



Response to Comments

Back to the Future: Contrasting Scientific Styles in Understanding Reading

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In this rejoinder to Willis, Smagorinsky, and Douglas (this issue of *Educational Researcher*), the authors discuss how many of the points raised by Willis and Smagorinsky regarding their original article, which appeared in the March 2009 issue of *Educational Researcher*, are concerned less with the methods themselves than with different styles of science. The authors of this rejoinder examine their differing styles of science, using Stanovich's 2003 framework, and call for concision and the understanding that multiple perspectives and methods are needed to solve the important and perplexing problems that students and teachers will face in the 21st century.

Keywords: classroom research; reading; research methodology

As education researchers, we have a pressing obligation to ensure that what we do improves the lives of children. This is an important calling and one that deserves the best thinking of researchers from many disciplines, including education, psychology, learning sciences, speech pathology, biology, statistics, economics, and technology. In the summer of 2002, Keith Stanovich delivered the Distinguished Scientific Contribution Award address to the Society for the Scientific Study of Reading. In it, he attempted to shed light on the different "styles of science" employed to study reading (Stanovich, 2003, p. 106). We mention Stanovich's address and article at the outset because much of what we see in the critiques of our article (which appeared in the March 2009 issue of *Educational Researcher*; Connor et al., 2009) by Peter Smagorinsky and Arlette Ingram Willis (this issue of *Educational Researcher*, pp. 522–527 and 528–536, respectively), vividly illustrate the stylistic differences that Stanovich elaborated 6 years ago. We thank Karen Douglas (this issue of *Educational Researcher*, pp. 518–521) for her thoughtful contextualization of the set of articles in which our article appeared. We think her discussion will be useful to those who choose to go back and reread the original articles. The critiques of Willis and Smagorinsky, however, are not so much specific critiques of our work as rather broad critiques of entire approaches to research in education science. Thus, in this rejoinder, we place the remarks from those two

responses and our work in this broader theoretical and historical context, using the light of Stanovich's insights as a guide.

Stanovich (2003) posited five dimensional styles of science that serve as implicit underpinnings of how we practice science, how we evaluate evidence, and how we define our goals as researchers: correspondence versus coherence theories of truth; analytic reductionism versus holism; probabilistic prediction versus case-based approaches; robust-process explanations versus actual-sequence explanations; and concision.

Correspondence Versus Coherence Theories of Truth

The first style, correspondence versus coherence theories of truth, is perhaps the most fundamental to the questions we pursue as scientists: How do we evaluate evidence? How should we conduct research that produces evidence that we value? Answers to these questions often reveal where we fall on the continuum between correspondence theories of truth and coherence theories of truth. Correspondence theories of truth hold that

there is a real world out there that exists, independently of our beliefs about it [and] researchers form theories about this world, and the theories that track the world best are closer to the truth and are thus a better basis for action. (Stanovich, 2003, p. 107)

On the other end of the continuum are those who place higher value on making sure that the pieces of evidence gathered logically fit together into a narrative that makes sense. These researchers value observations that cohere in an existing framework. Many qualitative researchers across multiple disciplines would fall at the coherence end of the continuum.

At the heart of the matter is the notion that human beings are natural "pattern seekers" (Aveni, 2006; Lowrey, 1998, p. 2). Human beings excel at finding patterns in the environment and developing heuristics to explain these patterns. Finding patterns in the environment has clear survival benefits. But the same mechanisms that allow human beings to see important relationships in the environment can "lead us astray" (Guidoni, 1985, p. 133) and have one believing that readers only sample words from text instead of reading most of the words (Goodman, 1967) or that context is the primary driver in reading new words (Smith, 1971). Sometimes things that appear

obvious and true are not necessarily so. Thus, when we read Willis's critique stating that our work ignores entire bodies of literacy research evidence from "case study, discourse analysis, critical race theory, ethnography, and narrative" (p. 530), we believe we must explain why it might appear so. From our perspective, the research strategies described by Willis are among the first steps for examining possible generalizable causes and correlates of reading success—but they are only first steps. The anecdotes, narratives, and case studies she cites as evidence are often intriguing to researchers on our end of the spectrum, but they are too open to other interpretations, biases, or questions about exactly to which groups of people these findings apply. To raise such findings to the level of a generalization that can be applied to a population is, from our view, premature. There might very well be broad principles that can be derived from these narratives, or narrow principles that apply to a small group of people. We make these statements while acknowledging the weaknesses inherent from our own end of the continuum. All methods are imperfect. These weaknesses will become apparent as we discuss the other continua of the styles of science.

