LEARNING THAT MATTERS

Toward a Dispositional Perspective on Education and its Research Needs

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Nothing could be more obvious than that we want learning that matters, that makes a difference in learners' lives. Nothing could be less obvious than that we are getting it. To be sure, in the course of their schooling, students learn some things that they put to work often—basic literacy and numeracy for example. However, they also encounter ideas from history and civics that might inform citizenship, health science that might inform personal care, reading strategies (not just basic 'decoding') that might inform active reading-to-learn, moral precepts that might inform good conduct. Yet everyday experience suggests that many students do not learn such content well enough and in the right ways to translate it into action. Learning that should matter doesn't.

One explanation for the gap emphasizes motivation: Students may not invest themselves seriously in the learning process in the first place, so that any superficial learning that occurs isn't robust enough to stick. Another explanation is the problem of transfer: Students may learn well enough in one context, but aren't able to transfer their knowledge to new contexts. Yet another explanation that includes these views but also reaches beyond them is a dispositional perspective on thought and behavior.

The idea of dispositions comes from everyday discourse: People not only have different knowledge and skills but also different dispositions, broad characterological tendencies that influence how they use their knowledge and skills. People are more or less inquiring, responsible, honest, charitable, collaborative. They are *disposed* to make different sorts of choices in how they think, the kinds of learning they embrace or shun, civic responsibility, personal relations, and so on.

A substantial technical literature on dispositions and related constructs—research we will review later—argues that how people think and learn and how they use what they learn are highly dispositional matters. People commonly know better than they do. They either fail to notice opportunities to deploy what they know, or, recognizing the opportunities, don't care enough to bother.

These and a number of other findings constitute a critique of a conception deeply imbedded in our culture: Thinking and learning tend to be viewed in *abilities-centric* ways. Learning well-mastered is learning readily and routinely used, the presumption goes. Adaptive behavior is limited primarily by what people *can* do rather than by what they are *disposed* to do, primarily by their performance capabilities, based on natural abilities and acquired skill, knowledge, and understanding, rather than the opportunities they notice and the choices they make. Accordingly, the principal mission of education becomes one of capitalizing on initial abilities to equip learners with skills, knowledge, and understanding, in the expectation that these will be readily and appropriately deployed.

A dispositional perspective argues that this is profoundly untrue. In many real-world situations, underdeveloped or contrary dispositions constrain both initial learning and later performance at least as much as limits of capability. Conventional education tends to mask this problem and may indeed exacerbate it. Classroom experiences by and large have an architecture of *performance on de-*

mand. Students are asked to engage in sequences of activities—read this chapter, answer this question, solve this problem. Even when in the name of teaching for understanding the questions and problems are open-ended, even when the teacher makes the material lively, still the basic mode is one of responding to demand. Also, many classroom settings are likely to foster extrinsic motivation over intrinsic motivation, although the former relates negatively and the later positively to achievement (e.g. Lepper, Corpus, & Iyengar, 2005; Lepper & Greene, 1978). These prevalent patterns inherently do not invite alertness nor self-initiated engagement. They are likely to leave behind 'inert knowledge' (Bereiter & Scardamalia, 1985; Bransford, Franks, Vye, & Sherwood, 1989; Whitehead, 1929) without revealing that the knowledge is inert.

In summary, the concept of dispositions and related constructs might help to fashion a fuller picture of what it takes for learning to matter. However, many questions need to be asked along the way. Some of them can be explored here by drawing on existing research. Others remain challenging and call for further inquiry. Among the themes we can at least begin to address in the following sections are these:

- *The idea of dispositions.* What are dispositions as more precisely formulated?
- *The importance of dispositions.* How in principle might dispositional constructs help to explain pattern of human behavior?
- *The reality of dispositions.* Deriving from folk psychology, are dispositions real—identifiable individual traits that help to explain performance somewhat independently of abilities?
- *Toward an agenda for future inquiry.* What are some key questions about dispositions important to pursue if the dispositional perspective is to make its best contribution to psychological understanding and educational practice?

At the end we return briefly to the theme of learning that matters, drawing the various threads together to underscore its importance.

The Idea of Dispositions

The general idea of dispositions is that people's behavior is guided not only by knowledge and skills but also by predilections or tendencies. This idea is reflected in everyday language, which includes many words that refer to tendencies in intellectual, social, and moral conduct. For example, we speak of people as more or less open-minded, reasonable, skeptical, inquisitive, warm-hearted, responsible, fair-minded, and so on. These attributions indicate what we believe people are inclined to do, given their knowledge and capabilities, and we recognize that things could be different. Closed-minded people *could* consider different perspectives if they chose. People who aren't inquisitive *could* identify more puzzles and ask more questions. Stingy people *could* act more generously. Dishonest people *could* try to behave more honestly.

In general, a disposition is a predilection to exhibit an available conduct under certain conditions, but a predilection neither necessary nor sufficient. Accordingly, George may tend to behave in a more curious or honest way than Sam, but this does not mean that George is more curious about everything or more honest in the face of every temptation than Sam. Dispositions mark trends, not laws.

Philosophers, too, have been interested in the concept of dispositions. For example, Ryle discusses what he calls dispositional properties (Ryle, 1949), which are properties that manifest themselves only when certain preconditions are met. For instance, brittleness is a tendency to shatter when struck. This contrasts with properties like shape that exist independently of being acted upon in certain ways.

John Dewey recognized the problem of mobilizing knowledge and skill and the prospects of a dispositional answer:

> We need a word to express the kind of human activity which is influenced by prior activity and in that sense acquired; which contains within itself a certain ordering or systematization of minor elements of action; which is projective, dynamic in quality, ready for overt manifestation; and which is operative in some subdued subordinate form even when not obviously dominating activity (Dewey, 1922, p. 41).

Dewey preferred the word habit, leading to the notion of habits of mind, but also commented on dispositions: "readiness to act overtly in a specific fashion whenever opportunity is presented" (p.41).

To unpack Dewey's, Ryle's and indeed the everyday concept of disposition, they point to the pattern of evidence needed to recognize a disposition at work:

1. A broad selective tendency in response to opportunity (for instance, showing self-discipline and dutifulness—conscientious).
2. Independent of ability (the person has the capability to execute more and less self-disciplined or dutiful patterns of behavior).
3. Fairly consistent within the individual (the person shows similar tendencies over time and context) but varying across individuals (some people tend to be more conscientious than others).

