CAN PEOPLE CHOOSE NOT TO SMOKE? A STUDY OF
VOLITIONAL SELF-CONTROL, SELF-EFFICACY, AND CIGARETTE USE

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Abstract

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Traditional assumptions about the nature of science have historically precluded the empirical study of human agency, but conceptual and methodological advances by Howard (1984) and others have made research on agency possible. Following Howard and Conway’s (1986) volitional instruction paradigm, the present study examined whether participants could willfully control their cigarette use. Data from 43 smokers indicated that participants did indeed smoke significantly less when instructed to “try not to smoke;” moreover, the proportion of variability explained by this simple instruction was greater than is typically seen in psychological research. Self-control was not associated with self-efficacy, nor was self-control enhanced by participants’ self-prediction. Self-ratings of effort were found to mediate the effects of volitional instructions on smoking behavior, providing further support for an agentic (versus mechanistic) interpretation of volition effects. The results of this study highlight the importance of considering both agentic and non-agentic influences on human behavior.
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CHAPTER 1
INTRODUCTION AND LITERATURE REVIEW

The concept of human agency—the ability of human beings to direct their own actions—has permeated the writings of the humanities for centuries. Indeed, agency and the related concepts of free will, volition, and responsibility continue to be an important focus of modern philosophy, theology, ethics, and law (Double, 1991; Howard & Conway, 1986). This is not surprising, for as many authors have observed, nothing is more central to human experience than the sense of guiding one’s own life (e.g. Bandura, 2001). However, despite its prominence in collective and personal human discourse, the notion of agency has been troublingly absent from the realm of human science.

To be more accurate, it is support for the notion of agency that has been absent among the scientific community. The notion itself, like an annoying insect that continues to buzz in one’s ear despite effortful flailing and swatting, simply hasn’t gone away. From the outset, clinical and applied theorists have affirmed or implied a capacity for people to self-direct (Rychlak, 1979), and in fact, a shared belief in some form of human agency is a uniting factor among many otherwise disparate clinical theories (Schultz, 1977), many of which consider agency (and the
factors by which it is constrained or facilitated) to be a central focus of treatment (Mahoney, 1993; Richardson, 1994).

Because the notion of agency plays such a prominent role in applied psychology, the humanities, and the life experience of most people, it is easy to see why the dismissal of agency by research psychology has led many to become skeptical about our efforts and outcomes (Howard & Conway, 1986). Though the goal of a science is obviously not to be well-liked, might the alienation of research psychology from these groups (who are, in their own ways, intimately familiar with human nature) suggest that we have overlooked an important aspect of human functioning? Might we have lost track of something that is obvious to these other ‘experts’ on humanity? If so, when did we lose track of it, and how?

1.1 Psychology, Agency and the Philosophy of Science

The scientific shunning of agency had its roots in an evolving philosophy of science. Howard (1984) explains that just as scientific methods change and progress over time, judgments about what constitutes “good” science also change and progress. It is important to note that the philosophical judgments about science are always embedded within the culture in which they are formed, and they often begin as reactions to specific scientific methods being employed (Howard, 1984).

As demonstrated by Rychlak (1979), Howard (1990), and others, the Baconian revolution of the seventeenth century incorporated several new premises about what “good” science entailed—how scientific knowledge should be obtained, how observations should be explained, etc. Though very productive for studying the
“natural sciences” (e.g. astronomy, physics) that were the intrigue of the day, these premises effectively rendered the study of human agency—by definition—unscientific. One might ask, how can a philosophy of science proscribe the study of a specific topic? Philosophies of science address the adequacy and value of scientific methods, and in theory, one should be able to apply solid methods to any topic of interest (Rychlak, 1988). Yet this was not the case for human agency. To see why, we must note Aristotle’s doctrine of causes and the way these were viewed by Francis Bacon and his 17th century contemporaries.

1.1.1 Aristotle’s Doctrine of Causes

Aristotle argued that to understand something in nature, one must consider each of four explanatory factors, or “causes,” that make it what it is. An object’s material cause is the substance of which it is made. Formal cause refers to the structure, shape, or pattern by which an object is identified. Efficient cause is the moving force underlying something’s existence and nature. Lastly, formal cause (telos) is an object’s end or purpose, the reason “for the sake of which” it exists.

As explained by Cohen (2002), these are not causes in a Humean cause-and-effect sense, but are better understood through the English verb “to make.” He illustrates:

A table is **made** of wood (material cause).
Having four legs and a flat top **makes** this a table (formal cause).
A carpenter **makes** a table (efficient cause).
Having a surface suitable for eating or writing **makes** this a table (final cause).
From Aristotle’s perspective, sound knowledge of something includes a full understanding of its causes and the inevitable relationships between them. Our table, for example, is brought into existence by a carpenter (efficient cause) who shapes wood (material cause) into the pattern of a table (formal cause) in order to create something upon which someone can write or eat (final cause) (Cohen, 2002).

Aristotle asserted that these four types of causes could be applied to natural phenomena as well: A butterfly is made of various natural elements, takes the form of a butterfly, and is brought about by the reproduction of its parents as well as the biological processes inherent in insect growth. But what of its final cause? What is the purpose of a butterfly? Unwilling to rely on a divine teleology (i.e. butterflies exist for God’s intentions or purposes), Aristotle reasoned that the ‘end’ of a biological phenomenon is to become that into which it will naturally develop (Cohen, 2002). The purpose of a butterfly is to become a butterfly. Other natural phenomena exist not just to become their own form, but to become part of the pattern or form of Nature itself. For example, to Aristotle, the final cause of leaves is to provide shade for fruit.

1.1.2 The Baconian Revolution

Unsatisfied by this “anthropomorphism” of nature by Aristotle and the scientist-philosophers of the Dark Ages, the scientists of the 17th century developed a new vision of scientific exploration (Howard, 1990). Led by Francis Bacon, scientists in Great Britain and elsewhere increasingly dismissed final-cause explanations of natural phenomena as being “unscientific” (Howard, 1988). Bacon
asserted that though teleology may be appropriate for metaphysics and ethics, it did little more for the sciences than to impose explanatory “fiction” on sensory observations. Efficient and material causes, by contrast, could be repeatedly observed and measured of their own accord (Rychlak, 1979). These types of causes soon became—and continue to be—the coin of the scientific realm (Rychlak, 1994b).

Along with establishing efficient and material causality as the only “scientific” causes, Bacon and his contemporaries (e.g. Descartes, Newton, Kepler, Galileo) laid a groundwork of premises about what constituted “science”. Among these are mathematical rationalism, empiricism, extraspectivity, rational objectivity, and mechanism (Howard & Conway, 1986; Rychlak, 1979).

*Mathematical rationalism* was the philosophical stance adopted by 17th century scientists. Rationalism is the presumption that there is order in the universe. The mathematical branch of rationalism asserts that this order can be understood through the predicable and measurable regularities that order inevitably produces (Rychlak, 1979). From this perspective, understanding of human agency should stem from measured predictability, not from theory or common sense.

Stemming from mathematical rationalism is *empiricism*, which is the premise that knowledge should come through observation (Rychlak, 1994b). Agency, then, must be observed behaviorally to be understood, whereas the subjective experience of human volition would be deemed a poor source of knowledge.

Since the 17th century, the role of scientists has been to observe their subject matter from a distance. As “*extraspective*” observers (Rychlak, 1981, p. 27),
scientists are set apart from the phenomena they study, and they invariably present their descriptions and explanations of these phenomena in the third person. Scientific accounts of agency (or consciousness, or any innately “introspective” experience) must boil down to behavioral observations (Howard & Conway, 1986; Rychak, 1994b).

Baconian science also presumes rational objectivity, or the idea that no reciprocal interaction exists between an observer and that which is observed (Howard & Conway, 1986). The “objective” scientist observes a natural phenomenon; and the phenomenon is neither aware of nor affected by the act of observation. This presumption is problematic for all psychological research--participants are nearly always aware that their actions are being observed, and the impact of observation on their behavior is difficult to “objectively” assess (Toulmin 1981).

The Baconian perspective also involved mechanism, which is the presumption that mechanical laws dictate natural events. In likening natural phenomena to machines, mechanism favors efficient-cause explanations and fully rejects telic-cause explanations for human behavior and other events (Rychlak, 1993; Howard, 1990).

1.1.3 Baconian Premises in Psychology

The premises that scientific knowledge should be empirical, extraspective, objective, and mechanistic were productive for the fields to which they were tailored (Howard & Conway, 1986)—several 17th century advances in physics, astrology, and biology can be attributed to their application (Rychlak, 1979). However, their implicit adoption by psychology proved to be problematic. As Koch observed in
1959, “from the earliest days of the experimental pioneers, man’s stipulation that psychology be adequate to science outweighed his commitment that it be adequate to man” (p.783).

Lazarick and her colleagues (1988) note how absurd telic causes can appear when they are applied to planets, subatomic particles, or chemicals. Imagine a planet “choosing” to continue along its orbit or a substance “making plans” to dissolve in water. Advocates of agency argue that it is equally absurd to try to explain human behavior without telic explanations. To do so is to rid human science of what it is to be human (Howard, 1984; Rychlak, 1993, 1999).

Nonetheless, the Baconian premises that came to prevail in the natural sciences were adopted quite readily by psychology. Telic explanations for human behavior were shunned as pre-scientific, which effectively disallowed any scientific view of human agency. Consciousness and other central features of human experience were disregarded as irrelevant because they were inescapably subjective (c.f. Skinner, 1971; Watson, 1914). Leery of imitating Aristotelian excesses by anthropomorphizing natural phenomena, scientists instead “mechanomorphized” human behavior and the factors by which it is influenced (Howard & Conway, 1986).

In the decades that have ensued, little has changed for psychology. As expressed by Rychlak (1979):

Academic psychology is a younger member of the family of sciences, and as such has accepted without question the values and attitudes of its older siblings like physics, biology, and chemistry. It learned to speak in the language of natural science and has since tried to put its descriptive accounts of the human being in this preferred terminology. . . [but] human freedom
simply cannot be properly expressed in the descriptive terminology of natural science. (p.8)

The vast majority of our published research seeks to identify and explain relationships between social, occupational, biological, cultural, and other influences that efficiently cause people to behave as they do. Though the impact of subjective psychological phenomena (e.g. beliefs, perceptions, emotional states, etc.) on behavior has become widely studied, these phenomena are invariably portrayed as efficient causes of behavior, attributes or tendencies that follow directly from other efficient causes and which people can, at best, passively possess (Howard, 1984). There is still no room for active agents in most psychological research.

1.1.4 Baconian Premises in Cognitive Psychology

Recent research in cognitive psychology illustrates this point. Though some researchers have hailed the “cognitive revolution” as a long-awaited vindication of the premise that mental processes do indeed influence behavior (Howard, 1990), others note that these processes are generally portrayed by researchers as links in chains of efficient causality (Bandura, 2001; Rychlak, 1995). That is, environmental stimuli activate neurobiological systems, which in turn cause behavior. In these “mediational” models, people do not choose or direct their behavioral responses any more than computers choose how they will respond to data (Rychlak, 1994b).

Some cognitive researchers have in fact directly attacked the notion of free will. Spence (1996), for one, asserts that free will is incompatible with evidence showing that the neurological initiation of behavior temporally precedes a person’s
awareness of the intention to act (c.f. Libet, 1999). Similarly, Vartiainen (1995) argues that changes in brain chemistry associated with specific behaviors confirm that “every event and every state of affairs is caused by and is always a consequence of other prior events and states of affairs (p.6)”

Other cognitive researchers, however, assert that it is difficult to tie consciousness to specific neurological processes, which makes it problematic to temporally isolate a conscious decision or act of will (Libet, 1996; Stephens, 1996). Also, temporal sequence does not necessarily imply causality; it is conceivable that observed changes in cognitive states or brain chemistry represent separate branch-extensions of a broader process rather than sequential steps in a single causal chain (Frith 1996).

1.2 A Departure from Baconian Premises

As evidenced by cognitive psychology, human science has faithfully adhered to the Baconian premises that so poorly fit its subject matter. Ironically, the sciences for which these premises were originally tailored have all but abandoned them. The premise that any observation can be purely “extraspective” has been refuted in the natural sciences by Einstein’s theory of relativity. Similarly, the notion of rational objectivity was defeated by Bohr’s demonstration that acts of observation inevitably affect the observed (Rychlak, 1979). Further, Capra’s classic assertion, “if I ask [an electron] a particle question, it will give me a particle answer; if I ask it a wave question, it will give me a wave answer” (1982, p. 87) illustrates that science cannot be devoid of telic explanations, as the nature of what we observe can in some cases
literally depend on the reasons, for the sake of which we are observing.

Consciousness is essential to modern physics, yet in our outdated, empirical view of humanity, psychology disregards it completely (Howard, 1984; Rychlak, 1988). Modern psychology continues to study human beings in the way that 17th century scientists insisted we should study the planets, whereas astronomers have moved on to broader, more productive views of science.

1.2.1 Implications of a Deterministic Psychology

What has resulted from psychology’s adherence to Baconian premises of science? For one thing, psychological research has focused almost exclusively on efficient causes of behavior, whereas teleology has been ignored. As noted by Berger (1963):

> Freedom is not empirically available. . . Every object of scientific scrutiny is presumed to have an anterior cause. An object, or an event, that is it’s own cause lies outside the scientific universe of discourse. . . There is no way of perceiving freedom, either in oneself or in another being, except through a subjective inner certainty that dissolves as soon as it is attacked with the tools of scientific analysis (pp.122-124; cited in Howard, 1993).

Thus, decades of research exist that explore hundreds of internal and external influences on behavior in tens of thousands of studies. Yet our understanding of human behavior is unimpressive, at least as far as our ability to predict and control it implies. Cohen (1977) observes that we are rarely able to explain more than one third of the variance we observe in research participants’ behavior. Howard, Curtin, & Johnson (1991) attribute this paucity of predictive power to the weakness of our efficient-cause theories, rather than unsound methodologies, and they note that
predictive power can be significantly increased when telic influences are taken into account (c.f. Howard & Conway, 1986; Howard & Myers, 1989).

In addition to limiting our scientific understanding, a lack of tolerance for teleology has also been divisive to our field from the start. Rychlak (1979) sees early evidence of the scientist-practitioner schism in the writings of Freud, who was censured by his colleagues in the scientific community for incorporating telic explanations into his clinically-formulated theory of psychopathology (e.g. defense mechanisms unconsciously employed by a patient in order to strategically bring about desired ends). Similarly, William James felt compelled to deny free will when acting as a scientist, even though this conflicted with his theological and philosophical beliefs about human nature (Howard, 1993).

