



The Best-Laid Plans: Modern Conceptions of Volition and Educational Research

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Reviewed work(s):

Source: *Educational Researcher*, Vol. 22, No. 2 (Mar., 1993), pp. 14-22

Published by: [American Educational Research Association](#)

Stable URL: <http://www.jstor.org/stable/1176169>

Accessed: 12/09/2012 14:25

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The Best-Laid Plans

Modern Conceptions of Volition and Educational Research

LYN CORNO

Part of what it takes to succeed in academic settings is paying attention to and working toward appropriate goals. Working toward goals involves protecting the intention to accomplish goals from competing intentions and other distractions. Voluntary movement to protective action when situations demand it is central to a modern-day view of volition. This paper (a) discusses contemporary theory and research related to volition in education and (b) proposes agenda items for continued research.

Educational Researcher, Vol. 22, No. 2, pp. 14-22.

Colloquially, *volition* is taken to mean "strength of will," an expression that suggests a continuum with weakness as its opposite. Volition is also associated with a variety of characteristics attributed to individuals who apply themselves diligently to almost anything they do. Adjectives include, for example, conscientious, disciplined, self-directed, resourceful, and striving. All imply an ability to buckle down to tasks that goes beyond goal-directedness or persistence in the face of difficulty. To do something "of one's own volition" is to do it by one's own resources and sustained efforts, independent of external source or pressure. Despite the distinctions, this collection of characteristics forms a coherent psychological construct that has something to do with learning from schooling and that therefore ought to be a target of educational research.

Recent work by Richard Snow (1989a; 1989b) supports this position and calls for combined investigation of cognitive and *conative* aptitudes for learning from instruction. Referring to an ancient trilogy of human mental functioning that consists of cognition, affection, and conation, Snow defines conation as the opposite of homeostasis and considers it to comprise both motivation and volition.¹ Because this suggests a great range of conative constructs and processes that might be considered important for learning in education, careful analysis is required if profitable research paths are to be pursued. Snow (1989a) began this process with respect to volition; the present article is an effort to clarify some key issues that arise in applying modern theory on volition to questions for educational research.

Although the study of volition has not been topical in educational research, it has a long history in 19th century European will psychology (e.g., Ach, 1910) and was treated as well by both John Dewey (1895/1964) and William James (1904). In discussing the history of theory and research on volition, German psychologists Julius Kuhl and Jurgen Beckmann (1985) note that prominent psychologists of the 1920s and 1930s effectively removed volition from the inves-

tigative scene by arguing that it could be accounted for by motivation; theoretical parsimony prevailed. American psychologists then working in the conative domain paid close attention to motivational constructs related to education such as achievement motivation (Atkinson, 1958), and the aspects of volition that might conceptually and operationally distinguish it from motivation remained uninvestigated. More recently, scientific psychology has renewed interest in theory and research on volition, and the nature of the construct has changed.

While some theorists retain the notion that aspects of volition are dispositional (see Digman, 1990), modern views diverge from philosophical notions about willpower and the concomitant suggestion that "weakness of will" somehow implies weakness of moral character. Volitional processes are now being defined and considered part of a broader self-regulatory system that includes motivation and related cognition and emotion (Snow, 1989a).

Action Control Theory

The foundation for contemporary studies of volition was established in the early 1980s with key publications by Heinz Heckhausen and Julius Kuhl (Heckhausen, 1980; Kuhl, 1984). These authors developed a complex information processing theory of motivation, volition, and related cognition and emotion in the context of action control (Heckhausen & Kuhl, 1985; Kuhl, 1985). A primary issue is how individuals move from deliberating about and committing to goals (or "predecisional" analysis) to "postdecisional" regulation and action. This theory specifies different conditions and strategies for pre- and postdecisional processing, and explicitly characterizes predecisional analysis as motivational and postdecisional regulation as volitional. According to Kuhl (1985), postdecisional processing or volition serves as a mediational function; it "energizes the maintenance and enactment of intended actions" (p. 90).

Data from studies conducted by Heckhausen, Kuhl, and their colleagues show that different information processing principles seem to account for performance before and after the point of commitment (see, e.g., Gollwitzer, Heckhausen, & Ratajczak, 1990; Heckhausen & Gollwitzer, 1987). Before commitment, decision-making principles apply;

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following commitment, implementation becomes focal. Once subjects move from planning and goal-setting to the implementation of plans, they cross a metaphorical Rubicon. That is, their goals are typically protected and fostered by self-regulatory activity rather than reconsidered or changed, often even when challenged (Heckhausen & Kuhl, 1985). Hence, commitments firmly established by effective predecisional processing carry greater likelihood of follow-through. Effective postdecisional processing or follow-through reinforces the original decision in turn. The Heckhausen-Kuhl model is recursive and dynamic (see Figure 1).