These three characteristics seem plausible for putative dispositions like conscientiousness or curiosity or honesty. However, the case needs to be made, a matter we will turn to later in 'The Reality of Dispositions.' In fact, conscientiousness is one of the factors in the well-known 'Big Five' model of personality (Goldberg, 1993). Although the model has faced considerable criticism, certainly the research behind it makes something of an empirical case for conscientiousness satisfying the three criteria above.

One potential critique of the idea of dispositions emphasizes the role of context in human behavior. Particular individual and social situations with all their complex dynamics can easily create local predilections that do not necessarily represent any abiding trait-like trend. Least productive here would be to indulge in categorical positions – overarching dispositions dominate behavior versus all behavior is highly contextual. Unsurprisingly, the reality seems to lie somewhere in between. Scholars examining dispositions routinely emphasize how the immediate social context can amplify or diminish propensities and at least one line of research, looking at *need for cognitive closure*, has relied extensively on manipulation of local context to reveal dispositional influences (Kruglanski & Webster, 1996; we will examine this work further later). At the same time, also as discussed later, there is clear evidence for a number of important dispositional trends that cut across contexts.

Another potential criticism of the idea of dispositions is that it is essentially descriptive, mute about the underlying causes of the behavioral tendencies identified. Certainly this is an important consideration. However, it is not one that dismisses the potential significance of dispositions. First of all, to find that dispositions as well as capabilities influence performance greatly, especially in areas that tend to be viewed in abilities-centric ways, is to make an important point even without a causal account of how the dispositions operate.

Secondly, scholars proposing an important role for dispositions do not generally suggest viewing dispositions as unanalyzable monolithic traits. They often offer accounts of how the dispositions operate. For example, Dweck and colleagues, examining why some students persist and others quit in the face of learning challenges, locate important differences in learners' mental models of intelligence as malleable or fixed (Dweck, 1975, 2000; Dweck & Leggett, 1988). To generalize, many dispositions might be ex-

plained at least in part as the natural consequences of underlying largely tacit belief systems and associated expectancies.

Another idea about mechanism comes from our own research group, urging a distinction among three logically distinct and separable contributions to behavior: *sensitivity, inclination,* and *ability* (Perkins & Tishman, 2001; Perkins & Ritchhart, 2004; Perkins, Tishman, Ritchhart, Donis, & Andrade, 2002). Sensitivity concerns alertness to opportunities, inclination concerns tendency to engage the opportunities once detected, and ability concerns capability to follow through appropriately. While most work on dispositions collapses sensitivity and inclination, these authors contrast the two and offer evidence that in the area of good thinking the principal limits on good performance often lie in sensitivity more than inclination—people simply fail to notice problems rather than being disinclined to take them on (see 'The Reality of Dispositions').

To round out this profile, it's useful to note some contrasts between the idea of dispositions and the related notions of motivation, habit, and transfer of learning. Each of these might appear to obviate the need for any talk of dispositions, which could be considered some mix of motivations, habits, and instances of broad transfer of a learned pattern of thought or behavior. However, any such reduction seems inappropriate.

Turning to motivation first, a motivation is most often seen as an explicit reason to pursue an immediate goal, for instance run hard to win the prize. Dispositions in contrast are generally thought of as characterological traits that persist across time and contexts, and as tacit influences rather than explicitly pursued agendas. Dispositions could be considered motivations in the rough sense that they help to mobilize action, but they are not prototypical motivations.

Turning to habits, usually when we speak of these we have in mind relatively specific patterns of behavior, like brushing one's

teeth in the morning and at night or putting on one's right shoe before one's left shoe. In contrast, dispositions are generally viewed as quite general. Just as dispositions are not prototypical motivations, they are not prototypical habits, although many of them can be characterized aptly with the Deweyan phrase 'habits of mind'.

Turning to transfer of learning, one might understand a disposition simply as a broadly transferred pattern of intellectual, moral, or social thought and behavior. This is certainly true definitionally. However, a considerable body of research shows that transfer of learning across a wide range of contexts is generally hard to come by (see for example, Bransford & Schwartz, 1999; Detterman & Sternberg, 1992; Salomon & Perkins, 1989), so, if anything, dispositions in their reach are anomalous with respect to transfer as usually found. In several other ways, typical patterns of research on transfer mismatch the character of dispositions. Usually studies of transfer focus on the transfer of an ability rather than a commitment or leaning. Usually the literature treats transfer, particularly far transfer, as a bonus—the main thing is to master the target learnings and if those learnings see wide use all the better. Usually tests of transfer pose an explicit task—performance-on-demand again—without however explicitly cueing the desired transfer response. In contrast, dispositional constructs help to explain deploying knowledge and understanding in contexts where demand is generally low, as in idly reading a newspaper editorial or having a cocktail party conversation.

None of this means that the rich literature on transfer of learning is mute with respect to dispositions or more generally to learning that matters. Rather, the point is much the same as before: Just as dispositions are not prototypical motivations or habits, neither are they prototypical patterns of transfer of learning. They deserve a place of their own in the quest to understand thought and behavior.

The Importance of Dispositions

Why are dispositions at least potentially important? There is a general reason and a specific reason, and in this context the specific reason is more compelling and provocative.

To comment on the general one briefly, dispositions, like other concepts from folk psychology, provide clues and pointers toward fashioning a better rounded model of human thought and behavior. The dispositional turn of everyday notions like open-mindedness, trust, honor, and curiosity invites constructing a good technical account of them as well as searching for similar traits perhaps not so much a part of everyday language. Thus, for example, the Big Five model of personality mentioned earlier includes the relatively commonsense characteristics of conscientiousness, agreeableness and openness to experience but also the rather more technical traits of neuroticism and extraversion (Goldberg, 1993). To generalize, the broad quest is to join characterological traits with basic drives and needs, native capacities, and acquired skills and understandings toward a fuller account of broad patterns in human behavior.

The specific reason brings us back to the theme of learning that matters. It concerns dispositions and abilities not as complementary but as *rival* explanatory factors regarding how learners learn and whether they use later what they learn. In a range of cases, especially within certain psychological traditions and considerable educational practice, an abilities-centric stance has overshadowed the possible role of dispositions. Without any pretense to completeness, we look briefly at three broad areas where something like this is arguably the case: thinking, learning, and civic and moral responsibility.