Unlike research psychology, clinical and applied psychologists make frequent use of agentic explanations (Howard, 1990). Harre (1974) explains the scientist-practitioner schism in this way:

Academic psychologists, particularly those who work in the “experimental” tradition, make the implicit assumption that men, women and children are high-grade automata, the patterns of whose behavior are thought to obey something very like natural laws . . . . It is assumed that there are programs which control action and the task of psychology is to discover the “mechanisms” by which they are implemented. Lay folk, clinical psychologists . . . and all of those who have to deal in a practical way with human beings tend to think of people as agents struggling to maintain some sort of reasoned order in their lives against a background flux of emotions, inadequate information, and the ever-present tides of social pressures (p. 4).

Schultz, in a 1977 review of several then-current clinical theories, identified one common thread among the diverse perspectives: all of the theories presumed that “healthy persons are capable of consciously, if not always rationally, directing their
behavior and being in charge of their own destinies” (p. 143). Several other authors note that self-determination is often a primary focus of clinical treatment (Ferguson, 2000; Mahoney, 1993; Steibe & Howard, 1986). Is it any wonder that practitioners tend to discount published research as a clinical resource? (Howard, 1990; Koch, 1981)

A final consequence of the incompatibility of human agency with science has been the alienation of psychology from the humanities and from the general public (Howard, 1993; Howard & Conway, 1986). Human beings generally experience themselves as volitional beings. They choose from among alternatives, and they sense that their reasons are the causes of their choices. Human beings plan with forethought and intentionally pursue courses of action. They feel responsible for their choices. They act with purpose.

Being central to human experience, agency is also central to the humanities. Explorations of agency and related concepts are thoroughly represented in the writings of philosophy and theology. The study of ethics rests on the premise that people have the capacity to choose to behave ethically. Agency and its companion, responsibility, are foundational to the study of law.

Agency is also central to the daily life of most human beings. Whether it is choosing how to spend our time, with whom to interact, or how to respond to the events of daily life, people typically experience their lives as being full of choices (Howard, 1984). When we resolve to do things, we sense that we could have resolved and done otherwise (Rychlak, 1994b). Though we experience the pressures
and constraints imposed by biological and social influences, we feel we respond to these not as automatons but as active agents, with intent and purpose.

Because psychology has failed to make room for the study of so basic an aspect of human experience, it is not surprising that in the eyes of our fellow sciences, the humanities, the general public, and even applied psychologists within our own ranks, the knowledge we produce lacks face validity, and hence, real value. As Stephen Toulmin (1981) eloquently explains:

A world of nature into which humanity has been reintegrated will no longer be an impersonal, mechanistic world. Rather, it will be a world within which the human reason itself is a causally efficacious agency, within which—as the ancients recognized but the philosophers of the seventeenth century denied—we have the elbowroom that we require to exercise the autonomy that is a chief mark of our humanity. (p. 35)

1.2.2 The Reintegration of Agency in Psychology

With Baconian premises so snugly nestled among the scientific traditions of psychology, how then can agency be reintegrated? Several authors have suggested that to take a stance of “hard volitionism” (i.e. the idea that telic causes are the only causes of behavior) would be unproductive, as not only would this contradict decades of solid psychological research demonstrating the relevance of efficient causes, but it would serve little purpose other than to initiate another round of the fruitless determinism v. free will debate (Howard, 1993; Staats, 1987). Most contemporary agency theorists agree that the conceptual integration of telic and non-telic causes is essential to the future study of agency (Bandura, 1997; Howard, Youngs, & Siatczynski, 1989; Rychlak, 1988).
For example, Howard (1993) suggests that the antithesis of determinism is not free will, as has typically been assumed, but acausality, the idea that things occur completely at random. Whether determined events are caused by mechanistic or agentic determinants is a separate issue, he asserts. One might locate the degree to which a person believes behavior is determined on a continuum ranging from fully determined to fully random. A complementary axis could represent one’s belief in the relative influence of mechanistic versus agentic determinants. Thus, a theorist could reasonably claim to be both deterministic and agentic. Though the primary purpose of Howard’s model is to demonstrate the compatibility of supposedly irreconcilable scientific perspectives, it could also be used to illustrate how agentic and non-agentic factors interact to produce specific behaviors. Readers will note similar conceptual integrations of telic and non-telic influences on behavior throughout the theory and research that will be reviewed shortly.

Unfortunately, setting “hard volitionism” aside does little to resolve the conflict between telic explanations and the current model of science—acknowledging that behavior is not fully the product of human agency does nothing to challenge the presumptions of empiricism, rational objectivity, and extrapsectivity that inevitably produce mechanistic explanations. How then is agency to be studied?

One obvious way to make room for agency would be to set aside the scientific method in favor of other sources of knowledge. Such a move may represent a step in the evolution of science (Howard et al., 1989), but it may also take away from psychology what it is to be a science (Rychlak, 1988). Rychlak asserts that:
The logic of scientific method need not be altered to achieve a humanistic science of psychology. What we must revolutionize is the way in which we construe the design of our experiments, the manipulations we apply to our independent variables, and the explanations we proffer for the observed changes in the dependent variables. (1988, p. 187)

Some researchers presume that not even this degree of change to traditional methods is necessary, but that scientists can “sneak agency in the back door” of our discipline by developing and studying empirically-accessible constructs that are conceptually related to agency. In this way, they hope to provide indirect support for teleology without straying from efficient-cause explanations. Two notable examples of this approach are Deci and Ryan’s Self-Determination Theory (1985; 2000) and Bandura’s Social-Cognitive Theory (1986; 2001).

Other researchers strive to overtly challenge the limitations of the Baconian perspective through creative methodologies and forthright telic explanations of results. This approach to the study of agency is exemplified by Rychlak’s Logical Learning Theory (1988) and by studies of volition by Howard and his colleagues (e.g. Howard & Conway, 1986; Howard, Curtin, & Johnson, 1991).

1.3 Contemporary Critics of Agency

Before reviewing specific theory and research on agency, it should be noted that not all psychological theorists support its reintegration with and study within psychology. Some feminist, social-constructionist, and post-modern theorists see the construct of agency to be constraining. To feminist theorists such as Gergen (1994), for example, “free will,” “agency,” and “autonomy” are masculine character traits that have been extolled and idealized by Western patriarchy, implicitly devaluing
feminine character traits. According to Gergen, “feminists agree that the autonomous, self-controlled individual is a gendered formulation that privileges male elites” (1994, p.18). Women with professional aspirations, she asserts, have typically been molded to fit the role of the autonomous, self-determining male, very much at the expense of “relatedness” and other feminine ways of being. Rather then reifying the notion that masculine traits are healthy traits by focusing on free will, researchers should retire the notions of the autonomous, self-controlled individual and focus instead on “relational selves” as the source of identity “relational units” as the cause of behavior (Gergen, 1994).

Similarly, Richardson (1994) reframes agency as “agency/empowerment” in order that it be understood as an interpersonal rather than individual construct. Noting that agency/empowerment is central to the work of most clinical providers; Richardson challenges its value as a therapeutic endeavor. She asserts that though enhancing agency/empowerment may ideally provide clients with increased personal efficacy and better understanding of the subjective, interpersonal nature of the self, this focus may also serve to reify existing social structures with their inherent inequities.

Other psychological theorists point out philosophical problems with traditional notions of agency. Williams (1994), for example, challenges the modernist notion of agency by noting that, according to the Cartesian premises upon which this view of agency is based, the “freedom” in free will implies being wholly unhindered by any constraining influence. Thus, the past experiences, bodily
sensations, and cultural influences that are inescapable in human experience render true freedom impossible. Williams argues that though a postmodern rejection of the idealized Cartesian ego would allow for the possibility of agency-as-volition, the relativity that typically accompanies this perspective precludes moral responsibility. Thus, a new construal of agency, such as “agency as living truthfully,” is needed (Williams, 1994, p. 35).

Additional criticism of agency comes from certain social-constructionist and post-modern writers who assert that individual human agency is an illusion (Rychlak, 1999). From a social-constructionist perspective, psychological processes reside within collectives rather than individuals (Harre, 1984). Similarly, to some post-modern theorists, human behavior and beliefs are really the by-products of an ongoing linguistic exchange over which individuals have no control (Ellis, 1989). From these perspectives, empirical research on human agency is pointless.

Rychlak notes that many conceptual criticisms of agency confound the process of agency with its content (1994a). For example, the clinical effort to enhance personal agency that is challenged by feminist theorists typically implies providing people with a wider range of choices or increased control over particular behavior. Such activities challenge specific contents of agency but speak nothing of its process. The agency process, he asserts, occurs when a person cognitively affirms one of several possible construals or interpretations of experienced events. This is inherently a cognitive, not a social, process. Also, because there is no such thing as a
“group mind,” the agency process cannot be construed as a relational or collective phenomenon (Bandura, 2001).

Howard (1994) observes that some criticisms of agency insist on unnecessary polarizations. For example, he objects to Williams’ (1994) assertion that one must be fully unhindered by experiential influences to be agentically free. Could partial freedom not be possible, he suggests? Similarly, both autonomy and relatedness can be valued in theory and in therapy (Howard, 1994).

1.4 Traditional Research on Agency

Many researchers have attempted to study agency-related concepts without actively challenging the constraints of the current scientific paradigm. Examples might include research on personal causation (de Charms, 1968), active agency (Harre & Secord, 1972), self-fulfilling prophecy (e.g. Darley & Fazio, 1980), and others. Though research on these concepts will not be presented here, two well-established theoretical models that belong in this group will be outlined—Deci & Ryan’s Self-Determination Theory (1985; 2000) and Bandura’s Social Cognitive Theory (1986; 2001).

1.4.1 Self-Determination Theory

Deci and Ryan’s (1985, 2000) Self-Determination Theory (SDT) is an example of a research program that attempts to approximate agency without truly challenging the Baconian premises of traditional empiricism. This well-researched theory of human motivation posits that all people have an innate tendency to explore,
learn, grow, and overcome challenges. Actions that stem from this drive are considered to be *intrinsically motivated*; that is, they are performed simply for the inherent satisfaction derived from performing them. The majority of human behavior, however, is *extrinsically motivated*, or done in order to obtain some separable outcome. Research has shown that in general, people are more conscientious, persistent, and productive when carrying out actions that are intrinsically motivated than when acting out of extrinsic motivation (Deci & Ryan, 2000).

Though intrinsic motivation may be optimal, SDT theorizes that some types of extrinsic motivation are also quite productive and conducive to psychological well-being. Ryan & Deci (2000) explain further that the factors that regulate extrinsically motivated can be “internalized,” or even “integrated” into one’s sense of self. For example, some people make charitable donations purely for the tax write-offs, or to seem generous to others *(external regulation)*. Others might donate in order to alleviate guilt or to “feel” charitable (somewhat internalized, or *introjected* regulation). Some might donate because they believe that charity is important and have made a personal commitment to contribute (internalized, or *identified* regulation). Still others may donate because they have incorporated charity as a deep, personal value, and important aspect of who they are (*integrated* regulation). Note that acting in congruence with one’s own values, beliefs, or personal commitments does not imply that the action is inherently satisfying of itself; “internal” regulation can still be “extrinsic” motivation (Deci & Ryan, 2000).
Just as intrinsic motivation is related to better task performance than is extrinsic motivation (Deci & Ryan, 1985), some types of extrinsic motivation are preferable to others. Specifically, the more internalized and integrated the regulation of a extrinsically-motivated behavior becomes, the more consistently the behavior will be performed. This has been demonstrated with educational performance, medical compliance, and various types of social activities (Ryan & Deci, 2000). The implications of this conceptualization go beyond simple motivation as well; SDT researchers have linked intrinsic and integrated extrinsic motivation to psychological health and well-being, both on a daily basis and over time (Ryan & Deci, 2000).

SDT postulates that intrinsic and extrinsic motivation are each powerfully influenced by the degree to which certain innate psychological needs are met. Three such needs have been empirically identified: autonomy, competence, and relatedness. Research indicates that social contexts that foster a sense of competence and autonomy tend to enhance intrinsic motivation (Deci & Ryan, 2000). Similarly, it is unlikely for extrinsic motivation to become internalized and integrated without conditions that support all three psychological needs (Deci & Ryan, 2000).

Recognizing the importance of these inherent psychological needs has contributed significantly to the scientific understanding of human motivation. The influences of environmental factors on intrinsic and integrated motivation can now be viewed through their supportive or subversive effects on autonomy, competence, and relatedness. (For example, the observation that extrinsic reinforcement tends to reduce intrinsic motivation is better understood when the undermining effects of
rewards on autonomy is noted; Deci & Ryan, 1985) Moreover, specific contexts (e.g. parenting approaches, educational environments, management styles) that support the fulfillment of these psychological needs can be highlighted.

One limitation of SDT is that it is fully embedded within the Baconian premises that disallow the study of telic human behavior. At first glance, the theory appears fairly telic—people are described as having an innate tendency to be agentic, and even the name of the theory seems to challenge a strict reliance on efficient-cause explanations. SDT theorists specifically assert that they rely on “experimental methods without accepting the mechanistic or efficient causal meta-theories that have typically been associated with those methods (Deci & Ryan, 2000, p.69).”

However, a careful evaluation of the theory’s assertions suggests otherwise. The innate human tendency to explore, grow, and enjoy challenges, for example, is explained to be an (efficiently caused) evolutionary propensity (Ryan & Deci, 2000). Motivation, the (efficient) product of evolution, in turn (efficiently) produces behavior. However, to be the possessor of a trait that efficiently causes behavior is not to be agentic (Howard, 1984).

Even SDT’s descriptions of allegedly telic propensities are essentially efficient: volition is described as “perceived volition,” autonomy as “perceived autonomy.” The premise of SDT that most closely approximates agency is the idea that all extrinsically-motivated behavior is performed in order to gain some desired separable end (Ryan & Deci, 2000). Though this could easily be construed to represent an intentional, telic process, it could just as soon be understood to be a
complex system of reinforcement contingencies. The authors subtly assert that extrinsic motivation is not just operant conditioning; however, they base their assertion on the premise that people experience externally-regulated behavior as being externally-controlled, an assertion that has been repeatedly challenged by behaviorists (c.f. Skinner, 1971). By staying fully faithful to Baconian premises and efficient causes, Self-Determination Theory only weakly supports the idea that human behavior is self-determined. As Howard (1984) and Rychlak (1994b) suggest, it is impossible to describe telic behavior in efficient-cause terms without losing the very teleology one is trying to describe.