Although a full explication of action control theory is beyond the scope of this article, it will be useful to consider some aspects of particular import for education and to identify issues that arise in this regard. Some shortcomings in current ways of looking at school learning and motivation might be remedied by studies that take volition into account. Similarly, experimental tasks developed by Kuhl and others appear to be best interpreted using volitional constructs (see Corno, 1986, 1989; Corno & Kanfer, in press, for reviews of research related to education). Still at issue are fine distinctions between the microprocesses of volition and motivation, and the extent to which volitional capabilities may or may not be deemed persistent, stable individual differences—as, for example, is the case with some cognitive abilities or personal “styles” (Snow, Corno, & Jackson, in press; Sternberg, 1988). Other issues concern how volition might best be operationalized; how measures of volition relate to additional personality, behavioral, and cognitive factors in educational settings; and how volition develops and may be manipulated in students.

To illustrate work on these topics, I first discuss the role of volition in educational settings and its relationship to constructs that have been the focus of modern research on motivation in the United States and abroad. Some of Kuhl’s research with children is then discussed to illustrate ques-

tions that arise in operationalizing volitional constructs. A case has been made elsewhere for the added value of research on volition in education (see Corno & Kanfer, in press), which is integrated in summary form throughout this article.

The Role of Volition in Education

Educational researchers are often concerned with factors that explain individual differences in learning and performance under complex conditions such as those found in school. In this context, volition can be viewed as one of several key conative aptitudes for education, that is, a measurable potential for responsibility, dependability, or conscientiousness predictive of success in educational settings (Snow, 1992, p. 6). Conative (motivational and volitional) aptitudes are considered by most theorists to be conceptually and empirically distinct from general or specialized intellectual abilities (e.g., Weiner, 1990; cf. Sternberg, 1988). Like intellectual abilities, however, conation is assumed to be reflected in information-processing regularities that may be captured within the demands and affordances of schooling environments. The forms of information processing associated with volition in schooling function to protect and maintain students’ “best-laid plans” for accomplishing academic goals in the face of competing (e.g., social) goals and other distractions.

School situations dictate that students meet established goals as a performance requirement for many academic tasks. These goals are often set by teachers, sometimes school districts, or by parents, and of course they may be coincident with goals students commit to themselves. Because shifting goals is rarely an option in schoolwork, and because many times students wish to persist at goals rather than shift them, maintaining goals or elaborating on subgoals becomes important. In addition, students have to exercise control over other, perhaps more desirable, thoughts and behavior.

Socializing and appearances matter to students, often more than academic work (Farrell, Peguero, Lindsey, & White, 1988). Distractions are, of course, the norm. Among the many documented distractions are social pressures outside the classroom (e.g., family and economic problems), classroom crowding, public performance requirements, and unstructured, repetitive, or incomplete tasks (Ames, 1990; Cronbach & Snow, 1977). Many volitional challenges are not even of students’ own making, but occur because schooling requires some degree of compliance (McCaslin & Good, 1992).

Table 1 lists examples of various volitional challenges faced on a typical school morning by a hypothetical sixth grader. This student reflects a composite of the challenges identified in discussions with actual sixth-grade students about school. These remarks have been digested to focus the point, but students do perceive demands for compliance with respect to schoolwork, and such demands are real (McCaslin & Good, 1992). While most researchers would agree with McCaslin and Good that teachers should encourage students to set their own goals, the point is that *whatever the source*, goals often require protection and maintenance if they are to be met.

One important function of volition, then, is higher-level, or “metamotivational”; it directs and controls intellectual, emotional, and behavioral energy toward academic goals

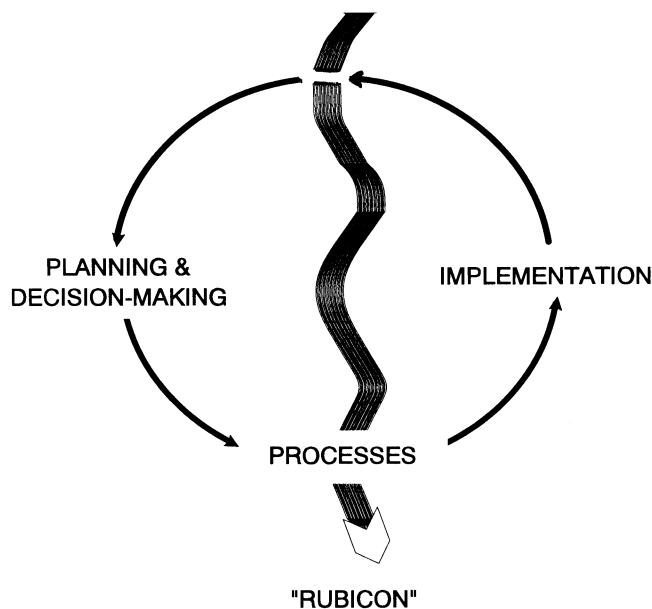


FIGURE 1. Simplified recursive model of action control (after Heckhausen & Kuhl, 1985)

Table 1
A Typical Sixth Grade Morning

What I did	What I wanted to do
Got dragged from bed	Sleep
Rode bus to school	Watch TV
Dreaded sitting through math	Talk with friends
Worried more than learned	Enjoy the work and do well
Thought about going outside	Go outside
Finished work early	Read other stuff I like
Hit the playground	Hit the playground

and other goals that are subjectively “difficult to enact” (Kuhl, 1986). Theories of volition do not assume that volition is necessary when goals are perceived as easy to enact. Volitional control mediates goal-setting and action when the need for it arises (see Corno, 1989).

