

Fostering Conceptual Change About Child Development in Prospective Teachers and Other College Students

Teresa M. McDevitt¹ and Jeanne E. Ormrod^{2,3}

¹University of Northern Colorado, ²University of Northern Colorado (Emerita), and
³University of New Hampshire

ABSTRACT—*Research findings about children and their developmental pathways have innumerable implications for teachers, other practitioners, and parents, who often learn about child development as part of college instruction. It appears, however, that courses in child development do not always have optimal effects on college students' understandings of children. This article identifies several factors that may impede effective learning in child development courses. Then, drawing from research in numerous content domains and with diverse student populations, it offers several hypotheses for facilitating conceptual change in college students' understandings of child development and for promoting positive transfer of those understandings to actual practices with children.*

KEYWORDS—*child development; conceptual development; college; teachers; schools; policy issues*

Researchers have spent more than a century examining children's development, producing a dynamic, ecologically rich body of literature on children's thought processes and social-emotional functioning. This knowledge base has matured to such a level that it now offers innumerable strategies for promoting children's learning and well-being. Developmentally based strategies are currently helping children in a range of settings, but children will more broadly benefit from this knowledge base

when a greater number of educators, parents, and caregivers grasp the field's essential concepts and implications.

College coursework is an important way to disseminate information about child development to budding professionals and current and future parents. Of course, simply informing students about children's needs through lectures and assigned readings does not necessarily result in deep insights about children. In this article, we examine factors that impede effective learning in college students, hypothesizing that instructors can promote more robust and usable understandings about child development when they use tactics that foster students' *conceptual change*, the process of revising or replacing existing understandings to accommodate new, more adaptive ones (Carey, 1985; Murphy, 2007; Posner, Strike, Hewson, & Gertzog, 1982). We begin with an analysis of prospective teachers, illustrating the kinds of problematic ideas future teachers sometimes hold even after acquiring basic developmental concepts. Next, we examine barriers to learning that affect college students generally during their exposure to developmental information. Finally, we propose a research agenda for evaluating instructional strategies designed to foster meaningful conceptual change about child development.

LEARNING ABOUT CHILD DEVELOPMENT: THE CASE OF PROSPECTIVE TEACHERS

Prospective teachers are important consumers of research in child development. In their future professions, these individuals must draw on knowledge of child development to nurture children's and adolescents' academic and creative skills, physical and emotional well-being, and productive peer relationships. Aware of the many practical implications of theory and research in child development, college instructors almost invariably expect

Correspondence concerning this article should be addressed to Teresa M. McDevitt, School of Psychological Sciences, Campus Box 94, University of Northern Colorado, Greeley, CO 80639, e-mail: teresa.mcdevitt@unco.edu; or Jeanne E. Ormrod, e-mail: jormrod@comcast.net.

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prospective teachers to learn course material with a sense of purpose and an eagerness to apply what they are learning.

In point of fact, prospective teachers have historically needed, and continue to need, considerable scaffolding in order to bridge theory and practice (Armstrong, 2006; O'Shea, 1909; Pressey, 1942). In a recent analysis of child development offerings for prospective teachers, however, a joint commission of developmental scientists and teacher educators concluded that child development coursework does not consistently offer realistic illustrations of developmental concepts or tie concepts to children's activities in classroom settings (National Institute of Child Health and Human Development & National Association for the Accreditation of Teacher Education, 2007). Moreover, a growing body of research suggests that efforts to stress practical applications of child development will have minimal impact unless college instructors simultaneously address how prospective teachers *think* about children (Daniels & Shumow, 2003; Goldstein & Lake, 2000; McDevitt, Jobs, Sheehan, & Cochran, 2007; McDevitt & Ormrod, 2005).

Unfortunately, many prospective teachers are slipping through college courses in child development with erroneous and overly simplistic ideas about children and their development (Daniels & Shumow, 2003). For instance, some prospective and practicing teachers believe that (a) intelligence and specific cognitive abilities are inherited and fixed, rather than environmentally influenced and malleable; (b) children learn best from one-way, didactic teaching practices, rather than from more active and *interactive* classroom lessons and activities; and (c) classroom behavior problems can almost invariably be traced back to poor parenting, rather than being the result of a complex interplay of many genetic, environmental, and behavioral factors (Daniels & Shumow, 2003; see also Ball, 1990; Reyna, 2000; Waterhouse, 2006). The perseverance of such beliefs may help explain the presence of uneven associations between teachers' completion of coursework in child development and the attainment of positive developmental outcomes of children in their care (Early et al., 2007; LoCasale-Crouch et al., 2007).

