Beyond L2 motivation: Automaticity, habit, and the second language learner

Julian Taketani ✉
Ryukoku University, Kyoto, Japan
https://orcid.org/0000-0003-2073-7475
pigott@world.ryukoku.ac.jp

Abstract

Much of our day-to-day behavior transpires with little or no conscious forethought: Habit, rather than motivation, explains our morning routine, daily commute, and many workplace activities. Empirical research has demonstrated the indispensability of implicit knowledge and automaticity for linguistic processing, but the roles they play at the behavioral level, for example learning as an automatic response to context cues, remain unclear. If it is true that nonconscious psychological processes triggered by internal or external stimuli are an important constituent of second language (L2) learning behavior, the second language acquisition (SLA) literature can be enriched by incorporating theory, methods, and findings from research on automaticity in cognitive psychology. Acknowledging the role of automaticity need not undermine our appreciation of volition. Like yeast in dough, the role of volition in the "mixture" of learner behavior does not have to be large to be consequential. In fact, by discriminating more carefully between automatic and volitional behaviors, researchers may be able to target more effectively rare but consequential volitional junctures in language learning. The pedagogical implication of the position I advocate is a shift in emphasis from motivating second language learners to training them.

Keywords: automaticity; volition; agency; implicit learning; motivation

1. Introduction

So strangely is freedom environed in necessity; such a singular somnambulism, of conscious and unconscious, of voluntary and involuntary, is this life of man.
(Thomas Carlyle, 1837*)*

Second language acquisition (SLA) research has two broad agendas, hereafter referred to as *Agenda 1* and *Agenda 2*. Agenda 1 addresses how language is processed and acquired cognitively; Agenda 2 examines language learning as a type of behavior. Agenda 1 scholars examined the roles played in second language (L2) learning by implicit memory, knowledge, and learning. Ellis (2006) notes: "Most linguistic processing is unconscious. It is underpinned by implicit, or procedural learning through which we have access to a distributional analysis of the linguistic problem space" (p. 7). By contrast, Agenda 2 research prioritizes explanations in terms of conscious representations and actions relating to agency, autonomy, self-regulation, self-efficacy, motivation, and goal formation. My thesis is that volition is somewhat overemphasized in Agenda 2 research, that it gravitates toward volitional explanations because they are easier to access through participant testimony. Like the drunk who looks for his car keys under a lamppost a block away from where he dropped them, Agenda 2 researchers are drawn to volitional interpretations of learner behavior "because the light is better here" (Ellis, 2006, p. 10).

The first section of this paper offers an overview of automaticity research in cognitive science. The second section addresses the preference for volitional explanations for learning behavior in SLA research. Section 3 examines the theoretical and methodological implications of incorporating automaticity theory into Agenda 2 research. The final section suggests some practical means by which SLA researchers can effectively differentiate between automatic and volitional learning behaviors.

2. Automaticity and volition: Findings from cognitive psychology

There is a story of a practical joker who, seeing a discharged veteran carrying home his dinner, suddenly called out, "Attention!" whereupon the man instantly brought his hands down, and lost his mutton and potatoes in the gutter.
(Huxley, 1866, cited in James, 1980, p. 120).

People behave for reasons of which they are completely unaware. Habit, rather than motivation, is key to understanding what people eat, drink, smoke, when and how they brush their teeth, and the mode of transportation they choose

(Aarts & Dijksterhuis, 2000). Automaticity denotes behavior driven by implicit (or procedural) memory, knowledge, and learning. Automatic processes, the triggering of nonconscious psychological processes by internal or external stimuli (Bargh & Williams, 2006), occur without conscious awareness, their operations are governed by neuroanatomical structures distinct from those governing explicit, declarative processes, they yield both abstract and concrete memorial representations, they show relatively little interindividual variability, and they are less subject to developmental influences than explicit or declarative learning (Reber et al., 1999). Implicit processes are implicated when previous experiences facilitate task performance despite the learner having no conscious or intentional recollection of those experiences (Schacter, 1987). The "knowledge" required for automatic action governed by implicit processes is contained in the procedures themselves (Dienes & Perner, 1999).

