Social Policy Report

PK-3: WHAT DOES IT MEAN FOR INSTRUCTION?

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Abstract

"PK-3" has become a rallying cry among many developmental scientists and educators. A central component of this movement is alignment between preschool and the early elementary grades. Many districts have made policy changes designed to promote continuity in children's educational experiences as they progress from preschool through third grade—to provide children with a seamless education that will sustain the gains made in preschool and lead to better developmental and learning outcomes overall. This report proposes a conceptualization of productive continuity in academic instruction, as well as in the social climate and classroom management practices that might affect children's social-emotional development. It also considers ways in which schools might seek to achieve continuity in parents' and children's experiences. Finally, the report proposes specific state and district policies and school practices that are likely to promote continuous and meaningful learning experiences.

From the Editor

Despite the fact that participation in early care and education has become normative in the United States (with 76% of 3 and 4 year olds participating in non-parental early care and education and 61% participating in center-based programs, according to the National Household Education Survey of 2012), we are only beginning to see efforts to connect instruction for preschool-age children with what they will experience in their early years of elementary school (kindergarten through third grade). One reason for this disconnect is the lack of a clearly articulated framework for what continuity in instructional practices should involve. In this *Social Policy Report,* the authors take a much-needed step towards providing a framework for such alignment, or "PK-3 instructional alignment."

There is a growing body of evidence that young children's preparation for school can be strengthened by high-quality early care and education. Yet there are signs that the boost in school readiness from such experiences can diminish or disappear when subsequent educational experiences fail to build on them with intentionality. Evidence summarized in this *Social Policy Report* indicates, for example, that there is substantial repetition in the kindergarten year of what many children have already learned in their pre-kindergarten year—repetition that can lead to boredom and a decline in motivation.

But what does it mean to build on strong early care and education? Simply stating that there is a need for continuity from the preschool years to the early years of elementary school is not enough. Continuity can mean continuing poor educational practices, such as pushing down rote learning from the elementary school years into preschool programs. While evidence from multiple evaluations of strong curricula for preschool-age children indicates that they can be effective in building early math skills, language and literacy skills, and social competence, there is very little evidence as yet on what the implications are when such programs start in preschool and intentionally continue on into the early years of elementary school. While the early results of such efforts are quite exciting, they are still limited.

This *Social Policy Report* makes the case that even as we wait for further evidence from evaluations of educational approaches that begin in the pre-k year and build systematically through third grade, we can draw upon other sources to define continuity that is educationally productive for children across these years. School reform research and the cognitive science literature provide strong foundations for articulating such a framework. This *Social Policy Report* provides guidance for both policy makers and educational practitioners on how to purposefully connect instructional approaches from pre-k to the early years of elementary school in order to effectively bridge across these.

PK-3: What Does It Mean For Instruction?

"PK-3" has become a rallying cry among many developmental scientists and educators (Bogard & Takanishi, 2005; Graves, 2006; Kauerz, 2006, 2007; Takanishi, 2016). The concept refers to a broad array of policies and practices designed to launch children from birth to age 8 on a positive developmental pathway, with the early elementary grades continuing to build on what children learn in preschool. At the federal level, the Early Learning Initiative at the U.S. Department of Education has a strong focus on birth-through-eight policy. Philanthropic organizations, such as the Foundation for Child Development, have brought broad attention to the importance of this particular age span. And school districts across the country are implementing or considering policies recommended by proponents of PK-3. Increasing interest at the local, state, and federal levels in expanding access to preschool make attention to this issue particularly timely.

A central component of this movement is alignment between preschool and the early elementary grades. Until recently preschool and K-12 have typically been offered in separate institutions. Even when offered in the same building, policies and personnel were frequently disconnected. But that situation is changing. Increasingly, efforts are being made to create stronger connections between preschool and elementary school (Takanishi, 2016).

Some PK-3 initiatives have endeavored to improve children's early education opportunities and to reduce fade-out by continuing services (e.g., health and nutrition) and other resources (e.g., reduced class size) from preschool through the early elementary grades (Reynolds, Temple, Ou, Arteaga, & White, 2011). Community Schools (Geiser, Rollins, Gerstein, & Blank, 2013), in particular, emphasize consistent community resources to support children and families as they transition from preschool to elementary school.

Other PK-3 efforts have involved policy or structural changes, such as aligning state preschool standards to kindergarten standards, placing preschools on the same campus as elementary schools, having preschools administered by school districts and overseen by elementary school principals, and creating integrated data systems that can be used to track students' progress across grades. Some districts and schools have adopted the same curriculum for preschool and the elementary grades and provided professional development (PD) to teachers across levels and grades.

Presumably, all of these changes are designed ultimately to promote continuity in children's educational experiences as they progress from preschool through third grade—to provide children with a seamless education that will sustain the gains made in preschool and lead to better developmental and learning outcomes overall. As mentioned above, PK-3 has many facets,

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and by most definitions it includes children from birth through the third grade. In this report, we focus on one particular facet—continuity in instruction between preschool programs (typically 3 to 5 year olds) and the grades from kindergarten to third. To be sure, the foundation of children's development begins long before the age of three years. But we focus on preschool programs because "instruction" takes a very different form in the infant and toddler years. In our definition of preschool programs, we include any structured educational setting that is explicitly designed to promote young children's development, including state-funded preschools, Head Start, school-based programs for 3 to 5 year olds, or private preschool programs.

Although it seems reasonable to expect that continuity in instruction between preschool and the early elementary grades will promote learning, we do not have direct evidence on whether continuity has value over and above the value of high quality instruction, continuous or not. And we also see hardly any empirical evidence on whether—or under what conditions—typical structural and policy changes such as those mentioned above actually lead to greater continuity in children's educational experience (Whyte, McMahon, Coburn, Stein, & Jou, 2016).

