails understanding the social (including cultural) implications of one's actions. In human life, this means knowing the relevant rules, such as moral principles, laws, and social norms, and adjusting one's behavior accordingly. As Haggard puts it, "Voluntary action is better characterized as a flexible and intelligent interaction with the animal's current and historical context than as an uncaused initiation of action" (Haggard, 2008, p. 936). Responsibility does not mean one always follows the rules—but it does require that one *knows* when one is violating a rule.

Another way of putting this is that the individual understands the meaning of the actions and incorporates that meaning into the causal process. The use of meaning (e.g., ideas such as symbols, communicative implications, moral principles, laws, group goals, and *ad hoc* plans) into the causation of behavior can be considered another important form of free will (e.g., Baumeister, in press). Social psychology would be unthinkable without the assumption that much human action is based on ideas. Insofar as ideas are not themselves physical entities, then acting on the basis of ideas constitutes an important kind of freedom, as the causation of those actions goes beyond mere physical causation. It is hard to dispute that the capacity to incorporate meaningful ideas into the causation of action is an essential requirement for living in human civilization. It is thus a prominent candidate to be considered one of the adaptations that enabled human beings to pursue the biological strategy of constructing culture and benefiting from it. We think that makes it also an important component of free will.[2]

Studies about how people make judgments for moral responsibility support the view of free will as responsible autonomy. Monroe (2013) found dramatic reductions in blame when an agent was described as failing to meet criteria for moral responsibility (cf. Roskies & Malle, 2013), such as by being unable to make choices or to understand the wrongness of his actions. In a second study, Monroe (2013) showed that perceptions of the agent's intentionality were central to blame (see also Alicke, 2000; Cushman, 2008; Guglielmo, Monroe, & Malle, 2009; Lagnado & Channon, 2008; Malle, Guglielmo, & Monroe, 2012; Monroe & Malle, 2010; Young & Saxe, 2009), and blame was reduced insofar as the actor's intentionality

[2] There are some issues to be resolved before this theory can be asserted with satisfaction. In particular, some meaningful ideas can influence behavior in ways that do not seem to evoke free will, such as unconscious priming.

was compromised, with mild impairments (e.g., powerful emotion, social pressure) producing some mitigation and extensive impairments (psychosis, hypnosis, brain abnormality) eliciting extensive mitigation of blame.

### 2.6. Conclusion

Although a large body of theoretical discussion of free will is available in philosophy, it is not well suited to psychological research, and psychology would benefit by developing its own theories and focusing on a distinctive set of issues and questions. One promising approach is to place free will theory in the context of human volitional capabilities. These can be tested and measured. They can be understood as an evolutionary advance over simpler forms of volition found in simpler animals. Very likely, what sets human volition apart from that of other species is its suitability for living and functioning in a complex society with cultural organization. Understanding free will as an evolved capability for directing action in a complex social environment should enable the focus of theory to shift away from sterile debates about determinism and causality. Instead, understanding the demands and opportunities within such systems can furnish a useful framework for understanding free will. Civilized beings need to be able to exert self-control and make rational choices in pursuit of delayed benefits and other signs of enlightened self-interest. Responsible autonomy may be a useful conceptual framework for capturing both layperson conceptions of free will and the socially important aspects of human volition. That is, cultural beings can benefit from a form of volition that includes being able to act as an independent, self-governing unit, including taking care of oneself, managing relations with others, and initiating actions, and they must also learn to accept responsibility for their actions in the sense of understanding society's rules and using that knowledge to guide behavior. The deliberate use of meanings and ideas to make behavioral choices is also a central part of human social action and, hence, of free will.

## 3. BELIEFS ABOUT FREE WILL

Beliefs about free will may seem to be an abstract metaphysical or even theological opinion with little direct relevance to social life. Contrary to that view, research has shown these beliefs to be heavily intertwined with other attitudes and views and to have substantial behavioral and social consequences. This section reviews research on people's beliefs about free will.

This work by itself makes no assumptions about the reality of free will, as most or even all such beliefs could be mistaken.

## 3.1. Consequences of belief

An important step in getting past the roadblock question of whether people have free will was provided by Vohs and Schooler (2008), who investigated the behavioral consequences of manipulating people's belief in free will. This seminal investigation manipulated beliefs about free will and measured whether students would cheat on a test. To increase the temptation to cheat, participants expected to earn money for each correct answer they reported after grading their own test. In a series of studies, Vohs and Schooler (2008) showed that inducing disbelief in free will increased the tendency to claim more correct answers and more money than the people were entitled to receive. The finding that manipulated disbelief in free will increased cheating was recently replicated by Trager, Vallacher, and Sherman (2013).

Why? The consequences of believing in free will are linked to the common understanding of it as responsible autonomy, and indeed moral responsibility is often linked to free action. In this view, people use their free will so as to behave responsibly, which includes obeying moral rules and social norms for proper behavior. The opposite of free will is the belief that one could not help acting as one did—in which case moral responsibility is diminished. Vohs and Schooler (2008) reasoned that if people disbelieve in free will, they would not feel responsible for their actions, resulting in willingness to perform selfish, immoral actions.

To be sure, alternative interpretations have been put forward regarding manipulations of belief in free will, but gradually the evidence has ruled these out (as we shall discuss). Emotion and mood have not been shown to change reliably as a direct result of these manipulations (although, as we shall cover, some specific emotions such as gratitude can be facilitated or inhibited by changing beliefs about free will, in combination with circumstances that evoke gratitude). Additionally, the question whether the effects are specific to reducing free will beliefs, as opposed to challenging someone's favored beliefs about any important issue, was addressed by Alquist, Ainsworth, and Baumeister (2013), who found that undermining free will beliefs produced effects quite different from undermining people's belief that their lives were meaningful. Hence at present it appears that reducing belief in free will has highly specific effects that involve diminishing one's perception of self and others as being morally responsible, autonomous individuals.

Subsequent studies on free will beliefs adopted Vohs and Schooler's (2008) method for manipulating and measuring free will beliefs. One common method for manipulating free will beliefs involves randomly assigning participants to read a passage that either denies that free will exists (e.g., "although we appear to have free will, in fact, our choices have already been predetermined for us and we cannot change that") or to read a passage that covers neutral, irrelevant material (e.g., a passage on consciousness). The other common method for manipulating free will beliefs is based on the Velten mood induction. In this manipulation, participants are randomly assigned to read a series of statements that either deny the reality of free will (e.g., "Science has demonstrated that free will is an illusion") or that express scientific facts irrelevant to free will (e.g., "Oceans cover 71% of the Earth's surface").

Whereas the methods for manipulating free beliefs have remained relatively constant over the past decade, new methods for measuring free will beliefs have emerged. Current research tends to rely on either the Free Will and Determinism Plus Scale (FAD+; Paulhus & Carey, 2011) or the Free Will and Determinism Scale (FWDS; Rakos, Laurene, Skala, & Slane, 2008). In many ways the scales are similar; however, small differences in measurement and assumptions concerning the relationship between free will and determinism importantly distinguish the scales from each other. On the one hand, the FAD+ measures free will belief and deterministic beliefs using separate scales, allowing for any degree of compatibilism. By contrast, the FWDS treats determinism and free will as opposing concepts, such that increases in one belief necessarily reflect decreases in the other.

Subsequent studies extended the impact of free will beliefs onto other phenomena. Participants who were induced to disbelieve in free will were more aggressive than control participants (Baumeister, Masicampo, & DeWall, 2009). In other studies, they were less willing to help in various hypothetical scenarios, such as if a fellow student wanted to borrow their cell phone. People who habitually had low belief in free will were less helpful in terms of volunteering actual time to help another student who had suffered personal and family misfortunes (Baumeister et al., 2009). Disbelief in free will has heightened mindless conformity, in the sense that disbelievers are more prone than believers to copy the opinions of others and produce suggestions that closely resemble the examples they were given, rather than thinking for themselves in a creative, open-minded way (Alquist, Ainsworth, & Baumeister, 2013).

