

DISTINGUISHED EDUCATOR SERIES

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Romance and reality

Stanovich reviews significant findings from his research and speculates on differential responses to his work. He argues that we must let scientific evidence answer questions about the reading process.



When, in preparation for this essay, I began thinking about the various components of my research program over the past 20 years, I realized that they could be divided into two categories: Research I have done that almost everyone likes and research I have done that not everybody likes. I thought that this distinction might be worth exploring in this essay because it may well say more about the current state of the field of reading than it does about my research itself.

Research I have done that almost everyone likes

In this category would go some of my research that has demonstrated that certain ways of classifying children having reading difficulties may be untenable. For example, one idea that has a long history in the learning disabilities field is that less-skilled readers who display a discrepancy with a measure of "aptitude" (typically defined as performance on an intelligence test) are different from poor readers who do not display such a discrepancy. It was thought that the reading-related cognitive characteristics of these groups were different and that they needed different types of treatment. Nevertheless, recent research and theory has brought these assumptions into question (Siegel, 1989; Stanovich, 1988, 1991).

It appears that children having difficulties in reading who have aptitude/achievement discrepancies have cognitive profiles that are surprisingly similar to children who do not. Also, to a large extent, these groups respond similarly to various educational interventions. Although some in the learning disabilities community have not found this research to be palatable, IRA audiences and the vast majori-

ty of teachers have not only felt very comfortable with these research conclusions, but also vindicated by them.

Even more popular has been my work on Matthew effects in reading development (Stanovich, 1986). The term Matthew effects derives from the Gospel according to Matthew: "For unto every one that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath" (XXV:29). It is used to describe rich-get-richer and poor-get-poorer effects that are embedded in the educational process. Herb Walberg (Walberg & Tsai, 1983) had focused attention on the process by which early educational achievement spawns faster rates of subsequent achievement, and in a 1986 paper I specifically explored the idea of Matthew effects in the domain of reading achievement. I outlined a model of how individual differences in early reading acquisition were magnified by the differential cognitive, motivational, and educational experiences of children who vary in early reading development.

In that particular paper, I detailed several developmental mechanisms that are of continuing theoretical and empirical interest. Put simply, the story went something like this: Children who begin school with little phonological awareness have trouble acquiring alphabetic coding skill and thus have difficulty recognizing words. Reading for meaning is greatly hindered when children are having too much trouble with word recognition. When word recognition processes demand too much cognitive capacity, fewer cognitive resources are left to allocate to higher-level processes of text integration and comprehension. Trying to read without the cognitive resources to allocate to understanding the meaning of the text is not a rewarding experience. Such unrewarding early reading experiences lead to less involvement in reading-related activities. Lack of exposure and practice on the part of the less-skilled reader further delays the development of automaticity and speed at the word recognition level. Thus, reading for meaning is hindered, unrewarding reading experiences multiply, practice is avoided or merely tolerated without real cognitive involvement, and the negative spiral of cumulative disadvantage continues. Troublesome

emotional side effects begin to be associated with school experiences, and these become a further hindrance to school achievement.

Conversely, children who quickly develop efficient decoding processes find reading enjoyable because they can concentrate on the meaning of the text. They read more in school and, of equal importance, reading becomes a self-chosen activity for them. The additional exposure and practice that they get further develops their reading abilities. I speculated that reading develops syntactic knowledge, facilitates vocabulary growth, and broadens the general knowledge base. This facilitates the reading of more difficult and interesting texts. Thus, the increased reading experiences of these children have important positive feedback effects that are denied the slowly progressing reader.

My description of the different developmental trajectories due to differences in the ease of early reading acquisition struck a responsive chord of recognition with many practitioners who thought that the theoretical description captured some things that they had observed. Critiques by researchers were also largely supportive. Subsequent work in which I have tried to generate empirical sup-

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port for the role of print exposure in cognitive development has been equally well received. My research group has tried to develop alternative methods of assessing differences in amount of print exposure in children and adults (Allen, Cipielewski, & Stanovich, 1992; Cunningham & Stanovich, 1991; Stanovich & West, 1989). Using some new methods, as well as some instruments designed by other investigators, we have documented an important role for print exposure

in cognitive development (Stanovich, 1993; Stanovich & Cunningham, 1992, in press). Amount of print exposure is a potent predictor of vocabulary growth, knowledge acquisition, and a host of other verbal skills. Exposure to print does seem to be implicated in some educational Matthew effects.