1.4.2 Social-Cognitive Theory

In contrast with Self-Determination Theory, Bandura’s *Social-Cognitive Theory* (SCT: 1986, 2001) explicitly places agency in the forefront of human functioning. Bandura (2001) asserts that human being capable of exercising control in their lives and behaving with purpose and intent; moreover, this agency is the essence of what it is to be human. Agency is a core concept in SCT, an integrative theory of human functioning attributes human behavior to the interplay between neurobiological structures, agentic psychological processes, and varied sociostructural influences.

The cognitive revolution of the last decade has provided a wealth of information about the biological structures or “hardware” that cognition employs. However, this reductionistic approach to cognition often overlooks the accompanying psychological “software” by which people activate these structures and guide their
operation (Bandura, 2001). The activation of these structures is instead attributed solely to environmental stimuli, which reifies the use of efficient-cause explanations of human behavior by psychological researchers (Rychlak, 1995).

SCT posits that the neurobiological structures associated with cognition are better understood as tools that people purposefully employ in their efforts to obtain anticipated outcomes (Bandura, 2001). Though a hammer, a chisel, and repeated muscular contraction may be mechanisms by which a statue is made, it is to the sculptor who planned and created the work that credit for the statue is given. Similarly, though solution-generating biological structures may be the mechanisms by which problems are solved, these structures are set in motion by sentient, purposeful individuals who teleologically engage in the task of problem-solving. Moreover, just as the sculptor can cause fluid and precise interactions of muscles, joints, and tendons without being aware of the complex underlying physiological processes, people are able to select and activate neurological structures for problem-solving and other cognitive tasks without recognizing or understanding exactly what they are doing.

Thus, rather than mechanistically causing behavior in response to environmental stimuli, neurobiological structures assist people to carry out their own purposeful acts. What then of environmental influences? According to SCT, sociostructural factors affect people’s actions by influencing the psychological processes that prompt action and facilitate agency (Bandura, 2001). For example, children who are exposed to frequent domestic violence may develop a weak sense of self-efficacy, which may reduce the likelihood that they will seek challenging esteem-
building experiences or aspire to develop healthy relationships as adults. They may shy away from some demanding environments, which will in turn impact the social influences to which they are exposed. Sociostructural factors and individual psychological functions are thus interdependent and reciprocally influential. Nonetheless, it is ultimately the agentic psychological processing, not the environmental inducement, that directs behavior (Bandura, 2001). It is to this agentic processing that we now turn.

Human agency, to SCT, is the ability to intentionally cause things to happen. Agency is not a single capacity, but encompasses a broad network of physiological and psychological processes that interactively allow individuals to exert their own telic influence (Bandura, 2001). Four core psychological processes are the foundations of agency: intentionality, forethought, self-reactiveness, and self-reflection.

*Intentionality* refers to commitment to a future course of action, a purposeful intent to initiate behavior for the sake of a desired end. Planning is an important component of intentionality. *Forethought* is the capacity to anticipate the outcomes of one’s actions and then to use these expectations to guide one’s behavior. Forethought includes the establishment of goals and cognitive representations of likely outcomes, which create motivation to take action. Whereas intentionality and forethought are primarily cognitive, *self-reactiveness* provides the link between thought and action. Self-reactiveness refers to self-regulatory processes by which we monitor our actions and internal states, compare these with our personal goals and
moral standards, and initiate corrective action when our performances do not match our goals and standards.

*Self-reflection* refers to the process of meta-cognitive self-evaluation in which we assess the accuracy and adequacy of our beliefs, expectations, goals, values, and behavior. Self-reflection is linked to consciousness, which is considered an essential, functional aspect of being human (Bandura, 2001).

SC T notes that not only are there different components to agency, but there are also different types of agency (Bandura, 2000). The processes described above are explained in terms of *personal agency*, that is, that ability of an individual to exercise his or her own personal influence. Other types of agency include *proxy agency*, the ability to exercise influence through the intervention of others, and *collective agency*, or the ability of a group to exert its influence. SCT posits that the processes that underlie proxy and collective agency are similar to those upon which personal agency rests. This does not imply, however, the existence of a self-reflective “group mind;” rather, individuals employ intentionality, forethought, self-reactiveness, and self-reflection with regard to the plans, goals, and performances of the group (Bandura, 2000).

Research stemming from SCT has focused largely on specific psychological functions that are encompassed by agency. Foremost among these is perceived self-efficacy, which refers to a person’s belief in their ability to affect the outcome of a situation through their actions (Bandura, 1977, 1997). Research in various fields (e.g. academic achievement, athletic performance, psychopathology, medication
compliance) has demonstrated that perceived self-efficacy consistently predicts future behavior—people do things at which they believe they will succeed and which they believe will produce desired outcomes (Gwaltney et al, 2001). High levels of perceived self-efficacy are associated with better performance at tasks, greater persistence in the face of opposition, and better psychological adjustment in general (Bandura, 1989). Additional research on self-efficacy will be presented shortly.

As compared to Self-Determination Theory, Bandura’s Social Cognitive Theory comes closer to the mark of surpassing Baconian premises in addressing human agency. One prominent distinction is that agency an explicit, central feature in the theoretical premises of SCT, whereas it must be assumed in SDT. Moreover, theoretical writings stemming from SCT generally present the underpinning of agency and other constructs in telic-cause terms (Bandura, 2001). The point at which SCT is hampered in its efforts to portray human agency is at its extension of theory to research. Studies of self-efficacy and other SCT constructs typically comply fully with the restrictions of Baconian science (e.g. Gwaltney et al, 2001). As result, its theorized agents are lost within extraspective, mechanistic accounts of their behavior and become mere possessors of efficient-cause traits that in turn receive the credit for producing their behavior (Howard, 1984).

1.5 Telic Research on Agency

Having outlined two theories that attempt to support human agency while remaining largely within the current scientific paradigm, two examples of theories that overtly challenge Baconian premises will now be presented. This telic approach
to agency research is exemplified by Rychlak’s Logical Learning Theory (1994b) and by studies of volition by Howard and his colleagues (e.g. Howard & Conway, 1986; Howard, Curtin, & Johnson, 1991).

1.5.1 Logical Learning Theory

Rychlak’s *Logical Learning Theory* (LLT; 1994b) is an agentic, introspective theory of human cognition and behavior. LLT posits that human beings are continuously confronted with information and experience that they must interpret and act upon. New information is processed as people assign meaning to, or “predicate,” what they perceive.

This process of “affirming” meanings is where agency occurs. When confronted with new information, people must select from among various meanings that they may potentially affirm. More importantly, because human beings reason dialectically (i.e. understand things by actively considering what they are not), people are inevitably aware of—and are free to affirm—the opposites of the meanings that come to mind. Thus, people are continuously put in a position to choose the grounds upon which their actions will be based (Rychlak, 1994b).

Once a meaning has been affirmed, it serves as the precedent for meaning-extensions and actions that inevitably, “sequaciously” follow. LLT asserts that these extensions of meaning and behavior are fully determined by the affirmed precedent meaning. This telic or “psychic” determinism is analogous to a logical syllogism—once the major and minor premises are established, the conclusion is logically inevitable (Rychlak, 1994b).
LLT refers to this entire process of affirming precedent meanings and then sequaciously extending these meanings to new understandings and actions as “telosponding.” Telosponding is a continuous process, though people are often not overtly aware of the meanings they consider and choose to affirm. In some cases, when potential meanings are closely matched, people engage in a self-reflective evaluation of the positive and negative aspects of the meaning-extensions and action-intentions that would sequaciously follow. It is in these cases that people sense that they are making conscious choices or decisions (Rychlak, 1994b).

Rychlak (1994b) notes that critics of telic-cause explanations often assume that the “freedom” in “free will” refers to having various alternatives from which to select. According to LLT, freedom refers to the process of telosponding, not to the content of what or how many specific meanings are employed in the process. Moreover, the oppositionality inherent in human reasoning implies that even if only one meaning is available to a person at a given time, he or she might always “choose to do otherwise.”

Empirical support for LLT comes from a wide body of research on cognitive processes. Rychlak (1994b) states that more than 150 independent empirical studies have been carried out to test various LLT concepts, the results of which have consistently supported the theory’s premises. For example, the use of predication in cognition has been demonstrated through studies of the grammatical use of words of varying salience, the cognitive organization of spatial patterns, and recognition for verbal and visual materials (Rychlak, 1994b, Rychlak & Rychlak, 1991). The
importance of oppositionality to cognition has been demonstrated in research on word recall, memorization tasks, and sentence recognition (Rychlak, 1994b, Rychlak, Williams, & Bugaj, 1986). LLT research has also supported the logical (vice mechanical) nature of cognition and the salience of self-reflective evaluations of alternatives (Rychlak, 1994b). Rychlak (1994b) further notes that the premises of LLT are further supported by hundreds of studies of cognition that were designed with purposes other than validating LLT.

1.5.2 Howard’s Empirical Studies of Volition

Another body of research that has contributed substantially to a scientific understanding of agency comes from George Howard and his colleagues. In 1984, Howard challenged the scientific community to reconsider the goals of research psychology. Noting that conceptualizations of science must evolve along with scientific understanding (Toulmin, 1981) and that the goals of science—typically prediction and control—necessarily vary for different disciplines, Howard suggested that psychology would do well to modify its goals to better reflect its subject matter. He argued that human beings, who experience themselves as active agents who intentionally direct their own behavior, might be better studied if the goals of prediction and control (i.e. by an objective experimenter) were replaced by the goals of self-prediction and self-control (i.e. by research participants themselves). After all, if prediction and control of a person’s behavior by a scientist imply a thorough understanding of its causes, should not the ability to predict and control one’s own behavior imply a similar degree of understanding (Howard, 1984)? Howard suggested
that self-control and self-prediction could be rigorously and empirically studied, and he demonstrated through a hypothetical experiment how such a shift in perspective could facilitate the integrated study of agentic and non-agentic influences on behavior (1984).

1.5.2.1 Measuring Volition

After issuing this challenge, Howard and his colleagues began an active program of empirical research on volitional self-control. The foundation of their research is a straightforward approach to measuring volition: participants are simply asked to try to control their behavior. For example, a group of participants might be asked to “try to eat peanuts” on certain days and to “try not to eat peanuts” on other days. The mean difference in the number of peanuts a one eats when “trying” versus “trying not” to eat them is a measure of his or her volitional self-control for peanut-eating (c.f. Howard & Conway, 1986).

Not only can volition be measured in this way, but its effects on behavior can be considered together with the effects of non-agentic influences on behavior. In the case of peanut-eating, for example, researchers might also assess participants’ affinity for peanuts or typical snacking habits, or they may wish to experimentally control participants’ access to peanuts or the settings in which peanuts are eaten. By incorporating non-agentic factors in research alongside conditions of volition (“try to”/”try not to” instructions), the relative importance and combined influence of agentic and non-agentic factors can be explored.
Critics of volition research have argued that assigning participants to “try” and “try not” to behave in a certain way fails to demonstrate volition; rather, it reflects their (efficiently-caused) compliance with experimental instructions. Participants comply, it was asserted, because they are unknowingly under the control of the experimenter (c.f. Milgram, 1974) or because they are socialized to take the “good subject” role when participating in research (Hayes, 1987). From this perspective, so-called volition effects are little more than confirmation that research participants generally do what they are instructed to do (Ford, 1987; Hayes, 1987).

Howard and his colleagues have employed several techniques to challenge the plausibility of this “compliance hypothesis.” First, they narrowed the distinction between investigators and participants by having the participants themselves make the experimental assignments of volitional conditions to days (e.g. Howard & Conway, 1986; Howard, Myers, & Curtin, 1991). Furthermore, their assignments were withheld from investigators until after the research was complete, which made the notion of strict (Humean) causality by the investigators difficult to support (Ansoff, 1993).

In another study (Howard, Myers, & Curtin, 1991, Study 1), the distinction between participant and experimenter was fully collapsed by making them the same person: the primary investigator was also the sole research participant. To assert that he was “under the control of the experimenter” was thus to confirm that he exercised volitional self-control.
Another technique by which the compliance hypothesis was challenged was to explicitly allow participants *not to comply* with instructions. In study 2 of Howard, Youngs, & Siatczynski (1989), participants were invited to choose each day whether or not to follow an assigned volitional condition. Again, their choices were withheld from experimenters until the conclusion of the study. The resulting data indicated that participants were quite capable of choosing to disregard experimental instructions (Howard et al, 1989).

A final challenge to the compliance hypothesis comes from Howard, Myers, & Curtin (1991), who found that a participant’s volitional control of a specific behavior depends on the personal moral salience of the behavior. If volition effects simply reflect compliance with instructions due to social roles or the control of the experimenter, then a participant’s compliance with different types of instructions should be comparable.

Howard et al. (1989) note that because observations can always be interpreted in multiple ways, it is the *plausibility* of our conclusions that established their *validity* (Chronbach, 1982). Given the demonstrated problems with the compliance hypothesis, it is much more plausible to interpret participants’ ability to control their behavior—simply by trying—as evidence of personal volition.

1.5.2.2 Research on Volition

Using variations of this basic method, research by Howard and his colleagues has assessed participants’ ability to volitionally control a variety of behaviors, including peanut consumption, exercise, positive self-talk, alcohol use, nutrition
enhancement, research activity, binge-eating, and specific behaviors conducive to positive social interaction (Howard & Conway, 1986; Howard, Curtin, & Johnson, 1991; Howard, DiGangi, & Johnson, 1988; Howard, Myers, & Curtin, 1991; Howard et al, 1989; Lazarick et al, 1988; Steibe & Howard, 1986). What has this research shown? Are people able to volitionally control their behavior? The answer is a consistent and resounding yes! Volitional control was repeatedly demonstrated, regardless of whether the behavior of interest was dietary, social, or academic (e.f. Howard, Curtin, & Johnson, 1991; Howard & Myers, 1989).

Even more telling is the degree to which behavior was found to be influenced by volition. Effect sizes (Partial eta squared [Maxwell, Camp, & Arvey, 1981]) for volition in studies of peanut-eating generally fell between .50 and .60. Comparable effect sizes were established for the volitional control of several other behaviors of study. Given that the “effective upper limit” of predictability for psychology is presumed to be roughly one-third of the total observed variance (Cohen, 1977), findings of this magnitude are noteworthy!

By comparison, effect sizes for non-volitional factors in peanut-eating studies (e.g. whether peanuts were kept in sight, whether reminders were given, etc) typically fell below .10 (Howard & Conway, 1986; Howard et al, 1989). Thus, the proportion of variance explained by volition in these studies was roughly five times greater than the amount explained by non-volitional factors. Howard & Myers (1989) note that these results should be interpreted with caution; it is very likely that the ratio of
volitional to non-volitional influence on peanut-eating would be different had other non-volitional factors had been included in the study.