For another example, think about assignments completed in class, where decisions must be made and carried out quickly. As any experienced teacher can attest, in-class assignments frequently elicit a predictable behavior pattern: When the assignment is first made, students respond with questions to clarify the nature of the task; they also complain about the task and worry aloud that they might not be able to finish on time or meet the teacher’s expectations. In the best of circumstances, these predecisional processes function to set a *negotiated* agenda for follow-through. That is, the initial interaction between teacher and students serves to alter the goals in minute but perceptible ways, and broadens the means of attainment. The new agenda departs to some extent from the one the teacher held prior to hearing students’ concerns. A negotiated agenda is a form of joint goal-setting, which satisfies students that their concerns have been heard and allows the work to begin.

Students then shift direction postdecisionally: They begin to gather resources (materials, books, etc.), to tell one another what to do, to watch the clock, and to rein in peers whose behavior is bothersome (see, e.g., Panagiotopolous, 1986). Crossing the Rubicon from motivation to volition creates different work conditions and different information-processing demands. Not incidentally, a classroom environment that permits negotiation over goals is one way that teachers can consciously move away from persistent demands for compliance, while concurrently providing opportunities for volitional development to occur.

Thus, in academic situations, volition can be characterized as a dynamic system of psychological control processes that protect concentration and directed effort in the face of personal and/or environmental distractions, and so aid learning and performance. When students appear volitional, they can be observed to sense the need to buckle down and to use volitional control to move through academic tasks.

Volitional control is perhaps most observable in so-called “volitional control strategies.” Kuhl (1985) has proposed a taxonomy of volitional strategies, which I have discussed elsewhere with respect to education (see, e.g., Corno, 1986). It is nevertheless worth looking briefly at some of these strategies again, as they provide a lens for investigating volition

in schools. In the Heckhausen-Kuhl theory, strategic volitional control reflects a critically important aspect of human development: the formation of elaborate, symbolic representations of ways to enact one’s intentions, and comprehension of their relative functional values in influencing action.

Covert Volitional Strategies

Table 2 presents two key categories of volitional strategies (after Kuhl, 1985), which have been designated covert strategies and illustrated with examples from Kuhl’s research as well as from discussions with teachers and students. Motivation control strategies enhance or strengthen the motivational basis of intentions—regulating the attributes of goals and tasks, their visualized enactment, and their contingent outcomes. Emotion control strategies are useful in managing emotional states that might disrupt or inhibit action, such as feelings of inadequacy, anxiety, or other emotions tied to past academic experiences. Intrusive attributions from past performances, “repetitive perturbing ideation” (Bandura, 1982, p. 137), and irrelevant rumination are various experiential states that limit an individual’s action focus (Kuhl, 1985). When individuals learn to identify these emotional intrusions and to disengage from them, a focus on action and better goal completion can result.

Research has distinguished these two categories of covert strategies from other covert strategies, such as cognitive or metacognitive strategies, and from overt behavioral management strategies. This work suggests that both covert and overt strategies are critical for self-regulation, but has only recently begun to investigate the role of motivation and emo-

Table 2
Two Categories of Covert Volitional Control Strategies

Motivation control

- Set contingencies for performance that can be carried out mentally (e.g., self-reward; self-imposed penance; self-applied Premack).
- Escalate goals by prioritizing and imagining their value.
- Visualize doing the work successfully.
- Uncover ways to make the work more fun or challenging.
- Immerse yourself in plans for achieving goals.
- Self-instruct.
- Analyze failures to direct a second try.

Emotion control

- Count to 10 in your head.
- Control breathing so it is slow, steady, and deep.
- Generate useful diversions (e.g., sing to yourself).
- Visualize doing the work successfully *and* feeling good about that (change the way you respond emotionally to the task).
- Recall your strengths and your available resources.
- Consider any negative feelings about the experience and ways to make it more reassuring.

Note: Examples of strategies were derived from Kuhl (1985) and in discussions with teachers and students.

tion control in student learning and performance (e.g., Bereiter, 1990; Mischel, 1974; Pintrich & DeGroot, 1990; Trawick, 1990).