More optimistically, however, we have found that exposure to print seems to be efficacious regardless of the level of the child's cognitive and reading abilities. Using some fairly sophisticated statistical analyses, we found that print exposure was a significant predictor of verbal growth even after the children had been equated on their general cognitive abilities. Print exposure was a strong predictor of cognitive growth in even the least advantaged children in our research samples. Thus, the child with limited reading skills and low general ability will build vocabulary and cognitive structures through immersion in literacy activities just as his or her high-achieving counterpart does. An encouraging message for teachers of low-achieving children is implicit here, and this research program of mine has been almost universally well received. Not so, however, with some other research that I have done.

Research I have done that not everyone likes

One of the first research problems in reading that I investigated was the role of context in word recognition. At the time I began these investigations with my colleague Richard West (in the early 1970s), several popular theories posited that the ability to use contextual information to predict upcoming words was an important factor in explaining individual differences in reading ability. Fluent readers were said to have attained their skill because of a heavy reliance on context in identifying words. Reading difficulties were thought to arise because some readers could not, or would not, use context to predict upcoming words.

To our surprise at the time (West and I had started these investigations thinking that the context view was correct), our initial investigations of this problem revealed just the opposite: It was the less-skilled readers who were more dependent upon context for word recognition (Stanovich, West, &

Feeman, 1981; West & Stanovich, 1978). The reason for this finding eventually became apparent: The word recognition processes of the skilled reader were so rapid and automatic that they did not need to rely on contextual information.

Over 10 years later, this finding is one of the most consistent and well replicated in all of reading research. It has been found with all types of readers, in all types of texts, and in a variety of different paradigms (e.g., Bruck, 1988; Leu, DeGroff, & Simons, 1986; Nicholson, 1991; Nicholson, Lillas, & Rzoska, 1988). Reviews of the dozens of different studies that converge on this conclusion are contained in Perfetti (1985), Rayner and Pollatsek (1989), and Stanovich (1980, 1984, 1986, 1991).

Perhaps understandably, at the time our initial findings were published they were not warmly received by researchers invested in the context-use theory that the results falsified. Today, however, the implications of these results have been incorporated into all major scientific models of the reading process (e.g., Just & Carpenter, 1987; Rayner & Pollatsek, 1989). Scientifically, the results are now uncontroversial. However, they are still not welcomed by some reading educators who would perpetuate the mistaken view that an emphasis on contextual prediction is the way to good reading.

It should be noted here that the findings I have referred to concern the use of context as an aid to word recognition rather than as a mechanism in the comprehension process. Although good readers employ contextual information more fluently in the comprehension process, they are not more reliant on contextual information for word recognition. A tendency to conflate these two levels of processing in discussions of context effects has caused enormous confusion among both researchers and practitioners.

Additional confusion has been caused by the use of imprecise labels such as "word calling." Despite the frequency with which this term occurs in reading publications, it is rare to find authors who spell out exactly what they mean by the term "word caller." However, the implicit assumptions behind its use appear to be as follows: (a) Word calling occurs when the words in the text are effi-

ciently decoded into their spoken forms without comprehension of the passage taking place. (b) This is a bad thing, because (c) it means that the child does not understand the true purpose of reading, which is extracting meaning from the text. (d) Children engaging in word calling do so because they have learned inappropriate reading strategies. (e) The strategic difficulty is one of overreliance on phonemic strategies.

The idea of a word-caller embodying the assumptions outlined above has gained popularity despite the lack of evidence that it applies to an appreciable number of poor readers. There is no research evidence indicating that decoding a known word into a phonological form often takes place without meaning extraction. To the contrary, a substantial body of evidence indicates that even for young children, word recognition automatically leads to meaning activation (Ehri, 1977; Stanovich, 1986) *when the meaning of the word is adequately established in memory*. The latter requirement is crucial. Reports of word calling rarely indicate whether the words that are called are even in the child's listening vocabulary. If the child would not understand the meaning of the word or passage when spoken, then overuse of decoding strategies can hardly be blamed if the child does not understand the written words. In short, a minimal requirement for establishing word calling is the demonstration that the written material being pronounced is within the listening comprehension abilities of the child.