In addition to demonstrating the effects of volition on behavior, research by Howard and his colleagues assessed whether volitional control was impacted by various non-volitional factors. Early studies showed that the effects of volition were not significantly influenced by feedback on performance (Howard et al, 1989) or by reminders to carry out volitional assignments (Howard & Conway, 1986, Howard et al, 1989). In one study, the accuracy of participants’ self-control was 23% greater when financial incentives were offered (Howard et al, 1989). In another study, participants demonstrated volitional self-control even though this entailed remaining in a dissatisfying condition. (Lazarick et al., 1988). Research provided mixed indications of whether people demonstrate less self-control in problem areas than do people who do not share the same difficulties (Lazarick et al., 1988; Steibe & Howard, 1986).

Three additional findings are of particular note. First, Howard, Myers, and Curtin (1991) found that the degree of volition a person demonstrates for an action depends upon the personal moral salience of the action. That is to say, people are unlikely to do morally offensive things simply to demonstrate that they can volitionally control them. Though this finding points out one limitation of the “try to/try not to” research paradigm (i.e. people’s ability to control morally repulsive behavior cannot be effectively studied in this way). As noted previously, this finding
also challenges the notion that volitional instructions place research participants under the control of experimenters (Hayes, 1987).

Second, volitional control of an action depends on whether a person sees the action as meaningful and personally salient. In a study of participants’ ability to precisely match pre-established targets for their beverage intake (e.g. “try to drink two glasses of milk today”), Howard, Curtin, & Johnson (1991) found that participants who recognized that the targets reflected the morse-code spelling of words performed better than participants to whom targets seemed random. Furthermore, those participants who had personally selected the word-targets showed even greater accuracy in controlling their beverage intake. This finding may suggest that people naturally have greater volitional control of behaviors that are inherently personally meaningful. It may also suggest that increasing the personal meaning of a behavior could be a means for enhancing self-control (Howard, Curtin, & Johnson, 1991).

Finally, people who have trouble with specific behaviors typically do not benefit from instructions to “try harder”; however, they do demonstrate the capacity to control correlated behaviors that can impact the behavior of interest (Howard & Conway, 1986; Lazarick et al., 1988; Steibe & Howard, 1986). For example, Howard & Conway (1986) found that participants who desired more frequent social interactions with members of the opposite sex were able to increase the frequency of these interactions by volitionally increasing the amount of time they spent in social settings, the frequency of positive self-statements, and the number of conversations
they initiated with others. Similarly, a group of participants struggling with weight control or binge-eating demonstrated the capacity to control the types of snacks they ate and/or the amount they exercised (Lazarick et al., 1988; Steibe & Howard, 1986).

The clinical implications of this finding are straightforward:

> When people indicate that they have some difficulty in controlling some activity voluntarily, this is usually the case. Further, direct exhortations to gain better self-control are usually ineffective in such cases. But helping these individuals to volitionally control the conditions that aid them in achieving their primary ends has proven remarkably successful. (Steibe & Howard, 1986, p. 93).

1.6 Future Directions for Volition Research

Summarizing the findings of volition research, Howard, Curtin, & Johnson (1991) state that, “evidence for agent causality as the preeminent influence in the genesis of human behavior . . . is overwhelming (p. 224).” A thorough understanding of volition is thus essential to a sound understanding of human behavior. However, our current understanding of volition is still precursory (Howard & Myers, 1989). To know that something occurs is not to know how it occurs.

Additional research is clearly needed to examine the processes of volition and the factors upon which it depends (Howard, Johnson, & Curtin, 1991). For example, to what degree is volition affected by personal meaning, and how does this occur? What other cognitive and emotional factors impact volition? How do agentic processes interact with non-agentic processes to produce behavior? Does volition, as measured by Howard and his colleagues, function as is theorized by Social Cognitive
Theory (Bandura, 2001) and Logical Learning Theory (Rychlak, 1994b)? How else might volition be measured (Howard, Myers, & Curtin, 1991)?

1.7 Self-Efficacy

According to Bandura, (2001), human agency is founded upon self-efficacy beliefs. Self-efficacy beliefs refer to a person’s beliefs in their ability to affect the outcome of a situation through their actions (Bandura, 1977, 1997). Decades of research have highlighted the salience of self-efficacy—people consistently perform better at tasks which they believe they can successfully accomplish (Bandura, 1997). Self-efficacy is not a global trait, but instead applies to specific behaviors. Thus, people typically have relatively high self-efficacy in some domains and lower self-efficacy in others. Self-efficacy beliefs encompass both feeling confident in one’s skills as well as feeling able to implement these skills as they are needed, even when under stress (Bandura, 1997).

Research has demonstrated that the effects of self-efficacy on behavior are pervasive. Across many behavioral domains, people with higher self-efficacy for a task tend to have greater interest and motivation in the task, try harder to succeed at the task, set higher goals for themselves, are more committed to their goals, are more strategic about accomplishing the task, are more likely to respond to failure by increasing their efforts, and are more likely to succeed in the end than are people with lower self-efficacy (Bandura, 1997). Conversely, individuals with low self-efficacy for a task are more likely to shy away from the task, tend to have lower aspirations and weaker commitment, are more likely to respond to failure by decreasing their
effort, and tend to dwell more on their deficiencies and the consequences of failure (Bandura, 1997). Individuals with low self-efficacy also tend to be more vulnerable to discouragement and to the negative effects of stress (Bandura, 1997). Regardless of the activity, higher self-efficacy means better outcomes (Bandura, 2001).

The importance of self-efficacy has been demonstrated in many areas of functioning. Education research, for example, has consistently shown that self-efficacy beliefs for academic tasks strongly predict academic performance (Multon et al., 1991; Schunk, 1991; Zimmerman & Bandura, 1994). Contextual variables that have traditionally been used to explain academic performance (e.g. cognitive ability, educational preparation, gender) may exercise their influence through their effects on self-efficacy (Bandura, 1997; Pajares & Miller, 1994). In adults, academic self-efficacy predicts not only academic performance but also career choices and later occupational success (Lent & Hackett, 1987).

Self-efficacy also affects people’s health. A considerable body of research has demonstrated that self-efficacy is essential to coping with stress. When people are exposed to levels or types of stress that they deem beyond their control, various physiological “stress response” systems are activated (Bandura, 1997; Gerin, Litt, Deich, & Pickering, 1995; Shavit & Martin, 1987). The recurrent activation of these systems over time leads to major health problems, such as the weakening of the immune system (Bandura, 1997). High levels of self-efficacy are also associated with better management of pain and its behavioral effects (Holman & Lorig, 1992; Buckelew et al, 1995), better compliance with medical recommendations (Ewart,
In addition to affecting people’s health directly, self-efficacy also impacts people’s efforts to improve their health. Studies of health-related behavior change (smoking cessation, dietary enhancement, exercise programs, etc.) have consistently demonstrated that self-efficacy predicts one’s ability to implement and maintain new behaviors (Bandura, 1997; Prochaska & DiClemente, 1992). Bandura (1997) observes,

. . . the impact of various therapeutic interventions on health behavior is partly mediated by their effects on efficacy beliefs. The stronger the efficacy beliefs the interventions instill, the more likely people are to enlist the personal resources and sustain the level of effort needed to adopt and maintain health-promoting behavior. (p. 286)

This assertion is supported by research and theory emerging from the widely-applied Transtheoretical model of behavior change (Velicer et al., 1998), which incorporates the assessment and enhancement of self efficacy as a core component of health-related behavior change (c.f. Maibach & Murphy, 1995).

In addition to physical health, self-efficacy beliefs also affect people’s psychological health. Research and theory support connections between self-efficacy beliefs and anxiety disorders, depressive disorders, eating disorders, and substance-related disorders (Bandura, 1997). As with health-related behavior change, Bandura (1997) suggests that the efficacy of a mental health intervention may depend largely on the degree to which it impacts a client’s impaired self-efficacy beliefs. The primary vehicle of behavior change in Social Cognitive Theory is mastery experience,
a type of behavioral rehearsal that by enhancing self-efficacy produces new behavior (Bandura, 1997). Work with phobic patients, bulimics, and others has provided empirical support for the value of guided mastery experiences in treatment. (Rohsenow et al, 1990-1991; Williams et al, 1984; Wilson et al, 1986).

The effects of self-efficacy extend into other domains of activity as well. A wide body of research has shown that self-efficacy predicts various aspects of athletic performance, ranging from how well new skills are mastered to how well one is likely to perform under pressure (Bandura, 1997). Self-efficacy beliefs also impact career development, occupational success, and managerial style (Bandura, 1997). Self-efficacy beliefs affect one’s biological, psychological, and social functioning; indeed, few constructs in psychology have such demonstratedly widespread, pervasive effects on human behavior.

1.8 The Present Study

The present study examined the relationships between volition, self-efficacy and cigarette smoking. Cigarette use was selected as a behavior of interest because of its clinical significance, the relative ease with which in can be measured, and its reputation for being very difficult to control. Whereas existing volition research has primarily demonstrated participants’ ability to control relatively benign behaviors such as peanut-eating, the present study assessed whether a similar degree of volition would be demonstrated for a more challenging behavior.

In addition to assessing whether cigarette use can be volitionally controlled, the present study examined whether this control was associated with self-efficacy or
could be enhanced by self-prediction (Howard, 1984). The following hypotheses were considered:

1) It was hypothesized that participants would demonstrate some volition control of their use of cigarettes.

2) It was hypothesized that participants with relatively high self-efficacy would demonstrate greater volitional control of their smoking than would participants with lower self-efficacy.

3) It was hypothesized that participants would exhibit greater volitional control when they attempted to maximize their self-control through self-prediction than when they haphazardly tried to demonstrate self-control.

4) It was anticipated that the effects of maximizing volitional control through self-prediction would be associated with the amount of effort participants put forth. Specifically:

   a) Volitional effort was expected to partially *mediate* the effects of self-prediction; that is, self-prediction was expected to improve volitional self-control by causing an increase in volitional effort.

   b) Volitional effort was also expected to *moderate* the effects of self-prediction. That is, self-prediction was expected to have a greater impact on self-control for participants who generally put forth more effort than for those who put forth less effort.
CHAPTER 2

METHODS

2.1 Participants

Cigarette smokers were recruited from a pool of approximately 21,000 military families empanelled to receive medical care through the Naval Medical Clinic at Pearl Harbor, Hawaii. Two groups of participants were recruited. A first group of smokers was recruited through signs, fliers, and cards placed in medical clinics and other public areas accessible to all potential participants. Health care providers were also invited to mention the study to known smokers in their care. A second group was recruited by contacting smokers enrolled in DeLeo’s (2002) adaptation of the *Freshstart* smoking cessation program (American Cancer Society, 1998), which is offered to the Naval Medical Clinic’s beneficiaries at no cost. Excluded from the study were non-smokers, infrequent smokers, very heavy smokers, and individuals beneath the legal smoking age or unable to give consent.

Sixty-one participants enrolled in the study, 29 from the smoking cessation pool and 32 from the general military population. Participants ranged in age from 18 to 50 ($M = 28.5, SD = 7.45$). Twenty-nine of the participants (47.5%) were female. Participants listed their primary ethnic backgrounds as white/Caucasian (82%), black/African-American (6.6%), Asian/Asian-American (4.9%), Pacific Islander
Thirty-six of the participants (59.0%) were married. Seventeen participants (27.9%) had a high school education or less, thirty-eight participants (62.3%) had completed some college work, and six participants (9.9%) were college graduates. Forty-one of the participants (67.2%) were currently on active duty in the military; the remaining 20 participants (32.8%) were family members of active duty service members. The time in military service of the participants (or their military sponsors) ranged from 1 to 24 years ($M = 8.8$, $SD = 6.7$).

Some demographic differences were observed between smoking cessation (SC) participants and those from the general population (GP). SC participates were on average 6.42 years older than GP participants, $F(1, 59) = 13.69$, $p < .01$. SC participants were also more likely than GP participants to be female, to be married, and to be family members rather than active duty service members, $\chi^2(1, N = 61) = 7.16, 6.49, \text{ and } 6.02$, respectively, $p < .05$. No statistically significant differences in the ethnicity or educational attainment of SC and GP participants were found.

In addition to demographic information, data was also collected about participants’ smoking history and habits. The length of time participants reported they had been smoking ranged from 1 to 27 years ($M = 11.74$, $SD = 7.09$). The average number of cigarettes that participants reported smoking each day ranged from 1 to 40 ($M = 11.74$, $SD = 7.09$). All but four of the participants (6.6%) reported they had attempted to quit smoking in the past, and 29 of the participants (47.5%) had successfully quit smoking for six months or more. Only eleven participants (18.0%)
had no current plans to quit smoking. Twenty six participants (42.7%) had plans to quit smoking within the next six months, and the remaining 24 participants (39.3%) had plans to quit smoking eventually.

The smoking profiles of SC and GP participants were compared. As expected, SC participants were more likely than GP participants to have plans to quit smoking during the next six months, $\chi^2(1, N = 61) = 5.79, p < .05$. It was also noted that SC participants had been smoking for an average of 6.9 years longer than GP participants, $F(1, 59) = 18.95, p < .01$, a difference that was statistically significant even when age was taken into account, $F(1, 58) = 4.25, p < .05$. There were no statistically significant differences between groups in the amount smoked each day or in past success at quitting smoking.

### 2.2 Procedures

Participants were asked to carefully track their cigarette smoking for four consecutive weeks on forms provided by the examiner (See Appendices A and B). Each day, they were asked to follow one of two specific volitional instructions, either, ‘try as hard as you can not to smoke today,’ or, ‘today just do what you normally do.’

Daily instructions were assigned in two ways. In the *random* condition, participants flipped a coin repeatedly in order to generate a series of 14 heads and tails. Each series of four coin flips was constrained to include two heads and two tails, such that there were no more than four consecutive days of either instruction. A final coin flip determined which instruction applied to “heads” days and which to “tails” days.
In the prediction condition, participants were helped to generate a sequence of 14 instructions that they believed would maximize their self-control for smoking. Specifically, they were asked to consider their usual smoking patterns in order to identify the days on which they would likely have the most success at resisting the urge to smoke. The “try not to smoke” instruction was assigned to the seven days that each participant predicted would be the most conducive to self-control. The order in which each participant used the two methods to generate instructions was randomly assigned, such that half of the participants completed each condition first.

Participants were asked to record the exact number of cigarettes they smoked each day. To facilitate this, they were given a cigarette case and were asked to begin each day with the same number of cigarettes in their possession.