Analytic Reductionism Versus Holism

Stanovich also sees researchers in reading varying on a continuum of analytic reductionism versus holism. Reading is a complex activity that can be viewed through multiple lenses and paradigms. Even defining what reading is and is not apparently is fraught with peril. However, one theme that emerges from the criticisms of Willis and Smagorinsky is that our work is too narrow and reductive. That is, they claim that we conceptualize reading as if it were a "discrete and measurable act" (Smagorinsky, p. 523). We accede to these criticisms. We do believe that reading is a discrete act. There are times when we are reading—and times when we are not. We also believe that reading is measurable, while acknowledging that our measures are only imperfect proxies for a broader set of behaviors that constitute the construct of reading. Smagorinsky asserts that our assessments of reading "in no way resemble young people's authentic transactions with texts of their choice" (p. 523). Although ultimately we believe this statement is an empirical question, we would argue that they do indeed have much in common. Both require the reader to view printed words and decode them. Both challenge the reader to understand what story or information the text is trying to communicate. We would predict that how a reader performs on these standardized tests will relate quite well with a reader's ability to transact with any text (Connor & Rex, 2006).

Similar holistic arguments about classroom observations are presented by Willis. Willis wonders how many observations per year would be sufficient to capture the literacy instruction in a classroom. Although Willis does not give an actual number in answering her own question, her statement that "each day in a classroom is unique; there are no typical days, and . . . there are days that appear to be more like others" (p. 531), along with her other statements, leads us to believe that in order to capture the multiple literacy processes, one needs to be there every day. Our response to this form of holism is that we accept that every day is different; every child is different; every classroom, teacher, and school is different. Yet, although we acknowledge this fact, we also argue that there are enough consistencies across days, children, and classrooms that it is a worthwhile endeavor to study these consistencies, all the while acknowledging that there will be

exceptions to every generalization. So, from the analytic reductionist end of the continuum, the question "How many observations are necessary" becomes another empirical question that will depend on what behaviors the researcher wishes to observe and how commonly those behaviors are seen in the classroom environment. Perhaps more observations are necessary for some behaviors, and fewer observations for others. Our system relies on three observations—made in fall, winter, and spring—that allow us to capture important patterns of instruction precisely enough to predict students' reading skill growth.

Probabilistic Prediction Versus Case-Based Approaches

One of the authors of this response (Schatschneider) was presenting the results of a research synthesis to a large group of researchers and practitioners a few years ago. He was excited that one of the reported effect sizes was represented by close to 10,000 students. Afterward, however, he was pulled aside by one of his colleagues and told, "This group doesn't want to hear about 10,000 children—they want to hear about one child!" As Stanovich so eloquently pointed out, researchers who engage in large-scale quantitative studies often forget that there are a large number of conditional assumptions upon which our research is based and that these assumptions are almost certainly not understood by many people. One of these assumptions is the notion of cumulative probabilistic prediction. Our research often looks to make generalizations across all students, but not all students will benefit from our generalizations. There will always be exceptions and groups of students for whom these results and practices do not generalize very well. But exceptions do not necessarily refute the rule. For example, simply because specific situations exist (such as the Heath [1983] study that Smagorinsky cites) in which students struggle with text for unique reasons does not negate the overall conclusions found in numerous other studies (Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001). Specific instances serve to condition and contextualize the results of other studies; they do not negate them. An alternative model to the notion of cumulative prediction is the replacement model. According to this model, if certain instances cannot be explained by a generalization then a new model must be found to replace the old model. This has the potential negative consequence of throwing out what indeed does work for many children in the pursuit of what might work for a smaller number of children.

However, those of us practicing the probabilistic approach to science need to incorporate more adequately the findings from the case-based approaches and conditionalize our results in their light. There are exceptions and assumptions to our approach, and by being thoughtful in our conclusions, we can better serve the real-life needs of students and teachers.