Research on the question of how continuity in educational experiences across grades enhances children's learning and development will require a clear conceptualization of instructional continuity, one that is not at all straightforward to develop. First, note that most writing on this topic assumes that continuity is positive, without considering or specifying which aspects of instruction should be continuous and which should be adjusted to be developmentally appropriate. It is possible that some kinds of continuity could have harmful effects. Children clearly would not benefit from continuity of bad instruction that does not promote learning. We do not address the issue of what constitutes quality instruction in detail in this report, but we recognize that the value of continuity in instruction depends substantially on its quality.

"Continuous" clearly does not mean "the same." The content of instruction needs to change as children develop new understandings and skills, are able to take on new forms of participation, develop language, and take on new content. As an example, the ratio of time teachers spend reading to children versus children reading should shift as children acquire reading skills. Similarly, as children develop their math ideas, teachers need to change the tools they provide to support their math problem solving. Likewise, older children should be given tasks that require them to remember more complex instructions than younger children. Other differences across grades, however, may be unnecessary or interfere with children's learning and development, such as moving from an inquiry-based approach to one emphasizing rote memory. The question, then, is: What changes in content and pedagogy are developmentally appropriate and support continuity in learning, and what changes are likely to be disruptive?

The first goal of this report is to propose a conceptualization of productive instructional continuity. Given the emphasis in PK-3 on the development of the whole child, we include a discussion of continuity in the social climate and classroom management practices that might affect children's social-emotional experiences and development. Because parents play an important role in children's learning, we also consider ways in which schools might seek to achieve continuity in parents' as well as children's experiences.

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A second goal of the report is to propose specific strategies for promoting continuous and meaningful learning experiences that are likely to improve child outcomes. While continuous, meaningful learning is mostly determined by what children experience in the classroom, instructional practices are substantially affected by district and school policies and practices. Accordingly, the final section of this report focuses on district and school policies that might support productive continuity at the classroom level. Because research evidence on these issues is thin, we venture beyond the evidence base to speculate about policies and practices that are likely to contribute to continuity in children's learning experiences in an effort to stimulate further research.

Continuity in Academic Instruction

Our conceptualization of instructional continuity is based on school reform research and the cognitive science literature that addresses curricular/instructional coherence within grades and continuity of curriculum and instruction across grades. Although cognitive scientists who study the effects of continuity and coherence in instruction have not included preschool children in their studies, the research focused on K-12 can provide some guidance for creating greater coherence between preschool and the first few grades of elementary school.

Content: Progressions and Connections

In this section, we focus on research on the content taught, the order in which it is taught, and the connections made between topics. These issues are directly relevant to efforts to achieve coherence and continuity in instruction across grades.

Newmann, Smith, Allensworth, and Bryk (2001) define "coherent instruction" as providing "sensible connections and coordination between the topics that students study in each subject within a grade and as they advance through the grades" (p. 298). They add that coherent curricula proceed "logically from one grade level to the next and offer a progression of increasingly complex subject matter rather than repeating rudimentary material previously taught" (p. 299). The validity of their conceptualization is supported by evidence suggesting that instructional coherence, as they define it, is a component of school reform that leads to better learning outcomes for children. In their study conducted in 222 Chicago elementary schools, they found that improvement in the level of instructional coherence, among other variables, was associated with improved student test scores over the same period of time (Newmann et al., 2001).

Logical progression is, in part, embedded in the discipline. In learning to read, children need to understand letter-sound relationships before they can decode whole words; in math, solving addition problems requires counting and therefore logically follows opportunities to develop this competency. Mathematics provides one example of the usefulness of coordinating content progression with children's thinking trajectories. Building on the work of a rich body of research in addition and subtraction (Carpenter & Moser, 1984), Clements and Sarama (2014; Sarama & Clements, 2009) have found that children follow fairly predictable learning trajectories in developing understanding and skill within particular mathematics topics. Consider addition. Children typically learn to add by counting all the objects. For example, after counting three bears, if asked how many they have when two are added, they count all five bears. Subsequently, they learn to "count on" rather than "count all." For example, if they know they know they have six objects and are asked to add three, they count "seven, eight, nine" rather than count all nine objects. Later, children can compose and decompose numbers (e.g., 10 can be created with 1+9, 2+8, and so on).

The age at which children develop skills is not pre-ordained, and even the sequence in which they acquire them may show inter-individual variation; instruction can affect both age and sequence. Children also often develop different skills simultaneously, and their performance at any given time may not be the same if minor changes are made in the context or materials. Knowing typical trajectories, however, gives teachers guidance on the sequence in which new mathematical ideas should be introduced. This knowledge helps teachers identify the next step, so they can target instruction just beyond children's current understanding—in what Vygotsky (1978) refers to as the "zone of proximal development." Moreover, considerable evidence shows that professional development focused on math learning trajectories increases not only teachers' professional knowledge, but also their students' motivation and achievement (Carpenter, Fennema, Peterson, Chiang, & Loef, 1989; B. Clarke, 2004; D. Clarke et al., 2001; D. Clarke et al., 2002; Clements & Sarama, 2007; Fennema et al., 1996; Kühne, van den Heuvel-Panhulzen, & Ensor, 2005; Thomas & Ward, 2001; Wright, Martland, Stafford, & Stanger, 2002). Scale-up projects using curricula and professional development based on learning trajectories have also shown strong positive and enduring results (Clements, Sarama, Spitler, Lange, & Wolfe, 2011; Clements, Sarama, Wolfe, & Spitler, 2013, 2014; Fuson, Carroll, & Drueck, 2000; Thomas & Ward, 2001).