Further studies have suggested that believing in free will belief is conducive to counterfactual thinking, that is, mentally simulating recent events with alternative actions and outcomes. A series of experiments by Alquist, Ainsworth, Baumeister, Daly, and Stillman (2013) linked higher belief in free will to generating more counterfactual thoughts about past personal misdeeds, such as having hurt someone, as well as about hypothetical (imagined) misdeeds. The former have the benefit of involving actual events from people's lives. The latter have the benefit of being experimentally controlled so that the stimulus is the same for all participants. Counterfactual thinking is an important mechanism for learning and for improving one's behavior (e.g., Epstude & Roese, 2008). Insofar as belief in free will increases tendencies to engage in such thoughts about one's misdeeds, it can help people become better individuals and better members of society.

A similar conclusion about the usefulness of free will beliefs for self-improvement emerged from studies by Stillman and Baumeister (2010). After reflecting on personal misdeeds, people reported learning more from them to the extent that they felt guilty about those actions—but the effect was mainly found among those who believed in free will. Participants whose belief in free will had been experimentally reduced showed less inclination to learn from guilt and other negative emotions. The lessons were coded by independent judges who were blind to experimental condition, and these ratings confirmed the lesser learning among those who disbelieved in free will.

Stillman and Baumeister (2010) found that increased belief in free will caused students to volunteer their time to work in a campus-recycling program, especially after they had been made to feel guilty for the ostensibly large amount of pollution and ensuing wildlife deaths caused by fellow students. While the actual benefits of recycling are open to debate (see Denison & Ruston, 1997; Tierney, 1996), most people and certainly most college students consider it a virtuous act that safeguards and preserves the environment for future generations (in the students' case, starting with their own generation). Hence we treat recycling as an example of virtuous behavior even though some question whether it should be regarded as such.

Experimental studies by Vohs and Baumeister (2013) confirmed that free will beliefs increased recycling. Students were given a can of soda to drink while they underwent a manipulation of free will beliefs. The experimenters tracked what they did with the empty can, with the options of leaving it in the lab, throwing it in the trash, or taking it to a recycling bin that was on another floor. (Thus, as is often true outside the lab, recycling took

somewhat more effort than simply discarding.) Those who had had their free will beliefs bolstered were more likely to recycle than those whose belief in free will had been weakened. Because recycling took more effort than the alternatives, this finding fits both patterns we have linked to believing in free will: greater prosocial action and greater agency.

Several findings have linked belief in free will to gratitude. Dispositional belief in free will was positively correlated with trait gratitude (Crescioni, Baumeister, Ainsworth, Ent, & Lambert, 2013). Boosting belief in free will experimentally made people feel more grateful for favors others had done them earlier in their lives, and an experimental study indicated that high belief in free will caused people to feel more gratitude toward a favor done for them in the context of the experiment, as compared to low belief (MacKenzie, Vohs, & Baumeister, 2013).

The link to gratitude is of particular interest because presumably it is not one's own free will that is at issue (unlike in the studies above concerning cheating, stealing, aggression, helping, counterfactual thinking, recycling, and learning lessons) but rather another person's free will. The gratitude research began with the assumption that gratitude is a positive feeling associated with thinking that another person conferred a benefit but did not have to do so. As already noted, the idea that one could have acted otherwise is integral to many conceptions of free will. Thus, the perception that one's benefactor could have done otherwise (thus exercised free will in providing the favor) could be a vital component of feeling grateful about this. Consistent with this view, MacKenzie et al. (2013) found that disbelief in free will reduced both gratitude and the perception that one's benefactor was motivated by a sincere intention to provide help. Indeed, the link between free will beliefs and gratitude was statistically mediated by believing that the person could have done otherwise (MacKenzie et al., 2013).

Outside the laboratory, high belief in free will has been linked to better job performance. Mostly nonwhite workers for a temporary employment agency and their supervisors at their various temporary employment sites were studied by Stillman et al. (2010). Workers who expressed higher belief in free will were rated more favorably by their supervisors on overall work performance. They were also rated higher on consistency of showing up for work (a fairly important aspect of temporary work that cannot be taken for granted), on having a positive impact on fellow employees, and simply on working harder on the assigned tasks and duties. These effects were all above and beyond any effects of life satisfaction, personal energy and vitality, and belief in the Protestant Work Ethic.

Generally, the effects of free will reviewed here have been found in connection with interactions with other members of one's large social group who are not relatives or relationship partners. Among nonhuman primates, cooperation and other positive interactions are mainly found among kin, and so the innovation of having such beneficial interactions with nonkin may be a primarily human innovation. Indeed, one can argue that an essential feature of human society and culture is the establishment of mutually beneficial interactions among nonkin, an achievement that has largely eluded all other mammals (e.g., Fukuyama, 2011). Controlling one's actions so as to be kind, cooperative, and fair to nonkin is possibly an evolutionary advance, and free will is plausibly understood as partly designed to serve that purpose.

The findings reviewed here about the effects of beliefs in free will are highly consistent with the view that free will evolved to facilitate functioning within culture, and not just in that they promote mutually beneficial interactions with nonkin. Belief in free will increases a wide assortment of actions that are conducive to good social functioning in cultural groups: helping strangers, refraining from aggression, reporting one's work honestly, taking only the money they earned, doing one's job in a reliable and effective manner, learning from one's misdeeds and mistakes, thinking for oneself when the situation calls for that, and more.

These findings have been taken by some to indicate that disbelief in free will contributes to antisocial behavior. Indeed, Schooler (2010) has elaborated the opinion that it is socially harmful and hence perhaps irresponsible for scientists to tell the public that there is no such thing as free will, as various scientists have recently done (Coyne, 2012; Harris, 2012; Overbye, 2007). Our view is that scientists should tell the truth regardless of social consequences, though we recognize that, in practice, this is not what scientists always do. Nonetheless, because the question of free will has not been resolved to everyone's satisfaction, and because lay beliefs about free will may be crucially different from the versions of free will that scientists believe they are rejecting in public statements, Schooler's accusation of irresponsibility is not without justification in this case.

Several limitations are worth noting. First, experimental manipulations designed specifically to *increase* belief in free will have not generally caused much change in behavior. The typical finding has been that *reducing* belief in free will causes behavior to depart from the neutral control condition baseline, whereas bolstering belief in free will leaves behavior quite similar to the control baseline. (The study on counterfactual thinking has been the main

exception: there, bolstering free will belief led to an increase in such thinking, above and beyond the neutral control condition.) It is possible that manipulations for increasing belief in free will are somehow less persuasive than manipulations for decreasing belief, though the parallel procedures cast doubt on that interpretation. More likely, the differential success is caused by the fact that most people generally believe in free will to some degree, so affirming that free will is real and does not change people away from their baseline belief—unlike disputing the existence of free will, which does depart from their normal view.

Another limitation is that although moral behavior changes with belief in free will, moral judgment patterns do not change much. Manipulations of belief in free will have not altered assessments of blameworthiness of many actions. (We have found no published studies in this regard, but we each have separately have run several studies testing the effects of free will beliefs on moral judgment and found null results, even despite *a priori* power analyses and significant differences on manipulation checks.) One broad exception is a set of findings by Shariff et al. (2013). They showed that reducing belief in free will made people less punitive toward hypothetical criminals and various other recalled or imagined rule breakers. Initial drafts of the report sought to spin this as a positive side of disbelieving in free will by linking that view to forgiveness, but it does not appear that forgiveness is the operative variable. Shariff et al.'s (2013) own data found that the effect was strongest when evaluating strangers (where forgiveness is not at issue), but the effect disappeared with close relationships where forgiveness is operative.

Our interpretation of the Shariff et al. (2013) findings is that belief in free will serves societal purposes. When judging strangers, one wants them to obey and uphold the guidelines that make civilized life possible. Hence people think criminals and other immoral actors should be punished, as a way of enforcing the rules. With close relationship partners, one has other goals that take priority over upholding society's rules. In particular, one wants to maintain the relationship. When an intimate partner transgresses, one wants to believe that the partner can change so that the future of the relationship is not jeopardized by the expectation of further, similar transgressions. Belief in free will helps support the view that the partner can indeed change for the better (especially if the partner shows contrition and expresses the intention to avoid repeating the offense). Putting these together, high belief in free will contributes to being more punitive toward strangers but more forgiving with intimate partners.

Still, other work has found that moral judgments are largely unaffected by manipulations of belief in free will. One study by Monroe and Malle (2013b) manipulated free will beliefs and then had participants play the role of judge in a three-person game. The judge witnessed one of the other players gain extra money by stealing from the other. Some judges made a judgment about blaming the thief, and others had the opportunity to impose a monetary penalty on the thief. The manipulation of free will beliefs successfully changed those beliefs—but had no effect on the judges' decisions about either blame or punishment.