BARRIERS TO EFFECTIVE LEARNING IN CHILD DEVELOPMENT COURSES

To understand why prospective teachers and other college students fail to learn child development as effectively as they might, we need to consider that a great deal of learning in college classrooms can probably best be characterized as an additive process: Students acquire an ever expanding collection of facts, concepts, and theories without changing their fundamental views—that is, without undergoing appropriate accommodation in the face of contradictory evidence (e.g., Holt-Reynolds, 1992; Sinatra & Pintrich, 2003). At least three

specific barriers appear to reduce students' ability to grasp developmental concepts accurately and productively.

Tenacity of Prior Knowledge and Beliefs

Learners typically draw on what they currently know and believe as they interpret and elaborate on new information (e.g., Novak, 1998; Shapiro, 2004). In some cases, students' everyday understandings can wreak havoc with new learning. For example, students are apt to apply everyday meanings to such words as *stage*, *egocentrism*, *socialization*, *maturation*, and *reinforcement*, leading them to misunderstand these words as theoretical concepts in developmental psychology (Dai, Gonyea, Malkani, Zhang, & Smith, 2005). Students can also fall victim to *epistemic egocentrism*, drawing on their own childhood experiences to conclude, often incorrectly, that children from diverse backgrounds have gained understandings similar to their own (Royzman, Cassidy, & Baron, 2003).

Alternatively, students may learn classroom subject matter accurately and yet continue to maintain existing contradictory beliefs. Sometimes this happens as a result of rote-learning strategies in which students make little or no conscious attempt to connect what they are studying to their current understandings about a topic (Novak & Musonda, 1991; Perkins & Simmons, 1988; Prawat, 1989). In other cases, it seems to occur because existing beliefs take the form of *tacit knowledge*—knowledge that cannot easily be consciously accessed. In either situation, students do not realize that new information contradicts what they already believe and thus continue to apply their original beliefs when interpreting and responding to new situations (Chambliss, 1994; Sinatra & Pintrich, 2003).

Students' tacit beliefs about children may be especially resistant to conceptual change. Because these beliefs lie “below the surface” of conscious understandings, they are not readily available for reflection and revision (Keil & Silberstein, 1996; Strike & Posner, 1992). Furthermore, some beliefs (including many tacit ones) are apt to be integrated into larger, more comprehensive theories about the nature of human beings. In such circumstances, changing beliefs would ultimately involve changing an entire organized body of knowledge—perhaps even an entire worldview—rather than a few isolated ideas (Derry, 1996; Koltko-Rivera, 2004). For example, students may come to class with general beliefs about human nature—for instance, that people (or some groups of people) are inherently good (or evil) or that human personality characteristics are essentially fixed at birth (or easily changed through experience; Koltko-Rivera, 2004; Losh, 2003). Often, such beliefs are widely held and regularly affirmed in one's sociocultural environment (Hatano & Inagaki, 2003; Southerland & Sinatra, 2003). Significantly, such subterranean beliefs occasionally lead students to see individuals from ethnic and cultural groups different from their own as being less worthy and capable than other individuals (Ludman, 2007).

Cognitive Biases

In addition to being committed to particular ideas, students take shortcuts in their thinking, thereby reducing the complexity of information they encounter. They often invoke a *cognitive bias*, applying a fairly consistent cognitive “filter” that influences how they interpret new information. One such bias is *confirmation bias*, a general tendency to look for information that supports existing beliefs and to ignore or discredit any contradictory evidence (Chinn & Brewer, 1993; Kuhn, Amsel, & O’Loughlin, 1988). Generally speaking, maintaining existing perspectives, rather than considering alternative and possibly conflicting ones, is the “default” mode in human cognition (De Lisi & Golbeck, 1999).

Another cognitive bias coming into play is *ethnocentric bias*, a tendency to take one’s own cultural teachings as general standards of what practices are “right” or “best.” Virtually any culture passes views about children and their development—about feeding practices, sleeping arrangements, discipline, and so on—from one generation to the next. Such views differ considerably among cultures, yet college students (like other adults) are apt to take the teachings of their culture as “obvious,” indisputable truths about what practices are best for children (e.g., Kağitçibaşı, 2007; Rogoff, 2003).

An *antiresearch bias* can play a role as well. Some students are suspicious of psychological research. They may have heard that “you can prove anything” by fiddling with data or believe that averages and general trends have little relevance to individual children or particular classrooms (e.g., Joram, 2007). This bias can carry over into students’ future professional practices. Some educators see research findings as being largely irrelevant to classroom practice, perhaps because numerous studies are conducted outside the classroom, statistical analyses are complex and difficult to decipher, or research reports are written in dry, technical language (e.g., Bracey, 1989; Gore & Gitlin, 2004). With such reservations, prospective and practicing teachers alike may discount research findings and rely on their own intuitive judgments and experiences with children.