Automaticity is an indispensable part of virtually all psychological phenomena, serving to free the conscious mind from the immediate concerns of the environment. When goals are pursued regularly, the need to pay conscious attention dwindles – It would be impossible to function effectively if conscious, controlled, and aware mental processing had to choose and guide every action and response to the environment (Anderson, 1982; Bargh, 1989, 1990; Bateson, 1972; Miller et al., 1960; Newell & Rosenbloom, 1981; Nørretranders, 1998). Automaticity has been shown in experimental settings to account for up to 95% of action (Baumeister & Sommer, 1997; Baumeister et al., 1998). Automaticity studies use priming, whereby participants are unknowingly subjected to some sort of intervention with no discernable relevance to a subsequent task. Priming research began with laboratory studies of motor control. These studies suggested that a conscious intention to move occurred after brain activity suggested the 'decision' had already unconsciously been made. Subsequent findings indicated that not only short-term proximal intentions, but longer-term distal intentions could also lead automatically to action (Libet et al., 1983; Maoz et al., 2014; Soon et al., 2008). The findings of priming research undermine our confidence that we are conscious of, and in control of, our behavior:

- People compromise more in price negotiations when sitting on soft chairs (Ackerman et al., 2010).
- People are more likely to pursue careers and relocate to locations that incidentally share letters of their name or other aspects of identity, such as birthdays (Pelham et al., 2002),
- Single men unconsciously approach, and committed men unconsciously avoid, fertile women (Miller & Maner, 2010).
- Increased cognitive load reduces concern for authority, loyalty, and purity, but not for harm or fairness (Greene et al., 2008).

- Negative task feedback increases the tendency to stereotype others (Spencer et al., 1998).
- People are more likely to give time to an interviewer after being asked questions about friends as opposed to coworkers (Fitzsimons & Bargh, 2003).
- Participants shown a picture of a library tend to speak more softly during an experiment (Aarts & Dijksterhuis, 2003).
- Participants primed with elderly-related materials walked more slowly down the hallway after leaving the experiment, and remember fewer details about room in which that experiment was conducted than control participants (Bargh & Chatrand, 1999).
- People are more likely to wash their hands after recalling feelings of guilt for past behavior (Zhong & Liljenquist, 2006).

Automaticity has been found to play a role in self-regulation, adaptation, decision-making, moral judgments, emotion regulation, face perception, social judgment, motivation, goal pursuit, conformity, behavioral contagion, and goal-seeking behavior (Bargh, 1990; Bargh et al., 2001, 2012; Kruglanski, 1996; Maoz et al., 2014). Automatic behaviors can be divided into two types, pre- and post-conscious activities. The former derive from sensory or perceptual triggers – certain people, or the carryover effects of recent emotional experiences. Pre-conscious activity can serve either as an implicit input into conscious and deliberate processes, or it can directly activate higher mental processes such as goal pursuit and social behavior. Post-conscious goal-dependent automaticity, or habit, refers to actions that have become automatized over time (Aarts et al., 1998; Sniehotta & Presseau, 2012; Triandis, 1980).

Within psychology, research on habits was for a long time dominated by mechanistic, behaviorist approaches with little consideration for the role of mental processes. In the 1980s, research found that habits tend to be goal directed. These goals are represented mentally and become automated in the same way as stereotypes and other perceptual structures through frequency and consistency of use of the same set of component mental processes under the same circumstances (Bargh, 1990, 1997; Bargh & Chatrand, 1999; Bargh & Gollwitzer, 1994; Devine, 1989; Fazio et al., 1986; Kruglanski, 1996). As Aarts and Dijksterhuis (2000) note, people automatically enter the garage and select their car instead of their bicycle only if they have a reason to do so, even if they may not be conscious of this reason at the time of action. The representation, or goal, does not "care" about the source of the activation and, once activated, operates just as if it had been consciously intended.

Volitional processes, by contrast, denote conscious processes whereby action is formulated (emanant volition), decided upon (immanent volition), controlled

(predominant volition) and supported (subordinate volition). When tasks require conscious recollection of previous experience, knowledge, or conscious attention to learning, explicit, volitional processes are implied (Boekaerts & Corno, 2005; Heckhausen & Kuhl, 1985; Schacter, 1987). The consensus within cognitive psychology and social psychology is that volition is unlikely to be merely epiphenomenal (Baumeister & Masicampo, 2010; Briñol & DeMarree, 2012), although the question of how much control we have over our judgments, decisions, and behavior is perennially unresolved (Posner & Snyder, 1975). We ascribe volition to others less so than to ourselves, and these ascriptions influence our attitudes toward them (Pronin & Kugler 2010). Without a belief in volition, counterfactual reasoning, regret, and the sense of personal responsibility for our actions would be impossible, as would social cohesion built on a sense of shared responsibility (Frith, 2013). Nonetheless, what we commonly perceive as volitional may often be a collection of post hoc rationalizations for routine, or automatic, behavior and responses (Dijksterhuis et al., 2007). As Whitehead put it more than a century ago, *operations of thought* nay be like "cavalry charges in a battle – they are strictly limited in number, they require fresh horses, and must only be made at decisive moments" (1911, p. 61).