Participants met with examiners on three occasions. In the first meeting, participants signed consent forms, completed written questionnaires, and generated a first series of volitional instructions. During the second meeting, two weeks later, they returned their smoking log for the first two weeks and generated a second set of instructions. In the third meeting, after another two weeks, they returned their second smoking log, received a short debriefing, and were asked for qualitative observations about the study. Those who completed the study were given a gift certificate for lunch for two at Quizno’s Subs.

2.3 Measures

During the first meeting with a researcher, participants completed a demographic questionnaire (see Appendix A) and the Smoking Self-Efficacy
Questionnaire (SEQ-12; Etter, Bergman, Humair, & Perneger, 2000), a brief measure of smokers’ confidence in their ability to abstain from smoking when facing various challenging situations (see Appendix B). The scale consists of twelve stimuli, half of which are internal (e.g. when feeling depressed) and half external (e.g. when with others who are smoking). Respondents indicate how confident they are in their ability to abstain from smoking in each scenario using a five-point Likert-type scale. Despite the measure’s brevity, its two dimensions (internal and external stimuli) are highly reliable (internal consistency alpha = 0.95 and 0.94; test-retest ICC = 0.95 and 0.93) and demonstrate content, construct, and predictive validity comparable to that of longer measures of self-efficacy (Etter et al., 2000).

Participants were asked to track their cigarette use on specific forms that also contain their volitional instructions for each day (see Appendices C & D). They were also asked to rate their actual effort at the end of each day using a seven-point Likert-type scale developed for this study (see Appendix E). They were also asked to note if they chose to use nicotine supplements or medication to lessen withdrawal symptoms.
CHAPTER 3
RESULTS

3.1 Participant Mortality

Of the 61 participants originally recruited, only 37 completed all four weeks of the study. Of the 24 who withdrew, six provided two weeks’ worth of data on their smoking and effort ratings. The other 18 provided no smoking or effort rating data. The reasons given by participants for their withdrawal from the study are listed in Table 3.1.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>Proportion of Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military transfer</td>
<td>3</td>
<td>4.9%</td>
</tr>
<tr>
<td>Life transition (Illness, Divorce)</td>
<td>4</td>
<td>6.6%</td>
</tr>
<tr>
<td>Loss of interest/motivation</td>
<td>4</td>
<td>6.6%</td>
</tr>
<tr>
<td>Delay due to Investigator Absence</td>
<td>5</td>
<td>8.2%</td>
</tr>
<tr>
<td>Unknown/Could not be reached</td>
<td>8</td>
<td>13.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
<td><strong>39.3%</strong></td>
</tr>
</tbody>
</table>

The demographic data and smoking profiles of participants who completed the study were compared with those of participants who dropped out. There were no statistically significant differences between groups at the .05 level with regard to age,
gender, ethnicity, education, or military status. Dropouts were more likely to be single than married, $\chi^2(1, N = 61) = 4.92, p < .05$. However, this group difference in marital status failed to reach statistical significance when Yates’ continuity correction was applied, $\chi^2(1, N = 61) = 3.81, p > .05$.

There were no statistically significant differences in how long participants had smoked, how much they smoked, whether they had successfully quit smoking before, or whether they had plans to quit smoking in the near future. Those who dropped out were no more likely to belong to the smoking cessation group than the general population, nor were dropouts more likely to have begun the study with either the prediction or random method of assigning volitional instructions to days. Finally, SEQ scores were not significantly different for dropouts than for participants who completed the study.

3.2 Analyses

Prior to analysis, the data were screened visually and statistically. No prominent outliers were identified, nor was there any missing data other than that not provided by participants who withdrew from the study. Except where noted below, the data met the statistical assumptions necessary for the respective analyses. Means and standard deviations for the amount participants smoked and the effort they reported putting forth while assigned to follow each volitional instruction are listed below in Table 3.2.
A model-comparison approach was used to test the study’s various hypotheses. For each model, a test statistic was calculated using the following formula from Maxwell and Delaney (1990):

\[ F = \frac{[(E_R - E_F)/(df_R-df_F)]}{[(E_F)/(df_F)]}, \]

where \( E_R \) and \( E_F \) represent the summed squared errors for the restricted and full models and \( df_R \) and \( df_F \) the degrees of freedom for the restricted and full models, respectively.

### 3.2.1 Volition

To test whether participants smoked less when instructed to “try not to smoke, a difference score was created for each individual by subtracting the average number of cigarettes each person smoked on “try not to smoke” days from the average number he or she smoked on “do what you normally do” days. The mean “D-score” for the sample was 4.91 (i.e. on average participants smoked almost five less cigarettes on “try not to smoke” days), with a standard deviation of 5.65.
The statistical significance of the overall difference in the amount smoked while following different volitional instructions was tested by comparing the following models:

Model A (Full): \[ D_i = \mu + \epsilon_i \]

Model A (Restricted): \[ D_i = \epsilon_i \]

where \( D_i \) represents the average difference in the number of cigarettes smoked, \( \mu \) represents the population mean of \( D \) scores, and \( \epsilon_i \) is the degree to which an individual’s score differed from the estimate predicted by the respective model. The comparison of models was statistically significant, \( F(1, 42) = 32.43, p < .001, \omega^2 = .42. \)

Additional analyses assessed whether differences in the amount smoked varied with group membership, the way volitional instructions were assigned to days, or other factors. Mean differences in the amount smoked are broken down by group and assignment in Table 3.3.

In order to increase the power of subsequent analyses of volition, adjusted “try not to smoke” scores were used in lieu of raw difference scores to estimate volition. Specifically, the average number of cigarettes each participant smoked on “try not to smoke” days was covaried by the average number he or she smoked on “do what you normally do” days. Adjusted volition scores (i.e. the regression residuals) were highly correlated with the “difference scores” used in the previous analysis, \( r = .90, p < .001. \)

| TABLE 3.3 |

50
MEAN DIFFERENCES IN AMOUNT SMOKED AND EFFORT
BY GROUP MEMBERSHIP AND ASSIGNMENT METHOD

<table>
<thead>
<tr>
<th>Group</th>
<th>Assignment Method</th>
<th>Amount Smoked</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Random</td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>Self-Prediction</td>
<td>M</td>
</tr>
<tr>
<td>Smoking Cessation</td>
<td></td>
<td>18</td>
<td>3.54</td>
<td>5.45</td>
<td>3.85</td>
<td>8.21</td>
<td></td>
</tr>
<tr>
<td>General Population</td>
<td></td>
<td>21</td>
<td>5.01</td>
<td>5.04</td>
<td>6.49</td>
<td>5.66</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th></th>
<th>Effort</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Smoking Cessation</td>
<td>18</td>
<td>1.30</td>
<td>1.60</td>
<td>1.19</td>
<td>1.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Population</td>
<td>21</td>
<td>2.06</td>
<td>1.40</td>
<td>2.37</td>
<td>1.71</td>
</tr>
</tbody>
</table>

3.2.1.1 Volition and Smoking Profiles

The relevance of participants’ smoking profiles to volition scores was next examined. First, it was considered that volition scores might covary with the number of years participants had been smoking or with the amount they currently smoked. However, neither of these factors was significantly correlated with adjusted volition scores ($r = .26, p > .05$, and $r = .04, p > .1$ respectively) or the difference scores used in the previous analysis ($r = -.16, p > .10$, and $r = .21, p > .10$ respectively), so these smoking factors were ruled out as covariates for subsequent analyses of volition.

Next, a two-by-two ANCOVA was carried out to assess whether adjusted volition score means varied depending on whether participants had previously quit smoking or whether they currently had plans to stop smoking. For this analysis the data were represented by the following statistical model:
Model B (Full): \[ Y_{ijk} = \beta + \alpha_j + \gamma_k + (\alpha \gamma)_{jk} + b X_{ijk} + \epsilon_{ijk} \]

where \( Y_{ijk} \) represents the average number of cigarettes a participant smoked on “try not to smoke” days, \( X_{ijk} \) is the average number he or she smoked on “do as you normally do” days, \( \beta \) is the unstandardized population coefficient for regressing \( Y_{ijk} \) onto \( X_{ijk} \), \( \beta \) is the Y-axis intercept of the same regression, \( \alpha_j \) is the average effect of belonging to group j (having versus never having quit smoking), \( \gamma_k \) is the average effect of belonging to group k (having versus not having current plans to stop smoking), \( (\alpha \gamma)_{jk} \) is the combined effect of belonging to group j and group k, and \( \epsilon_{ijk} \) is the difference between an individual’s observed \( Y_{ijk} \) score and the score predicted by the model’s parameter estimates.

Homogeneity of regression was assessed by comparing the full model to one in which regression coefficients were allowed to vary between groups (c.f. Maxwell & Delaney, 1990; Rogosa, 1980). Heterogeneity of regression was not evident from the data, \( F(3, 35) = 1.10, p > .20 \).

The impact of having previously quit smoking on volition scores was tested by comparing the adequacy of the full model to that of a restricted model from which the indicated effect parameter had been removed:

Model B (Restricted): \[ Y_{ijk} = \beta + \gamma_k + (\alpha \gamma)_{jk} + b X_{ijk} + \epsilon_{ijk} \]

This effect was not statistically significant at the .05 level, \( F(1, 38) = .221, p > .10 \).

Similarly, the effect of having current plans to quit smoking and of the interaction of these two main effects were tested by comparing the full model to restricted models with the indicated effect parameters removed. Neither of these
effects was statistically significant, $F(1, 38) = 1.074, p > .10$, and $F(1, 38) = 1.802, p > .10$, respectively. Excluding the covariate from the model, however, was associated with a significant increase in error, $F(1, 38) = 19.50, p < .001$.

3.2.1.2 Volition and Experimental Factors

After considering the relevance of participants’ smoking profiles to their volition scores, analyses of experimental factors were carried out. The impact of group membership (smoking cessation versus general population) and assignment method (random versus prediction-based generation of daily instructions) on adjusted volition scores was assessed by way of the following two-by-two “split plot” ANCOVA model:

Model C (Full): $Y_{ijk} = m + a_j + g + (a g)_{jk} + (g p)_{ki(j)} + b X_{ijk} + e_{ijk}$,

where $Y_{ijk}$ represents the average number of cigarettes smoked by an individual during “try not to smoke” days while using assignment method $k$, $X_{ijk}$ is the average number smoked on “do as you normally do” days while using method $k$, $b$ is the unstandardized regression coefficient for regressing $Y_{ijk}$ onto $X_{ijk}$, $m$ is the Y-axis intercept for the same regression equation, $a_j$ is the effect of belonging to group $j$, $g$ is the effect of using method $k$, $(a g)_{jk}$ is the interaction effect of belonging to group $j$ and using method $k$, $(g p)_{ki(j)}$ is the overall effect of being participant $i$, $(g p)_{ki(j)}$ is the interaction effect of using method $k$ and being individual $i$, and $e_{ijk}$ is the difference between an individual’s observed $Y_{ijk}$ score and the score predicted by the model’s parameter estimates.
As before, homogeneity of regression was tested by comparing the full model to one in which different regression coefficients were allowed for different groups and methods. The full model was not significantly improved by accommodating heterogeneity of regression, $F(3, 29) = .305, p > .20$.

Main and interaction effects were again tested by comparing the full model to a restricted model from which isolated effect parameters were omitted. The main effect of group membership was not statistically significant, $F^*(1, 28.28) = 1.82, p > .10$. (Brown and Forsythe’s $F^*$ (1974) was calculated in lieu of a traditional $F$ because of a significant difference in variances between groups, $F(1,41) = 6.166, p < .05$ using O’Brien’s 1981 test. Had a traditional $F$-statistic been used, the result would have been the same, $F(1, 34) = 1.68, p > .10$.)

Similarly, the main effect of assignment method and the interaction of group and method were not statistically significant, $F(1, 34) = 1.16, p > .10$, and $F(1, 34) = .04, p > .10$, respectively.

Next, self-efficacy scores were considered as a possible covariate of volition scores. A one-way ANOVA revealed that SEQ scores for smoking cessation participants were not significantly different than those of smokers from the general population, $F(1, 59) = .557, p > .10$. Furthermore, SEQ scores were not significantly correlated with raw difference scores ($r = .01, p > .10$) or with “try not to smoke” scores, once typical smoking habits were taken into account ($r = -.14, p > .10$), nor did the inclusion of SEQ scores as an additional covariate in Model C comparisons significantly improve the full model’s portrayal of the data, $F(1, 33) = 1.805, p > .10$. 
For these reasons, self-efficacy scores were excluded from subsequent analyses of volition.

3.2.2 Effort Ratings, Smoking Profiles, and Experimental Factors

Before assessing the relationship between participants’ effort ratings and volition scores, the effort scores themselves were examined. First, the overall effort participants reported putting into the study was considered.

Participants’ overall effort ratings (averaging across all four weeks and both volitional conditions) ranged from .07 to 4.39, with a mean of 2.19 and a standard deviation of 1.043. A two-by-two ANOVA was used to assess whether participants’ overall effort ratings depended on whether they had previously stopped smoking or had current plans to quit. The full model for this comparison was essentially Model B (full), with the exception that the $\beta_{Xijk}$ term representing a covariate effect was omitted. Effort ratings were found to be higher for participants with current plans to quit smoking than for those without, $F(1, 39) = 4.09$, $p = .05$. Though statistically significant, this group difference was relatively small in magnitude (mean difference $= .72$, $d^* = .71$, $\eta^2 = .07$). Overall effort scores were not significantly different for participants who had previously quit smoking than for those who had never quit, $F(1, 39) = 1.24$, $p > .10$. The interaction of these main factors was also statistically non-significant, $F(1, 39) = .07$, $p > .10$.

Other smoking factors were considered in relation to overall effort. Correlations of effort with the length of time participants had been smoking and the
amount they currently smoked were small and statistically non-significant ($r = .01$ and $r = .09$ respectively, $p > .10$ for both statistics).

After the properties of overall effort scores were examined, the likelihood that effort scores vary for different volitional instructions was assessed. Difference scores were created by subtracting participants’ averaged effort ratings for “do what you normally do” days from their ratings for “try not to smoke” days ($M = 1.82$, $SD = 1.42$). A test of these difference scores using Model A indicated that participants’ effort ratings were significantly higher when following the “try not to smoke” instruction than on other days, $F(1, 42) = 70.10$, $p < .001$, $\eta^2 = .61$.

As with volition difference scores, effort difference scores were replaced by “adjusted effort scores” in subsequent analyses in order to improve statistical power. Specifically, participants’ averaged effort ratings from “try not to smoke” days were covaried by their averaged ratings from “do what you normally do” days. These adjusted effort scores were highly correlated with the difference scores used in the previous analysis, $r = .88$, $p < .01$.