As with mathematics, some researchers have identified what appear to be developmental progressions for key topics in science, such as physics and biology. Developmentally-appropriate practice—especially the sequence in which new concepts are introduced—can be informed by these progressions (Duschl, 2007), and although there is not complete agreement on science trajectories, there is evidence that following identified pathways is educationally efficacious (Gelman & Brennemann, 2004). Work on identifying learning progressions and core concepts in science is not as far along as it is in mathematics (Brenneman, 2009). The field of progressions is expanding, however, and science-related learning trajectories might increasingly inform standards, curricula, and teaching (Duschl, 2007).

We also know something about learning trajectories in reading. A recent review by Quinn, Spencer, and Wagner (2015) lays out the developmental trajectory for phonological awareness, a key predictor of later reading comprehension. The developmental progression is "characterized by awareness of successively smaller phonological units (i.e., compound words, syllables, onsets and rime, individual phonemes, and phonemes in consonant clusters)"

(p. 87). Phonological awareness precedes word awareness and the ability to distinguish words in a stream of speech, as well as understanding rhyme and the beginning sounds in words. Subsequently, children can successfully tap out the number of syllables in a multisyllabic word and detect phonologically similar or dissimilar words, which is followed by the ability to segment words. Similarly, Kim and Wagner (2015) have outlined the progression of reading comprehension across the early grades (first through fourth grades). Reading comprehension is made up of the component skills of word-reading fluency, text-reading fluency, and listening comprehension. Word-reading fluency is a prerequisite to text-reading fluency, which in turn is important for reading comprehension.

Efforts are also under way to develop learning progressions to capture the development of the English language proficiency of PK-12 English language learners. The Dynamic Language Learning Progressions (DLLP) project (Bailey & Heritage, 2014; DLLP website) is working to develop and empirically validate a model of how language learning progresses for a range of academic language functions needed to be successful in school. Ultimately, the goal of DLLP is to support the use of the progressions by teachers for formative assessment and instruction of English language learners in standards-based classrooms.

Sequencing instruction according to children's typically developing understandings helps children connect with and build on previous learning, which cognitive science researchers have shown facilitates learning (Bransford, Brown, & Cocking, 1999; Greeno, Collins, & Resnick, 1996; Mayer & Wittrock, 1996). When experiences are disconnected, students have difficulty incorporating new understandings into prior knowledge and altering prior knowledge when necessary.

Taken together, this research suggests the importance of organizing instruction within and across grades so that it moves children along typical—albeit sometimes somewhat messy— learning trajectories. Kindergarten instruction that focuses on skills that children already developed in preschool will not produce learning gains (Engel, Claessens, & Finch, 2013), and children may not benefit from instruction that skips to levels far beyond their understanding. The research likewise suggests the value of connecting concepts, skills, and learning approaches introduced in one grade to what children learned in the previous grade.

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Continuity in instruction also means providing children opportunities to broaden and deepen the development of their understanding. Cognitive science research has shown that learning requires recurring opportunities to practice and to apply skills in new contexts (Newmann et al., 2001). Skills are less likely to transfer to other settings after either short-term or disconnected exposure. Thus, if a teacher in one grade does not build on the skills children developed in the previous grade, as well as give students opportunities to practice them in different contexts, children may not develop flexible or adaptive skills that they can access and apply in different situations (Baroody & Dowker, 2003). The task is not to repeat material that children have already covered in the same way that it was covered before, but to give them opportunities to extend those proficiencies in ever-expanding and novel contexts.

Continuity in instruction, as conceptualized above, most likely contributes to students' academic achievement in several ways. First, if instruction is sequenced, connected, and elaborated, less time is spent repeating material that children already understand, which a recent study has demonstrated is often the case. Engel et al. (2013) found in a nationally representative sample of kindergarteners that before they entered kindergarten, children had already mastered most of the mathematics skills kindergarten teachers reported teaching. For example, although the vast majority of children entered kindergarten having mastered basic counting and were able to recognize simple geometric shapes, their teachers reported still spending about 13 days per month on this content. Children thus failed to receive a "progression of increasingly complex subject matter," wasting instructional time that could have been used to advance their skills. A later study by Engel and her colleagues (Engel, Claessens, Watts & Farkas, 2016) revealed, not surprisingly, that instruction on basic content that most children had already mastered was negatively associated with kindergarten learning.

Research efforts by Engel and her colleagues are not the only studies that have documented unnecessary repetition in math. In 2004, Fuson characterized math instruction in the early grades in the United States as a mile wide and an inch deep, with many topics repeated from year to year that wasted learning time. In a teacher survey, Polikoff (2012b) found redundancy in math content, with as much as 90 days of instruction overlapping with the prior year. Often, some repetition is called for, but it needs to be tied directly to students' needs, and ideally it involves using previously developed skills in new and different contexts.

Similar problems may exist at the preschool level. A study comparing children who had two years of Head Start (ages 3-5) with children who had one year of Head Start (age 3) followed by a year of Oklahoma state preschool (age 4), found that the latter children made significantly greater academic gains than the former (Jenkins, Farkas, Duncan, Burchinal & Vandell, 2016). The authors speculate that because Head Start typically combines 3 and 4 year olds into one class, their second year may not build on and extend what they learned the first year. The findings point to the importance of minimizing repetition in preschool, as well as in the transition from preschool to elementary school.

A second way in which continuity in instruction may contribute to academic achievement is by reducing the apparent "fade out" of the effects of high-quality preschool. If children who have developed math skills in preschool are not given an opportunity to continue to develop their skills, they will not continue to progress. Thus, rather than the skills of the children who benefitted from preschool fading out, the other children simply catch up and therefore look the same in subsequent grades. Indeed, in a large scale-up study of a math curriculum, the children in classrooms where kindergarten and first-grade teachers were encouraged to and helped to build on and deepen the math ideas taught in preschool maintained early gains; in classrooms where the teachers were not given such support, the initial gains were largely lost (Clements et al., 2013, 2014).