3. SLA theory and automaticity

Children automatically acquire complex grammatical knowledge (Ellis, 2006) without being consciously aware of their engaging in learning or acquisition behavior. While first language acquisition relies principally on implicit learning processes, SLA relies on both implicit and explicit processes. Explicit learning involves paying conscious attention to linguistic regularities and irregularities, volunteering and testing hypotheses about concepts and rules (Bley-Vroman, 1991; DeKeyser, 2003; Ellis, 2004, 2005; Krashen, 1981; Reber & Allen, 2000). Ellis (2006) lists noticing negative evidence, attending to language form, perception focused by social scaffolding or explicit instruction, the voluntary use of pedagogical grammatical descriptions and analogical reasoning, the reflective induction of metalinguistic insights about language, and consciously guided practice, as key functions of volitional behavior in SLA. Studies have identified the role played by explicit or declarative memory in priming concepts and words. Findings in neurological, neuroimaging, electrophysiological, and behavioral research implicate declarative memory in the learning, storage, and retrieval of idiosyncratic language (Ullman, 2016). Words are learned more quickly than grammatical rules, since vocabulary depends more on explicit memory, and grammar on implicit memory (Bloom, 2000; Marcus et el., 1992).

Nonetheless, automaticity is still vital to learning a second language. Agenda 1 researchers have used audio, semantic, syntactic, and lexical priming in laboratory settings to show how automaticity operates in L2 grammar acquisition, lexical access, word recognition, the acquisition of orthographic knowledge, and attention (Chang et al., 2006; Coumel et al., 2022; Ferreira & Bock, 2006; Hoey, 2004; McDonough & Mackey, 2008; McDonough & Trofimovich, 2011; Segalowitz & Hulstijn, 2005). Linguistic automaticity is a consequence of repetitive exposure to, and production of, language forms. A learner is more than a linguistic processor, however, and repetitive drilling, for example, tends to undermine communicative orientations to language learning that in turn guide higher order language learning behaviors (Segalowitz, 2008). That is, linguistic processing occurs in the wider context of general behavior, and that which is productive in the cognitive domain may be counterproductive in the behavioral domain.

Early Agenda 2 SLA research was built on the presumption that, given sufficient need for a language, successful language learning was dependent on traits such as intelligence, personality, and sex. This research focused on unconscious or, broadly speaking, automatic, influences, and took a domain-specific view of language learning. Presuming that domain general aspects of L2 learning behavior could imported from general psychology, scholars sought to understand what makes L2 learning unique, rather than what it has in common with other learning behaviors. However, in the 1990s researchers expressed more interest in how the individual learner exercises volition, or agency, in learning a second or foreign language. This interest stemmed in part from a certain ennui with the predominance of psychometric research addressing relatively stable influences on behavior, the methods it used (typically Likert-scale instruments), and the target of its research, the abstract "average learner." Second, decades of reductionist conceptions of the language learner centered around individual differences had led to *conceptual overlap*. For example, the need for social contact has been conceptualized as love/belonging (Maslow, 1943), relatedness (Deci & Ryan, 1985, 2002), or a sociostatic tendency (Schumann, 1997). Self-esteem, self-worth (Baumeister et al., 2007; Smith et al., 2007) and distinctiveness (McGuire & Padawer-Singer, 1976) are variations on a theme, as are autonomy, control, or self-determination. Likewise, self-fulfillment, self-affirmation and self-actualization are all roses by other names that share a common ancestor dating back to Ancient Greece. Increased interest in the individual learner perhaps also stemmed from a desire among practitioners to identify the motivational "secret ingredient" necessary to teach L2 effectively, and the sense that automatic explanations for behavior counter to a can-do, individualist zeitgeist. Reasons aside, from the 1990s until the present day, the methodological and theoretical predilections of SLA researchers have caused findings from the automaticity field to slip their theoretical net.