Thinking

The psychology of intellectual performance—intelligence, reasoning, decision making, problem solving, and so on—has by and large been pursued in an abilities-centric way. The hard core ver-

sion of this stance holds that the dominant influence on intellectual performance is Spearman's *g* factor for general intelligence, which, normed to populations and ages, yields IQ (e.g. Brody, 1992, Jensen, 1980; Spearman, 1904). Although certainly particular intellectual skills can be learned—medical diagnosis, statistical reasoning, formal deduction—*g* theorists commonly hold that *g* is largely biologically determined, with little prospect of improving general intellectual performance beyond ensuring good health.

This view of intellectual capability has been critiqued from many quarters, generating a range of softer versions of *g* theory and alternative models of the structure of intellect (e.g. Brody, 1992; Gardner, 1983; Guilford, 1967; Sternberg, 1985). There is no need here to review this complicated debate. Suffice to say, though, that most of the critiques and most of the alternative models still analyze intellectual performance overwhelmingly in terms of abilities, inherent or learned, of one sort or another. Likewise, most direct efforts to cultivate better thinking in schools center on fostering some category of ability—decision making, formal reasoning, analytical thinking, and so on—through some mix of teaching thinking and learning strategies and providing persistent exercise.

This is the trend, but there are many exceptions. For example, in their critique of 'cognitivism'—an ability-centric computational model of intellectual performance that dominated psychology in the second half of the 20th century—David Yun Dai and Robert Sternberg argue that conceiving of the mind as a pure cognitive system neglects the key roles of motivational, emotional, and contextual factors (Dai & Sternberg, 2004). Philosophers, too, have taken exception to an ability-centric conception of mind. Earlier we noted John Dewey's commitment to a dispositional view. Israel Scheffler (1982) in a well-known essay foregrounded the importance of the *cognitive emotions,* including some with a dispositional turn such as curiosity or the love of truth. Scheffler empha-

sized that such emotions are not just characteristic of thinking but epistemologically relevant to thinking. They help to steer the process. The contemporary philosopher Robert Ennis attended to dispositions in his analyses of intelligence and thinking (1986), proposing in a key paper a taxonomy that includes a number of thinking abilities alongside a number of dispositions.

A number of psychologists have emphasized the role of dispositions in their analyses of thinking and intelligence. For example, in his model of rationality, Baron distinguishes between dispositions and cognitive capacities (1985). He argues that capacity factors like short-term memory determine what a person *can* do. Dispositional factors, in contrast, determine what a person *does* do within the limits of his or her capacity. Perkins (1995) in an analysis of psychometric versus other conceptions of intelligence discussed how positive dispositions are needed to overcome broad negative dispositional tendencies in thinking that veer toward hasty, narrow, undiscriminating, and disorganized thinking.

Relatedly, Cacioppo and Petty (1982) identified the dispositional trait *need for cognition.* The trait refers to people's willingness to invest in cognitively challenging activities and their level of enjoyment of such activities. Research has shown *need for cognition* to be a stable individual trait. It is largely independent of psychometric intelligence and correlates positively with school performance, critical evaluation of arguments, and related intellectual performances (Cacioppo, Petty, Feinstein, & Jarvis, 1996).

Langer (1989), in a program of research extending over many years, has documented a very general disposition toward 'mindlessness'—the shallow processing of ideas and information in everyday circumstances that can lead to maladaptive albeit superficially efficient responses. Some people are systematically more mindful, and sometimes remarkably simple manipulations can boost mindfulness well beyond their obvious scope. For instance, giving elderly people plants to care for and various decisions to

make about the organizations of their lives has been shown to improve their attitudes and patterns of activity in a number of ways, in addition to extending somewhat their life spans (Langer, 1989, chapter 6).

Further treatments that advance the case for the importance of dispositions—sometimes under that name and sometimes with other labels—include for example Facione, Sanchez, Facione, and Gainen (1995), Perkins, Tishman & Jay (1993), Passmore (1967), Paul (1990), Siegel (1988) (critical spirit), and Stanovich (1994) (dispositions toward rationality).

Learning

Many teachers hold informal models of student learning that foreground ability in contrast with effort. One characterization of this limiting conception comes from Strauss and Shilony (1994), who charted how teachers maintain a kind of 'slot size' model of what learners can take in and seek to carve up content in pieces small enough to fit the slot. Of course, teachers recognize the importance of motivation and the prevalence of unmotivated learners, as well as culturally rooted negative and positive attitudes to learning. However, the sorts of broad dispositional traits that can discourage or mobilize learners' energies are not so likely to be part of their view.

The 'ability more than effort' theory is something of a cultural mindset, characteristic of Western nations but reversed in some Asian nations where teachers and parents emphasize effort (Nisbett, 2003; White, 1987). Students too often embrace an ability-centered conception. In keeping with this, Dweck and colleagues have investigated a learning-related dispositional contrast for a number of years—learners with a learning or equivalently mastery orientation, who seek to understand and engage challenging topics, versus learners who display a helpless pattern, retreating from challenge (e.g. Dweck, 1975, 2000; Dweck & Leggett,

1988). This work argues that degree of persistence in the face of intellectual challenge reflects underlying belief systems. Learners inclined to helplessness are 'entity learners', who see intelligence as fixed, want to look as good as they can, and tend to quit when problems prove difficult because they conclude the problems are beyond them. In contrast, mastery-oriented learners are 'incremental learners,' who see intelligence as learnable, prove stubborn in the face of intellectual challenge and labor through problems to improve themselves, with less concern for looking good in the short term. Moreover, teaching style and classroom culture can influence considerably the extent to which students adopt entity versus incremental mindsets.

Relatedly, investigations of university students' study practices disclose systematic contrasts between surface and deep approaches, some students coping with the demands of study through memorization and practicing up routines while others invest much more in understanding (e.g. Entwistle, 2003). Also, researchers have distinguished between a *mastery* and a *performance* mindset in learners, some seeking to understand while others seek to demonstrate success in the eyes of teacher and/or peers (e.g. Pintrich, 2000). None of these mindsets are wholly independent of other influences, of course. While students bring certain predilections to their studies, the style of instruction also wields considerable influence, as do the local features of the instructional environment and the students' own cultural context.