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Maximizing motivation is a third likely benefit of instruction and activities that build on and deepen children's skill levels. In addition to supporting learning, considerable evidence demonstrates that instruction targeted just above children's current skill level is more intrinsically motivating than instruction on already-mastered skills or that is far beyond a child's skill level (Stipek, 2002). Rather than being motivated to engage in learning activities, children who repeat material they have already mastered are bored, and children who are given instruction far beyond their skill levels become frustrated and discouraged.

Continuity in instruction should also allow children to see their skills developing over time, which creates a sense of mastery and self-efficacy, as research on motivation has shown (Stipek, 2002). Inconsistent or disconnected instruction, in addition to undermining skill development, may result in children being unable to visualize the progress they have made.

In summary, research suggests the importance of the following qualities related to the progression and connections in instruction over the course of a grade and between grades:

1. Topics in each grade build on those covered in previous grades.
2. Instruction:
   a. becomes increasingly complex in accordance with the discipline,
   b. is aligned with typical learning trajectories,
   c. is targeted just above each student's skill level.

3. Connections are made between constructs and topics.
4. Students are given opportunities to:
    a. broaden and deepen their skills by applying them in novel contexts,
    b. see the progress they make in their understanding and skills.

Pedagogical Practices

In addition to *which* concepts are taught and in what order, continuity in teachers' pedagogical practices may also be important. On this topic, we have mostly anecdotal evidence and expert opinion. The absence of systematic research on the effect of continuity in teaching practices requires us to speculate about the ways in which children might benefit from experiencing similar instructional practices as they move from preschool into and through the early elementary grades.

Consider math, for example. Children could be confused and learning could be undermined if they move from classroom A to classroom B, or vice versa, as indicated below:

Instructional Approaches

Classroom A	Classroom B
Manipulatives are commonly available and can be used by children in ways that make sense to them.	Manipulatives are used infrequently, often for demonstration only, and most of children's work involves paper and pencil.
Children frequently work in dyads or small groups.	Children work alone.
The teacher asks children to figure out different ways to solve problems on their own or with classmates.	The teacher stresses using a particular, taught method for generating answers to problems.
The teacher expects children to explain how they found their answer and why an answer is correct.	The teacher focuses only on the correctness of answers.
It is important to be able to solve problems correctly, but also to be able to analyze incorrect answers and invalid reasoning.	Only getting the right answer is emphasized.
Speed is less important than reasoning. (although fluency in core skills is developed).	Speed is emphasized.
Assessment occurs every day in the context of classroom practice.	Assessment occurs every Friday on a quiz or at the end of a unit.

In these examples, most early math researchers today would favor the instructional practices in classroom A as better instruction in any grade (Clements & Sarama, 2004; National Research Council, 2009), but children might be confused if they move from a classroom like classroom B to one more like classroom A or vice versa. Whatever the instructional approach, learning is likely to be disrupted when children change grades if they are required to learn a new set of rules and a new way of thinking about what it means to do math.

Some experimental evidence is available to support this claim. In a study by Clements and his colleagues (2013), children who experienced preschool instructional approaches known to be effective (like those in Column A) outperformed children in the control group by the end of preschool. They subsequently either received the same enhanced instructional program or they received traditional instruction (like that in Column B) for kindergarten and first grade. The latter group performed only slightly better than the control group at the end of first grade, demonstrating the familiar "fade-out" effect. The positive effects of the preschool instruction in math were sustained through first grade in the group that experienced the same enhanced math instruction in kindergarten and first grade. Although it cannot be determined whether the achievement benefits accrued from high-quality instruction over two years versus one, or from children experiencing continuity in the instructional approach, the findings point to the value of interventions that transcend a particular grade in school.

Substantial changes in teaching strategies in reading may also disrupt learning. For example, a second-grade teacher who tries to engage students in analysis and sense-making when they read may have a hard time getting students to participate productively if in previous grades they had experienced reading instruction that focused almost exclusively on decoding (Institute of Medicine [IOM] & National Research Council [NRC], 2015). In contrast, similar teaching approaches to reading in preschool through third grade could give children a sense of familiarity and confidence. Lesaux (2013) suggests using thematic units as a strategy for teaching language and literacy skills throughout these grades. Whatever the specific strategy, it is likely that some continuity in teaching approaches and emphasis will support learning better than requiring children each year to learn a new way to develop their reading skills.

An anecdote from a colleague who asked a young child to read some text illustrates how reading can take on different meanings depending on how children are taught. The child read the text flawlessly, but when the adult asked him what it was about, his response was: "You asked me to read it, not to understand it." For this child, "reading" meant decoding the sounds, not drawing meaning from text.

Anecdotal evidence also indicates that children can "unlearn" productive habits and beliefs when they move from a classroom in which they received high-quality instruction to one where less effective instructional strategies are used. This is one way that low-quality instruction in the early elementary grades might wipe out the benefit of high-quality preschool. In one study, McNeal (1995) describes how a shift from relational mathematics (focused on understanding) in one grade to instrumental mathematics (focused on memorizing and applying procedures) in the next grade undermined a child's mathematical development. The boy, Sam, had successfully invented his own solution strategies in a classroom where an inquiry-based mathematics program was implemented. In only eight weeks of traditional instruction in the next grade, he learned that he had to use a specific set of rules to solve math problems rather than figure them out. When the interviewer encouraged him to think of another way to solve a problem that he had solved incorrectly using the textbook algorithm, he refused, explaining that he had to follow the procedure he had been taught, even though it was not yielding the correct answer. Sams's initial conception of doing math involved finding, in some cases inventing, solutions to problems and being able to explain them. After a few weeks of his new class, he changed his view to believe that math involved applying specific rules he had been taught.