The reaction to conceptual overlap took the form of methodological holism. Norton Peirce (1995) described the emphasis on psychological explanations for language learning as a "hegemony of skin and skull." Opposition to the separation of the psychological and social was spearheaded by scholars working with qualitative methods, who are less likely than statisticians to be comfortable holding to discreet binary conceptual categories when confronted with the interrelated and conflicting influences exhibited by the typical interview subject. Ushioda (2009, 2011, 2016) proposed the person-in-context as an appropriate unit of analysis, suggesting that scholars examine how motivation emerges from relations between people against the backdrop of unfolding cultural context. Other scholars, typically those who had been working with psychometric measurement, began to adopt metaphors from complexity theory. The learner is, they argued, a "complex system," comprised of a dynamic constellation of cognitive, affective, and motivational characteristics (Dörnyei, 2009; Ellis & Larsen-Freeman, 2006; Larsen-Freeman & Cameron, 2008; Richards et al., 2011). This reaction brought problems of its own, namely *conceptual spread*, whereby abstract concepts such as motivation become increasingly difficult to define. If *everything is connected* – If, for example, a chance encounter can have life-changing consequences for the language learner – the utility of broad predictive models consisting of discreet internal and external factors is quite justifiably called into question.

In SLA research the psychological/social distinction is a perennial cause of confusion. Is the enjoyment of language study "intrinsic" (Deci & Ryan, 1985) if it is itself the consequence of a childhood spent in a cosmopolitan, multilingual foreign country? Is the influence of a teacher an "extrinsic" form of motivation if its effect is contingent on an innate preference on the part of the learner for a particular type of teacher personality? I argue that the desire to categorize influences according to spatial orientation confuses origin for function, and that attempts to reconcile the two, so long as they are underwritten by the psychological/social distinction, will likely struggle to achieve a general resolution. In more recent SLA research learners are understood to exert agency in the face of contextual affordances (Donato, 2000; Dörnyei & Ushioda, 2011; Gao, 2010; Lantolf & Pavlenko, 2001). The terms *agency* and *volition* are sometimes used interchangeably, but they stem from different intellectual traditions. Agency derives from sociology and is understood in opposition to socialization. As with other broad concepts such as motivation, it is often depicted as a force – a *latent potential* for self-directed behavior (Mercer, 2011), a *power* to initiate purpose-driven actions (Bandura, 1997), a *capability* to make and act on choices (Martin, 2004), a *capacity* to act independently and to make free choices (Archer, 1995), or the *ability* to direct individual behavior in the face of societal influences that either constrain or enable action (Durkheim, 1974). Work on automaticity, however, suggests

that representations, understandings, judgments, goals, and attributions can operate automatically or volitionally. Translated into SLA terms, the socialization, or learning context can, so to speak, be either outside or inside the head (or both). Thus, an automatic/volitional distinction may offer a tidier and more satisfactory conceptual classification than the psychological/social distinction. For example, Hulstjin (2005) notes that SLA literature has tended to treat individual differences as mediating the learnability of language, rather than intrinsically associated with it. He concludes that "If language aptitude, intelligence, and working memory can be conceptually related to the constructs of implicit and explicit learning and knowledge, their status might change from peripheral and correlational to central and causal" (p. 136).

4. Theoretical implications for SLA, focusing in particular on motivation

Recognition of automaticity would likely bring to light an inverse relationship between language learning success and the utility of explaining the time and effort put toward this success in terms of volition. This is because those who we regard as "motivated" language learners are those who have strong habits – a tendency to engage in automatized, goal-directed behavior which reduces the need for motivation as an explanatory factor. While a great deal of research has been conducted on relatively stable psychological and social structures and their influence on language learning (cf. Crookes & Schmidt, 1991; Dörnyei & Ushioda. 2011), personality traits and drives are conventionally grouped together with conscious perception, representation, and attributions, as internal, or psychological influences. In functional terms, however, they can be understood to share more in common with social and cultural influences such as national curricula and socioeconomic status. Together, they account for general truisms such as *Extroverts learn to speak a second language better than introverts* and *Japanese students study English primarily because it is a compulsory subject in school*. Writ large, they constitute general rules governing behavior. Findings from cognitive psychology suggest that, in conjunction with relatively stable goals and context, traits are a component of automatic language learning behavior. Should these conditions persist, language learning behavior will continue, absent a conscious decision to abandon it. Should they change, learning behavior will change, absent a conscious decision to maintain it.