The relevance of participants’ smoking habits to their adjusted effort ratings was next examined. A two-by-two ANCOVA was used to test whether mean effort scores were different depending on participants’ previous success at quitting smoking or current plans to quit. Model B was used for this comparison.

A test for heterogeneity of regression was not statistically significant, $F(3, 35) = .061$, $p > .20$. Tests of the model’s main effects and interaction were also statistically non-significant, $F(1, 38) = .012$, $p > .10$ for having quit before, $F(1, 38) =$
.410, $p > .10$ for current plans to quit, $F(1, 38) = 1.185, p > .10$ for the interaction. Exclusion of the covariate from the model, on the other hand, led to a significant decrease in the adequacy of the model, $F(1, 38) = 6.37, p < .05$.

Adjusted effort scores were not significantly correlated with the length of time participants had been smoking and the amount they currently smoked ($r = -.22$, and $r = .04$, respectively, $p > .10$ for both correlations), so these factors were excluded from subsequent analyses of effort.

Next, the potential effects of group membership and assignment method on adjusted effort scores was examined using Model C. Heterogeneity of regression was not observed, $F(3, 29) = .154, p > .20$. Neither group membership nor assignment method led to a significant difference in effort scores, $F(1, 34) = 1.68, p > .10$ and $F(1, 34) = 1.16, p > .10$, respectively. The interaction of these two factors also failed to reach statistical significance, $F(1, 34) = .04, p > .10$.

The relationship between self-efficacy scores and effort scores was also considered. Correlations between SEQ scores and effort scores were statistically non-significant ($r = .24, p > .10$ for overall effort scores; $r = .20, p > .10$ for adjusted effort scores), so SEQ scores were ruled out as covariates for further analyses.

### 3.2.3 Volition and Effort

The next set of analyses considered whether volition scores could be accounted for by effort scores. First, a two-by-two ANCOVA was used to test (a)
whether differences in the amount smoked during different volitional conditions would continue to be observed once effort scores were taken into account, and (b) whether this would depend on the assignment method used. The data were represented with the following model:

Model D (Full):  
\[ Y_{ijk} = m + a_j + g_k + (\alpha g)_{jk} + (\alpha p)_{ji} + (g p)_{ki} + (\alpha g p)_{jki} + b X_{ijk} + e_{ijk}, \]

where \( Y_{ijk} \) represents the average number of cigarettes smoked by an individual within volitional condition \( j \) (“try not to smoke” v. “do what you normally do”) while using assignment method \( k \), \( X_{ijk} \) is the individual’s average effort rating within condition \( j \) and method \( k \), \( m \) is the unstandardized regression coefficient for regressing \( Y_{ijk} \) onto \( X_{ijk} \), \( a_j \) is the overall effect of volitional condition \( j \), \( g_k \) is the overall effect of using assignment method \( k \), \( (\alpha g)_{jk} \) is the effect of the interaction of method \( k \) and volitional condition \( j \), \( \bar{a} \) is the average effect of being individual \( i \), \( (\alpha p)_{ji} \) is the interaction effect of being in condition \( j \) and being individual \( i \), \( (g p)_{ki} \) is the interaction effect of using method \( k \) and being individual \( i \), \( (\alpha g p)_{jki} \) is the three-way interaction effect of being individual \( i \) within condition \( j \) while using method \( k \), and \( e_{ijk} \) is the difference between an individual’s observed \( Y_{ijk} \) score and the score predicted by the model’s parameter estimates.

As before, a test of homogeneity of regression was carried out by comparing Model D to a model in which the regression coefficient \( \bar{a} \) was allowed to vary across
conditions and methods. Allowing heterogeneity of regression did not significantly improve the model, $F(3, 29) = .147, p > .20$.

The impact of taking effort into account as a covariate in the model was examined by comparing the full model to a restricted model from which the $X_{ijk}$ parameter had been omitted. This test was statistically significant, $F(1, 35) = 17.30, p < .001, \Delta^2 = .45$, indicating that the model portrayed the data significantly better when effort scores were included as a covariate.

The effects of volitional condition, assignment method, and the interaction of these factors were tested by comparing the full model to restricted models from which the respective parameters had been removed. With effort scores taken into account, the test of volitional condition was no longer statistically significant, $F(1, 34) = .04, p > .10$. (Note that a significant relationship between effort scores and treatment conditions was previously observed). Neither assignment method nor the interaction of method and volitional condition had a statistically significant effect, $F(1, 35) < .01, p > .10; F(1, 35) = .24, p > .10$, respectively.

An additional analysis was carried out to address whether specific mediating or moderating relationships could be demonstrated between effort ratings and volition scores. This was done using least-squares regression as recommended by Judd, Kenny, and McClelland (2001). The data were represented by the following model:

Model E (Full): $Y_{Di} = b_0 + b_SX_{Si} + b_DX_{Di} + \epsilon$

where $Y_{Di}$ represents the average difference in the number of cigarettes an individual smoked per day in the “try not to smoke” condition than in the “do what you normally
do” condition (i.e. $Y_{Di} = D_i$ from the first Model A comparison), $X_{Si}$ is the sum of the individual’s averaged effort scores across both volitional conditions, $X_{Di}$ is the difference between the individual’s averaged effort scores across conditions, $b_S$ and $b_D$ are the unstandardized regression coefficients for regressing $Y_{Di}$ onto $X_{Si}$ and $X_{Di}$, respectively, $m$ is the Y-axis intercept for the same regression equation, and $e_i$ is the difference between an individual’s observed $Y_{Di}$ score and the score predicted by the model’s parameter estimates. As in previous analyses, covariate scores were centered before being included in the model.

A test of the mediation of volition scores by effort scores was carried out by comparing the full model to one from which the $b_D X_{Di}$ term had been omitted. This test was statistically significant, $F(1, 40) = 63.98, p < .001, \hat{\eta}^2 = .60$.

A test of the moderation of volition scores by effort scores was carried out by comparing the full model to one from which the $b_S X_{Si}$ term had been omitted. This test was not statistically significant, $F(1, 40) = 1.84, p > .10$.

A test of the effect of volitional condition on smoking difference scores above and beyond the degree to which smoking difference scores were mediated or moderated by differences effort was carried out by comparing the full model to one from in which the expected value of $m$ was constrained to be zero. This test was not statistically significant, $F(1, 40) = 2.64, p > .10$.

3.2.4 Quit Phenomenon
It was noted that eight participants decided to quit smoking during the course of the study. The difference in the daily amount smoked by these participants before and after their identified “quit date” was analyzed in eight separate single-subject comparisons. For each participant, the following models were compared:

Model F (Full): \[ Y_{ij} = m_j + e_{ij} \]

Model A (Restricted): \[ Y_{ij} = m + e_{ij} \]

where \( Y_{ij} \) represents the number of cigarettes smoked on a given day, \( m_j \) represents the true mean of an individual’s \( Y_{ij} \) scores before or after an identified “quit date”, and \( e_{ij} \) is the degree to which an individual’s score on a given day differed from the estimate predicted by the respective model.

In choosing an appropriate test statistic for comparing these models, the likely properties of the population distributions of scores were considered. Post-quit distributions in the sample data were noted to have extremely small variances, a property that seemed likely to apply to population variances as well. It was also noted that each participant had either an equal number of days in the pre-quit, quit, and post-quit conditions or a greater number of days in the pre-quit condition than in the post-quit condition. When smaller samples have smaller variances, as in the present data, traditional \( F \)-statistics tend to be somewhat conservative (Maxwell & Delaney, 1990). However, non-parametric corrections such as Brown & Forsythe’s \( F^* \) (1974) and Welch’s \( W \) (1951) are quite susceptible to very small variances, such that they provide extremely liberal test statistics. For this reason, traditional \( F \) statistics were used to compare the data for each individual. The results of these
analyses are found in Table 3.4. As indicated in the table, a statistically significant pre-quit/post-quit difference was found for each participant.

**TABLE 3.4.**

**TEST STATISTICS AND ASSOCIATION STRENGTH ESTIMATES FOR PARTICIPANTS WHO QUIT SMOKING**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Mean Difference</th>
<th>$F(1,26)$</th>
<th>$p$</th>
<th>Predicted $\hat{\nu}^2$</th>
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<td>1</td>
<td>15.15</td>
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<td>.44</td>
</tr>
<tr>
<td>2</td>
<td>8.86</td>
<td>99.34</td>
<td>&lt;.001</td>
<td>.78</td>
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<td>3.29</td>
<td>4.95</td>
<td>&lt;.05</td>
<td>.12</td>
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<tr>
<td>4</td>
<td>14.47</td>
<td>11.61</td>
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CHAPTER 4
DISCUSSION

The results of this study resoundingly support the premise that agentic self-control exerts a major influence on human behavior. Participants in the study reduced their cigarette use by nearly five cigarettes per day, on average, simply by trying. As in previous self-determination studies, not only did participants’ volition affect the behavior of interest, but the strength of this association exceeded Cohen’s (1977) effective upper limit of prediction for psychological research.

Volitional self control has been demonstrated with many behaviors (Howard & Myers, 1989), yet its reemergence in a study of cigarette use is particularly salient, as cigarette use is notoriously difficult to control. According to research from the American Lung Association (2003), the majority of smokers report that they want to stop smoking. Nearly all smokers have some awareness of the profound health risks associated with smoking. Yet tobacco use is surprisingly prevalent—approximately 22.8% of the adult population of the United States continues to smoke, and international prevalence rates are even higher (American Lung Association, 2003).

Why do so many people smoke? More than half of current smokers in the U.S. attempt to quit each year, yet only 10% of cold-turkey attempts to quit smoking result in long-term success. When behavioral counseling, nicotine supplements, or
medication are used, the frequency of success improves to only 15 to 30% (American Lung Association, 2003). Apparently, the main reason that people continue to smoke is simply that smoking is extremely difficult to stop.

Nonetheless, participants in the current study showed a remarkable degree of volitional self-control over their smoking. Self-control accounted for more than 43% of the overall variability in the amount smoked. This remarkable finding parallels the results of other studies of volitional self-control (Howard & Myers, 1989).

4.1 Volition Effects and Effort Ratings

How should the participants’ reduction in cigarette use be interpreted? Whereas Howard and his colleagues have attributed behavior change in similar studies to volitional self-control, critics have argued that non-agentic factors such as the experimental manipulation itself (cf. Ford, 1987) or the socialized need to assume the “good subject” role (Hayes, 1987) were the true causes of the change. These criticisms have addressed elsewhere (c.f. Howard, Curtin, & Johnson, 1991), but the results of the present study shed a little additional light.

The specific instruction received by participants was to “try as hard as you can not to smoke” for 14 days. Participants also rated their actual effort each day, thus providing an estimate of how close they came to complying with the instruction. Though these effort ratings did indicate increased effort on “try not to smoke” days, not a single participant reported trying as hard as he or she could on all 14 “try not to smoke” days. In fact, 62.2% of the sample (23 participants) indicated that they never—not even for one day—tried as hard as they could not to smoke. Moreover,
effort ratings suggest that participants effectively disregarded the instruction (i.e. made “little” to “no” effort not to smoke) 34.9% of the time. By contrast, participants indicated that they complied fully with the instruction by trying “as hard as possible” only 8.9% of the time.

Since even a little effort not to smoke might be considered partial compliance with the instruction, a “percent compliance” estimate was calculated for each participant by summing his or her effort ratings for the 14 days, then dividing this by the sum that would have been obtained had the participant fully complied each day. Percent compliance estimates ranged from 4.8% to 92.9%, with a mean estimated compliance of 52.1%.

This estimate, however, presumed that all reported effort had resulted from experimental instructions. This seemed unlikely, as most participants (89.2%) indicated that they had tried not to smoke on at least one “do what you normally do” day. When effort ratings from “do what you normally do” days were taken into account, the mean compliance estimate dropped to 36.1%, with individual estimates ranging from -35.2% to 92.2%. Three compliance estimates were negative, suggesting that three participants not only disregarded the instruction but actually acted against it, trying harder not to smoke on “do what you normally do” days than when instructed to “try as hard as you can not to smoke.”

Thus, participants were roughly 36.1% compliant with the experimental instruction on average, according to their self-ratings. They reported that they fully complied with the instruction only 8.9% of the time, and they acknowledged
disregarding it 34.9% of the time. This finding is hardly consistent with the notion that participants were slavishly controlled by the experimental manipulation (Ford, 1987). Given the data, a claim of “experimenter control” in this study would essentially be to assert that a simple instruction, largely disregarded by participants, caused pronounced change in a behavior that is notoriously difficult to control.

Similarly, the “good subject” explanation for volition effects seems implausible in light of these data. Were the need to assume the “good subject” role a primary influence on participants’ behavior, a fairly high degree of reported compliance would be anticipated. Participants would certainly not be expected to report that they had disregarded the experimental instruction nearly four times as often as they had fully followed it.

An agentic explanation for the data seems more plausible than either mechanistic alternative. Volitional instructions were intended to “activate” the self-determined effort of participants, and to the degree that this occurred, behavior change telically followed. Participants responded to the experimental “invitation” by choosing, in varying degrees, to willfully reduce their smoking on specific days. The more effort participants exerted each day, the less they smoked, regardless of which volitional instruction they had been assigned to follow. This explanation is supported by the observed volition effects in the data, the complete mediation of volition effects by effort ratings, and the mediocre compliance of participants with the experimental instruction.
4.2 Self-Efficacy

Self-efficacy was not found to be associated with volitional self-control in the present study. This is somewhat surprising, given that smoking-cessation research has repeatedly shown that smokers with higher self-efficacy tend to have greater success in reducing their cigarette use (Bandura, 1997). One explanation for the inconsistency is that most self-efficacy research with smokers has assessed their reduction in tobacco use while they were actually attempting to quit smoking. The present study, by contrast, included only eight smokers (21.6% of the final sample) who engaged in such an attempt. This distinction is important because self-efficacy tends to vary within individuals as they progress through the stages of readiness to change (Prochaska & DiClemente, 1992). It is quite possible that the relationship between self-efficacy and self-control similarly varies as participants progress through the different stages.

For example, it may be that among smokers with no motivation or plan to stop using tobacco, high self-efficacy has no bearing on the ability to willfully reduce cigarette use. In later stages of change, however, self-efficacy may become a supportive condition that enhances an individual’s volitional self-control (Prochaska & DiClemente, 1992). This hypothesis is consistent with Howard, Myers, & Curtin’s (1991) finding that increased personal meaning is associated with greater volitional self-control, as a reduction in cigarette use would likely be more meaningful to someone who is highly motivated to stop smoking than to one with no such motivation. This hypothesis could be further examined by comparing the
volition/self-efficacy relationship among smokers in different stages of change or by assessing changes in this relationship longitudinally as smokers progress through the different stages.