In summary, although we do not yet have systematic evidence on the effects of changes in pedagogical approaches from one grade to the next, we have reason to suspect that such inconsistency could create confusion in students' basic understanding about what it means to "do math" or "read." This confusion could, in turn, slow down development or even reverse previous gains.

In contrast, consistency in particular practices or instructional routines (e.g., warm-up math activities, reading to each other in pairs, or discussing the meaning of text in a small group) may give children a feeling of familiarity, self-confidence, and self-efficacy (e.g., "I know how to do this; this is just like what we did last year"). Many lessons can be made increasingly complex, so they are appropriate for both children in preschool (e.g., children solve a counting problem with small numbers of individual items and tell how they know; they share their personal reactions to text verbally) and later grades (children solve counting problems by counting groupings of items in collections and explain their solution strategy; they write about their reactions to text and justify their position). The complexity changes, but the task is familiar. Presumably, teachers spend less time on teaching children how to go about the task, saving more time for engagement in the task itself.

Feelings of self-confidence and self-efficacy are known to affect students' learning and motivation, especially their willingness to persist when they encounter difficulty (Bandura, 1977; Schunk, 1991). To the degree that consistency in pedagogical practice contributes to self-confidence, it will also contribute to children's intrinsic motivation (Deci & Ryan, 1985).

Consistency in pedagogical practice may be particularly important for children who are not proficient in English and receiving instruction in English. Making sense of instruction is challenging in any case, but it is particularly challenging if the instructional approach and expectations change every year. We know that dual-language learners (DLLs) also benefit from consistent use of particular language supports, such as using home-language cognates and visual supports for making instruction accessible (Governor's State Advisory Council on Early Learning and Care, 2013). If the goal is to support children's native language while they learn English, instruction needs to be consistently organized to support that goal.

An example of a successful effort to support DLLs' academic skills by creating a continuous approach to teaching PK-3 is the Sobrato Early Academic Language Program (SEAL), as referenced in the organization's online overview. The program has several pedagogical features that children experience in preschool through third grade:

- Language-rich environments and instruction with an emphasis on expressive and complex oral language development and enriched vocabulary.
- Text-rich curriculum and environments that engage children with books and the printed word.
- Language development through academic thematic units based on science and social studies standards.

To promote continuity, the model provides intensive professional development to preschool and elementary school teachers through workshop sessions, coaching, and collaborative reflection and planning. An evaluation indicated that children in classrooms where teachers have been trained to implement the model significantly outperformed children in other classrooms (Sobrato Family Foundation).

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Continuity in the Social Context of the Classroom

Even if academic growth is the primary goal, children need to feel psychologically safe and comfortable (Pianta 1999). Some attention has been paid to making children more comfortable in the transition to kindergarten (Eckert et al., 2008; Geiser, Horwitz, & Gerstein, 2012; Perry, MacDonald & Gervasoni, 2015; Schulting, Malone, & Dodge, 2005). Various strategies have been proposed and implemented, including visits to the kindergarten classroom and teachers meeting with parents to help the parents prepare their children emotionally. We did not uncover much evidence on the effects of such programs, but at least one study found that such efforts to prepare parents and children for the transition to kindergarten was associated with better learning (Schulting et al., 2005).

Kagan, Carroll, Comer, and Scott-Little (2006) found in the districts they studied that the efforts emphasized preparing children for changes in classroom practices rather than minimizing the amount of change children and parents experienced. There may be ways that reducing unnecessary changes, or creating alignment in various management strategies and other practices, could also facilitate the transition to kindergarten, rendering it and subsequent grades more familiar, and thus comfortable, for children.

We are not aware of studies on the effects of consistency in classroom practices and expectations, but conjecture that these are important, too. For example, maintaining certain routines, such as practices designed to gain children's attention (e.g., teacher counting down from 5 with her hand raised), transitions to go outside or eat lunch (e.g., dismissing children by table), and language (e.g., "no put-downs") used in conversations about appropriate behavior may give children a sense of comfort and confidence. Consistency in such practices should reduce the time required to acquaint children with new practices and language (cf. Lemov, 2010). Changing the rules from year to year may be confusing, and teaching the new rules siphons time away from instruction.

To be sure, expectations should change as children move from grade to grade, such as the amount of responsibility children take to self-regulate and manage tasks. But just as instruction in math, science, and reading needs to develop gradually and build on previous understandings and skills, increased responsibility needs to come in small increments that build on previous responsibilities. Four year olds can be expected to complete brief tasks and put their materials away. Eight year olds may be expected to plan a multistep task involving collaboration with classmates and to identify, collect, and put away materials. A substantial distance exists between these two sets of responsibilities, and introducing greater autonomy and responsibility gradually would most likely provide children with a more coherent and predictable educational experience.

Continuity in Parent Involvement

Continuity in how schools involve parents may also be important (Takanishi, 2016). Parent engagement is typically stressed more in preschool than in elementary school (Epstein, 1990; Zill & Nord, 1994). If parents who have been actively invited to be involved in preschool are not given opportunities to engage productively in their children's elementary schooling, the advocacy and involvement they learned in preschool may wane. Given the evidence that children benefit from parental involvement (see Henderson & Mapp, 2002), a failure to build in the elementary grades on what parents learned when their children were in preschool could lead to a drop-off in parental support for their children's learning and a severance of school-family relationships.

One strategy to support continuity in parents' experience is inviting both preschool and elementary-school parents to the same events, such as back-to-school nights, educational programs, and programs to connect parents to community resources. In addition to providing parents with a continuous experience as their children advance from preschool through the early elementary grades, inviting them together gives the parents of preschool-age children an opportunity to meet the parents of elementary school-aged children, and potentially an opportunity to learn about the elementary grades from parents' perspectives.