In sum, beliefs about free will contribute to morally virtuous, prosocial action patterns and upholding cultural beliefs. Disbelief in free will may reduce the impulse to punish people who break society's rules, but moral judgment *per se* is largely unaffected. Free will thus contributes to moral action, but changing beliefs about free will has little apparent effect on judgment according to moral rules.

## 3.2. Correlates of belief: Who believes in free will?

Belief in free will is widespread. It persists across cultures (Sarkissian et al., 2010). It is found from early in life until old age (Kushnir, 2012). It remains strong even when people have their own freedom of action restricted (Laurene, Rakos, Tisak, Robichaud, & Horvath, 2011). Nonetheless, there are systematic variations in the degree to which people believe in free will, and these are linked to a variety of other psychological traits. A series of studies by Crescioni et al. (2013) revealed some of these correlates. Belief in free will is higher among religious persons, which is perhaps not surprising insofar as Christianity emphasizes free will as an important doctrine. Still, the effect was found mainly for intrinsic religiosity rather than extrinsic. It is thus not simply that religious people believe in free will because they conform to the expectations of their social group to affirm the tenets of their faith. Rather, religious belief in free will seems to have more to do with being able to make choices that express the values that one personally embraces within one's religion.

Political conservatives also have higher belief in free will than political liberals (though Crescioni et al. did not find a difference between Republicans and Democrats). The correlation with free will beliefs was found on both conservative social attitudes (e.g., disapproval of homosexuality) and fiscal conservatism (e.g., support for free market capitalism). One might think that religiosity may have contributed to the link to political attitudes,

insofar as conservatives tend to be more religious than liberals, but adding religiosity to the regression did not alter the results. Thus, it appears that conservatism contributes to free will beliefs independently of religiosity. Conservative views tend to emphasize personal responsibility, whereas liberal views depict people as products and victims of their environment, and those ideological differences may be reflected in the differing beliefs about freedom of action.

Several correlates of free will beliefs suggest a link to personal agency. People who believed in free will scored higher on self-efficacy and mindfulness (Crescioni et al., 2013). This fits a growing body of work suggesting that high belief in free will goes with an agentic approach to life, as in taking action and initiative to pursue goals and get things done (e.g., Alquist, Ainsworth, & Baumeister, 2013; Alquist, Ainsworth, Baumeister, Daly, et al., 2013; Baumeister et al., 2009; Stillman et al., 2010).

Other findings by Crescioni et al. (2013) indicate links to positive outcomes. People who believe more strongly in free will are happier and report lower stress compared to other people. They report higher levels of commitment to their relationship partners, greater forgiveness of partner misdeeds, and higher degrees of satisfaction with their romantic partners. They find higher levels of meaning in life. The latter link was replicated with experimental manipulation of free will beliefs, so one may conclude that believing less in free will actually causes people to find life less meaningful.

The positive links to happiness, meaningfulness, self-efficacy, good relationship skills and outcomes, mindfulness, and other positives raised the concern that responses to the free will scale are contaminated by a general positivity. This has been identified as a problem with self-esteem, for example: Some people simply seem to describe themselves favorably on whatever questions are put to them (see Baumeister, Campbell, Krueger, & Vohs, 2003). Crescioni et al. (2013) administered measures of several traits that have evaluative dimensions but did not seem to have any theoretical link to free will. Fortunately, free will beliefs had no correlation with any of these, including empathy, sense of humor, and (self-rated) physical attractiveness. Thus, belief in free will may be linked to a host of positive outcomes and attributes, but not indiscriminately so. The selective specificity of the findings suggests that the links to free will involve meaningful relationships rather than unthinking global positivity or socially desirable responding. That brings up the question of what antecedent causes influence belief in free will, to which we turn in the next section.

### 3.3. Causes of belief: Why do people believe in free will?

At first blush it may seem absurd to ask why people believe in free will. Subjective experience overwhelmingly confers the impression that there are multiple possible futures, that one can perform a particular act or not, and that one chooses among options and could easily have chosen other than one did. According to his biographer Boswell, Samuel Johnson put this succinctly: "All theory is against the freedom of the will; all experience for it." (We hope to rectify the first of those claims!) Indeed, many readers would be satisfied with another of Johnson's comments "Sir, we *know* our will is free, and there's an end on it." Indeed, we suspect that the subjective certainty that one can choose in different ways contributes to the appeal for many scientists to claim precisely the opposite. By saying that freedom of choice is an illusion, they can present themselves as dispelling long-standing popular mistakes and folk myths.

Wegner (2002), who became a prominent skeptic of freedom of will, still conceded the persuasive power of subjective experience. In his view, people have the subjective experience of choosing and willing, and these induce people to believe that such experiences are real. In influential experiments, he showed that these conclusions can be mistaken. That is, people sometimes think they have caused an effect when they have not, and vice versa (Ebert & Wegner, 2011; Moore, Wegner, & Haggard, 2009; Wegner, 2002; Wegner, Sparrow, & Winerman, 2004; Wegner & Wheatley, 1999). Wegner titled his book "The illusion of conscious will" to hammer home the point. To be sure, Wegner did not claim that people are always mistaken, and one assumes people are mostly correct about whether their own actions produced some particular effect. Still, the fact that they can be mistaken perhaps reveals that conscious experience is not a direct reproduction of reality but rather a constructed simulation (e.g., Baumeister, Masicampo, & Vohs, 2011; Masicampo & Baumeister, 2013). Subjective experience of volition—the feeling of doing—is a mentally constructed best guess, not an infallible record of fact.

But are conscious acts of willing and choosing *always* illusory? It is difficult to know just why consciousness would bother creating the subjective impression of free choice if there were no such thing. On this issue, Wegner's analysis faltered. He proposed rather vaguely that people want to know whether they or someone else did something, but he gave little thought to explain why people should want that. In our view, it is more plausible to propose that people do genuinely choose, that subjective

experience of freedom approximately captures those real processes but is vulnerable to occasional error. The errors arise precisely because conscious experience is a mentally constructed simulation. But it is a simulation of something that is genuinely happening. The sorts of errors documented in Wegner's ingenious experiments probably almost never occur in everyday life (how often are people playing with an Ouija board?) and rarely cause problems if and when they do.

We speculate that belief in free will arises from the requirements of social systems, specifically the need to regulate one's own behavior: choosing to do (or not to do) this or that, and from the need to regulate the behavior of others (i.e., moral judgment and punishment). Cultures are systems that can confer immense advantages for survival and reproduction. But in order for that to happen, people must obey the rules of the systems, and they must be able to enforce the rules when they are broken. The former requirement demands that people voluntarily alter their behavior to conform to the requirements of the system. For example, many societies have improved life immensely by increasing wealth through manufacture and trade, but such processes are only possible on the basis of legal recognition of property rights and ownership. People must respect the ownership of property by others in order for it to become efficacious or even meaningful. If everyone were to steal all the time, the notion of ownership would possibly become meaningless, and in any case the potential gains from economic activity would be prevented.

The second requirement, of enforcing the rules, provides a reason for meting out punishment when people break society's rules: Miscreants with free will can be punished for wrongdoing because they could have chosen to refrain from violating a social or legal rule. Indeed, in Western civilization, the theory of free will was greatly stimulated by Christian theology, which used free will as a means to provide a justification for God punishing sinful behavior. The troublesome idea that the Christian god was a sadistic being who created human beings only to consign them to eternal torment was sidestepped by proposing that the creator gave each individual person freedom to choose whether to be good or evil and then simply rewarded or punished people according to the choices they freely made.

Experimental evidence by Clark et al. (2014) supported this pragmatic use of free will. Belief in free will increased among research participants who read about or contemplated misdeeds by others. Positive deeds by others and misdeeds by the self had no such effect. Indeed, misdeeds by others that victimized a morally reprehensible person failed to increase belief

in free will, presumably because people are not motivated to punish someone who steals from a sex criminal. Thus, people uphold and assert freedom of will precisely when they want to hold someone responsible (and punish that person) for behaving badly.