Early behavioral strategies for controlling the environment drew on conceptions such as Thoresen and Mahoney's (1974) in behavioral self-control, as well as the work of Meichenbaum (Meichenbaum & Goodman, 1971), which includes cognitive-behavioral strategies as well. Zimmerman and Martinez-Pons (1988) have interviewed high school students about the strategies they use to study and learn in and outside school. Consistent with these early views, these researchers found that students' responses ranged from turning up lights to asking smarter students over to study. But students can also make more subtle changes to manage academic behavior, such as adding challenge to class assignments to make them more interesting (goal elaboration) and streamlining assigned tasks to reduce apparent complexity or repetition (goal organization; Lepper & Chabay, 1985). The readily observable strategies for controlling the task environment (e.g., self-monitoring by behavior charts) do not adequately reflect these subtleties or the more covert aspects of self-regulation central to volitional control (Rodriguez, Mischel, & Shoda, 1989; Zimmerman, 1989).

When academic and social preferences are in conflict, it becomes necessary to regulate the way that information is processed, as well as the external environment and one's observable behavior. Ideational aspects of self-regulation are less easily traced behaviorally but are more pointedly tied to modern views of volition. They involve control that students may exert over motivation and emotion, *in addition to* cognition, in the context of learning or performance tasks. Volitional control thus represents a broader range of regulation or control than metacognitive control alone; it is reflected in students' activation, allocation, and maintenance of a variety of psychological resources, so goals and the means for attaining them can become and remain focal (Kanfer & Ackerman, 1990).

Links to Modern Research on Motivation

How do volitional constructs coincide with existing models of motivation for learning from schooling, including models of self-regulated learning? Figure 2 reflects a provisional framework for discussing volition in education. This framework depicts the arena of motivation as comprising constructs and processes that affect decision making and choice with respect to individual goals. Within this arena, various lines of research have progressed in a direction that complements work on volition (see, e.g., Entwistle, 1981; Kanfer, *in press*; Pintrich, 1990).

This research has associated different types of achievement goal orientations with more or less effective forms of information processing during learning and performance. For example, so-called "mastery" or "learning" goal orientations have been correlated with constructive views of ability, feelings of efficacy and confidence, and concomitant self-regulatory efficiency during the early phases of complex learning in particular, with both children and adults (see, e.g., Ames, 1985; Dweck, 1975; Nicholls, 1984; Nollen, 1988; Pask, 1976). Deeper, more metacognitive modes of information processing, in turn, result in greater potential for elaboration, retention, and transfer (Lepper, 1988; Pintrich, 1990). No distinction is made in this research, however, between pre- and postdecisional processing, or among meta-

cognitive, metamotivational, and meta-affective (emotion control) activities that learners might engage in when academic and social goal preferences conflict or when distractions must be averted. In addition, few researchers accommodate the probability that students shift back and forth between intrinsic and extrinsic motivators both within and across different tasks, or that they might hold both learning and performance goals at once (note the attempt to convey motivation as an elliptical orbit around two points in the arena of decision making).

Related views of self-regulated learning (see, e.g., Pintrich & DeGroot, 1990; Zimmerman, 1989) encompass both (a) motivational and volitional processes and (b) primary and meta-level processes (e.g., goal setting and appraisals of ability, as well as task management activity). Thus, volition and self-regulated learning are not synonymous; volitional processes generally involve the self- or task management aspects of self-regulated learning, rather than planning or appraisals such as self-efficacy for tasks (Pintrich & DeGroot, 1990; Zimmerman, 1989).

The primary role of volition is in the management and implementation of goals. Motivational factors, in contrast, help to determine goals. Volition is depicted tentatively in terms of three construct/process clusters. Action control processes refer to knowledge and strategies used to manage cognitive and noncognitive resources for the purpose of goal attainment. How students allocate and control their attention, as well as enlist techniques for self-motivation and for handling intrusive emotions, are examples of processes included in this cluster. The second cluster consists of goal-related cognitions that form the basis for adaptive use of learning strategies (or mindful effort investment) in tasks (Salomon, 1983, p. 13). These include (a) the well-timed application of deep or elaborative processing and (b) the monitoring and appraisal processes that help determine the extent to which effort investments are sustained.

Volitional styles, the third category, refer to dispositional tendencies that affect goal implementation. Rooted in personality views, these stylistic constructs involve relatively stable individual differences that affect goal choice and striving through the action-control processes. Volitional efficiency is hypothesized to increase skill in the management of both task and personal resources and, through it, long-term growth in responsibility, dependability, and so forth—those volitional aspects of character predictive of educational outcomes and related opportunities, such as college admission and employability (Sockett, 1988). Most contemporary models of motivation do not adequately address these aspects of personal endeavor or emphasize their central importance to either the implicit or explicit curricular agenda of American schools (McCaslin & Good, 1992; Sockett, 1988).