Civic, moral and social responsibility

The picture here is not as clear-cut as in the cases of thinking and learning, but nonetheless a certain tension needs to be recognized between abilities-centric and dispositional accounts of civic and moral responsibility. The roots of this are very old. Plato held that genuinely to understand the good led inevitably to striving to attain the good. Aristotle (1941 edition) argued that ethical behav-

ior was wholly dispositional and was developed as habits develop—through repeated practice. However, he was less sanguine about human nature and believed it was *akrasia,* roughly weakness of will, which commonly created a gap between understanding and action.

Turning to present times, the well-known stage model of moral development from Lawrence Kohlberg (1969, 1970) has a somewhat abilities-centric character, emphasizing the importance of attaining successively more cognitively complex conceptions of what is morally good. However, Kohlberg himself recognized that logical sophistication was not necessarily sufficient for moral behavior in the world. The alternative developmental perspective propounded by Carol Gilligan (1982) and her colleagues, originally but not so much in later research strongly linked to women's versus men's patterns of moral reasoning, has a more dispositional cast, emphasizing the centrality of the caring stance coupled with the intellectual challenge of figuring out how to solve problems of caring simultaneously for a number of individuals and interests involved in a situation. Meanwhile, other contemporary researchers on moral development have emphasized how real-world decision making throws many considerations into the pot in addition to moral ones, generating gaps between moral judgment per se and chosen behavior (e.g. Rest, 1984; Saltzstein, 1994).

In the related civic realm, understanding also does not appear to lead reliably to the choices of behavior one would like to see. Haste (2004), examining the meaning of citizenship behaviors and reviewing their origins, reports that correlations between various citizenship behaviors and civic knowledge in a schoolish sense are strikingly low.

Turning to the social domain, Gehlbach (2004a) analyzed social perspective taking—the reading of how a situation looks to another with a different point of view and what the person might think and feel about it—emphasizing the tremendous importance

of social perspective taking in human affairs from playground disputes to international conflict. Gehlbach argued that, although usually conceived as an ability, social perspective taking needs to be understood also as a propensity. In an extensive program of research, Gehlbach (2004b) examined how performance measures of conflict resolution, historical empathy, and social studies grades depended on ability and dispositional measures of social perspective taking. He found only a weak relationship between the ability and disposition measures for social perspective taking. Some subjects proved very able at taking other perspectives but not particularly inclined to do so, others not so able but strongly inclined.

Informally, it seems to be widely recognized that good civic and moral conduct call not just for conceptual understanding but for some kind of commitment. In educative contexts, this leads to efforts to condition young learners into appropriate behavior along with various breeds of instruction and exhortation about the right thing to do. However, most of this shares the characteristic educative pattern mentioned in the introduction of performance-on-demand. It may not be so likely to create broad dispositional commitments that generalize beyond the immediate learning environment.

In summary

The default assumption of many educators and psychologists cleaves closer to Plato than to Aristotle: The primary determinant of both initial learning and later application is ability in a broad sense – initial ability further enabled by skill, knowledge and understanding. Certainly motivation, values, and so on have importance, but ability is the principal bottleneck, and building it up through cultivating skills, knowledge, and understanding the principal mission of education.

In contrast, investigations in several areas suggest that learners often do not invest themselves in learning. When they do, they of-

ten do not make later use of what they have learned. In other words, the bottleneck in the way of learning that matters is as much a matter of dispositions, both regarding initial learning and later use, as it is abilities. Unfortunately, this bottleneck tends to be largely invisible in the classroom, because the performance-on-demand architecture of typical instruction directly cues performance and tends to mask the role of dispositions. In certain branches of psychology, much the same happens, because experiments in trend pose particular tasks with high explicit or implicit incentives, in order to find out whether people can do them and how well.

In contrast, the influence of dispositions becomes more prominent in naturalistic circumstances of moderate to low demand—one might vote or not, look at the other side of the case or not—and of embedded rather than highly salient cues—no one tells me to examine the politician's speech for bias. In just such naturalistic circumstances is where we want education ultimately to matter. Accordingly, the dispositional perspective takes on tremendous explanatory and pedagogic importance.

The Reality of Dispositions

So far we have been operating on a promissory note: Yes, dispositions mean such-and-such, yes, dispositions could be important thus-and-so. But are we talking about anything real?

Although it may seem obvious that putative traits like curiosity or open-mindedness or honesty are real, this cannot be granted *a priori.* For centuries people believed that personality was formed of the four humours—sanguine, choleric, phlegmatic, and melancholic—yet today we dismiss this parsing.

Also worrisome is the *fundamental attribution error:* People tend to account for their own choices of action by situational factors, while attributing others' choices to character or personality

(Ross, 1977; Ross & Nisbett, 1991). This is a strong pattern in Western cultures, although less so in Eastern (Nisbett, 2003). At its worst, the whole idea of broad dispositions could be a grand exercise in the primary attribution error.

What then is the evidence that at least some of the dispositions scholars have proposed live up to their name? Turning back to the criteria introduced under 'The Idea of Dispositions', what is the evidence of (1) a broad selective tendency, (2) at least somewhat independent of ability, (3) at least somewhat persistent within individuals over time and context but varying across individuals?

Certainly the perfect argument is hard to construct, but just as certainly a number of lines of research make a pretty good case for some proposed dispositions. The literature is extensive and our aim here cannot be a comprehensive review. Instead, we single out a few lines of inquiry to mention the methods and patterns of findings, focusing particularly on thinking and learning, since these are the areas we know best.

The self-attributions approach

What people say about themselves—self-ratings, explanations, and the like—offer the most common approach to measurement. One notable example concerns *need for cognition.* As mentioned earlier, this is a dispositional construct describing an individual's tendency to seek, engage in, and enjoy cognitively effortful activity (Cacioppo & Petty, 1982; Cacioppo, Petty, Feinstein, & Jarvis, 1996). To measure the tendency, the developers used a 5-point self-rating system for a battery of questions such as *I would prefer complex to simple problems* and *I feel relief rather than satisfaction after completing a task that required a lot of mental effort* (Cacioppo, et al, 1996). Need for cognition has proven to be a stable individual trait largely independent of psychometric intelligence and showing significant positive correlations with school

performance, thoughtful examination of arguments, and related matters (Cacioppo, et al, 1996).