Teachers in preschool and elementary school can also make sure that parents get consistent messages across grades about their role in supporting children's learning, including suggestions for particular kinds of interactions and activities with their children. This kind of consistency may be particularly helpful to immigrant parents who are not fluent in English or familiar with American education. All parents may be more likely to follow up on teachers' suggestions if they get similar messages across grades. Throughout these years, teachers can send messages, such as encouraging parents to make sure that they (or someone else) read to their children, play math games, and talk to their children about what they are learning in school. Teachers can promote particular activities, such as using cards to play math games that become more complex as children progress through the grades and develop more math skills. Teachers can also help parents use community resources at the library and explore their communities with their children.

Consistency in how schools and teachers provide information to parents is likely to promote more parental involvement. To illustrate, if schools provide a newsletter that is similarly organized across grades, they can help build the habit of parental support by providing information on what children are learning and suggestions for conversations or home activities to reinforce and extend classroom learning. Text messages have also shown promise as a strategy for stimulating parent involvement (York & Loeb, 2014), and could be used similarly across the grades.

Although the content of assessments needs to change as children develop new skills, the reporting formats can be similar in order to facilitate parents' processing and understanding of their children's development, performance, and needs. Reporting might also follow the same hierarchically organized skill development trajectory that is instantiated in the standards, curriculum, and assessments. A continuum of skills on reports to parents would allow parents to follow their children's progress across grades better than if in each grade they are presented with information about a new set of skills that does not clearly connect to the set of skills from the previous year's report.

> If parents who have been actively invited to be involved in preschool are not given opportunities to engage productively in their children's elementary schooling, the advocacy and involvement they learned in preschool may wane.

State, District, and School Support: Conditions for Achieving Continuity in Children's Educational Experience

Classrooms do not exist in a vacuum. What transpires within them is significantly affected by policies and practices at the state, district, and school levels. Continuity in instructional practices is less likely to occur if state and

district standards and assessments are not well aligned, and if schools do not provide structures and opportunities for teacher collaboration. Very little research documents the effects of specific state or district policies on the continuity of classroom instruction across grades. We review the available research in this section, but because it is scarce, we also posit hypotheses about which policies might matter.

Standards and Assessment

Consider, first, state or district standards and assessments. For instruction to be logically related and sequentially developed across grades, a fair speculation is that standards and assessments need to have these same qualities (Cohen, 1990; O'Day & Smith, 1993). Schmidt, Wang, and McKnight (2005) claim that the learning standards that guide the content of mathematics instruction, as an example, should:

> . . . evolve from the particulars (e.g., simple mathematics facts and routine computational procedures associated with whole numbers and fractions) to deeper structures. It is these deeper structures by which the particulars are connected (such as an understanding of the rational number system and its properties). This evolution should occur both over time within a particular grade level and as the student progresses across the grades. (p. 528)

Supporting their claim of the importance of alignment, Schmidt et al. (2005) found in their cross-national study of learning standards that countries with hierarchically structured standards, with topics in each grade building on those in previous grades, had the highest-performing students in math and science. Similarly, Polikoff (2012a) found in a study of eight states that the overall level of alignment between standards and assessments was low, but teachers' instructional practices were more aligned with both standards and assessment instruments in states where standards and assessments were relatively well aligned with one another. Presumably, misalignment forces teachers to choose between standards and assessments, whereas alignment makes a teacher's job of aligning instruction to standards and assessments easier.

Some districts have made efforts to align standards and assessment at the district level. Montgomery County, Maryland Superintendent Jerry West initiated one notable example. Over a decade, the district worked from the bottom up with strong teacher participation to create an integrated PK-12 instructional progression (Marietta, 2010a).

Schmidt et al. (2005) described U.S. standards as an "arbitrary, laundry list approach" (p. 542), with considerable redundancy in math content across grades. Polikoff (2012b) also found a great deal of redundancy in state standards in math, but did not find any apparent relationship between the redundancy of state content standards and the redundancy of instruction. The Common Core State Standards were designed, in part, to address problems of discontinuity in standards across grades, but not all states have adopted them.

Kagan et al. (2006) only examined two districts, but theirs was the only study that included preschool. They found poor alignment between preschool and kindergarten in both the standards and the curricula.

Taken together, these analyses suggest that alignment between standards and assessment within and across grades affects continuity in instruction. Efforts to improve PK-3 continuity in instruction, however, requires parallel efforts to improve alignment between standards and assessment in preschool and the elementary grades.

District and School Policies

District policies and practices mediate the effect of state policies on teaching. Efforts at the district level will only affect instruction and learning if appropriate practices are put in place at the school level. Thus, these local contexts substantially affect what occurs in classrooms. Extant research suggests a few school-level policies and practices that might promote continuity in instruction, as well as district policies that could support such efforts in schools.

Coherent instructional framework. Based on their study of 222 elementary schools, Newmann et al. (2001) concluded that schools that have a clear and coherent instructional framework for guiding practices and decisions tend to have higher student achievement than schools that do not, a finding very similar to work done decades ago by Edmonds (1979). Newmann et al. explain that schools achieve coherence when an instructional framework provides the criteria for recruiting and hiring teachers; when teachers are evaluated on the basis of how effectively they use the common instructional framework; and when resources are allocated to advance the school's common instructional

framework. To promote continuity between preschool and the early elementary grades, preschool and elementary school teachers would both need to embrace the framework.