Another possible explanation for the lack of an observed relationship between volition and self-efficacy is that self-efficacy may be associated with some types of volitional self-control and not with others. For instance, reducing cigarette use for a single day is quite different from stopping smoking altogether. Volitional self-control in the present study was measured in one-day increments, without regard to long-term reductions in cigarette use or progress toward abstinence. Self-efficacy, on the other hand, has been studied in relation to longer-term changes in smoking and with the ability to maintain prolonged abstinence (Bandura, 1997). This possibility might be studied in future research by varying the length of volitional instructions, as suggested by Howard & Myers (1989).

4.3 Self-Prediction

Participants’ volitional self-control was no better when they selected specific days on which to “try not to smoke” than when these days were randomly assigned. In other words, the “self-prediction” intervention used for the study did not significantly enhance participants’ volitional self-control.

This finding is difficult to interpret because it is unclear whether the intervention worked. The goals of the intervention were (a) to activate participants’ self-predictive abilities, such as the ability to anticipate days when non-agentic influences would be particularly hard to resist, and (b) to attach increased personal
meaning to the volitional assignment. It seems unlikely that the latter was accomplished, as increased personal meaning would very likely have improved self-control, based on previous research (Howard, Myers, & Curtin, 1991). Whether participant’s self-predictive abilities were activated, on the other hand, is more difficult to say.

On the surface, participants seemed able to select the “best” days to “try not to smoke” without much difficulty yet their predictions didn’t seem to make a difference. Perhaps people are poor predictors of their volitional self-control—maybe they can’t accurately anticipate when non-agentic factors will be most influential or when their agentic processes will be at their best. On the other hand, perhaps the intervention was too simplistic to elicit the self-reflection and foresight necessary for meaningful self-prediction. The present data provide no way to compare these possibilities, so the most appropriate conclusion is simply that self-control was not enhanced by the present intervention. Future studies might remedy this problem by including corollary assessments of the effects of the interventions, such as brief questionnaires that assess whether the intermediate goals of interventions were met. (Waltz, Addis, Koerner, & Jacobson, 1993)

4.4 Quit Phenomenon

Although the self-prediction intervention was ineffective, a different form of self-prediction became apparent over the course of the study. Howard (1984) asserts that one of the hallmarks of human agency is the ability to envision the future, formulate plans, and willfully bring about premeditated change. Eight of the present
study’s participants demonstrated this type of agentic self-prediction by making and carrying out plans to quit smoking during the study. Data from these participants indicated—in every case—a significant reduction in the amount smoked after the selected “quit date,” regardless of subsequent volitional assignments.

From an agentic perspective, these changes in behavior were the result of self-reflection, goal-setting, and a conscious resolve to change, followed by the willful carrying out of meaningful personal plans despite anticipated pressures to continue to smoke from non-agentic influences. Information provided by the eight participants during informal debriefing interviews was very consistent with this explanation. In all but one case, a pre-meditated resolve to quit smoking on a specific future date was made at least a week before the behavior change occurred. Two of the eight acknowledged that their quitting was prompted by specific environmental factors (one learned that she was pregnant, and the other began urgent medical treatment that precluded smoking), yet even these two attributed their change in behavior more to a conscious resolve to stop smoking than to the known environmental factors that helped activate this resolve. All of the eight reported that quitting involved self-reflection, goal-setting, and commitment to a future course of action. Thus, the “quit phenomenon” may reflect a way in which self-prediction enhances self-control.

4.5 Implications for Theory and Research

The findings of the present study have important implications for theory, research, and clinical practice. A primary contribution is the additional evidence of agentic self-control provided by the study, in this case, for a behavior that is clinically
significant and known to be very difficult to control. As noted, the degree to which volitional self-control has accounted for behavioral variability in this and other studies has repeatedly exceeded the highest expectations for psychological research (Cohen, 1977).

It follows that an understanding of volitional processes has great potential to enhance the scientific understanding of human behavior. Statistically speaking, the more variability we can parsimoniously explain, the easier we can detect other meaningful effects. The same might be said of psychological theory—the better we understand human functioning, the more capable we become of investigating aspects of behavior we have yet to understand. Conversely, to ignore well-validated theory or to overlook consistent, compelling empirical findings would be to undermine the process of scientific exploration.

For these reasons, incorporating agentic processes such as volitional self-control into the body of psychological theory and research is of high priority. To fail to do so would be scientifically negligent. At the same time, integrating agentic and non-agentic research will not be as simple as plugging new variables into existing statistical equations.

Rychlak (1988) notes that the premises of agentic research continue to be largely incompatible with the goals, tenets, and terminology of most psychological research. The findings of the present study illustrate this conflict. The relationship between experimental instructions and smoking behavior was fully mediated by self-ratings of effort. Typically, this would be interpreted (and diagrammed) as a
straightforward chain of efficient causes: Variable A (the experimental instruction) caused Variable B (volitional effort), which in turn caused Variable C (a reduction in cigarette use). This mechanistic interpretation, however, clearly contravenes the agentic perspective underlying the study. Volitional effort is an agentic process—it is, by definition, the product of an active agent, not the efficient result of any series or combination of other factors. Participants’ intentional, active responses (Variable B) to experimental instructions (Variable A) should not be construed as mechanistic, efficiently-caused effects, regardless of the strength of the statistical association.

It was to highlight this problem that Rychlak (1993) coined the term “telosponse,” meaning a “telic response” or choice from among cognitive alternatives. The present study underscores the need for continued innovation, not only with vocabulary, but with statistical approaches, structural models, and research paradigms that can accommodate agentic factors by allowing for different shades of causation. Mechanistic influences might be said to “inform” or “invite” agentic processes, but should not be said to “cause” them. Similarly, active agents or agentic processes might be added to structural models, but influences upon them would have to be represented in novel ways, as neither agents nor agentic processes can be the efficient results of other constructs. It is anticipated that the increased inclusion of agentic processes such as volitional effort in other research will foster such innovation; as the problems are clarified, creative solutions will necessarily follow.

One caveat to this recommendation is that adding agentic tools to the collective research toolbox will not inherently produce agentic research, as evidenced
by the mechanistic reinterpretations of early volition studies (cf. Ford, 1987). The goals of traditional research—prediction and control by an objective observer—remain at odds with the nature of human agency (Howard, 1984). Thus to be truly agentic, research must accommodate self-prediction and self-control by participants and must allow these to represent scientific understanding. This will doubtless require creativity and flexibility, perhaps as great as those required in recent decades of our elder sibling “hard” sciences, whose tolerance of the subjective ironically now seems to exceed our own (Howard, 1984; Rychlak, 1979, 1988).

4.5.1 Agentic and Non-Agentic Influences

A more specific implication of the present study is its support for the premise that both agentic and non-agentic influences contribute to behavior (Bandura, 2000; Howard, 1993). Specifically, non-agentic factors exert their influence indirectly, by activating and informing agentic processes, which in turn produce behavior (Howard, 1993). If participants’ effort ratings are taken at face value and accepted as causally prior to smoking behavior, then this model is supported statistically in the present data by the full mediation of the impact of experimental instructions on smoking behavior by participants’ effort ratings.

It seems very likely that self-control could have been further stimulated (or likewise, constrained) by other non-agentic factors. One participant, for instance, joked that he could easily quit smoking if only someone would hold a gun to his head and promise to shoot him if he lit a cigarette. A real-life demonstration of this principle is the observed increase in the self-control of the two women who quit
smoking for medical reasons. Self-control and other agentic processes may also be influenced by extrinsic incentives, social pressures, biological cravings, psychological states, and many other non-agentic factors.

Even when non-agentic influences become so profound that behavior is highly predictable (e.g. a $5000 incentive for each cigarette-free day), agentic processes still play an important role, as the intentional pursuit of a desired end requires forethought, a self-reflective weighing of priorities, and a commitment to a chosen course of action. Regardless of the non-agentic influences present, agentic influences nearly always come into play.

Similarly, agentic processes are nearly always informed by non-agentic factors. External and internal influences are never fully absent, and they continuously impact agentic processes by creating alternatives from among which agents choose, by informing the self-reflective weighing of these alternatives, and by impacting the agentic processes themselves. In most cases, non-agentic factors have a significant bearing on the agentic underpinnings of behavior. Thus, though traditional research has long overestimated the importance of mechanistic influences on behavior (Howard, 1984; Rychlak, 1988), it would be equally short-sighted to overlook them while pursuing an understanding of agency.

It is recommended that researchers and theorists take an integrative stance toward agentic and non-agentic influences on behavior. Such an approach will be more consistent with agentic theory, more palatable to traditional researchers, and
more illuminating in general than would research that focuses exclusively on agentic processes (Bandura, 2001; Howard et al., 1989; Rychlak, 1988).

4.5.2 The Potential Value of Effort Ratings.

A last implication of the present study is the potential value of broader assessments of volition. Most volition research to date has focused on demonstrating volition effects, so the most common measure of volition has been the dichotomous “try” or “try not” instruction. The present study demonstrates the potential value of assessing volition in other ways, such as through self-ratings of volitional effort.

A continuous rating scale likely portrays volition more accurately than a volitional dichotomy (Howard, Curtin, & Johnson, 1991), which may help to clarify relationships between volition and other continuously-measured constructs of interest. For example, in the present study effort rating were more closely linked to changes in the behavior of interest than were the dichotomous volitional conditions. Moreover, the continuous scale of the effort ratings made it possible to quantify participants’ compliance with instructions.

Effort ratings have other advantages as well. For one, they are more conducive than experimental instructions to the study of behaviors that would be unethical to manipulate. For another, effort scales could easily be modified to assess the impact of experimentally-controlled non-agentic influences on agentic processes. While manipulating or measuring non-agentic factors, researchers could ask participants to rate “how hard they had to try” in order to perform or avoid certain
behaviors. Ratings of the required effort may bring to light non-agentic influences that tend to enhance or constrain volitional self-control. Of course,

Thus, effort ratings are considered a potentially fruitful way to expand agentic research. Recommendations for their further validation are discussed below.

4.6 Implications for Clinical Practice

The present study also has a number of implications for clinical practice. Among these are the relevance of volition research to clinically significant behaviors, the salience of agency-enhancing factors to personal change, and the promising role of clinicians in carrying out volition research.

Whereas early volition studies focused chiefly on relatively benign behaviors such as peanut-eating, the present study confirms that volition research can be meaningfully applied to behaviors of clinical significance. The schism between the science and practice of psychology is due partly to the perceived inapplicability of research findings to practice (Harre, 1974). Not so with volition research, which can provide concrete tools for clinical work as it also adds to our understanding of human functioning (cf. Steibe & Howard, 1986).

The present study, for example, demonstrates the potential value of a premeditated “quit date” for people who attempt to quit smoking. Similarly, the study’s more fortuitous findings (e.g. the enhancing of self-control by medical considerations, the loss of some participants due to a reported lack of interest) offer corollary support for the finding that self-control varies with the personal meaning of the task (Howard, Myers, & Curtin, 1991). Smoking cessation courses and other
psychoeducational programs may thus benefit from emphasizing these principles in their programming, and clinicians may be more effective when they work to enhance the personal meaning of a behavior change with clients before making concrete recommendations. Even the foundational finding that people have some volitional self-control may be therapeutic, as this knowledge may be empowering clients who feel helpless to change and relieving to those with excessive guilt or unrealistic expectations for self-mastery.

The process of volition research may also be clinically valuable. Steibe and Howard (1986) demonstrated that a personalized volition study can play a useful role in therapy. Similarly, several individuals in the present study reported during debriefing interviews that their participation had brought to light non-agentic influences to which they were particularly susceptible, which they will take into account when making future plans to quit smoking. Four of the eight participants who quit smoking during the study had no intention of quitting so soon when they began the project. Though their quitting can’t necessarily be attributed to the study, the “practice” they received in exercising volitional self-control may well have been a facilitating condition. It might also be noted that over the course of the study, 43 people smoked nearly 3000 cigarettes less than they say they typically would have. Thus at a number of levels, volition research has great potential to be clinically helpful.

Just as volition research can be informative to practice, clinical practice has great potential to inform volition research (Lazarick et al., 1988). The mainstay of
clinical practice is helping people change, which often takes the form of helping them increase their self-control (Mahoney, 1993). Psychotherapy often involves identifying and confronting non-agentic influences on behavior (e.g. learned behavior patterns, irrational beliefs, family-of-origin issues), improving agentic processing (e.g. decision-making, accurate self-reflection), and creating conditions that facilitate agentic self-control. What better arena could there be for research on agency than the front line of the battle for increased volition?

Moreover, the agentic perspective underlying volition research is more consistent with clinical work than with most traditional research efforts (Harre, 1974). The goals of therapy, for example, often parallel the agentic goals of self-prediction (e.g. the anticipation and planned avoidance of self-defeating behavior cycles) and self-control (e.g. behavior change through intentional choices “to do otherwise”). Howard (1987) suggests that tomorrow’s psychological research may largely resemble today’s clinical practice. This seems particularly true for research on agency, which is likely to benefit most from the study of clinically-relevant topics and which may best be carried out by scientists who are also steeped in clinical practice.

4.7 Future Directions

Several recommendations for future theory and research on agency have already been noted, such as the development of new vocabulary and methods for studying agentic processes, the continued study of the interaction of agentic and non-agentic influences, and the coordination of clinical and research efforts in studying
agency. Before addressing the limitations of the study, three additional recommendations for agency research are offered.

First, research on substance dependence may shed considerable light on agency. A defining feature of substance dependence is reduced self-control in relation to the substance (DSM-IV-TR; American Psychiatric Association, 2000). Typically this loss of self-control is attributed to the disruption of normal physiology through extensive, prolonged use. From an agentic perspective, this impairment might be viewed as the overriding of agentic processes by profound physiological influences.

Treatment for substance dependence often includes an acknowledgement of helplessness, a “surrendering” of one’s impaired self-control, a study of personal “triggers” to use the substance, and the development of a social support network. Surrendering control in order to gain control may seem counterintuitive, but from an agentic perspective it may be the start of developing a realistic awareness of the nature and power of prominent non-agentic influences. A study of personal triggers may likewise increase one’s awareness of specific non-agentic factors to which he or she is particularly vulnerable. The development of increased social support may be a way of aligning agentic and non-agentic influences (e.g. social expectations, reinforcement contingencies, commitment to change) so as to enhance volitional self-control.

Studying substance dependence or behavioral “addictions” (e.g. gambling addiction, sex addiction) from an agentic perspective may reveal how profound
physiological and psychological cues influence or impair agentic processes.

Examining the responses of dependent individuals to treatment may also provide new understanding of how agency can be enhanced.