For another example, Stanovich and West (1997) sought to distinguish cognitive skills from thinking dispositions as predictors of reasoning performance. They applied self-report-based measures indicating dogmatism, categorical thinking, openness, counterfactual thinking, superstitious thinking, and actively open-minded thinking. Later, they asked subjects to evaluate the quality of arguments related to a controversial topic. The dispositional measures turned out to have great influence on the argument evaluations, even after controlling for cognitive capacities.

For still another, Facione, Sanchez, Facione, and Gainen (1995) offered a view of dispositions as related to but separable from ability. Using a small sample of college students and college-bound high school students and later a sample of nursing students, Facione and Facione (1992) compared students' dispositions scores with performance on a critical thinking skills test. For the dispositions, they employed a self-report measure they and colleagues had developed, the California Critical Thinking Skills Test, which evaluated both frequency of behavior and strength of belief in certain types of thinking. Students rated themselves on such criteria as: *We can never really learn the truth about most things*, and *The best argument for an idea is how you feel about it at the moment*. The researchers found a significant correlation of .67 between the two measures, accounting for 45% of the variance on the skills test. They did not employ an independent measure of cognitive abilities, but certainly the results are suggestive of a dispositional influence.

Kruglanski and Webster (1996; Kruglanski, 1980; Webster & Kruglanski, 1994) elaborated the *need for cognitive closure,* which broadly is a predilection to reach conclusions hastily ('seizing') and maintain them stubbornly ('freezing'). They view need for closure as a dispositional construct measurable by the Need for

Closure Scale, a carefully developed self-rating instrument. Studies using the scale have demonstrated stability over time and context, independence of psychometric intelligence, and correlations with a range of important characteristics of everyday thinking, for instance stereotyping.

Dweck and colleagues' program of research on mindsets toward learning and the malleability of intelligence, cited earlier, employs learners' self-characterizations through explanations and think-aloud reporting and an Intellectual Achievement Responsibility scale (Diener & Dweck, 1978, 1980). The work has shown that learners' beliefs are independent of cognitive abilities but influence cognitive performance greatly. Indeed, often learners well above the norm in cognitive abilities display an entity attitude and, in the 'either you get it or you don't' spirit, prove to be early quitters when the going gets tough and sustained effort would serve them better. Also teaching style and classroom culture can influence considerably the extent to which students adopt entity versus incremental mindsets.

Relatedly, goal theory finds in different learners a contrast between mastery and performance goals (Pintrich, 2000). Students with a mastery orientation seek to understand whereas those with a performance-approach orientation seek to demonstrate superior performance. Finally, students with a performance-avoidance orientation seek to conceal what they perceive as personal incompetence. A mastery orientation consistently relates to greater achieved understanding. However, mastery and performance-approach goals are not independent of one another and there is something of a debate in the literature regarding when and where it is most advantageous to have a pure mastery orientation or a mixed mastery-performance orientation (e.g. Midgley, Kaplan, & Middleton, 2001).

The scaffolding approach

Another approach to measuring dispositions eschews self-ratings and instead manipulates scaffolding to demonstrate their influence. For example, Norris (2002) includes a volitional component in his definition of dispositions, stating, "Individuals must either have formed habits to use certain abilities, or overtly think and choose to use the abilities they possess" (p.4). This definition emphasizes the importance of being alert to occasions to think and choosing to follow them through, and to test it, Norris developed a way to measure the extent to which people are alert to occasions to use their thinking abilities (2002). He created an alternative version of the *Ennis-Weir Critical Thinking Essay Test* (2002), that included hints, such as "think of other explanations for the results" (p. 13), after each paragraph. The purpose of the hints was to "provide suggestions (surrogate dispositions), but for an examinee who does not know how to do what is suggested, they will be useless" (Norris, 1995, p. 13). By comparing groups using the two different versions of the test, Norris showed that thinking performance is not synonymous with thinking ability; the group that received the hints scored over 60% higher on average than the group who took the traditional test.

A very common shortfall of thought is one-sided reasoning or 'myside bias'—the extensively documented trend of people to fixate on their own side of the case and neglect others (e.g. Baron, Granato, Spranca, & Teubal, 1993; Kuhn, 1993; Means & Voss, 1996). While it is natural to presume that this is a dispositional effect, perhaps people are not acquainted enough with other views to generate reasonable arguments, or perhaps they are simply unable to mobilize their cognitive apparatus in service of a cause they do not espouse.

These possibilities were investigated as part of a large-scale program of research on the impact of formal education on everyday reasoning (Perkins, 1985, 1989; Perkins, Allen, & Hafner,

1983; Perkins, Farady, & Bushey, 1991). The basic method used one-on-one interviews around issues current at the time, pre-tested to ensure accessible arguments on both side of the case—for example, *Would a nuclear disarmament treaty reduce the likelihood of world war?* or *Would a bottle deposit law in the state of Massachusetts reduce litter?* Most subjects adopted positions and proceeded to pile up reasons on their preferred side of the case with little attention to the other side of the case or to possible flaws in their own arguments. Even law students proved on the average as one-sided as subjects from the general population!

In one variant of the paradigm, when it appeared that the appeared that a subject had no more to say, the interviewer then asked the subject point blank to identify weaknesses in his/her argument and to elaborate the other side of the case. Subjects could readily do so. In a dramatic demonstration of the separability of disposition from ability, when subjects were directly prompted to mention arguments on the other side of the issue, subjects increased the number of points they mentioned by an average of 700% (Perkins, Farady, & Bushey, 1991.)

The methodology also used a short-form IQ test. IQ correlated with number of points subjects offered on their preferred side of the case at .4 or .5, but often did not significantly correlate with number of points on the other side of the case before prompting (Perkins, Farady, & Bushey, 1991). This suggests that my-side bias reflects dispositions rather than cognitive capacity. Similar results have been found by Baron, Granato, Spranca, & Teubal (1993).

The sensitivity approach

Most studies of dispositions make no effort to distinguish between *sensitivity* and *inclination* as they were called earlier. Yet the contrast is crucial to understanding how dispositions operate. Consider this example: Suppose you are driving down the highway

at the speed limit and a car races past you, coming dangerously close. Your annoyance flares, but (at least this time) you resist road rage and consider the possibility that the person is rushing to an emergency. For you to achieve this measured viewpoint, three forces coalesce. You need the *ability* to imagine alternative causal explanations for the event. You need the *sensitivity* to note that this might be a moment to seek alternative explanations. And you need the *inclination* to override your impulsive first reaction and at least explore other possibilities.