In short, we think people believe in free will because that belief is conducive to effective social functioning, especially in the context of human culture. The evidence reviewed above about the behavioral consequences of free will beliefs is highly consistent with that view. When people's belief in free will is reduced, they engage in many behaviors that are detrimental to social systems: cheating, stealing, aggressing, neglecting to help, and so forth. Belief in free will thus encourages people to act in ways that promote the effective functioning of society, which in turn brings benefits to the majority of its members.

Although promoting effective functioning in culture may be the main reason behind free will beliefs, other factors contribute. We turn now to review briefly some other factors that have been shown to affect whether people believe in free will.

People seem to infer free will from someone's unpredictable behavior. The underlying assumption is presumably that lawfully doing what is expected indicates that one is under control of events, whereas acting in seemingly unexpected ways indicates greater independence of the environment, suggestive of the autonomy aspect of free will. Ebert and Wegner (2011) had participants view of a fictionalized film observing an alien on another planet (denoted by a featureless triangle on a brown background). The alien's actions were either repetitive (the agent conducted exactly the same series of moves nine times) or random (the agent conducted nine different, but well-ordered actions). Participants attributed more freedom, choice, soul, consciousness, and other trappings of free will to the randomly acting agent than to the predictable one.

In fact, Ebert and Wegner found that acting in a random manner can even bolster one's subjective sense of one's own free will. Participants were prompted to press the P and Q keys on a computer keyboard either in a random sequence or in a systematically ordered one (alternating). Although in all cases the computer told them what to do, they experienced greater freedom with the random sequence than with the ordered one. Thus, people experienced their own behavior as relatively free based purely on its randomness, even though they did not make any decisions as to how to respond and simply did what they were told. Some of their procedures required respondents on the random conditions to override other responses,

however, so it is possible that what drove the feeling of free will was the overriding experience (akin to self-control) rather than the randomness.

Uncertainty and not knowing what to do are precisely the sorts of situations in which people would have to make random decisions, but recent experimental evidence by Lau and Baumeister (2013) indicates that people experience low freedom in such situations. People feel free when they make simple decisions and know what is best. They report low feelings of freedom when pros and cons balance, when issues are highly complex and difficult to figure out, and when they do not know what is best to do. Thus, the feeling of exerting free will may be more closely linked to efficacy (getting good things by one's actions) than to uncertainty or a wide latitude of possibility.

Recent work has shown that cognitive processes can be shaped by bodily states and feelings (Niedenthal, 2007; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). For example, arm movements toward versus away from the self can influence the favorability of personal reactions to stimuli (e.g., Cacioppo, Priester, & Berntson, 1993; Glenberg & Kaschak, 2002). Some evidence suggests that beliefs about free will are likewise susceptible to alteration based on bodily states. Ent and Baumeister (2013) found that states of mild physical desire reduced beliefs in free will. That is, people expressed lower levels of belief in free will at times when they felt the urge to urinate or the desire to have sex, as compared to times when they did not feel such needs. Tiredness (desire to sleep) also correlated with lower belief in free will. There was a similar correlation with thirst, though that fell short of significance.

The only desire that failed to correlate was hunger. Ent and Baumeister (2013) reasoned that dieting might account for that, because hunger might be an important cue by which dieters realize they are exerting control over their actions (by not eating). They conducted a follow-up study that found a significant interaction between dieting status and hunger on beliefs about free will. Nondieters reported less belief in free will to the extent that they felt more hunger. Thus, among nondieters, the pattern was the same as with the other physical desires: More desire predicted less belief in free will. Among dieters, however, the pattern was reversed, with greater hunger trending toward higher belief in free will.

Chronic bodily states may also influence beliefs about free will. Ent and Baumeister (2013) found lower than average beliefs in free will among two groups of people. One was people with epilepsy, which is a disorder that causes bodily fits and seizures. The other was panic disorder, characterized by a physical and emotional reaction of uncontrollable fear. Ent and

Baumeister had predicted that these bodily states would affect beliefs about one's own free will rather than beliefs about free will in general. (The scale by Rakos et al., 2008, has separate subscales to distinguish those two beliefs.) Yet the results turned out the other way around. Epileptics and panic disorder sufferers reported less belief than healthy controls that people in general have free will. They did not differ from healthy controls in beliefs about their own free will. Thus, they seem to think they themselves have as much free will as anybody, but their experiences of loss of bodily control apparently influence them to think that free will is elusive for everyone.

Even laboratory manipulations of physical experience can alter beliefs about free will. Performing a voluntary action (bouncing a ball) caused ordinary people to have higher belief in free will than experiencing reflexes (eyeblink and leg kick) (Ent & Baumeister, 2013), though this effect was mainly found among people with low levels of trait reactance (see Hong & Faedda, 1996, for reactance scale).

## 3.4. Conclusion

Most people believe in free will to some degree, at least in the popularly understood sense of responsible autonomy and uncoerced, conscious choice, but the beliefs are malleable and variable; so it is possible to study the consequences of differences in that belief. Such work has shown that belief in free will contributes to socially and culturally useful behavior. Low or reduced belief in free will has been linked (often causally) to selfish, dishonest behavior, increased aggression, reductions in helpfulness toward strangers, and mindless conformity (i.e., not thinking for oneself when expected to do so). Low belief in free will reduces counterfactual thinking, especially reflecting about one's misdeeds to deduce how one might have behaved better. Low belief in free will has been shown to detract from gratitude and from eagerness to uphold society's rules by punishing criminals and other rule breakers. In general, then, belief in free will is conducive to humankind's ability to maintain well-ordered, moral societies.

Beliefs about free will are affected by multiple things. One motivating factor appears to be the wish to hold other people responsible and punish them for their misdeeds. Random and unpredictable behavior appear to increase belief in free will, possibly because they are cues that suggest autonomy as opposed to being programmed by external factors. Thus, both responsibility and autonomy are implicated in the causes of free will beliefs. The challenge for theory is to explain why beliefs about free will appear to

increase in response to misdeeds and immoral acts—when presumably free will itself evolved to enable people to obey rules and perform morally virtuous acts.

## 4. FREEDOM AND HUMAN VOLITION

We turn now from beliefs about free will to the actual processes that constitute the reality behind the idea. Even if some scholars reject the idea of free will as untenable, they may still have interest in the volitional processes that guide human behavior. In simple terms, we propose that if free will exists, these are what constitute it, and if free will does not exist, these are the sorts of phenomena that are mistaken for it.

Although social psychologists may be relatively new to these philosophical debates, their own theories have long recognized some role of freedom. Brehm (1966) proposed that people seek to preserve their multiplicity of options and will resist attempts to curtail their freedom of action, in particular increasing their desire for options that have been taken away from them—even, perhaps perversely, when they did not much desire those options while they were available. Self-determination theory features autonomy as a key aspect of human motivation and asserts that humans have a need to behave autonomously, which in a sense amounts to a free will instinct (Deci & Ryan, 1985, 1987, 2000; Ryan & Deci, 2000). Cognitive dissonance theory has long accorded a central role to choice, in the sense that people are much more motivated to reduce dissonance to rationalize choices they made freely than actions they were compelled to perform (Linder et al., 1967).

### 4.1. Self-regulation and self-control

Self-regulation is essentially a matter of altering one's responses, including thoughts, emotions, and actions. The deliberate exertion of control to alter one's response is logically quite relevant to free will, because it assumes that at least two different responses were possible for the person in that situation and the person exerted volition to bring about one rather than the other. In fact, an early survey of the self-regulation literature concluded that the majority of acts of self-control serve to inhibit and prevent some response, as in stopping oneself from eating, drinking, smoking, taking drugs, having sex, acting aggressively, and spending money (Baumeister & Heatherton, 1996; Baumeister, Heatherton, & Tice, 1994). Stopping oneself from enacting an impulse is arguably itself an increment (or at least

a sign) of freedom: Preventing the prepotent response creates the option (i.e., the freedom) to do something else. Without the capacity for self-regulation, a creature is at the mercy of its impulses and would try to enact them all.