The relationships conveyed in Figure 2 are meant to be dynamic, nonlinear, and heavily dependent on context. It is assumed that education develops not only what it demands but also what it invites, and that these capabilities are both learned and potentially misused (i.e., self-regulation can be used to accomplish all kinds of more or less noble goals). The figure is also drawn to convey the complexity of this theoretical domain as it presently exists. It is not assumed that any individual student behaves this planfully and deliberately in daily life or that all individuals are affected by these constructs in similar ways. Much is assumed

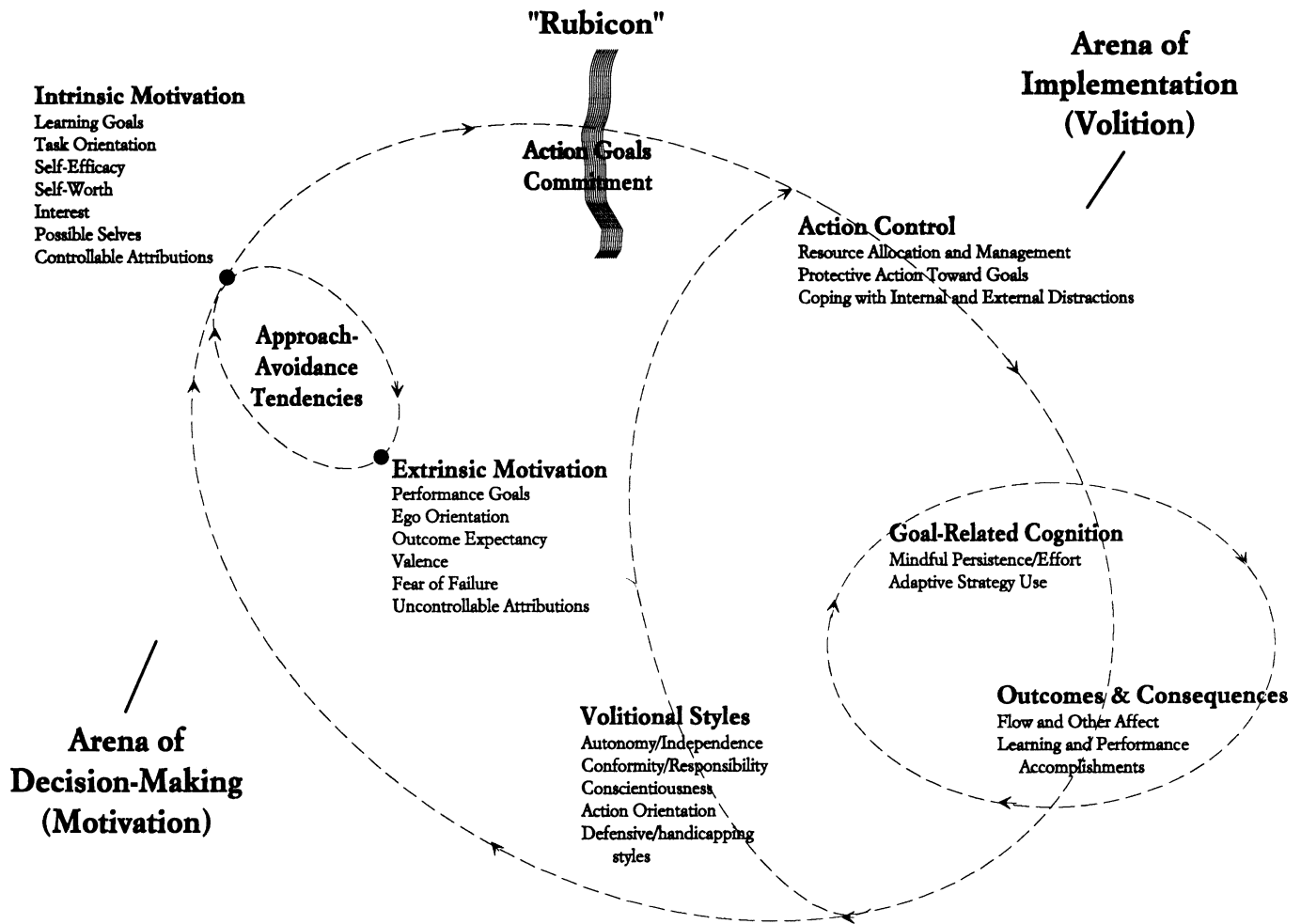


FIGURE 2. *Dynamic spheres of conation in the academic domain.* (Constructs derive from sources such as Lepper, 1988; Markus & Nurius, 1986; Pintrich, 1990; Snow, 1989a; Weiner, 1990)

to depend on cognitive-intellectual aptitude, as well as individual reinforcement history and context, which could not be captured here (see, e.g., Eisenberger, 1992). Indeed, research that includes volitional processes in the same equation with motivation and cognition can be used to illustrate how these relations may be mediated by a number of task and individual difference factors, of which volition is but one.