Secondly, it is necessary to show that the word calling is not a simple consequence of poor decoding. Although reasonably efficient decoding would appear to be an integral part of any meaningful definition of word calling, decoding skills are rarely assessed carefully before a child is labeled a word caller. It is quite possible for accurate decoding to be so slow and capacity-demanding that it strains available cognitive resources and causes comprehension breakdowns. Such accurate but capacity-demanding decoding with little comprehension should not be considered word calling as defined above. To the contrary, it is a qualitatively different type of phenomenon. Comprehension fails not because of overreliance on decoding, but because decoding skill is not developed enough.

Examples of phonological awareness tasks

Phoneme deletion: What word would be left if the /k/ sound were taken away from *cat*?
 Word to word matching: Do *pen* and *pipe* begin with the same sound?
 Blending: What word would we have if you put these sounds together: /s/, /a/, /t/?
 Sound isolation: What is the first sound in *rose*?
 Phoneme segmentation: What sounds do you hear in the word *hot*?
 Phoneme counting: How many sounds do you hear in the word *cake*?
 Deleted phoneme: What sound do you hear in *meat* that is missing in *eat*?
 Odd word out: What word starts with a different sound: *bag*, *nine*, *beach*, *bike*?
 Sound to word matching: Is there a /k/ in *bike*?

Another line of my research that has not been universally applauded concerns the role of phonological skills in early reading acquisition. Early insights from the work of Chall, Roswell, and Blumenthal (1963), Bruce (1964), and Liberman, Shankweiler, Fischer, and Carter (1974) came to fruition in the early 1980s when numerous investigators began to document the importance of phonological awareness skills in early reading acquisition. Our own work (e.g., Stanovich, Cunningham, & Cramer, 1984; Stanovich, Cunningham, & Feeman, 1984) was part of the "second generation" of research on these processes.

Reading researchers have for years sought the cognitive predictors of individual differences in early reading acquisition. The list of candidate processes and behaviors is long (short-term memory, intelligence, processes of contextual prediction, etc.). In the last 10 years, researchers have come to a strong consensus about the cognitive processes that best predict reading progress in the earliest stages. These cognitive processes have been called phonological awareness and they are measured by some of the tasks briefly summarized in the Table.

The term phonological awareness refers to the ability to deal explicitly and segmentally with sound units smaller than the syllable. Researchers argue intensely about the meaning of the term and about the nature of the tasks used to measure it. However, in the

present context, it is critical to establish only that phonological awareness is indicated by performance on the generic type of tasks that we see in this Table. These tasks vary in difficulty. Some can be successfully completed before others. But all are highly correlated with each other. Most importantly, they are the best predictors of the ease of early reading acquisition—better than anything else that we know of, including IQ.

The latter is a somewhat startling finding if you think about it. Consider that I can spend an hour and a half giving a child any of a number of individually administered intelligence tests; then I can take about 7 minutes and administer 15 items of the type illustrated in the Table. And, when I am done, the 7-minute phonological awareness test will predict ease of initial reading acquisition better than the 2-hour intelligence test! This is why both researchers and practitioners have been greatly interested in research on phonological awareness.

Additionally, research has shown that phonological awareness appears to play a causal role in reading acquisition—that it is a good predictor not just because it is an incidental correlate of something else, but because phonological awareness is a foundational ability underlying the learning of spelling-sound correspondences. Numerous training studies have demonstrated that preschool and kindergarten children exposed to programs designed to facilitate phonological awareness become better readers (Ball & Blachman, 1991; Bradley & Bryant, 1985; Cunningham, 1990; Lie, 1991; Lundberg, Frost, & Peterson, 1988). Programs incorporating aspects of phonological awareness have recently been described in the pages of *The Reading Teacher* (e.g., Griffith & Olson, 1992; Yopp, 1992).

Like my findings on context use in reading—but unlike my research on Matthew effects and print exposure—my research on phonological awareness was less than welcome in some quarters of the reading education community. What accounts for these differential responses to research emanating from the same investigator? It is certainly possible that when I did the work on print exposure I had a “good day” and that when I did the work on phonological awareness and

context effects I was having a “bad day.” However, those who have followed the dreadful “reading wars” in North American education will be aware that there is a more parsimonious explanation: Research topics that I investigated that were closer to the heart of the Great Debate over reading education were more controversial.