Relative emphasis on dimension of development. Newmann et al. (2001) did not include preschools in their study, so they did not address a potential disconnect between preschool and elementary school: the relative emphasis on different dimensions of children's development. Compared with elementary school teachers, preschool teachers typically believe that social-emotional development is more important and academic skill is less important (Kagan et al., 2006), and evidence exists that such differences in teachers' beliefs can have negative effects. For example, one study reported that being taught by preschool and kindergarten teachers who were misaligned in their beliefs about the relative importance of academic and social skills led to children receiving lower ratings for their social skills and approaches to learning and having lower math achievement than children taught by preschool and kindergarten teachers whose beliefs were aligned (Abry, Latham, Bassok, & LoCasale-Crouch, 2015). The effect was particularly strong for students from economically disadvantaged backgrounds.

Early childhood educators worry that efforts to create continuity between the early elementary grades and preschool will result in "pushing down" an emphasis on a narrow set of academic skills, as well as reducing time and attention to social-emotional development and play (Miller & Almon, 2009). Indeed, a trend toward more academic kindergarten is emerging already. In analyzing the changes in kindergarten instruction over the last decade, Bassok, Latham, and Rorem (2016) refer to it as "the new first grade." Comparing data from 1998-2010, they documented an increased focus on academic skills; a reduction in the time devoted to science, music, art, and dramatic play; and a substantial increase in the use of workbooks. Simply pushing down kindergarten to preschool can have significant costs, and thus is not the solution to achieving continuity.

A few states have begun to include social skills in elementary-grade standards. For instance, in 2015 Ohio added three dimensions (social and emotional development, physical well-being and motor development, and approaches to learning) to their state standards for kindergarten through third grade, to be consistent with the dimensions included in their preschool standards (Ohio Department of Education, 2015). In most states, however, standards for the elementary grades focus entirely on academic skills.

It is possible that a failure to attend to social-emotional skills in the early elementary grades may contribute to fade-out by not building on the social-emotional gains children make in high-quality preschool. These skills are not just important for relationships with peers and teachers; they also play a central role in learning. Take the example of executive functions (e.g., attention, inhibitory control), which are highly correlated with academic skills (Obradovic, Portilla, & Boyce, 2012). A failure to build on the progress in self-regulation and other social skills made in preschool is a missed opportunity to maximize student learning in the early elementary grades.

While increasing attention to social-emotional development in the elementary grades may be desirable, simply "pushing up" traditional preschool into kindergarten is no more a solution to discontinuity than pushing down kindergarten into preschool. The optimum solution is likely to involve change in both directions—an increased emphasis on academic learning opportunities in preschool and on social-emotional development in the early elementary grades. Critical here is the instructional theory and approach. Increasing academic learning does not require pushing down instructional strategies such as drilling on low-level skills. Such approaches do not promote effective academic learning at any grade, but are particularly inappropriate for the youngest children. Fortunately, alternatives—research-based, developmentally appropriate, and effective instructional frameworks—are available.

Curriculum. Some evidence does suggest the value of using the same curriculum across grades, one which builds on skills as they develop and gives students opportunities to apply their skills in an expanding set of novel contexts. In the two districts Kagan et al. (2006) studied, preschools that adopted a packaged curriculum were more continuous with kindergarten than preschools that did not use a curriculum. Nevertheless, a packaged curriculum does not guarantee coherence and continuity in instruction; neither is it necessary. Many districts develop their own curricula. Regardless of whether it is commercial or homegrown, a curriculum needs to sequence learning opportunities according to the principles discussed above, such as increasing in complexity in accordance with the discipline and being aligned with typical learning trajectories.

A challenge in using a curriculum is to avoid implementing it in a way that is unresponsive to student needs and emergent classroom issues. Rigid adherence to a predetermined curriculum will most likely produce instruction that is

too difficult (skips steps) for some children, precluding them from benefiting from instruction, and for others, repeats already mastered material, denying them the opportunity to continue to develop their skills. Some adjustments in instruction—as well as some extra support for children who are far behind in addition to enrichment opportunities for children who are way ahead—are necessary for continuous and effective learning to occur for all students.

Formative assessments and data system. In a similar vein, formative assessments aligned with the standards may also support continuity in instruction across grades, as they provide information on children's skill levels that can be used to make appropriate adjustments in instruction. In an examination of a district that had made considerable progress in creating continuity between preschool and elementary school (Union City, New Jersey), Marietta and Marietta (2013) noted that a comprehensive assessment system had been implemented that was benchmarked to the New Jersey Core Curriculum Content Standards. The assessment system included multiple progress indicators aligned from preschool through third grade that forewarned teachers of any skills and competencies students were not consistently reaching. Their observations do not demonstrate that the alignment between the assessment system and the content standards explained the high level of continuity across grades, but it was a likely contributor. The frequent information on students' achievement of the standards presumably allowed teachers to plan instruction that would help individual children achieve those standards.

Assessments that track student progress at the school and district levels are also useful for guiding programmatic changes, and can provide teachers information on students' skill levels when children enter the classroom. Kindergarten teachers, however, rarely have access to data on children who are transitioning from preschool to elementary school. In interviews conducted in a study of California districts endeavoring to create greater PK-3 continuity, many administrators complained that the lack of a data system that tracked children from preschool through elementary school hindered their efforts (Valentino & Stipek, 2016). Data systems that track children beginning in preschool are only valuable if they inform instruction in kindergarten. To address this problem, the Maryland State Department of Education developed a system to track school readiness by the program that 4-year-old children attend (http://news.maryland.gov/msde/new-data-finds-nearly-half-of-students-ready-for-kindergarten).