Cognitive-Conative Interactions in Complex Learning

Kanfer and Ackerman (1989, 1990), for example, conducted a series of training experiments with over 1,000 U.S. servicemen on an air-traffic-controller simulation task. Contrary to research that supports the positive effects of clear, proximal goals, these studies consistently showed that such goals facilitated learning on average *only* once trainees had mastered essentials of the task. At this later phase of learning, goals fostered attention to critical features of the task. At early phases, when the learning curve was not yet established, providing such goals had a negative influence on performance for most learners. This was particularly true for trainees who scored lower on indices of cognitive-intellectual ability when they were asked to use declarative, rule-based material. The performance difference between

groups of low-ability trainees given and not given goals in the procedural and declarative learning conditions was highly significant in this study.

Interview process data from these studies revealed that low-ability learners, in particular, displayed increased anxiety and ruminating thoughts when given specific, proximal goals to accomplish and were less likely than high-ability learners to report the use of volitional control. In addition, it is noteworthy that these response patterns were observed even in trainees who scored high on pretreatment measures of self-efficacy and other motivational factors (Bandura, 1982). Kanfer and Ackerman (1990) hypothesized that specific goals functioned to siphon off or divert attentional resources during early learning, particularly with low-ability learners. Their research team was able, in subsequent experiments in this series, to significantly improve the performance of such individuals with pointed emotion control training.

A cornerstone of Kuhl's (1985) theory is the hypothesis that volitional control is most adaptive when it is situationally applied. When it is inappropriate to maintain an intention, as is the case when academic goals are unrealistic, for example, the adaptive response is to develop more appropriate goals or subgoals, rather than to be protective. Yet

the Kanfer and Ackerman studies suggest that there are systematic differences in individuals' abilities to suspend self-regulatory activity once it is begun and to disengage from dysfunctional goals. To schoolchildren, disengagement may even be seen as unacceptable in the eyes of teachers and peers. And when goals and goal properties (specificity, ownership, etc.) shift through the school day, schools are asking lots of students to confront the Kanfer-Ackerman problem on a large scale, only they are not giving them training in aspects of volitional control.

In summary, modern conceptions of volition distinguish this construct from motivation by its postdecisional character. Volition helps individuals to direct and control their cognition, motivation, and emotion when faced with competing goals and other information processing intrusions (see also Deci & Ryan, 1985). Volition supports important aspects of cognition, such as depth of processing, when needed, and it reflects strategies for self-motivation and control over inappropriate emotions associated with inefficacy or helplessness (Norman & Shallice, 1985; Weiner, 1990). The upside of volition is that it helps individuals to maintain focus when needed; the downside is that it may be hard to disengage these processes and to reconsider goals once begun. Adaptive control reflects high-level functioning. These volitional functions are not equivalent to intelligence, but it is worth noting that theorists define them similarly to Sternberg's (1988) stylistic propensity for using intelligence, which he calls "mental self-governance" (pp. 284-295; see Snow, Corno, & Jackson, in press, for more detail regarding differences among various stylistic perspectives).

Illustrative Research on Volition in Schoolchildren

This section addresses additional issues for educational research by considering some work conducted by Julius Kuhl and his colleagues. This research is notable for its development of different assessment procedures for use with children.

Volitional Strategy Knowledge

Kuhl and Kraska (1989) have developed a measure of volitional strategy knowledge for use with elementary schoolchildren. Using a projective-like procedure, children are presented with 16 scenarios in which maintaining intentions is presumably difficult (such as trying to do homework while friends play outside or resisting the humorous comments of a peer during a teacher-led class lesson). Through drawings and cartoon-like captions, students see what actors in these scenarios "think" ("I'm not going to look at them," "I think he's funny," and so on), and are asked to indicate *which* of the various actors can focus on the task at hand (complete their homework, listen to the teacher, etc.). It is assumed that children who select actors displaying effective volitional strategies have some consolidated knowledge about such strategies themselves.

Scales derived for four categories of volitional strategies used by the actors were labeled attention control (e.g., selectively attending to the intended task), motivation control (e.g., escalating the intention to complete the task, such as by imagining its functional value), coping with failure (e.g., using failure information for a second try), and emotion control (e.g., avoiding or curbing intrusive negative emotions).

Kuhl and Kraska (1989) report data from two administrations of versions of this instrument in two studies—one with

60 German children in grades 1 to 4 and one with 120 Mexican children in grades 1 to 6 (Guevara, 1987). In the German sample, teachers' ratings of attentiveness in class, frequency of finishing homework, and independence were also obtained for each student. Volitional strategy knowledge scores were positively correlated with these other personality indicators and negatively correlated with fear of failure obtained via self-report.

Other results showed significant developmental trends for three of the four subscales (Kuhl & Kraska, 1989, p. 365). Greatest change overall occurred in coping with failure, with motivation control and attention control showing similar growth over grades. Even in first grade, the German students displayed a fair amount of motivation and attention control; the majority of these children could discuss these strategies by the fourth grade. Emotion control, on the other hand, did not appear developmentally linked in these four grades. Similar patterns were found in the Mexican sample, and in the German sample when only 3 of the original 16 scenarios were used to test a shorter version of the instrument.