The Great Debate—again

Simply put, the work on phonological awareness and context effects contradicted the philosophical tenets of the more “hard line” whole language advocates. Although almost all teachers recognize from their own experience that encouraging “contextual guessing” in those children experiencing early reading difficulty does not help, heavy reliance on context to facilitate word recognition is still emphasized by some whole language proponents. Similarly, phonological awareness training violates a fundamental tenet because it isolates components of the reading process.

What really is the heart of this controversy? I hesitate here, because so much contention and vitriol has surrounded the “phonics vs. whole language” debate that I almost balk at the thought of contributing to it further. Nevertheless, ever the optimist, in what follows I offer a five-step strategy for attenuating the dispute. My strategy has the following logic:

1. First look for points of agreement between opposing positions.
2. When doing so, invoke a “spirit of charity” whereby all sides are encouraged to stretch their principles to the maximum to accommodate components of the other position.
3. Step back and take a look at what might be a larger degree of agreement than anyone supposed.
4. Next, isolate the crucial differences. Try to make these few in number but clearly defined so that they are amenable to scientific test.
5. However, before arguing about the outcomes of the tests, both sides should take a look at the set of defining differences and ask themselves whether they are worth the cost of war.

It is really not difficult to demonstrate

that there is more agreement among reading educators than is sometimes apparent to those obsessively focused on the so-called reading wars. For example, Chall (1989) has repeatedly pointed out that many of the recommendations and practices that are commonly associated with whole language have appeared repeatedly in her writings. She reminds us that "Teaching only phonics—and in isolation—was not a recommendation of the Great Debate in 1967 or 1983" (p. 525). Chall is at pains to remind her readers that, in common with many whole language advocates, she "also recommended that library books, rather than workbooks, be used by children not working with the teacher and that writing be incorporated into the teaching of reading" (p. 525). Chall (1989) has no compunctions about admitting that "Some teachers may inadvertently overdo the teaching of phonics, leaving little time for the reading of stories and other connected texts," but she notes that "The history of reading instruction teaches us that literature, writing, and thinking are not exclusive properties of any one approach to beginning reading" (p. 531).

Clearly there is plenty of scope for the "principle of charity" to operate here. Corresponding to Chall's statement that "some teachers may inadvertently overdo the teaching of phonics" we simply need the companion admission that some children in whole language classrooms do not pick up the alphabetic principle through simple immersion in print and writing activities, and such children need explicit instruction in alphabetic coding—a concession having the considerable advantage of being consistent with voluminous research evidence (Adams, 1990; Vellutino, 1991). It seems inconceivable that we will continue wasting energy on the reading wars simply because we cannot get both sides to say, simultaneously, "some teachers overdo phonics" and "some children need explicit instruction in alphabetic coding."

Adams (1991) is likewise boggled at what, seemingly, is the cause of all our strife. She points to the defining features of the whole language philosophy that Bergeron (1990) gleaned from an extensive review of the literature:

Construction of meaning, wherein an emphasis is placed on comprehending what is read; functional

language, or language that has purpose and relevance to the learner; the use of literature in a variety of forms; the writing process, through which learners write, revise, and edit written works; cooperative student work; and an emphasis on affective aspects of the students' learning experience, such as motivation, enthusiasm, and interest. (p. 319)

Adams (1991) asks rhetorically "Is this what the field has been feuding about?" (p. 41). Probably not. Instead, she argues that:

the whole language movement carries or is carried by certain other issues that do merit serious concern....these issues are: (1) teacher empowerment, (2) child-centered instruction, (3) integration of reading and writing, (4) a disavowal of the value of teaching or learning phonics, and (5) subscription to the view that children are naturally predisposed toward written language acquisition. (p. 41)

Educators working from a variety of different perspectives might well endorse points #1 to #3. Clearly the key points of difference are issues #4 and #5. However, Adams (1991) makes the seemingly startling—but actually very wise—suggestion that the:

positions of the whole language movement on teaching and learning about spellings and sounds are historical artifacts. Although they are central to its rhetoric and focal to its detractors, they may well be peripheral to the social and pedagogical concerns that drive the movement....Yet their continuing centrality to the rhetoric of the movement may be owed no less to their historical precedence than to the fact that...they were tightly connected to the other issues of teacher empowerment, child-centered education, and the reading-writing connection. I believe, moreover, that it is these latter issues that inspire the deepest commitment and passion of the movement....To treat it today as an issue of phonics versus no phonics is not only to misrepresent it, but to place all of its valuable components at genuine risk. (pp. 42, 51)