To differentiate sensitivity and inclination, we devised a three-phase methodology that in one variation works as follows. Subjects begin by reading a paragraph-long story with one or more thinking shortfalls imbedded. For example, in one story, a woman called Mrs. Perez faces a decision about what to do when the company she works for relocates. Phase 1 asks subjects to underline any portion of the story they think reflects poor thinking, explaining what's wrong and how it might be made better. In the Mrs. Perez story, she says that she and her daughter must move immediately with the company, even though her daughter is just finishing the last six months of high school. *I have no other choice, said Mrs. Perez. There's no other decision I can think of in this situation.*

If subjects notice the narrowness of her thinking and offer other options, they are done. If not, the experimenter draws their attention to the shortfall in a nondirective way: *Some of Mrs. Perez's friends think she should have tried to find more options. Other friends believe she tried hard enough to find options. Suppose you were in Mrs. Perez's place. What would your thinking be like?* Again, subjects who offer options are done. However, subjects who do not are asked point-blank for alternatives (e.g. negotiate a delayed move, let the daughter stay with a friend and perhaps commute on weekends, seek another similar job) to test their ability to generate them.

Our group conducted such studies with many different stories targeting several different kinds of thinking and involving subjects in late elementary and early secondary school. We pretested the stories with experienced adult reasoners, who easily identified the thinking shortfalls, demonstrating that they were detectable. The results are described in detail in other venues (Perkins & Tishman, 2001; Perkins & Ritchhart, 2004; Perkins, Tishman, Ritchhart, Donis, & Andrade, 2002). In brief we found that almost all subjects were able to offer reasonable options, arguments, or interpretations when we directly requested them. This was no surprise, since we chose the problems to be accessible. What is especially striking about our findings concerns the contribution of sensitivity. Sensitivity proved to be a serious bottleneck and far more important than inclination: In about ninety percent of the cases, subjects never noticed the problem in the first place.

Concerning the trait-like character of these trends, the program examined test-retest correlations on sensitivity scores for detecting thinking shortfalls and found correlations of about .8 for a ninth grade sample and .6 for a fifth grade sample.

Concerning stability across tasks, subjects were asked to identify several different kinds of thinking trouble spots, such as neglecting alternative options, my-side bias, and more. Further, these trouble spots where embedded in different problem situations—decision making, problem solving, and explanation. Despite varying trouble spots and problem situations, factor analyses generally yielded single "sensitivity" and "inclination" factors. In other words, subjects performed consistently across these variations (Perkins, et al, 2000, 2001).

This suggests a startling possibility. Perhaps much of the time people do not think things through well not because they aren't able to, and not even because they aren't inclined to, but because they simply fail to notice occasions that call for sustained thought. If such an account does not seem plausible, consider how easy it is

to participate in a casual conversation or listen to a political speech or idly watch a television commercial without noticing any glaring problems or adopting any particularly probing mindset. Or consider the extensive work of Ellen Langer (1989) pointing to the persistent mindlessness of people engaged in many everyday activities.

In summary

The sampling of studies above suggests that at least in several cases a good argument can be made for dispositional constructs. Dispositions are real because they go some distance in meeting the reality criteria we mentioned earlier. Although not every line of research touches on all points, in general the studies show that indeed people do have dispositional proclivities—broad selective tendencies—such as need for cognition, dogmatism, open-mindedness, a mastery versus a performance orientation, and so on. The contribution of these tendencies to performance is separable from the contribution of ability. The patterns vary across individuals while displaying some consistency within individuals.

As we mentioned earlier, scholars are not only interested in proving that dispositions are real, they are also interested in identifying the factors that give rise to them—the mechanisms by which they work. We will discuss this further later, but one factor, suggested by Stanovich and West's work, as well as by Dweck's examination of the effects of students' beliefs about intelligence, is underlying belief systems. What people believe about themselves may partly explain the 'disposition effect'—the gap between people's ability and their behavior. Another aspect of mechanism is the need to recognize the joint contribution to a propensity of both sensitivity (likely to notice when a particular matter needs attention) and inclination (prone to engage upon noticing). On the whole, the current literature tends to treat dispositions as a matter

of inclinations, not recognizing the bottleneck of sensitivity, which at least in the studies reviewed above is considerable.

Toward an Agenda for Future Inquiry

A significant literature speaks to dispositions, and now is a good time to take stock of this developing field by asking two key questions: Is our body of knowledge growing? And do the emerging themes generate promising areas of inquiry? The work reviewed here and elsewhere suggests that the answer to the first question is "yes." To the second, the answer seems to us to be an even more resounding "yes." We round out this paper by identifying some themes that seem especially interesting and important.

Kinds of dispositions

The diverse dispositional constructs reviewed point to at least one basic area of inquiry: *What kinds of dispositional traits are there* in the thinking, social, and emotional realms that might invite study and inform education? Taxonomic questions tend to animate scholars who seek to "cut nature at its joints"—consider for example the many theories of the structure of intellect in the psychometric tradition.

It is apparent that many dispositional characteristics focus on particular areas of life or particular disciplines – a lifelong enthusiasm for sports, a persistent fascination with biological phenomena or literature or government. That acknowledged, most researchers have focused on relatively broad dispositions that touch many aspects of life and taxonomic endeavors reflect this. A number of dispositions in the current literature seem to overlap in their conceptions and measures. Kruglanski and Webster (1996), for example, comment on the partial overlap between need for cognitive closure and need for cognition. Also, several taxonomies of thinking dispositions have been proposed with some overlap but some differences (e.g. Ennis, 1986; Peter and Noreen Facione, 1992;

Perkins, Jay, & Tishman, 1993). Some items on these lists seem similar in spirit—seeking and offering reasons from Ennis, truth-seeking from the Faciones, the disposition to seek and evaluate reasons from Perkins, Jay, and Tishman. But each list also includes some distinctive entries.

Since some of these lists were constructed conceptually, factor analytic approaches may seem like the best way to uncover the deep structure. This is the method the Faciones used. However they analyzed subjects' self-ratings of a long list of traits, not their actual performances on tasks, their list could easily reflect subjects' conceptual groupings rather than performance factors.