A second promising area for agency research is the study of agentic "carryover" effects, such as habit formation and the resolve to change. In each of these cases, a specific exercise of agency at one point in time may affect one’s later agentic processing of non-agentic influences. For example, resolving not to behave a certain way may lessen the impact of a later impulse to do so, as the “choice from among alternatives” that would normally be informed by the impulse has essentially already been made. Similarly, habits may be cases in which the repetition of a specific agentic response to a non-agentic influence may gradually reduce the degree to which agentic processes are activated when the influence recurs. A study of habits, resolve, and other “carryover” effects may reveal ways that current agentic actions impact later agentic processes. This line of research may also bring to light specific ways of enhancing or constraining agentic self-control.

A third recommendation for future theory and research is the agentic study of motivation, which may serve as a bridge between non-agentic influences and agentic processes. Known environmental influences on behavior are often subjectively experienced as sources of increased motivation, which are in turn felt to inform agentic action. Thus, motivation may be the primary means by which many non-agentic factors exert their influence on agentic processes. For instance, extrinsic rewards or newfound personal meaning may increase an individual’s motivation for a
task, which may in turn impact his or her self-reflection, forethought, and commitment to a course of actions. Different types and degrees of motivation may contribute significantly to the agentic weighing of alternatives and priorities, or they may themselves be the focus of agentic self-reflection. It is also possible that certain types of motivation facilitate specific agentic processes. Intrinsic motivation, for example, may invite deep self-reflection more than would less internalized types of motivation. It is recommended that motivation be studied alongside volitional self-control and other agentic processes in future research so that these relationships can be better understood.

4.8 Limitations

The present study has a number of limitations that warrant discussion. Among these are participant mortality, sample limitations, and the presumed validity of effort ratings. Mortality in the present study was high—more than one third of the individuals who began the study withdrew before finishing. Several participants attributed their withdrawal to specific changes in personal circumstances, but a significant number withdrew for vague reasons or provided no explanation for their discontinuance.

Mortality was not statistically related to demographic traits, smoking habits, self-efficacy, or any other of the study’s variables of interest. Some authors have recommended that in such cases, mortality be disregarded (Tabachnick & Fidell, 1996). However, the possibility cannot be ruled out that participants withdrew from
the study because of some meaningful but unmeasured demographic trait, smoking propensity, or volition-related variable.

For example, it is possible that some participants withdrew because they had extreme difficulty controlling their smoking or even found themselves incapable of reducing it at all. The study’s estimates of volitional self-control would then be inappropriately high if applied to the general population of smokers. Similarly, mortality may have stemmed from nicotine dependence, a lack of motivation, or some other unmeasured factor relevant to the focus of the study. Even if a demographic trait unrelated to volition or smoking were responsible for the mortality, the study’s results could only be generalized to the portion of the population of smokers that resembled the present sample on that trait.

What can be said is that there is no known source of mortality, and thus no known reason not to tentatively generalize the study’s findings to other smokers. It is recommended that future research carefully attend to and address any similar mortality trends. Where possible, follow-up interviews with participants who withdraw may help shed light on any systematic sources of mortality.

4.8.1 Sample Limitations

A second, related limitation of the present study is its sample size. The proposed sample size for the study, based on anticipated effect sizes and a high level of desired statistical power, was 60 participants. Though 61 individuals began the study, only 37 finished all of the study’s procedures. Thus, statistical power was less than desired.
The effect of volitional self-control was clearly evident despite this limitation. This is not surprising given the effect sizes and association strengths typically found for volition effects (Howard & Myers, 1989). More subtle effects, however, may have been missed. For example, a number of statistically non-significant correlations in the mid-.20’s were observed between variables of interest. It is unclear whether these statistics reflect random associations or weak but potentially meaningful relationships that would have been detected with greater statistical power.

Maxwell and Delaney (1990) suggest that a larger sample is not always preferable to a smaller one, as even small and specious differences achieve statistical significance with enough observations. It is for this reason that sample size is best determined beforehand, with the goal of statistically identifying differences that are conceptually meaningful. Due to a high level of mortality, the present study may have fallen somewhat short of this goal. In light of this limitation, the conclusions drawn from the present data have focused primarily on volitional self-control and have been speculative in ruling out other associations.

An additional note about sample limitations relates to the demographic traits of the present sample. Participants came from a military population, and many were service members on active duty. People in this demographic group are adults who tend to be relatively young, physically healthy, and emotionally stable, and whose socioeconomic status and educational attainment is approximately average for the U.S. population. Though various ethnic backgrounds were represented in the study, participants were primarily of Caucasian ethnicity.
As with any study, the generalization of findings beyond the population from which the sample was drawn is speculative. This principle applies both to demographic traits and to observed levels of the variables of theoretical interest. The present findings are thus best applied to relatively healthy young adults with an average level of education whose smoking profiles, self-efficacy, and volitional self-control lie within the same ranges as those of the present sample. The applications of these findings to others, particularly those who differ significantly from the sample would be conjectural.

4.8.2 Validity of Effort Ratings

One additional limitation of the present study relates to participants’ self-ratings of volitional effort. The conclusions drawn about the data have tentatively presumed that the rating scale developed for the study produced reliable and valid measures of participants’ actual effort.

Though the reliability of individual daily ratings could not be assessed, the averaged ratings used for most of the study’s analyses showed high internal consistency ($\alpha = .93$). The validity of the rating scale is supported chiefly by its strong face validity and its observed relationships with other variables in the present study. (Effort ratings were associated with volitional instructions and cigarette use but were not significantly correlated with self-efficacy, smoking profiles, or demographic variables.)

A potential confound to the validity of these effort scores is the possibility that participants’ ratings were affected by their observations of their own performance.
Rather than thoughtfully reflecting on how much effort they truly made each day as instructed, participants may have allowed their effort ratings to be swayed by an awareness of how much they smoked (e.g. “I smoked more than usual today; I must not have tried very hard.”).

A number of measures were taken to minimize this likelihood. First, participants were explicitly instructed, both verbally and in writing, to consider their actual effort when making ratings, and to evaluate this independently from their tobacco use. Second, participants recorded cigarette use and effort ratings separately, on different sections of the log provided. Third, participants were asked to actually read the effort rating scale before making their ratings each day. Though this potential confound could not be conclusively ruled out, the ratings were presumed to be meaningful based on their strong face validity, the measures taken to prevent such a confound, and previous research supporting the value of self-report data (Howard, Maxwell, et al., 1980).

In order to carry out agentic research, a traditional bias for external observation will have to accommodate some reflective self-evaluation (Howard, 1984; Howard, Maxwell, et al., 1980). Researchers must nonetheless strive to make introspective measures scientifically sound, removing known threats to their reliability and validity. Along these lines, effort scores might be strengthened in future studies by assuring that participants rate their effort before recording their performance each day. Observations of effort and performance might be further separated by having participants complete unrelated data-collection activities after
rating their effort but before recording their performance, thus minimizing any
association due to proximity of measurement. An alternate approach might be for
participants to rate their effort periodically throughout the day rather than making a
single retrospective rating at the end of the day.

The validity of effort ratings might be further established by finding alternate
ways to measure volitional effort. For instance, participants in the present study
might have been asked to place a small bead in their cigarette case each time they
willfully resisted an urge to smoke. The number of beads at the end of the day would
provide a separate estimate of their volitional effort.

4.9 Conclusion

Taking note of these limitations, the present study offers strong evidence for the
influence of agentic self-control on behavior, even when the behavior is as
notoriously difficult to control as cigarette smoking. To overlook this evidence
simply to adhere—comfortably but inflexibly—to the tenets of a scientific paradigm
designed for different subject matter would be foolish. Instead, researchers are
challenged to incorporate agentic processes into their perspectives and projects in
order to develop a fuller understanding of human experience and behavior. Rychlak
(1988) and Howard (1987) contend that taking an agentic perspective should not
preclude being scientific. The converse is equally true.
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APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE

S1. How long have you been smoking cigarettes? (Please write the number of years)

________ YEARS

S2. Have you tried to quit smoking before? (Circle number of your answer)

1 NO
2 YES ——— How many times? __________

S3. Have you ever quit smoking for six months or more? (Circle number)

1 NO
2 YES ——— How many times? __________

S4. How much do you currently smoke each day? (Note: One pack = 20 cigarettes. Please write the number of cigarettes.)

________ CIGARETTES PER DAY

S3. Do you currently have plans to quit smoking? (Circle number)

1 NO, I DON’T HAVE PLANS TO QUIT.
2 YES, I PLAN TO QUIT WITHIN 30 DAYS.
3 YES, I PLAN TO QUIT WITHIN 6 MONTHS.
4 YES, I PLAN TO QUIT SOMEDAY.

D1. Your sex. (Circle number of your answer)

1 MALE
2 FEMALE

D2. Your present age: ________ YEARS

D3. Your present marital status. (Circle number)

1 NEVER MARRIED
2 MARRIED
3 SEPARATED
4 DIVORCED
5 WIDOWED
D4. Your primary ethnic background. (Circle number)

1   PACIFIC ISLANDER
2   WHITE / CAUCASIAN
3   ASIAN / ASIAN-AMERICAN
4   BLACK / AFRICAN-AMERICAN
5   HISPANIC / LATINO-AMERICAN
6   AMERICAN INDIAN / NATIVE AMERICAN
7   OTHER . . . (please specify) _____________________

D5. Are you in the military? (Circle number)

1   YES
2   NO

D5a. If you are not in the military, who is your military sponsor? (Circle number)

1   MY SPOUSE
2   MY PARENT
3   MY CHILD
4   OTHER . . . (please specify) _____________________

D6. How long have you (or your military sponsor) been in the military?

_________ YEARS

D7. What is your (or your military sponsor’s) rank? (Circle number)

1   E1-E3
2   E4-E6
3   E7-E9
4   O1-O3
5   O4-O6
6   O7-O9

D8. What is the highest level of education you have completed? (Circle number)

1   NO FORMAL EDUCATION
2   GRADE SCHOOL
3   MIDDLE SCHOOL
4   SOME HIGH SCHOOL
5   HIGH SCHOOL DEGREE / GED
6   SOME COLLEGE WORK
7   COLLEGE DEGREE
8   SOME GRADUATE WORK
9   GRADUATE DEGREE
APPENDIX B

SMOKING SELF-EFFICACY QUESTIONNAIRE

The following are some situations in which certain people might be tempted to smoke. Please indicate whether you are sure that you could refrain from smoking in each situation.

<table>
<thead>
<tr>
<th>Situation</th>
<th>1. When I feel nervous (Circle number)</th>
<th>2. When I feel depressed (Circle number)</th>
<th>3. When I am angry (Circle number)</th>
<th>4. When I feel very anxious (Circle number)</th>
<th>5. When I want to think about a difficult problem (Circle number)</th>
<th>6. When I feel the urge to smoke (Circle number)</th>
<th>7. When having a drink with friends (Circle number)</th>
<th>8. When celebrating something (Circle number)</th>
<th>9. When drinking beer, wine, or other alcohol (Circle number)</th>
<th>10. When I am with smokers (Circle number)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
<td>1 NOT AT ALL SURE</td>
</tr>
<tr>
<td></td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
<td>2 NOT VERY SURE</td>
</tr>
<tr>
<td></td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
<td>3 MORE OR LESS SURE</td>
</tr>
<tr>
<td></td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
<td>4 FAIRLY SURE</td>
</tr>
<tr>
<td></td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
<td>5 ABSOLUTELY SURE</td>
</tr>
</tbody>
</table>
11. After a meal (Circle number)
   1 NOT AT ALL SURE
   2 NOT VERY SURE
   3 MORE OR LESS SURE
   4 FAIRLY SURE
   5 ABSOLUTELY SURE

12. When having coffee or tea (Circle number)
    1 NOT AT ALL SURE
    2 NOT VERY SURE
    3 MORE OR LESS SURE
    4 FAIRLY SURE
    5 ABSOLUTELY SURE
APPENDIX C

TRACKING CARD, RANDOMLY-ASSIGNED INSTRUCTIONS

Smoking Study Tracking Card

Use this card to record exactly how many cigarettes you smoke each day.

______ = Try as hard as you can not to smoke today

______ = Today just do as you normally do

<table>
<thead>
<tr>
<th>WEEK ONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day of the Week</td>
</tr>
<tr>
<td>Instruction</td>
</tr>
<tr>
<td># of Cigarettes Smoked</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEEK TWO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day of the Week</td>
</tr>
<tr>
<td>Instruction</td>
</tr>
<tr>
<td># of Cigarettes Smoked</td>
</tr>
</tbody>
</table>

Remember:

- Please be honest and accurate
- It’s easy to count cigarettes if you start with the same number of cigarettes every day
- Try not to miss a day, but if you do, start with the instruction you missed. Don’t leave a column blank. It’s better to finish a day late than to skip an instruction.

If you have any questions, please call Quinn Bastian at 627-9441.
APPENDIX D

TRACKING CARD, SELF-PREDICTION-BASED INSTRUCTIONS

Smoking Study Tracking Card

Use this card to record exactly how many cigarettes you smoke each day.

X = Try as hard as you can not to smoke today

O = Today just do as you normally do

<table>
<thead>
<tr>
<th>WEEK ONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day of the Week</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEEK TWO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day of the Week</td>
</tr>
</tbody>
</table>

Remember:
- Please be honest and accurate
- It’s easy to count cigarettes if you start with the same number of cigarettes every day
- Try not to miss a day, but if you do, start with the instruction you missed. Don’t leave a column blank. It’s better to finish a day late than to skip an instruction.

*If you have any questions, please call Quinn Bastian at 627-9441.*
APPENDIX E

EFFORT RATING SCALE

Each day, please rate how hard you tried not to smoke. Whether or not you were successful, your rating should show how much effort you made not to smoke.

Also, please note if you used a nicotine supplement (gum or patch) or medication to make it easier not to smoke.

<table>
<thead>
<tr>
<th>Day #</th>
<th>Day</th>
<th>How hard did you try not to smoke today? (Write number from scale below)</th>
<th>Did you use nicotine gum, a patch, or medication? (Circle any used)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td>G P M</td>
</tr>
</tbody>
</table>

How hard did you try not to smoke today?

0 -- DIDN’T TRY AT ALL (made no effort)
1 -- BARELY TRIED (made minimal effort)
2 -- TRIED A LITTLE (made a little effort)
3 -- TRIED A FAIR AMOUNT (made a fair amount of effort)
4 -- TRIED HARD (made a good deal of effort)
5 -- TRIED VERY HARD (made a great deal of effort)
6 -- TRIED AS HARD AS POSSIBLE (made incredible effort)