We assume that the psychological reality behind the idea of free will is something that evolved out of the simpler form(s) of agency found in simple animals. Social animals need to adjust to the demands and pressures of the social group, and so some degree of self-regulation in the form of behavioral inhibition must be found in nonhuman social animals. Needless to say, human culture imposes much longer and more complex sets of rules and other standards that restrict and guide behavior; so to function effectively within a culture, a person needs a highly active, broadly effective capacity for self-regulation. As one sign of the widespread demands for self-regulation, an experience sampling study by Hofmann, Baumeister, Förster, and Vohs (2012; Hofmann, Vohs, & Baumeister, 2012) concluded that the typical modern citizen spends 3–4 h every day resisting various desires—and resisting desire is only one application of self-regulation. Moreover, Hofmann, Baumeister, et al. (2012) and Hofmann, Vohs, et al. (2012) found that the degree to which a given desire evoked motivational conflict was largely proportional to whether the desire was compatible with the demands of the workplace. That underscores the relevance of self-regulation to cultural life. To succeed at work, people must regulate their behavior and restrain many of their desires.

## 4.2. Basic features of self-control

Self-regulation can be analyzed into three elements (see Baumeister et al., 1994; Carver & Scheier, 1981, 2001). The first is a set of standards (and the commitment to them). Regulating is not just changing but rather involves change guided by a specific idea of how things should or should not be. Many standards are imposed by the culture, such as moral rules, laws, and social norms. Others may be chosen by the individual, such as personal goals and values. Thinking of free will as the deliberate use of meaningful ideas to cause behavior is thus highly relevant to self-regulation.

The second element is a supervisory monitoring process. It is very difficult to regulate something without keeping track of it. Seminal work by Carver and Scheier (1981, 1982) proposed that the function of self-awareness is mainly for self-regulation. They applied the cybernetic feedback loop to this process. In its simplest form, it tests the current state

against the standard, operates to reduce any unwanted discrepancies, tests again, repeats as necessary, and exits the loop once the test indicates that the current status meets the standard.

The third element is the capacity for change. Much work in recent years has suggested that this capacity involves the expenditure of a limited resource, akin to strength or energy. Most likely the traditional folk term "willpower" is an intuitive expression of the idea that persons must put energy into regulating themselves.

The idea that self-regulation depends on energy was proposed based on a literature review by Baumeister et al. (1994; also Baumeister & Heatherton, 1996). Early empirical support was provided by Muraven, Tice, and Baumeister (1998) and Baumeister, Bratslavsky, Muraven, and Tice (1998). These studies indicated that after exerting self-regulation on an initial task, performance on a subsequent, ostensibly unrelated self-regulation task was generally impaired. The implication was that some strength or energy was expended during the first task, leaving less available for the second. This state of reduced energy has been dubbed "ego depletion," to indicate that some resource belonging to the self was partly expended by the initial task.

These findings were inconsistent with alternative models of self-regulation. One was a priming model, by which the first task would activate the cognitive and motivational systems needed for self-regulation. Such a model would predict that the second task would be facilitated, not impaired, by having done the first task (because the self-regulatory processes would already be up and running when the second one started).

Another theory that was contradicted by the depletion findings was that self-regulation is a skill, a view that has been prominent in the developmental literature. Skill, however, does not change from one trial to the next. It only shows gradual improvement with practice. Hence it does not fit the findings of impairment, though they do not directly disprove it (i.e., there could also be skill improvements alongside the strength depletion). Indeed, other findings have shown that self-regulation does gradually improve when people engage in it on a regular basis over an extended period of time (for review, see Baumeister, Gailliot, DeWall, & Oaten, 2006). Even so, skill is likely to be specific to the particular task, whereas self-regulatory improvements seem to be domain-general. That is, the longitudinal studies on improving self-control with practice have generally shown improvements on tests that were quite different from the exercises. Muraven, Baumeister, and Tice (1999) showed improvement on physical handgrip

stamina after exercises on posture. Oaten and Cheng (2006, 2007) showed improvements in laboratory tests of vigilance and distractibility as a result of physical exercise, financial discipline, and study skills. Most remarkably, Muraven (2010) demonstrated improved success at smoking cessation as a result of performing simple daily handgrip exercises or resisting eating sweets.

### 4.3. Relevance to free will

The basic pattern of ego depletion has been well replicated in many laboratories and with a wide assortment of procedures (for review and meta-analysis, see Hagger, Wood, Stiff, & Chatzisarantis, 2010). It indicates several features that are relevant for understanding free will.

First, behavior becomes less autonomous when people are depleted. Depleted individuals tend to follow external cues rather than to initiate action (Alquist, Ainsworth, & Baumeister, 2013; Alquist, Ainsworth, Baumeister, Daly, et al., 2013; Stillman & Baumeister, 2010; Vohs, Baumeister, Vonasch, Pocheptsova, & Dhar, 2013). In the depleted state, behavior is also more likely to be guided by unconscious motives and preferences. Hofmann, Rauch, and Gawronski (2007) found that conscious attitudes predicted behavior among nondepleted people, whereas unconscious attitudes predicted behavior among depleted ones. Thus, ego depletion brings a reduction of conscious control over behavior.

Second, ego depletion seems to bring a reduction in morally virtuous action. When people experience a conflict between so-called higher and lower desires, with the higher one referring to something that is valued by the culture and the person in a long-term and/or moral perspective whereas the lower one involves some temptation toward immediate gratification that is potentially costly or objectionable, depletion shifts the balance in favor of the lower one (Gino, Schweitzer, Mead, & Ariely, 2011; Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009; Tittle, Ward, & Grasmick, 2003). The view that free will serves the cause of morally virtuous action has been asserted repeatedly throughout the history of philosophy, perhaps most forcefully by Kant (2002). Baumeister and Exline (1999) dubbed self-regulation the "moral muscle" because it appears to be a centrally important capacity for performing morally desirable actions. They pointed out that most moral virtues involve good self-regulation, whereas most vices (e.g., the Seven Deadly Sins of medieval Christian theology) involve self-regulation failure.

Third, self-regulation is highly adaptive for cultural beings. Abundant evidence has indicated both short-term and long-term benefits (but especially the latter) accrue to people with good self-control: they do better at work and school, are more popular, have better relationships, are better adjusted, have better mental and physical health, and live longer than other people with less self-control (Mischel, Shoda, & Peake, 1988; Moffitt et al., 2011; Shoda, Mischel, & Peake, 1990; Tangney, Baumeister, & Boone, 2004). In the depleted state, many adaptive behaviors deteriorate, which indicates the value of having this form of free will and the importance of conserving one's energy so as to avoid getting severely depleted.

The limited resource and depletion findings also fit the view that free will is an occasional, fluctuating phenomenon rather than an absolute property and that it exists along a continuum. Those findings indicate that a person's capacity for free actions (such as self-control) varies as a function of circumstances, concurrent and recent demands, and physiological factors.

## 4.4. How self-control works: Elucidating the strength model

If the exercise of self-control is an important instance of free will, then understanding the relevant processes involved in self-control can shed light on the mechanics of free will. This section will briefly cover the evidence that self-regulation depends on a limited resource that becomes depleted after use.

The strength model emerged from studies showing that after one act of self-control, performance on a second, typically different, self-control task is impaired (e.g., Baumeister et al., 1998; Muraven et al., 1998). This pattern of findings suggests that some limited resource was expended on the first task and was therefore not available for the second task. Many experiments in many laboratories with many different methods have confirmed this pattern (for meta-analysis, see Hagger et al., 2010). The implication is that some form of energy or strength is involved in self-regulation.

Some confusion arises because the term "depletion" has two meanings. One is that the quantity of the depleted resource is diminished but some remains, and the other is that the resource is completely gone. The former seems far more appropriate, as no laboratory study has ever provided evidence that anyone's capacity for self-control was reduced to zero. On the contrary, abundant evidence indicates that depleted people can still self-regulate effectively, especially when motivated to do so. Muraven

and Slessareva (2003) showed that providing cash incentives can motivate depleted persons to perform as well as nondepleted people.

The depletion effects thus indicate conservation, rather than exhaustion. Muraven, Shmueli, and Burkley (2006) extended the two-task procedure by adding a third task. How much energy people expended on the first two had the predictable impact on how they performed on the third task. When participants anticipated the third self-control task, they performed exceptionally poorly on the second task, which suggests that they were conserving energy for the future demands. Thus, as with any valuable but limited resource, people tend to conserve it, and when they note that some has already been expended, their efforts at conservation intensify. Ego depletion fits this pattern: The body seeks to conserve its somewhat diminished energy.