In our own work, we used a factor analysis on sensitivity and inclination in thinking dispositions, and it yielded a single factor for sensitivity and a single factor for inclination over several different kinds of thinking challenges (Perkins, Tishman, Ritchhart, Donis, & Andrade, 2002). It's not terribly surprising that conceptually distinct dispositions would merge into a single factor: Since many people within the same culture learn the same things at about the same time, the same is likely true of much of intra-culture human knowledge and skill.

Besides comparisons at the same level—for instance competing analyses of thinking—dispositions appear at different levels. The Big Five personality model (Goldberg, 1993) offers a panoramic picture of disposition-like constructs. Mindfulness (Langer, 1989) implicates a fairly broad cognitively-oriented disposition. Need for cognition is perhaps somewhat more specific (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Taxonomies of thinking dispositions have a finer grain yet. Finally, as we shall see later, a dispositional analysis of particular thinking systems is possible, for instance the thinking system of Darwinian evolution or the Tragedy of the Commons. What do these different levels of analysis have to do with one another, how are they best integrated, and where are

the richest insights toward more powerful teaching and learning to be found?

Many of the dispositional concepts in everyday language occur in negative-positive pairs, for instance conventionality versus creativity, narrow-mindedness versus open-mindedness, impulsiveness versus self-control, selfishness versus generosity, dependent versus independent, conformist versus iconoclastic. Such juxtapositions are immensely suggestive. However, it is important to recognize that the "negative" partner in these polarities is clearly adaptive in particular contexts and sometimes as a trend in whole cultures or microcultures.

In keeping with this, members of particular populations often show problematic dispositional profiles from the standpoint of conventional social expectations and aspirations. Youngsters from poor and urban schools often shun academic pursuits, many girls and women avoid studies in mathematics, science, and engineering. In cataloging kinds of dispositions and considering how to cultivate positive dispositions, special attention is due to the chronically disengaged, including understanding how that very disengagement can constitute a reasonable adaptation to cultural circumstances, albeit one with limited horizons.

Mechanisms for dispositions

Whatever dispositions there are, the further question arises: *What causes the trend in conduct* we refer to as a disposition*?* This question reaches beyond dispositions as descriptions of patterned behavior to ask about mechanism. As noted earlier, one contributing mechanism seems to be the selective influence of underlying partly tacit belief systems. These generate expectancies about success, failure, others' reactions and one's own, that can influence behavior greatly.

Another contributing mechanism seems likely to be habits of mind in a sense close to everyday habits—well-automatized rou-

tines. Just as one can have a habit of brushing one's teeth or putting on one's right shoe before one's left shoe, so can one have a habit of looking at the other side of the case or reviewing mentally what one has just read or engaging in social perspective taking. Explicitly held values and policies can also contribute. Someone might make it a personal rule to develop a pro-and-con list and consult with others around any important decision, or to try to get all the facts before responding angrily to what seems to be a provocative situation. In addition, our research on sensitivity and inclination indicates that the two vary somewhat independently of one another and therefore entail different mechanisms.

There may be a biological contribution to certain dispositions. Research on the Big Five model of personality (Goldberg, 1993) suggests some biological influence, for instance from dopamine levels on extraversion (Depue & Collins, 1999). In general, there is no particular reason to believe that any particular disposition depends on only one mechanism. Most likely multiple mechanism operate simultaneously and synergistically. So far as we can see, very little is known about relative contribution.

Development of dispositions

Whatever the story of mechanism, *how do dispositions develop?* How are they nurtured and reinforced? In part dispositions reflect belief systems, but where do the belief systems come from? Although they vary across individuals, they surely reflect to some extent the assimilation of cultural and subcultural norms as well as specific parental attitudes. As noted earlier, Western cultures foster an 'ability more than effort' conception of learning in contrast with some Asian nations (Nisbett, 2003; White, 1987). Also, some dispositions develop through adaptive responses to particular roles in society. Langer (1989) finds that members of minority populations that see themselves as threatened tend to be especially mindful. Research on family backgrounds of young students shows dra-

matic patterns of influence across cultural groups and subgroups on attitudes toward schooling and school success (Hayes 1981, ch. 11).

Child and adult developmental trajectories appear to figure in the formation of dispositions. Some dispositions may grow out of initially fragile interests in particular disciplines or areas of life and generalize somewhat. Hidi and Renninger (2006) present a four-phase model profiling how interests that first appear in the context of specific situations can become sustained over time and stabilize into enduring dispositions. People's patterns of moral thought and perspective taking change with development (e.g. Gilligan, 1982; Kohlberg, 1970). The adult developmental schemes of Perry (1970) and Kegan (1994) among others entail strong shifts in people's epistemological stance: What is it to know something? How can we be sure and how sure can we be? How do we deal with conflicting evidence and perspectives? With these shifts come distinctive patterns of dealing with life's puzzles.

In general, culture in the broad sense, from national and ethnic cultures to the microcultures of the family and the classroom, seems likely to be the 'teacher' of many dispositions. In keeping with the idea of situated learning (e.g. Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991), people pick up much of their general alertness and attitudes from the culture around them, as part of becoming streetwise about whatever streets one walks. However, just how does this osmosis operate—the formation of tacit mental models, development of explicit value systems, operant conditioning, in what balance, or do these boil down to the same thing?

The teaching of dispositions

This evokes yet another important question: *How can instruction be designed to teach positive dispositions?* Of course, teach in a didactic sense may not be quite the right idea. It seems unlikely that teaching practices sufficient for reliably imprinting state capi-

tals would impart the sensitivities and inclinations of open mindedness or perspective taking. As urged earlier, the performance-on-demand character of conventional education and the emphasis in extrinsic motivation do not support and arguably undermine a dispositional agenda. But flip this equation around and consider what it might be like to teach *for* dispositions. It might involve creating opportunity and encouragement for students to seek out complexity rather than seeking closure. It might involve guiding students to assess the need for persistence rather than telling them when to persist. It might involve cultivating a discerning sensitivity to the need for precision rather than admonishing students to be accurate.

More broadly, if dispositions somehow develop through culture one might put culture to work to 'teach' them. One place to look for clues is in classrooms where something like this is already happening, environments where teachers establish rich cultures of thinking (Tishman, Jay, & Perkins, 1993). For example, our colleague Ron Ritchhart (2002) conducted a year-long qualitative study of six such classrooms in which he identified eight forces that shape classroom culture: expectations, time, modeling, routines, opportunities, relationships, physical environment, and language.