Personal Epistemologies

In addition to the impacts of prior understandings and cognitive biases, students’ beliefs about the nature of knowledge and learning, collectively known as *personal epistemologies*, can have a significant impact on how students go about learning, and therefore on what they ultimately understand, in a college classroom (Hofer & Pintrich, 2002; King & Kitchener, 2004). For example, students may conceptualize “knowledge” in a discipline as (a) absolute and unchanging or, alternatively, dynamic and subject to revision over time and (b) a collection of simple isolated facts or, alternatively, an integrated body of complex interrelated ideas. And they may think of “learning” as (a) a process that occurs quickly and relatively “thoughtlessly” or, instead, a process that takes considerable time and active mental involvement and (b) a process that involves choosing the

right perspective from among several competing alternatives or, instead, a process that necessitates considering multiple valid viewpoints (Bendixen & Rule, 2004; Hofer & Pintrich, 2002; Patrick & Pintrich, 2001; Schommer, 1994a).

College students’ epistemological beliefs tend to be somewhat domain specific. On average, adult learners tend to believe that knowledge in mathematics and the natural sciences is largely set in stone, whereas knowledge in some social sciences, such as psychology, is tentative and subject to critique and change (Estes, Chandler, Horvath, & Backus, 2003; Hofer & Pintrich, 2002; Schommer, 1994b). We suggest that a “tentative” view of psychological theories of child development can in many instances be beneficial, in that it may predispose college students to read research studies with a critical eye and to expect that new results will inevitably challenge existing thought. In other cases, however, it might lead students to dismiss theories that do not match their own preconceived notions about children and their growth.

To some degree, epistemological beliefs are probably the result of classroom instruction and assessment practices—for instance, whether the focus is on memorizing certain facts, on the one hand, or on critiquing and applying theories, on the other (Hofer, 2004; Hofer & Pintrich, 1997). Personality traits (e.g., open-mindedness vs. need for closure), dispositions (e.g., preference for simple, one-dimensional explanations; willingness and inclination to engage in critical thinking), and intellectual values (e.g., importance placed on intellectual engagement with, as well as critical evaluation of, new ideas) probably also influence the epistemological beliefs that learners adopt (DeBacker & Crowson, 2006; Kuhn & Park, 2005; Kuhn & Weinstock, 2002; McDevitt et al., 2007; Waterhouse, 2006).

We propose that the three barriers just identified are especially likely to flourish during lectures and other conventional methods of instruction in which students are simply expected to absorb new information without also wrestling with how it jibes with what they currently believe. Heavy reliance on traditional assessment practices (e.g., multiple-choice questions) can compound the problem, especially if the focus of questions is on simple recall of course material rather than on its application to realistic scenarios with children.

POTENTIALLY EFFECTIVE INSTRUCTIONAL STRATEGIES: A RESEARCH AGENDA

To date, research regarding specific conditions that promote conceptual change in child development classes and with prospective teachers in particular has been quite limited. However, research in other domains (e.g., mathematics, science) and with other populations (e.g., young children, high school students, 1st- and 2nd-year college students) suggests that instruction can effectively nurture students’ thinking when students are thoughtfully engaged in learning and instructors make an effort

to foster new insights (Murphy, 2007; Piaget, 1973). We offer the following hypotheses both as potentially effective strategies and as topics for future research.

Hypothesis 1: Active cognitive engagement with the subject matter promotes conceptual change.

Almost invariably, people learn more effectively when they engage in *meaningful learning*, that is, when they make conscious connections between new information and the things they already know and believe (Ormrod, 2008). Meaningful learning takes time, however (National Research Council, 2000). Some theorists therefore advocate a *less-is-more* approach to instruction, in which students study a few topics in depth rather than “covering” many topics superficially (e.g., Berliner & Biddle, 1995; Brophy & Alleman, 2002). Virtually any child development class must, of course, address trends and characteristics in a variety of developmental domains. Nevertheless, instructors can focus on key ideas that underlie these domains—for instance, the idea that heredity and environment continually interact with an active, developing child—rather than piling fact upon fact upon fact. Such focused instruction should encourage thoughtful and thorough cognitive processing, for instance by regularly asking students to explain and justify their reasoning (Darling-Hammond & Bransford, 2005; Middleton & Midgley, 2002).

Hypothesis 2: Anticipation of typical preconceptions and vigorous attempts to address them promote conceptual change.

Instructors can more vigorously address any counterproductive beliefs when they know what those beliefs are (Murphy & Alexander, 2004). Informal question–answer sessions and non-graded prequizzes about upcoming topics are possible ways to get a handle on what students currently know and believe to be true about children and their development. Furthermore, instructors can inform students of common beliefs that interfere with accurate understandings of class content. For example, some instructors explicitly point out that developmentalists’ meanings of certain terms (e.g., *egocentrism*, *maturation*) are distinctly different from the meanings of these words in everyday conversation.