The initial papers on ego depletion used energy and willpower metaphorically, prompting some to wonder whether an actual energy resource is involved. Some evidence has linked self-regulation to the body's basic energy supply, encompassing levels of glucose in the bloodstream. Glucose is a chemical made from nutrients (not just sugar) stored in the body but also carried in the blood to muscles and organs. Neurotransmitters are made from glucose, which has earned glucose the nickname "brain fuel." Glucose is thus a prime candidate for the energy involved in self-regulation.

The role of glucose in self-regulation was illuminated in a series of experiments by Gailliot et al. (2007). There were three main findings, producing three main conclusions. In retrospect, one of them is likely wrong, but the other two have held up well. The findings were as follows. First, engaging in self-regulation reduced levels of blood glucose, both as compared to control conditions that did not require self-regulation and as compared to baseline glucose measures prior to the self-regulating task. This is the finding that has not replicated consistently and is now regarded as probably incorrect.

Second, low levels of blood glucose predict poor self-regulatory performance. Gailliot et al. (2007) measured blood glucose prior to behavioral measures of self-regulation, and these were positively correlated. Indeed, much research by nutritionists and others had already linked low glucose levels to a variety of behavioral pathologies indicative of poor self-control, such as juvenile delinquency, laboratory aggression, and poor classroom performance (for literature review, see Gailliot & Baumeister, 2007a). There is some evidence that the level of glucose itself is less important than its availability for metabolic use. For example, diabetics often have high levels of blood glucose, but their bodies resist it, so it is relatively useless as potential

brain fuel. Diabetics tend to have problems with self-control (Gailliot & Baumeister, 2007a).

The third finding is that receiving a dose of glucose can counteract the effects of depletion, as if the incoming glucose replenished the depleted resource. The typical procedure is to provide all participants with a soft drink, which by random assignment was sweetened with either sugar or diet sweetener. Gailliot et al. (2007) found that the sugar dose restored self-regulatory performance to levels commensurate with nondepleted controls, whereas the diet sweetener (no glucose) had no beneficial effect. Subsequent findings have confirmed the beneficial effects of glucose (Masicampo & Baumeister, 2008; McMahon & Scheel, 2010; Wang & Dvorak, 2010).

Linking self-control to blood glucose levels provides a new perspective on free will, especially if one regards free will as a variable capacity. Alcohol, for example, lowers blood glucose. On that basis, our theory would say that intoxicated persons have less free will than sober ones. Certainly, alcohol intoxication has been associated with a broad range of self-regulatory failures. Baumeister et al. (1994) observed that nearly every form of self-regulation they surveyed had been shown to suffer under alcohol intoxication: Inebriated persons were more aggressive, more prone to sexual misdeeds, more prone to spend money, more prone to praise themselves, more likely to smoke cigarettes, and even more likely to consume additional alcohol, as compared to people who had not had alcohol.

In a similar vein, premenstrual syndrome (PMS) may be also considered a temporary reduction in free will based on physiological processes. During the luteal phase of the menstrual cycle, the female body allocates more glucose than usual to its reproductive activities, leaving less for other things such as self-regulation. Consistent with that view, the behavioral manifestations of PMS suggest a general decline in control and restraint, as opposed to an increase in antisocial or other motivations (Gailliot, Hildebrandt, Eckel, & Baumeister, 2010).

## 4.5. Competing theories about self-regulatory depletion

Some theorists have proposed alternate accounts. Beedie and Lane (2012) have suggested that the decisive process is not the depletion of glucose resources but allocation. They noted that the human body has extensive stores of glucose, and that the brain's usage of glucose tends to be constant rather than dwindling. They suggested that the notion of a resource being depleted and conserved could be jettisoned. Alternatively, however, the

allocation hypothesis could be integrated with the limited resource model. Selective allocation of some resource is most plausible when that resource is actually limited and precious. After all, there is no reason to conserve a resource that is unlimited. An elaborate mechanism for assessing, conserving, and judiciously allocating glucose would be unlikely to have evolved unless it provided some benefits, presumably in the form of getting the best use out of a limited resource.

The notion of unlimited willpower figured in another alternative account of ego depletion. Job, Dweck, and Walton (2010) proposed that ego depletion is "all in the head," based on their finding that ego depletion effects were eliminated among people who were induced to believe that their willpower was unlimited. Their view, apparently, was that ego depletion is the tragic result of a mistaken understanding of willpower as limited. The plausibility of that view is debatable. If believing in unlimited willpower could actually make it unlimited, then presumably most successful cultures would have embraced that belief long ago. Several prior findings had already made this same point—that ego depletion effects could be eliminated by manipulating subjective beliefs—though Job et al. (2010) did not cite them and garnered considerably more attention than the earlier ones (e.g., Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002). Thus, this same idea has been reached by several apparently independent sets of researchers.

Recent work has clarified the benefits and limitations of adopting belief in unlimited willpower. It appears that such beliefs can help people continue performing well when they are slightly depleted but quickly lose their value and even become counterproductive at more substantial levels of depletion. Vohs, Baumeister, and Schmeichel (2012) borrowed the procedures used by Job et al. (2010) and replicated their findings—but added a condition in which participants performed four initial depleting tasks. In the latter condition of severe depletion, belief in unlimited willpower actually produced poorer performance than belief in limited willpower.

Subsequent work by Ainsworth and Baumeister (2013) found that mildly depleted persons who believe willpower is unlimited actually showed an increase in blood glucose levels. With severe depletion, however, glucose levels were low regardless of belief.

These findings fit the view that self-regulation depletes a limited resource that is carefully allocated. Inducing people to believe that they have unlimited willpower removes the reason to conserve it, and so people perform well (as in the original Job et al., 2010, findings). But of course inducing

that belief does not magically endow them with more glucose. Rather, it simply persuades the person that there is no need to conserve. Why bother being frugal with a resource that is unlimited? Hence depleted persons allocate freely insofar as they believe their willpower is unlimited. As a result, when first depleted, these persons will show none of the performance decrements that characterize other people who wish to preserve their diminished resource. Such reckless allocation will, however, cause difficulties for the person eventually, because one is in fact depleting one's stores all the more. This accounts for the negative effects of severe depletion, even among people who have been led to regard willpower as unlimited (Ainsworth & Baumeister, 2013; Vohs et al., 2012).

Another alternative theory was put forward by Inzlicht and Schmeichel (2012), who sought to replace the strength model's reliance on energy with more traditional explanatory processes of motivation and cognition. Inzlicht and Schmeichel proposed that self-regulating changes one's motivation, producing the desires to avoid controlling oneself further. Although such a motivational shift is certainly compatible with many findings, it is most plausible in combination with a limited energy resource model. In other words, it is precisely because some energy resource has been depleted that one is motivated to conserve what remains, and that is the reason one withholds effort. The motivational and attentional changes are thus set in motion by the depletion of energy. Moreover, and more troubling for the motivation account, thus far the weight of (admittedly limited) evidence has contradicted the central prediction that people would be less motivated to perform the second task after having already exerted self-control on the first.

## 4.6. Rational choice

Rational choice is an important hallmark of human behavior. It is a foundational model in multiple social sciences, including economics and political science. That does not mean that scholars in those disciplines are blind to human foolishness. They do, however, believe that, in general, people calculate their self-interest and guide their behavior so as to bring themselves advantageous outcomes. Moreover, prevailing opinion considers the capacity for abstract logical reasoning to be mostly absent in other species, which makes rational choice a distinctively human trait. The philosopher Davidson (1982) argued on conceptual grounds that rational thought is a social trait and that only communicators have it, which again would limit it to humankind, insofar as true and full communication requires mental capacities

(including understanding of others' mental states) that other animals lack. These points again support the view of free will as only being realized within a cultural context and as involving the deliberate use of ideas to guide behavior.

Insofar as free will exists, rational choice would be a vital and central form of it. Indeed, work by Monroe and Malle (2010, in press; Monroe, Malle, & Dillion, in press) shows that people view rational choice as a necessary condition for free will. Agents lacking the capacity for logical reasoning and rational choice are seen as also lacking free will and moral responsibility, and people emphasize rational choice as necessary when specifying the capacities a hypothetical mechanical or biological agent would need in order to have free will. Behavioral choice is central to volition, and basing choices on rational calculation frees one from more unconscious and less beneficial modes of guiding action. Thus, it appears to qualify as an important form of free will.