Self-Regulatory Efficiency

A second measure of volition derived by Kuhl and his colleagues is a computerized assessment of self-regulatory efficiency. Defined as the extent to which a subject can maintain attention to a committed task in the face of distraction, efficiency is a performance-based indicator of volitional control. The efficiency assessment requires children to attend to a simple computer discrimination task: Press the X key when a bar flashes on screen; the O for two bars. A 10-cent payoff is made for each of 10 correct responses, and the money can be used to buy small toys after the experiment.

Children are distracted while completing the task by a pair of smiling "monkeys" in the upper-right quartile of the screen. The two monkeys, who appear to be climbing a tree competitively, are displayed in 20-second intervals. Sometimes the white monkey reaches the top first. It then jumps down, and extracts a variable number of points from the subject's account. When the black monkey gets to the top first, it jumps down and deposits points. Children are told they cannot influence the play and that watching it will hurt their chances of accumulating points. Questions are asked during baseline trials to assure that rules are understood. In contrast to the volitional strategy knowledge measure, this task operationalizes volition at a processing level and does not assume meta-level awareness in children.

The same sample of 60 German children who completed the volitional strategy measure also engaged in this efficiency task, and scores were intercorrelated. Data included response-time calculations for individuals over trials on two segments of treatment. Results showed that these children readily completed the task despite frequent eye shifts toward the distractors. In addition, across-trial individual difference data on the distractor task showed interesting response patterns between groups of subjects.

About a third of the children were essentially undistracted; another third were slowed considerably by distractors; and a final third showed a large increase in the variance of response times during distractor episodes. Among these subjects, there were frequently "sudden increases in inter-response time followed by very short interresponse times." Kuhl and Kraska (1989) write that "apparently, they slowed

down when looking at the distractor and tried to make up for the delay by increasing speed subsequently" (p. 362). This "variance measure" of self-regulatory efficiency has an interesting advantage for the assessment of individual differences in volition, as these authors point out; it avoids confounding commitment with action control. Children would not have needed to rush to make up time if they lacked commitment.

Correlations between average variance of interresponse times on the efficiency measure (with and without distractors) and volitional strategy knowledge were statistically significant in this sample. Children with high strategy knowledge showed no difference in performance between sessions with or without distractors, while children with low strategy knowledge showed as much as four times more variance in interresponse time during distractor episodes. Thus, differences in volitional strategy knowledge may influence performance by affecting the way resources are expended while working (see also Kanfer & Ackerman, 1989).

Results of this sort suggest the possibility that information-processing disruptions during learning and performance may interfere with deeper, more flexible cognition. Over time, such interference could derail effective development of important cognitive abilities. Such hypotheses, of course, need support—in tasks designed to be learning tasks, and with both learning and performance outcomes. Curvilinear relationships and subject-task interactions may also be present: In some tasks, learners may benefit from a moderate level of processing "time-out;" they may need intellectual respite. This may be true primarily at the beginning phases of learning but not later on (Kanfer, in press). Other learners and tasks may require unbroken concentration to achieve completion. The ability to vary processing levels between tasks, and with growing facility within tasks, is among the highest levels of self-regulation and is a good step beyond simply being able to use volitional strategies consistently in complex tasks.

Extending the Research Questions for Education

Studying volition in the context of educational research requires considering a broader range of approaches than have previously been recognized. There are clear differences between experimental tasks for which children or adults freely volunteer and the persistent demands of schooling. There are also differences between information processing or strategic accounts of volition and traditional factor-analytic or stylistic views.

Following Messick's (1985) use of the term, *personal styles* are "self-consistent regularities in the manner or form of human activities" (p. 34) and are conceived of as "key variables in the organization and control of attention, impulse, thought, and behavior" (Messick, 1989, pp. 1, 3). Unlike abilities, which are largely "value directional" (higher levels are typically best), styles are "value differentiated." Having more or less of a style may be adaptive, depending on the situation (p. 58; see also Sternberg, 1988).

Messick (1985) has discussed style constructs aligned with the definitions of volition here described, including various organizing and controlling aspects of temperament, as well as styles of information processing during learning and performance, such as certain defensive styles that channel affect, focusing, and risk taking (see also Cantor, 1981). Snow (1989a) adds responsibility, conscientiousness, extroversion,

and reflectivity to Messick's list, while Kuhl (1984) has investigated a disposition factor labeled action orientation. In general, this work suggests these styles may have many dimensions at various levels of organization in any one individual and that these structures may differ as a result of differing socialization practices and experience (e.g., by gender). Some styles predict achievement outcomes, but relationships may well be curvilinear, and this is not often tested (Snow, 1989a). How volitional styles vary among subjects in different populations and how stable these characteristics are over tasks and time are therefore important research questions to pursue. These measures could certainly be readministered to individuals on several occasions. Also, evidence for culturally different representations of volitional control should be pursued.