Hypothesis 3: A focus on explicit, concrete principles and strategies promotes conceptual change more than does a focus on abstract generalizations.

Some research with prospective teachers in child development classes suggests that those students do acquire many productive beliefs either before or during their formal coursework. In some instances, however, these beliefs reflect vague truisms that prospective teachers have trouble translating into concrete practice. For example, future teachers typically assert that they should treat children kindly and respectfully, but

when asked how they might express such a caring attitude, some find it difficult to explain exactly what they would do (Goldstein & Freedman, 2003; Goldstein & Lake, 2000).

To be sure, general abstract ideas are essential for integrating large bodies of research about children into meaningful cohesive wholes. But we suggest that abstractions must also be tied to specific concrete classroom practices. Videos of children and classrooms in action, text-based case studies, and in-depth analyses of actual classroom artifacts are examples of strategies that may possibly help prospective teachers make important theory–practice connections (e.g., Darling-Hammond & Hammerness, 2005).

Hypothesis 4: Information and events that create disequilibrium promote conceptual change.

Numerous psychologists have followed Piaget’s lead in suggesting that presenting puzzling or unexpected information and events can spur learners to revisit and revise their existing understandings (e.g., Andre & Windschitl, 2003; Echevarria, 2003; Posner et al., 1982). Disequilibrium-producing experiences can take a variety of forms—asking questions that challenge existing beliefs (e.g., beliefs that “recess is a waste of time” or that “low-achieving students just aren’t motivated”), presenting research results that students cannot adequately explain using their current understandings, engaging students in discussions of the pros and cons of various explanations of children’s behaviors in case studies, and so on (e.g., Darling-Hammond & Hammerness, 2005).

Well-ingrained biases and dispositions, such as a preference for simplistic explanations, may be especially tough nuts to crack. When such tendencies come into play, prospective teachers may easily dismiss information that contradicts what they “know” to be true, perhaps by interpreting it as “the exception that proves the rule.” In such instances, instructors may need to provoke disequilibrium time and time again while simultaneously bringing existing (and possibly tacit) beliefs into focus for close inspection. For example, when prospective teachers assert that “bad parents” are invariably the cause of children’s emotional or behavioral difficulties, instructors can emphasize and illustrate how *all children* possess protective and risk factors in their multilayered environments; doing so repeatedly can potentially make a dent in students’ preferences for overly simple explanations (Spencer et al., 2006).

Hypothesis 5: Frequent and critical self-reflection promotes conceptual change.

Expert instructors—those whose classroom practices consistently yield positive outcomes in students—typically engage in *reflective teaching*. They regularly look inward, critiquing their own assumptions, inferences, and actions, and they are apt to modify their beliefs and classroom practices in the face of new

information (Hogan, Rabinowitz, & Craven, 2003; Larrivee, 2006; Silverberg, 2003). We suggest that for prospective teachers, such self-reflection best begins in college (if not sooner), spurred on by the encouragement and scaffolding of instructors and perhaps by one or more formal assignments that specifically require introspective self-examination.

Hypothesis 6: Conceptual change is more likely when the overall classroom culture encourages it.

Instructors who encourage transfer, critical thinking, and other higher level thinking processes tend to communicate the *importance* of such processes in both words and deeds (Haskell, 2001; Muis, Bendixen, & Haerle, 2006; Pea, 1987). For instance, they regularly encourage their students to ask “How might I use this information?” while reading, and they conduct in-depth analytical discussions of controversial issues (Chinn, 2006; Perkins & Ritchhart, 2004). Yet, these students must not see new contradictory information as in any way threatening their self-esteem (Minstrell & Stimpson, 1996; Sherman & Cohen, 2002). Ultimately, the classroom should be socially and emotionally supportive of conceptual change (Hatano & Inagaki, 2003).

We have examined empirical evidence that justifies expectations for favorable effects of interactive and conceptually focused lessons wherein students feel challenged, guided, and supported. Individual instructors can test these hypotheses in their own classrooms, remembering to look at their students in the same way they urge their students to view children—as learners who are intrinsically motivated to learn, frugal in their use of limited intellectual resources, constructive in their analysis of new information, and unable to achieve expert status overnight. At the same time, it is essential that the strategies we propose be validated through systematic research. The character of beliefs necessitates a multifaceted assessment strategy, as does the intricate connection between what adults understand about children and how they treat children in classrooms and other settings. Valuable designs would include large-scale experimental and quasi-experimental designs, case studies of college students who are exposed to particular instructional strategies, ethnographic investigations of prospective teachers during field placements and student teaching assignments, and longitudinal studies of new teachers trying to apply developmental concepts in their own classrooms. The accumulated data should ultimately help developmental instructors educate future teachers and other college students to measurably high standards of understanding in child development.

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