Adams is pointing toward some dangers that lie in wait for whole language advocates but also toward a possible rapprochement within the reading education community. The danger is this. In holding to an irrationally extreme view on the role of phonics in reading education—for failing to acknowledge that some children do not discover the alphabetic principle on their own and need systematic direct instruction in the alphabet principle, phonological analysis, and alphabetic coding—whole language proponents threaten all of their legitimate accomplishments. Eventually—perhaps not for a great while, but eventually—the weight of empirical evidence will fall on their heads. That direct instruction in alphabetic coding facilitates

early reading acquisition is one of the most well established conclusions in all of behavioral science (Adams, 1990; Anderson, Hiebert, Scott, & Wilkinson, 1985; Chall, 1983, 1989; Perfetti, 1985; Stanovich, 1986). Conversely, the idea that learning to read is just like learning to speak is accepted by no responsible linguist, psychologist, or cognitive scientist in the research community (see Liberman & Liberman, 1990). To stand, Canute-like, against this evidence is to put at risk all of the many hard-won victories of the whole language movement:

The whole language movement should be a movement that is a core component of a long overdue and highly constructive educational revolution. It should be about restoring the confidence and authority of teachers. It should be an affirmation that education can only be as effective as it is sensitive to the strengths, interests, and needs of its students....It should be about displaying such outmoded instructional regimens with highly integrated, meaningful, thoughtful, and self-engendering engagement with information and ideas. If, in fact, these are goals that drive the whole language movement then they must be supported wholeheartedly by all concerned. These goals are of paramount importance to our nation's educational health and progress. At the same time, however, they are strictly independent from issues of the nature of the knowledge and processes involved in reading and learning to read. Only by disentangling these two sets of issues, can we give either the attention and commitment that it so urgently deserves. (Adams, 1991, p. 52)

Future historians will find it difficult to explain how the political goal of restructuring educational resources got tied up with the issue of whether teachers should say, "S makes the /s/ sound."

"Only by disentangling these issues" is the key phrase here. The whole language movement is currently burdened with, shall we say, entangling alliances—in particular, an alliance with an extreme view on the role of direct instruction of decoding skills that is seriously out of step with current evidence. I would give essentially the same medical advice that Adams is pointing to: Only amputation will save the patient. And, make no

mistake, we do risk losing the patient. Several months ago, in the same Distinguished Educator Series in which the current essay appears, Goodman (1992) excoriated the Bush administration for its hostility to universal public education and pointed to a

group of individuals who want to limit education to a small elite group of technicians needed to run our industry....The Bush initiative would further the development of a two-tiered work force by limiting educational expense for those not needed as technicians. (p. 198)

I share all of Goodman's concerns, and I am in sympathy with his indictment of the Bush administration and the many special interest groups with a vested interest in privatized education (The Edison Project of the Whittle Corporation comes to mind). The "savage inequalities" (Kozol, 1991) in American education are indeed a national disgrace and deserve a revolutionary political response. But future historians will find it difficult to explain how the political goal of restructuring educational resources got tied up with the issue of whether teachers should say "s makes the /s/ sound."

But, paradoxically, the latter point does relate—in an unexpected way—to some broader political issues such as the integrity of the public education system. Parents with children who have trouble in early reading acquisition and who have not been given instruction in alphabetic coding will add fuel to the movement toward privatized education in North America. "Parents Question Results of State-Run School System" (Enchin, 1992) is an increasingly frequent newspaper headline in Canadian provinces (e.g., Ontario) where phonics instruction is neglected or deemphasized. The January 11, 1993, cover of *Maclean's*, Canada's weekly news-magazine, was titled "What's Wrong at School?" and featured numerous reports of parents seeking private education for children struggling in reading due to a lack of emphasis on alphabetic coding in school curricula. Featured stories in the magazine had titles such as "Angry Parents Press for Change," and photographs were highlighted with labels such as "Accusing the Schools of Taking Part in a Costly, Failed Experiment." It is reported that Canada's private school enrollment jumped 15% in the single year of 1992. In short, parents who notice that their second

and third graders cannot decode simple words will become the unwitting pawns of the corporate advocates of privatized education whose motives Goodman rightly questions.