Concerted efforts to develop thinking dispositions are not so common or thoroughly tested, but those that we know of conspicuously leverage culture as a teacher. The *Philosophy for Children* program developed by Matthew Lipman and colleagues emphasizes a community of probing philosophical inquiry (Lipman, 1988; Lipman, Sharp, & Oscanyan, 1980). Art Costa and colleagues' *Habits of Mind* initiative foregrounds several attractive dimensions of intellectual character, including for instance persisting, managing impulsivity, and listening with understanding (Costa & Kallick, 2002). Claxton and Carr (2004) offer an approach to fostering learning dispositions.

For two technology-based examples, the River City initiative developed by Chris Dede and his colleagues invites students in teams into a virtual space where they participate in complex inquiry about the sources of diseases in River City, aiming to foster not only skills but positive mindsets concerning scientific inquiry (Ketelhut, Dede, Clarke, Nelson, & Bowman, in press). Seymour Papert's conception of 'constructionism', where learners work with computers and programmable devices on a wide range of projects including ways of teaching others, seems likely to foster exploratory, inventive, and analytical dispositions (Papert, 1980, 1993).

Our own studies have yielded several related interventions. *The Thinking Classroom* (Tishman, Perkins, & Jay, 1995), *Art Works for Schools* (Tishman & Grotzer, 1998; Grotzer, Howick, Tishman, & Wise, 2002) and more recently the *Visible Thinking / Artful Thinking* multi-site initiative (Perkins & Ritchhart, 2005; Ritchhart, Palmer, Church, & Tishman, 2006; Tishman & Palmer, 2006) combine several of the cultural forces alluded to above. Other approaches might be cited as well. All of these efforts recruit the teacher as a key culture maker: The teacher helps create the culture and the culture in turn teaches. All of them undo in considerable part the performance-on-demand character of typical classroom instruction. All of them foreground intrinsic motivation over extrinsic motivation (Lepper, Corpus, & Iyengar, 2005; Lepper & Greene, 1978). All of them seek to create a cultural surround in which learning becomes more authentically and meaningfully situated (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991).

Culture clearly plays a role in the development of social, emotional, civic and ethical dispositions, and indeed educational approaches in these areas have traditionally played closer attention to the formative power of the cultural surround (consider the boy scouts). A promising way to further our knowledge about dispositional development is to look for relevant research in areas beyond

the cognitive, seeking fertile cross-field connections and conducting joint inquiries.

Curriculum and dispositions

Turning back to the broader theme, another overarching question focuses on the structure of education: *How do dispositions relate to curriculum?* One straightforward possibility is to position dispositions as objects of instruction, even if instruction that looks to enculturation and somewhat downplays performance-on-demand. Another is to view dispositions not so much as part of the curriculum per se but as mediators of its success. Thus, mindfulness appears to lead to the more active vigorous use of knowledge and particular classroom tactics such as the use of open-ended questions and less declarative certainty can foster mindfulness (Langer, 1997; Ritchhart & Perkins, 2000). Likewise, contextual factors could foster a performance mindset or reduce need for cognitive closure and thereby foster learning for understanding or deep rather than surface learning.

Yet a third strand would reconceive knowledge itself as dispositional. For instance, Ohlsson (1993) discussed the power of abstract schemas such as the Darwinian explanation pattern of variation, selection, and attention, applicable to a wide range of phenomena beyond biology. He emphasized how the intellectual agenda of able thinkers activates deployment of such schemas from within, even in situations that do not afford obvious clues. In the same spirit, a concept like Tragedy of the Commons (rational individual decisions lead to overuse of a common resource, e.g. common grazing grounds, fishing grounds) or a theme like rates of growth (linear, power, exponential) or a notion like formal properties of art (balance, structure, rhythm, etc.) might all be treated not just as curricular content but as flexible thinking systems that involve dispositions as part of what it means to know them. To truly know the Darwinian explanation pattern would include the ability

to apply it, alertness to occasions of application, and enthusiasm for deploying it. That's what it would take for such learning truly to matter as students step beyond the walls of the classroom into a complex world of competing entities from viruses to popular phrases to models of cars to spring fashions to political ideologies.

How Learning Can Matter

To return to the opening theme, it seems clear that if we want learning that matters, we need to pay attention to the dispositional side of learning. The urgency comes from an expanding body of knowledge about dispositions, modest as compared to some other literatures, say on reading development or psychometric intelligence, but still substantial in theories and findings. For instance, we know that the dispositional influences on performance can be separated from the influence of ability. We can point to certain dispositional tendencies of seeming importance, such as open-mindedness versus close-mindedness as modeled by need for cognitive closure, need for cognition, a mastery versus a performance mindset toward learning, and propensity toward social perspective taking. We know that these tendencies can be measured and used to explain and predict performance. We know that sensitivity—alertness to occasion—plays an important role in thinking dispositions and perhaps in all dispositions.

Not only does what students learn through formal education appear to depend on their dispositions and the dispositional tone of the classroom but also what they make later of what they learn depends on dispositions too. Dispositions do not matter so much when the call for a particular already learned fact or understanding or practice is clear and strong, but out there in the larger world beyond formal learning the calls often come with a softer voice. The cues are much more subtle and the needs much less immediately pressing than the performance-on-demand mode of the classic

classroom. The obvious options in a decision-making situation give us enough to worry about, never mind the divergent ones. The style of political figures appeal to our sense of identity, never mind their policies and their track records. The puzzling damp spot on the living room floor, well, it will soon evaporate. The quick take on this person of a particular race or ethnicity or gender is good enough without hovering over contemporary commitments or a history of discrimination. Those people somewhere clearly thought this kind of art was really something—but I know what I like. The interest rates on my debts sound okay, so long as I don't recall what I know about compound interest.

In any of these circumstances or endless others, a clear directive from outside the person could activate latent knowledge and generate a more informed and intelligent response. But the outer voices are not there. In many important circumstances, learning won't matter without the help of persistent inner voices picking the moments and urging attention. We call them dispositions. For learning to matter, we need to understand much better what they are, how they work, where they come from, and how to foster the best of them through education and beyond.

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