Several lines of work have linked rational choice to the limited strength model. An early paper by Schmeichel, Vohs, and Baumeister (2003) demonstrated multiple decrements in intellectual performance and logical reasoning caused by prior self-regulation. That is, depleted people scored lower than nondepleted controls on intelligence tests. Automatic cognitive processes were unaffected, including general knowledge, memorization, and vocabulary, but controlled processes suffered substantial impairments. Insofar as rational choice depends on intelligence, it is apparently compromised by depletion of willpower. Logical reasoning and related phenomena seemingly require the mind to exert active control over its thinking processes, and when some energy has been expended in prior acts of self-control, less is allocated for such difficult thinking.

Turning from the rational aspect of rational choice to the choosing aspect, depletion is again implicated. One early study by Baumeister et al. (1998) suggested that making choices depletes the person's willpower. That experiment borrowed a procedure from cognitive dissonance research, in which participants are instructed to give a speech contrary to their attitudes. When they were induced to make the choice deliberately, they later showed poorer self-control, as compared to participants who were simply assigned to make the speech without being given any choice. (Participants did not actually give the speech.) Indeed, behavioral effects indicating ego depletion were found even among participants who made the choice to give a speech entirely consistent with their attitudes. The implication was that making a decision depleted energy, regardless of what that decision was.

That experiment came under fire from Moller, Deci, and Ryan (2006), who pointed out that cognitive dissonance procedures induce people to make choices guided by external influences and constraints—thus not truly free or autonomous choices. They showed that when people were able to make just two pleasant, self-consistent choices, they did not show ego depletion effects. Their prize-winning paper contended that choosing *per se* is not depleting. This posed a serious challenge to the view that self-regulation and rational choice are psychologically linked forms of free will that share common processes.

The issue of whether choice is depleting was addressed explicitly in a series of experiments by Vohs et al. (2008). They confirmed that a wide variety of choices cause ego depletion, in the sense that after making decisions, self-control was impaired. Responding to the challenge raised by Moller et al. (2006), they replicated the finding that a small number of pleasant choices is not depleting—but as one continues to choose, the impact of pleasantness dwindles and then disappears. In a crucial study, participants simulated preparing a gift registry by selecting from an online catalog a variety of wedding gifts that they would like to receive whenever they got married. Many participants found this a pleasant, enjoyable task, but others detested it. Half the participants did this for only 4 min. Only the ones who disliked the task showed signs of depletion on a subsequent behavioral measure, indicating that enjoying the task prevented depletion (as proposed by Moller et al., 2006). However, the other half of the participants performed the gift registry task for 12 min. Their subsequent behavior indicated depletion, regardless of their level of enjoyment. Thus, in the long run, choosing is depleting, but in the short run, pleasant, self-guided choices do not cause depletion as rapidly or strongly as unpleasant ones.

Another study from the Vohs et al. (2008) paper tried to ascertain what aspect of the decision caused depletion: (1) surveying options and forming a preference, (2) making a choice, or (3) implementing an already made choice. To test the effects of these three stages of decision making on depletion, participants were instructed to configure a computer for purchase from the dell.com Web site. However, Vohs et al. manipulated the task so that some participants only reviewed the various options and formed a preference, but they did not make a choice. Other participants only implemented an already made choice by ticking on-screen the squares to execute the choices (e.g., buy this computer). (All stopped short of actually purchasing a computer!) A third group did all three parts: they surveyed the options, made choices, and implemented them. The last group showed significantly

greater impairment on a subsequent self-regulation task (persistence at anagrams) than the others. Thus, neither forming a preference nor implementing an already made choice is responsible for the depleting effects of the decision process. Rather, it seems that the act of *choosing* between options is a key part of what depletes volitional resources.

The link between choice and self-regulation was confirmed in an investigation by Pocheptsova, Amir, Dhar, and Baumeister (2009). Reversing the causal direction tested by Vohs et al. (2008), they showed that after exerting self-control, decision making is impaired. It seems depleted persons shift toward a more superficial, easier style of choosing. For example, when people had their full resources, they tended toward compromising in difficult situations, such as trading off varying levels of price and quality to achieve an optimal balance—but depleted participants were much less prone to compromise. Instead, they would adopt the simpler strategy of picking one dimension and maximizing on it (e.g., "Just give me the cheapest" or "I'll take the best one"). In other studies, depletion made people more prone to irrational bias. This included allowing one's decision between two possible jobs to be swayed by an irrelevant reference (anchoring) point. It also included having one's decision biased by a logically irrelevant inferior option, in the so-called attraction effect (i.e., asymmetric dominance; Huber, Payne, & Puto, 1982; Simonson, 1989). There was also some evidence that depleted decision makers seek ways to avoid or postpone deciding.

The relevance of glucose to decision bias was established by Masicampo and Baumeister (2008). They replicated the finding that depletion increased one's susceptibility to the attraction effect. This irrational bias was significantly reduced among participants who drank lemonade sweetened with sugar, which eliminated the effect of ego depletion. Lemonade made with a diet sweetener (Splenda) had no effect. Similar impacts of glucose on decision making have been shown in other studies, including inferring rules for predicting events (McMahon & Scheel, 2010) and valuing versus discounting delayed outcomes when making choices (Wang & Dvorak, 2010).

## 4.7. Conclusion

The fact that self-regulation and decision making share a common resource is important for theories about free will. Philosophical works on free will offer examples from both self-control and rational choice, but apart from interpretive analysis, philosophy has no way of establishing that the two sets

of phenomena are related. The work covered in this section shows that some important psychological and physiological processes are shared by rational choice and self-control. The methods of social psychology can thus augment philosophical analysis by establishing empirically that self-control and choice share common processes and resources—thus making the idea of free will more plausible.

If there is indeed such a thing as a free will, then it would have to be found in both self-control and rational choice. The common processes based on the same underlying resource increases the plausibility of such an understanding. That is, there is arguably a single psychological phenomenon that underlies the popular understanding of free will.

## 4.8. Initiative versus passivity

Thus far, we have focused on self-regulation and rational choice. These are presumably the classic, defining cases of free will. There is no reason to assume that they exhaust the purview of free will, however. To look for others, we can follow the limited resource that is used in both of them. What other phenomena is that resource used for?

One candidate is initiative, in the sense of responding actively rather than passively. Active responding suggests a higher level of autonomy than passive responding, insofar as passivity involves a submissive response to external influences whereas something is active because in some sense it begins inside the self. Indeed, the term "initiative" is related to the term "initiation" and thus implies starting a sequence of behavior. Dictionary definitions of "initiative" refer to acting on one's own, which thus has clear implications for freedom and autonomy.

We have said that the processes that expend the body's limited energy resource in service of self-regulation and rational choice constitute the psychological reality behind the idea of free will. To include initiative in that account, it would be useful to show that initiative is reduced during ego depletion. Evidence for this hypothesis was provided by Vohs et al. (2013). In one study, participants were supposed to follow instructions on a computer, but the computer malfunctioned and never did anything. Participants who were ego depleted by a prior exercise of attention control sat passively in front of the inert computer for twice as long as nondepleted ones, as opposed to taking the initiative to report the problem. In another study, depleted participants made fewer trips to gather resources for a collage they had been assigned to make, resulting in inferior, less creative collages, as

compared to nondepleted persons. (To get materials, one had to walk down a long room from their desk to the materials table, and they were limited to five Legos per trip, so that making extra trips was necessary to get more resources.) Yet another study showed that depleted persons tended to avoid and postpone decisions, which is also a form of passivity.

Some might question the passivity finding by noting that depletion often seems to produce an increase in various kinds of behaviors, especially ones that would otherwise be inhibited. It is important to distinguish disinhibition from initiative. The disinhibited behaviors found in the depleted state do not seem to resemble free will as generally understood. Instead, they typically involve yielding to external cues and internal urges that one would otherwise restrain, such as impulses to eat unhealthy food (Vohs & Heatherton, 2000), to aggress against others (DeWall, Baumeister, Stillman, & Gailliot, 2007; Stucke & Baumeister, 2006), to purchase unwanted items impulsively (Vohs & Faber, 2003), to consume large amounts of alcohol prior to a driving test (Muraven, Collins, & Neinhaus, 2002), to engage in inappropriate sexual activities (Gailliot & Baumeister, 2007b), or to violate other social norms (Gailliot, Gitter, Baker, & Baumeister, 2012). Alcohol abuse, overeating, wasting money, getting into fights, sexual misbehavior, and norm violations hardly qualify as using advanced volitional capacities conducive to the pursuit of enlightened self-interest.