I have faith, though, that in the end, teachers will save us from some of the more nefarious goals of the Bush administration (now thankfully gone) and its like-minded allies. Teachers, like scientists, are committed pragmatists. They single-mindedly pursue "what works"—ignoring philosophical strictures along the way. The scientists of 50-60 years ago ignored positivist restrictions on the extent of their theorizing. A population now enjoying the fruits of fiber-optic technology is glad they did. Currently, those of us who hope for medical cures for our health problems will be reassured to know that biochemists in their laboratories are blissfully unaware of constructivist arguments against the idea that one criterion of a good theory is that it should correspond to physical reality.

Teachers are similarly pragmatic, and I am confident that they will find a middle way between the rhetorical blasts and political posturings of our field. Increasingly we are seeing examples of practitioners and teacher-educators finding the middle way—some in the pages of this very journal (Spiegel, 1992; Stahl, 1992; Trachtenberg, 1990).

Mosenthal (1989) has characterized whole language as a "romantic" approach to literacy, and its affinities with Rousseauian ideas are commented upon by both advocates and detractors. But we are all aware that a shockingly high number of romantically inspired marriages end in divorce. Often, a little reality testing in the early stages of a romance can prevent a doomed marriage. Better yet, some early reality testing and adjustment can sometimes prolong a romance. Appropriately chosen direct instruction in the spelling-sound code is the reality that will enable our romance with whole language to be a long-lasting one.

The connecting thread: Science

Although I have dichotomized my research projects in this essay, I really do not think of them this way. The projects, to me, are all similar in a mundane way: They are interesting problems about the reading process that were amenable to scientific test.

And the latter point is really the common thread. I believe in letting scientific evidence answer questions about the nature of the reading process. Nothing has retarded the cumulative growth of knowledge in the psychology of reading more than the failure to deal with problems in a scientific manner.

Education has suffered because its dominant model for adjudicating disputes is political (with corresponding factions and interest groups) rather than scientific. Education's well-known susceptibility to the "authority syndrome" stems from its tacit endorsement of a personalistic view of knowledge acquisition: the belief that knowledge resides within particular individuals who then dispense it to others. Knowledge in science is publicly verifiable (see Stanovich, 1992) and thus depersonalized in the sense that it is not the unique possession of particular individuals or groups (Popper, 1972).

An adherence to a subjective, personalized view of knowledge is what continually leads to educational fads that could easily be avoided by grounding teachers and other practitioners in the importance of scientific thinking for solving educational problems. This training should include an explicit discussion of some of the common misconceptions that people hold about science, for example, that the idea of objective, depersonalized knowledge in the social sciences dehumanizes people. Such facile slogans compromise both research and practice in many educational domains.

What science actually accomplishes with its conception of publicly verifiable knowledge is the democratization of knowledge, an outcome that frees practitioners and researchers from slavish dependence on authority; and it is subjective, personalized views of knowledge that degrade the human intellect by creating conditions in which it is inevitably subjugated to an elite whose "personal" knowledge is not accessible to all (Bronowski, 1956, 1977; Medawar, 1982, 1984, 1990; Popper, 1971).

The scientific criteria for evaluating knowledge claims are not complicated and could easily be included in teacher-training programs, but they usually are not (thus a major opportunity to free teachers from reliance on authority is lost right at the begin-

ning). These criteria include the publication of findings in refereed journals (scientific publications that employ a process of peer review), the duplication of the results by other investigators, and a consensus within a particular research community on whether or not there is a critical mass of studies that point toward a particular conclusion. These mechanisms are some of the best consumer protections that we can give teachers.

Teachers should also be introduced to the values of science. Although the technological products of science are value free in that they can be used for good or ill, it is not true that the process of science is value free (Bronowski, 1956, 1977). For example, objectivity is a value that is fundamental to science and simply means that we let nature speak for itself without imposing our wishes on it. The fact that this goal is unattainable for any single human being should not dissuade us from holding objectivity as a value (this would be confusing what is the case with what ought to be). The sorry state of fields that have abandoned objectivity is perhaps the strongest argument for holding to it as a value. To use a convenient and well-known example, the inability of parapsychologists to screen out subjective wishes and desires from their observations has filled their field with charlatans and scandal, made progress impossible, and alienated a scientific world that was once quite supportive of the field (Alcock, 1990; Hines, 1988).