One catalyst for the development of the previously described measure of self-regulatory efficiency was an observation Kuhl made in early studies using the "delay of gratification" paradigm (Mischel, 1974): that German children, even at preschool ages, appeared able to "wait forever." Kuhl also finds that self-regulation issues in Germany often involve "overregulation," presumably inculcated by socio-cultural traditions at early ages (J. Kuhl, personal communication, January 30, 1991). Thus, comparative studies between cultures, such as the German-Mexican data permit, would seem to be useful lines of work. Longitudinal research on the stability of volitional indicators in individuals over time will also be important if aspects of volition are to be interpreted as dispositional.

The kinds of research on volition illustrated briefly in this paper reflect, in both theory and data, a new generation of research on individual differences in human performance. This research recognizes the value of studying individuals' performance over time and in appropriately applied contexts. In addition, the person is not divorced from the environment, and the extent to which individual differences are stable enough to be called aspects of temperament is not assumed but rather investigated (for similar modern perspectives, see also Cantor & Kihlstrom, 1987; Messick, 1989; Mischel & Peake, 1982; Mischel, Shoda, & Rodriguez, 1989).

A Short Research Agenda

Continued research on volition in education might follow several complementary paths. It will be important to establish experimental tasks in which student performance is best explained by a combination of cognitive, motivational, and volitional factors, with volition a necessary condition. These must be educationally meaningful tasks, with complex learning and performance outcomes (see, e.g., Blumenfeld et al., 1991, for a discussion of "projects" as school tasks requiring volitional control). Along the same lines, the role of volition in education would be clarified if Kanfer and Ackerman's (1989) intriguing results can be replicated: It needs to be further substantiated that training in (or cultivation of) volitional strategies overcomes some of the difficulties that remain for students who have clear academic goals and equivalent motivational profiles. New ways of training and assessment should accommodate the dynamics of volition and changes in levels over task demands. In addition, qualitative accounts of volitional activity from students and parents as they cope with the challenges of schooling (e.g., homework) should enrich our

understanding of the study and attentional routines of more and less successful students.

Finally, important developmental questions can be pursued. Is emotion control, for example, more difficult to achieve, as Kuhl and Kraska (1989) suggest, than other aspects of volitional control, and does it develop later in childhood? And what social-interactional influences lead to volitional efficiency at earlier ages (Mischel, Shoda, & Rodriguez, 1989)? How do adults assist or burden developing volitional systems (see Paris & Newman, 1990)? Can influences be identified that result in chronic state orientation and difficulty in overcoming this when needed; under what conditions does volition become stylistic? And might a rigid kind of action control (which Kuhl has observed in a reasonable percentage of German subjects) be maladaptive in learning from schooling?

Conclusion

As theory and research on volition in education evolve, some will undoubtedly ask: Do we need to resurrect this construct? Why not continue to investigate self-regulatory processes without reviving age-old distinctions between constructs of motivation and volition and tripartite views of human mental functioning? Indeed, the answer lies in data; the evidence may ultimately weigh in the direction of the status quo. But age-old distinctions persist for reasons that are often as useful for practice as for directing research.

Other educational psychologists have pointed out that much about present-day schooling does just the opposite of what might, hypothetically, support the goal of self-regulated learning in all students (Iran-Nejad, 1990; Zimmerman, 1989). Clinical therapists and physicians likewise wrestle with patients who want—and commit—to change but fail to mobilize the appropriate resources to do so. Their therapy turns to the knowledge base in, for example, cognitive-behavioral control (Meichenbaum & Goodman, 1971), when much of what needs to be managed in these patients is motivation and emotion. These functions are not adequately reflected in cognitive-behavioral theory or research. Accordingly, the applied settings of education and clinical therapy might just be ready for renewed understanding of the role of volition in school learning and behavior change.

Notes

Parts of this article were presented in a symposium on "Motivation, Volition, and Individual Differences" at the Annual Meeting of the American Educational Research Association, Boston, April 1990; other parts were presented in an address on "Student Volition and Schooling" to the American Psychological Association, August 1992. Special thanks to three anonymous reviewers, editor David Berliner, and Paul R. Pintrich, Ruth Kanfer, Mary McCaslin, Dick Snow, and Liz Sullivan for thoughtful comments on earlier drafts.

¹One advantage of a tripartite view of human mental functioning (cognition, affection, and conation) is that ancient distinctions between critical dimensions of personality and intellect may be preserved. While this article does not discuss the affective function, a forthcoming chapter treats affect in some detail (see Snow, Corno, & Jackson, in press).

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Received February 7, 1992

Final revision received July 1, 1992

Accepted July 13, 1992

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Received January 7, 1992

Revision received May 11, 1992

Accepted July 13, 1992