A final study by Vohs et al. (2013) highlighted the difference between initiative and disinhibition. Half the participants were depleted by forming a habit (crossing out everyone in a page of text) and then had to overcome that habit by following a more restrictive rule. Others simply continued the habit (nondepletion condition). Next, all participants took a taste test, which was a cover for measuring how much they ate. Initiative was manipulated by presenting half the participants shelled peanuts to taste, whereas others were given peanuts in shells. The latter required more active responding, as one had to take each nut out of its shell in order to eat it. When the peanuts were easy to eat (i.e., no shells), depleted participants ate significantly more than nondepleted ones. In contrast, when more initiative was required (i.e., peanuts were in shells), depleted participants ate significantly less than nondepleted ones. Thus, depletion produced disinhibition in the form of more eating—but only when eating was easy and simply involved giving in to external cues. Depletion also produced passivity, in that it led to less eating (even among participants who said they were hungry) when active steps were required in order to get at the food.

Evidence for passivity in actual decisions, caused by decision fatigue, was provided by Levav, Heitmann, Herrmann, and Iyengar (2010). In three field studies, they tracked choices made by consumers seeking to buy a bespoke suit or a self-configured car. In each case, the consumer had to make a series of decisions from assorted possible features or attributes, and a default option was always available. The researchers varied the sequence in which the consumer made the decisions; so, for example, sometimes the choice of fabric was early (nondepleted) and sometimes it was late in the sequence (when people were presumably depleted from the prior decisions). Levav et al. (2010) found a general tendency for people to passively choose the default option more frequently as they made more decisions.

## 4.9. Conclusion and implications

Initiative may thus be a third dimension of free will, alongside self-control and rational choice. It appears to draw on the same resource and suffers after that resource has been expended on self-control. It is consistent with the view of free will as responsible autonomy, in this case with more emphasis on the autonomy than on the responsibility. (Initiative can be irresponsible.)

Recognizing initiative as a form of free will pushes the evolutionary account of the origin of free will into an earlier period. Presumably, animals developed initiative long before they developed self-control or rational choice. Evidence for autonomous changes in behavior of fruit flies (Brehm, 1966) have been cited as an early form of free will, because the flies apparently changed direction as a result of inner processes, given that no external stimulus preceded the change. Calling the zigzags of fruit flies free will may overstate the case, but it certainly indicates that some form of animal autonomy can be found in small, simple creatures, which thus suggests that it at least some form of free will greatly preceded human evolution.

If we assume there is a common, unifying process in the psychological reality that underlines the concept of free will, then autonomous initiative may be the earliest form of it. Animals thus first evolved the ability to initiate actions in relationship to the environment, as opposed to merely responding passively to its stimuli and events. Self-control and (presumably even later) rational choice would likely have evolved out of this preliminary form of volition.

## 4.10. Planning

Making and carrying out *ad hoc* plans may be a fourth form of free will. Although research and theory on this link remain somewhat rudimentary

at present, planning shares many commonalities with rational choice (e.g., use of logic to devise meaningful guidelines for behavior). Further, it is useful to recognize how central such planning activities are to human life, presumably in contrast to what other species accomplish. Humans form mental plans for behavioral sequences as a regular part of everyday life. The sequences may be steps toward an overarching goal, such as planning how to carry out a research project or vacation trip. They may simply accommodate how to accomplish a variety of unrelated goals within a fixed time period possibly constrained by other factors, such as when one plans how to get a cluster of separate errands and chores done on a particular Saturday afternoon (e.g., visit the hardware store before the grocery, so that the food is not melting and spoiling in the overheated trunk of the car during the hardware store visit). The extremely limited capacity of nonhuman animals to think about the future (see Roberts, 2012) would preclude such planning. It is thus an important addition to the list of ways of controlling action that are unique to humans, or almost so.

Ideally, we would have evidence linking plan-making to ego depletion. At present, the amount of such evidence is insufficient to justify strong conclusions. Vohs and Baumeister (2012) found that depleted persons were less likely than others to choose to engage in planning activities when confronted with an assortment of possible activities. They rated planning as less desirable (than nondepleted persons rated it) on its own, and it was less favorably regarded in competition with other possible actions. This finding resembles the finding that depleted people prefer to avoid and postpone decision making.

An important form of planning is the conscious construction of implementation intentions, which translate general values and inclinations into specific guidelines for how to respond in particular situations, conforming to an if–then or when–then formula (e.g., Gollwitzer, 1999). Webb and Sheeran (2003) showed that having made such plans enabled people to avoid some of the detrimental effects of ego depletion. Their first experiment showed that forming implementation intentions to perform well on the Stroop task (i.e., "As soon as I see the word I will ignore its meaning (for example, by concentrating on the second letter only) and I will name the color ink it is printed in") made people less depleted than performing the Stroop task without such intentions, as indicated by subsequent persistence on unsolvable puzzles. Their second experiment applied the implementation intention to the dependent rather than the independent variable: Participants were first depleted, or not, and then they performed the Stroop task with or without implementation intentions. Implementation intentions

facilitated Stroop performance among depleted persons but not among nondepleted ones.

A promising direction for further research would be to expand these hints into a program of study of planning and limited resources. Making plans should be depleting, and when people are depleted, they should avoid planning or plan in inferior, low-effort ways. Planning is a highly important form of human volition, especially needed in cultural contexts, and so it would be highly consistent with the theory that free will is a new form of action control that helps adapt human beings for living in such societies.

## 5. CONCLUSIONS

Free will has moved from being a topic for abstract debate in philosophy, theology, and related fields to being an active research topic for laboratory work in social psychology. This work has suggested new and different ways of thinking about free will. In particular, views of free will as exemption from causality and as influence of souls on behavior should be dropped from the debate, as they are relevant to very little in either the prevailing folk beliefs about free will or to what experimental studies have learned about human volition.

Instead, we recommend thinking of free will as an advanced form of volition that evolved out of simpler versions of animal agency. We have proposed conceptualizing it as *responsible autonomy*. This formula appeals on multiple grounds. It is consistent with the prevailing majority of layperson and folk beliefs about free will. It captures aspects that are amenable to empirical investigation (unlike souls and noncausality). It emphasizes the idea that free will evolved to facilitate participation in social systems, insofar as autonomy and responsibility are largely requirements of systems.

The view that free will evolved to facilitate guiding action in cultural contexts is highly consistent with all three prongs of the research programs we have covered in this chapter. First, it fits well with how ordinary people typically understand free will: as making choices, acting on one's own, controlling one's behavior to conform to social rules, and pursuing delayed rewards over time. Second, beliefs in the reality of free will promote a broad range of behaviors that are beneficial to society, including honest action, helping others, restraining aggressive impulses, thinking for oneself, and feeling and expressing gratitude, upholding standards by advocating punishment for rule breakers, and learning from one's mistakes. Third, the extensive evidence on the limited resource model of volition likewise indicates its

helpfulness for cultural animals. Self-control, intelligent thought, and rational choice are all vital for cultural beings, and the less well-studied aspects (initiative and planning) are also helpful.

At present, we think the following is the best approximation of what is known about free will. Human beings have a complex form of volition that enables them to guide behavior based on a much wider range of considerations than what is seen elsewhere in nature. These considerations include moral rules, laws, social norms, and economic calculations—above all, the deliberate incorporation of meaningful ideas into the causation of action is central. Moreover, evolution seems to have created this capacity by managing to make resources from the body's basic energy stores available for producing metabolically costly acts of volition, including self-control, rational choice, and initiative. The fact that the same resource is allocated and depleted in all those different kind of volitional acts indicates that it is appropriate to invoke a common underlying phenomenon or process, and free will would be one apt descriptor. However, deciding whether those phenomena constitute proof of free will is more a matter of definition (i.e., which meaning of free will is espoused) than of testing hypotheses.

Conceptualizing free will as a distinctive form of human volition characterized by responsible autonomy and facilitating effective action within a cultural society is a promising basis for building theory and conducting further research. By pursuing this line of work, social psychologists can make original contributions to a topic that has been discussed and debated for centuries and that lies close to the heart of the human experience.

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