Robust-Process Explanations Versus Actual-Sequence Explanations

The fourth style of science is robust-process explanations versus actual sequence explanations. A robust-process explanation, which our observation system was designed to capture, describes a causal model that defines a "class of possible worlds" (Stanovich, 2003, p. 116) in which a set of posited relations among constructs holds. For example, a number or group of actions by teachers should lead to

students' grasping the alphabetic principle (that graphemes represent phonemes, which, when blended together, represent meaningful semantic units). Because other robust-process explanations indicate that understanding the alphabetic principle is a necessary (but not sufficient) part of basic reading (Ehri, 1998), we are attempting to understand the general actions of teachers that, for most children, help them learn the principle. In contrast, an actual-sequence explanation provides one example (among many potential examples) of a teacher's action that actually results in a particular student grasping the alphabetic principle. The research that Willis and Smagorinsky describe provides rich details of particular actual-sequence explanations. As Stanovich points out, this is an important and valid application of science. That is not to say, however, that our robust-process explanations do not also make important contributions to our understanding about how children come to be literate and productive students.

Consilience

The unwillingness on the part of Willis and Smagorinsky to accept our styles of science as valid and important represents a rejection of consilience—the fifth and, in our opinion, the most critical of the five dimensions Stanovich describes. Based on our reading of Edward O. Wilson's 1998 book *Consilience: The Unity of Knowledge*, the opposite of consilience is isolation or exclusivity. Consilience, as described by Wilson, is the unification of "knowledge by the linking of facts and fact-based theory across disciplines to create a common ground of explanation" (p. 8). Of course, Wilson was calling for a unification of the natural and social sciences, but his thinking is not inappropriate for the disparate factions that plague education research—the *them* and *us* that defined the disastrous reading wars. Ironically, the intervention that our observation system was designed to explicate was based on the seminal work of prominent researchers in the qualitative traditions, including Pressley, Gee, Heath, the Santa Barbara Discourse Group, and Taylor and Pearson, among others (Gee, 2000; Green & Meyer, 1991; Heath, 1983; Pressley, 2006; Taylor, Pearson, Clark, & Walpole, 2000; Wharton-McDonald, Pressley, & Hampston, 1998). Moreover, our observation system evolved from linguistic and ethnographic roots (Agar, 1994; Halliday, 1978; Rex, 2006) and in this way serves as an example of methodological consilience. Moreover, one of us (Connor) recently had two articles published that showed how using both psychological and sociocultural lenses to examine students' literacy development (both case studies, or specifically, telling cases; Mitchell, 1984) provided critical information that neither lens alone illuminated (Connor, 2006; Connor & Rex, 2006).

Returning again to the ultimate purpose of education research—to improve the lives of children—respect and collaboration across and within disciplines are critical. Speech-language pathologists and their research elucidate aspects of language development that might not be apparent to critical theorists—African American children's use of dialect is studied very differently by these two disciplines, and yet we suspect that the two views could inform each other. As can be seen in the biographical information, we are a large, multidisciplinary team. These multiple perspectives contribute to productive discussions about research questions, methods, and implications and have been critical to the success of our research efforts to support students' learning in the classroom. When lines are drawn in the

sand, it is easy to miss where research findings agree, and we miss opportunities for consilience.

We wrote this rejoinder with the clear sense that the scholarly discussions in this issue had the potential to shape the discourse among education researchers in years to come. With this responsibility clearly in mind, we call for open collaboration and an acceptance of multiple views. There is no morally right or wrong type of research. Assessments in and of themselves are not evil. They are tools that are used correctly or incorrectly and most certainly can and will be improved. The perfectly complete definition of reading does not yet exist because we are still learning what *to read* means. Fidelity to instructional regimes might be a good or a bad idea—depending on the regime (Cohen, Raudenbush, & Ball, 2003; Raudenbush, 2007). Researchers from multiple disciplines have methods and insights that are needed to solve the important and perplexing problems our children will continue to face in the 21st century. We call for science, consilience, and a commitment to improving the lives of children.

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Manuscript received February 17, 2009

Revision received August 18, 2009

Accepted August 24, 2009