My view on these matters is considered old fashioned in many educational circles. There is much loose talk in education now about paradigms, incommensurability, frameworks, and such. The whole melange is sometimes termed constructivism and it is commonly employed to support various relativistic doctrines such as the view that there is no objective truth, that all investigators construct their evidence from what they already know is true, that we all live in different realities, that correspondence to reality is not a valid scientific criterion, etc.—or, more technically, that “equally rational, competent, and informed observers are, in some sense, free (of external realist and internal innate constraints) to constitute for themselves different realities” (Shweder, 1991, p. 156).

These ideas have unfortunately come into education half baked and twice distorted. Legitimate philosophy of science was picked up and reworked by scholars in a variety of humanities disciplines who were not philosophers by training and who used the work for their own—often political—agendas. Educational theorists have taken these worked-over ideas and recooked them once again so that they are now almost unrecognizable from the original. For example, constructivist theorists in education cite Thomas Kuhn constantly. They are greatly enamored with Kuhn’s (1970) incommensurability thesis in philosophy of science: the idea that competing frameworks “cannot be compared and evaluated on rational grounds” (Bechtel, 1988, p. 55). These theorists seem unaware of the facts that Kuhn’s concept of incommensurability has been seriously disputed by numerous historians and philosophers of science (Gutting, 1980; Lakatos & Musgrave, 1970; Laudan, 1990; Leplin, 1984; Siegel, 1980; Suppe, 1984) and that Kuhn has largely abandoned the idea (see the 1970 Postscript to *The Structure of Scientific Revolutions* and the commentary on the Postscript by Musgrave, 1980; see also Siegel, 1980).

Numerous philosophers of science—the very scholars who did the original work that the educational theorists are parodying—have objected to the distortion of their work by social scientists and educators. For example, Ian Hacking (1983), a leading contributor to these debates in philosophy of science, has written of how

slightly off-key inferences were drawn from work of the first rank...Kuhn was taken aback by the way in which his work (and that of others) produced a crisis of rationality. He subsequently wrote that he never intended to deny the customary virtues of scientific theories. Theories should be accurate, that is, by and large fit existing experimental data. They should be both internally consistent and consistent with other accepted theories. They should be broad in scope and rich in consequences. They should be simple in structure, organizing facts in an intelligible way. (pp. 2, 13)

Larry Laudan, another key figure in the debate within philosophy of science, echoes Hacking’s comments that:

Many who are not philosophers of science (from cultural philosophers like Rorty and Winch to sociologists like Barnes and Collins) appear to believe that contemporary philosophy of science provides potent arguments on behalf of a radical relativism

about knowledge in general and scientific knowledge in particular....My belief, by contrast, is that strong forms of epistemic relativism derive scant support from a clearheaded understanding of the contemporary state of the art in philosophy of science. I am not alone in that conviction; most of my fellow philosophers of science would doubtless wholeheartedly concur. But that consensus within the discipline apparently cuts little ice with those outside it....Many scientists (especially social scientists), literati, and philosophers outside of philosophy of science proper have come to believe that the epistemic analysis of science since the 1960s provides potent ammunition for a general assault on the idea that science represents a reliable or superior form of knowing....My larger target is those contemporaries who—in repeated acts of wish fulfillment—have appropriated conclusions from the philosophy of science and put them to work in aid of a variety of social cum political causes for which those conclusions are ill adapted. (1990, pp. viii-ix)

The worst example of this distortion is how the concept of incommensurability has been used. The dehumanizing implications of this concept seem not to have entirely escaped educational theorists in the literacy area. The seeming delight in the view that we are all “locked into our paradigms” is puzzling. The very thing that incommensurability seeks to deny—the cumulative nature of human knowledge—provides the key rationale that commands a member of the intellectual community to show respect for the ideas of others. Although the social and moral motivation for attempting to view the world from inside another person’s framework is to gain a more humanized understanding of another individual, the intellectual motivation must be that by doing so I may gain a better (i.e., more accurate) view of the world.

If we, as educators, deny the last possibility, we will undercut the motivation to shift frameworks for even the first—the humanistic—purpose. It is one thing to deny the possibility of attaining certain knowledge. Most scientists admit this impossibility. It is another thing entirely to argue that we lose nothing by giving up even the attempt at attaining objective knowledge. Such a stratagem undermines the rationale for the scientific quest for knowledge and in this quest lies the only hope of escaping our continuing dilemma.

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