Volitional processes that initiate or maintain behavior in face of oppositional "forces" concern motivation. Theorists may therefore wish to view motivation as something that sporadically works to promote behavioral change, or to protect habitual behavior from disruption, particularly on the occasions when

there are real options and choices available to the learner, and situations in which the same conscious choice is not typically made each time (Bargh & Chartrand, 1999). According to this view, motivated behavior is, by definition, relatively rare (Ouellette & Wood, 1998), where "rare" could indicate anything from a conscious reaction to a major turning point in life, or to a deliberate decision to act during a classroom task. However, even during times of change the role of automaticity should not be overlooked. Major context changes such as moving home, starting a new job, or studying abroad break habitual patterns of behavior by discontinuing exposure to cues (Bargh et. Al., 2001). They are "windows of opportunity" during which new habits may form as a result of behavior proceeding in line with underlying intentions (Gardner, 2012), and during which volitional processes may play a contributary, or even vital role in bringing about behavioral change.

It is argued here that to a degree, both the misgivings felt towards both conventional categories and the confusion caused by methodological holism can be accounted for by the failure to incorporate the concept of automaticity into thinking about learner behavior. This has led to the mixing of automatic and volitional processes together under the umbrella of broad concepts such as motivation. Put provocatively, much of the motivation literature has been studying phenomena that are "motivation-related" (an infinitely large category) rather than cognitive processes that can be designated motivational. It is hoped that the incorporation into SLA theory of findings from cognitive psychology can clean up a certain amount of this conceptual spread with less confusion that the psychological/social distinction.

5. Practical implications for SLA research

Bronstein (1999) identifies the need to incorporate a comprehensive theory of implicit and explicit knowledge into the motivational domain. Human motives can be usefully divided into explicit motives accessible to conscious awareness, and therefore accessible through verbal report, and implicit motives which affect behavior indirectly, are inaccessible or partially accessible) to conscious awareness.

The first step is for the scholar to revisit his or her existing research with an eye to automaticity. The author's doctoral research (Pigott, 2015), for example, addressed the learning trajectories of successful young adult learners of English as a foreign language. Two particularly important influences on learner behavior, unconscious drives and significant events, were detected. For example, all participants exhibited a drive to make a "success" of themselves by accruing respect from others, differentiation from peers, and recognition as responsible members of society by virtue of their abilities, experiences and achievements.

The significant events they related, however, were each unique. One participant who spoke English well visited restaurant as a teenager, where she encountered a 'homeless looking' man whom she described as "really dirty," sitting in an opposite booth. But then something life-changing occurred:

> *. . . here comes this blonde, beautiful woman and they started speaking English . . . and I was like 'wow,' really shocked...After they started speaking English my first impression totally disappeared and I was thinking "wow he must be really smart." I was really shocked and I realized if I could speak English that well people are gonna be really impressed with me. I realized no one was impressed with me . . . I was good at math but everyone is good at math. There's nothing I was really good at, just average or lower, so my parents never complimented me . . . so I was just maybe thinking "I wish I could speak English that well". . .*

From that point on she began to study English enthusiastically. Events like this share much in common with those from the critical incident literature. They are often shocking, or even traumatic, they are unanticipated, and *they lead the individual to question the way things normally operate*. They are seminal moments in self-awareness that directly, or in conjunction with volitional action, initiate and accelerate learning behavior (Cope & Watts, 2000; Flanagan, 1954; Tripp, 1994; Webster & Mertova, 2007). The author concluded that experiences like these, and how they are perceived and represented, were more germane to the study of motivation than personality traits, goals, or routine behavior. An automaticity "mindset" also helps to elucidate the relationship between drives and significant events. Goal-directed behavior does not "care" whether it is stimulated automatically or volitionally, and its operation may extend into complex decision-making of the type that has hitherto been considered the exclusive domain of conscious and deliberate thought (Bargh et al., 2012). Traits, drives, goals, and day to day context are lower order, stable influences on behavior, and their influence can be understood to act unconsciously. By contrast, the significant event is the spark, the catalyst, for a *revelation in thinking* and a subsequent change in behavior. The experience in the restaurant *got the learner thinking* – about her situation and the role that language learning might play in her future.

Less dramatic but more numerous examples abound. Many language learners in Japan, for example, who achieve a measure of success are likely to have had an experience that prompted explicit motivational processes. In many cases this change is prompted by a mildly significant event, or a series of such events, such as a scoring well in a test. This causes the learner to "notice" English. In the same way that "noticing" is an essential ingredient for explicit learning at the cognitive level (Ellis, 2006) it is likely to be part of motivational change at the behavioral level. However, for many of these students, when compulsory

study ends, so does their habit of studying English. Since habits are triggered directly and immediately in associated contexts, these contexts may often override deliberative intentions in directing behavior (Gardner, 2012). To be a successful English speaker in Japan requires more volition than it does in Holland. Stating that most Japanese do not speak English because they do not need it is more straightforward and parsimonious than explaining it in terms of motivation This is because it explains failure in terms of automaticity rather than volition, and automatic behavior is the most prevalent. Viewed in terms of automaticity, failure to learn a language in many EFL contexts is perfectly normal and understandable (as is the success of English learners in Holland).

The primary implication of the argument presented in this paper is for scholars to increase their awareness of how volitional behavior takes place in a sea of automaticity, and to start by revisiting their own and others' research findings with this in mind. A subsequent step would be to incorporating items that address automaticity into questionnaires and interviews. By doing so, some insight may be gained on what types of learning behaviors are more likely to be habitual. Gardner et al. (2012), for example, judged the following items to match closely the definition of automaticity: *Behavior X is something I do automatically/without thinking; I start doing Behavior X before I realize I'm doing it.* With an awareness of automaticity comes a more careful targeting of volitional behaviors. Researchers may wish to pay particular attention to how learners deal with challenges, interruptions, and distractions to routine behavior. The usual caveats apply: There is no direct means of observing mental processes and representations, and introspection is a notoriously unreliable guide to cognitive processes that underlie behavior, and interviewees tend to construct post hoc explanations for volitional, let alone automatic behaviors. (Nisbett & Wilson 1977; Schwitzgebel, 2008). Nonetheless, these approaches are a helpful start.

Examining the effect of pre-conscious automaticity, or priming, on learner behavior requires an experimental approach. Software used to conduct priming experiments is freely available online, no expensive equipment is required besides a computer, and the relevant statistical methods are widely accessible. Most importantly, research from cognitive psychology can be adapted for use (cf. Bargh & Chartrand, 2014). Carver et al. (1983), for example, primed participants with hostile words before putting the participants in the role of a "teacher" who was to give shocks to a participant "learner." In a less dramatic adaptation, SLA researchers could prime participants with words positively associated with second language interaction before comparing their performance on a language task with that of a control group. Aarts and Dijksterhuis (2000) tested the hypothesis that habits are expressed as mental associations between travel goals and action. Habitual and non-habitual bicycle users were primed or not primed

with travel goals (e.g., having to attend a lecture). Response latencies on the location-bicycle links served as the dependent variable. The results showed that habitual bicycle users who were primed with travel goals showed faster responses than nonhabitual users, and that this effect did not appear in the absence of goal priming. They concluded that the activation of travel goals is required to reveal the mental accessibility of the habitual travel behavior. In other words, the automaticity of habitual behaviors is dependent on the presence of a goal. The L2 researcher might substitute L2 usage and career goals for bicycles and travel goals.

6. Conclusion

I have argued that incorporating findings and methods from automaticity research into the study of language learning behavior offers interesting avenues for future theorizing and research. Work in cognitive psychology suggests that our ability to exercise conscious, intentional control over behavior is limited, and that most of our psychological life must occur through nonconscious means if it is to occur at all. If this claim applies to L2 learning behavior, it suggests that SLA theorists may have unwittingly exaggerated the role of volition in learning. It is not difficult to understand why. "Men believe themselves free," Spinoza (2005/1667) wrote, "simply because they are conscious of their actions, and unconscious of the causes whereby those actions are determined" (p. 135). This, along with the ready availability of self-report data combined with the impossibility of observing mental processes directly, stacks the deck of in favor of volitional explanations for behavior. The automaticity hypothesis is supported by findings from cognitive psychology. Furthermore, the automatic/volitional distinction arguably offers a more parsimonious heuristic for making sense of behavior than the psychological/social distinction. Automaticity research may also hold important implications for practice. If most behavior is automatic, the effective teacher is one who manipulates the learning environment such that learning becomes habitual. Good habits, rather than motivation, should be the goal of pedagogy, because these are less likely to be disrupted by momentary losses of motivation. Conversely, boosting 'motivation' may be insufficient to disrupt bad habits.

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