Professional development. Professional development is another potential contributor to instructional continuity (Lesaux, 2013; Marietta, 2010b; Takanishi, 2016). Coherence and continuity across grades require teachers to understand the structure and interconnections of constructs in the disciplines they are teaching. The teachers need to understand the typical developmental trajectories in children's skill development and how to capitalize on those trajectories through the scope and sequence of their teaching. They need to know how to assess children's current skills and understanding and how to build on children's previous knowledge to promote increasingly deeper understanding of a concept. Finally,

We propose attention to:

- alignment of standards and assessments within and across grades

- formative assessments that are linked to standards

- a database that follows children PK through elementary school

- a clear instructional framework that guides practices and decisions at the school level

- continuity in the relative emphasis on social-emotional development and academic skills

- continuity in curriculum

- [coordinated] professional development

- the same coach working with teachers across PK–3

- opportunities for teacher collaboration across PK–3

they need to understand how to construct tasks that students might work on at different skill levels (see Ferrini-Mundy, Burrill, & Schmidt, 2007). Few teachers enter the profession with this level of skill; therefore, they need opportunities to continue to develop their skills. Professional development (PD) was a component of the measure of coherence that was associated with student learning in the Newmann et al. (2001) study of Chicago school reform, although the effect of PD on student learning cannot be differentiated from the other components of their measure of coherence. But there are many successful intervention efforts that have contributed to continuity and children's learning through continuing, comprehensive, and substantial professional development (for a review, see Clements & Sarama, 2011).

Integrating teachers across grade levels should contribute to instructional continuity. Coordinated meetings and professional development sessions between preschool and K-3 teachers was a common strategy used by the California school districts that stood out for their efforts and accomplishments related to PK-3 alignment (Valentino & Stipek, 2016). Whether PD is designed to help teachers implement a curriculum, use formative assessments, meet the needs of dual-language learners, develop effective classroom management strategies, or for any other purpose, similar implementation in classrooms and thus continuous educational experiences of children who move through the grades is more likely if PK-3 teachers receive the same PD.

Another strategy that has been used to promote continuity in teacher practices is using the same master teacher or coach to support preschool and early elementary grade teachers (Marietta & Marietta, 2013). Different master teachers might be used to coach math and literacy, but having the same person work with teachers across the grades within a discipline is likely to contribute to continuity.

Professional development communities. Dedicated time for collaboration and communication among teachers has been shown in many studies to contribute to the quality of instruction and student learning (Vescio, Ross, & Adams, 2008). Extrapolating from this evidence, opportunities to collaborate across PK-3 are likely to contribute to both continuity and quality in instruction. Teachers in each grade need to be knowledgeable about the curriculum, instructional approaches, and other aspects of classroom contexts (e.g., assessments, management, and communication and connections with families) in the grade before and after the grade they teach. Sadowski (2006) describes the strategies that specific schools have used to create cross-preschool/elementary-grade teacher collaborations designed to promote instructional continuity. For cross-grade collaboration to occur, schools need to make dedicated and regular time available for teachers at different grade levels to discuss topics that might affect the educational experience of their students.

Summary

Because we have so little evidence on associations between state, district, and school policies and continuity in instruction, this section is short on evidence and long on conjecture about the policies and practices that are likely to support instructional continuity PK-3. Our analysis nevertheless provides guidance on what kinds of policies deserve careful study.

In brief, we propose attention to the following:

1. alignment of standards and assessments within and across grades at the state and district levels
2. formative assessments that are linked to standards
3. a database that follows children PK through elementary school that is accessible to teachers
4. a clear instructional framework that guides practices and decisions at the school level
5. continuity in the relative emphasis on social-emotional development and academic skills (In most cases this will require increasing attention to academic skills in PK and increasing attention to social-emotional development in K-3)
6. continuity in curriculum, PK-3
7. professional development that brings PK-3 teachers together
8. the same coach working with teachers across PK-3
9. opportunities for teacher collaboration across PK-3

We recognize that most of these suggestions are challenging to implement (see Valentino & Stipek, 2016). Standards between preschool and elementary school are not aligned in many states, and accountability systems are typically very different. Preschools are often not in the same location as elementary schools, and one elementary school may draw students from many disparate preschools. Even when preschools are co-located, different funding and accountability systems can make coordination difficult. Differential pay, expectations, and cultures related to preschool and elementary teaching also render collegial collaboration between teachers at these different levels difficult to achieve. Clearly, efforts need to be made to address these broad structural impediments to instructional continuity if we expect teachers to provide children with a seamless PK-3 educational experience.

Conclusion

Many child advocates, researchers, and policy makers have joined the call for PK-3 alignment, and many districts and schools across the country endeavor to answer it. Ultimately, the goal is to create a coherent educational experience for children in which each grade builds and elaborates on what was learned in the previous grade. Although we lack evidence on the value-added of this kind of continuity across grades, we do have evidence related to how the structure and sequencing of instruction over grades are likely to affect children's learning.

Also, scant research exists on how continuity of pedagogy, classroom management, and parent involvement over the early grades contributes to children's learning, in part because evaluations of PK-3 initiatives (e.g., Zellman & Kilburn, 2015) typically examine student outcomes rather than classroom instruction. We do, however, have reasons to believe that maintaining some practices across grades can reduce the time required for teaching children new routines, as well as that introducing gradual and developmentally appropriate changes in practices can help children adjust to new expectations.

Recognizing that what transpires in classrooms is strongly affected by state, district, and school policies, we reviewed educational policy research that could be used to formulate hypotheses about the effects of various policies and practices on PK-3 continuity in children's educational experience. The effect of these policies on children's classroom experience needs to be studied. We hope that our efforts to delineate and identify factors that affect instructional continuity, however tenuous our recommendations, can be used to guide policy and practice for now— and will motivate research that tests the conclusions we drew from evidence and our conjectures.

Why Third Grade?

Why PK–3? Why not PK–2 or PK–5 or even PK–12? The PK–3 movement is not alone in focusing on third grade as a watershed. Third grade is also salient in state policies. For example, a few states and many districts have instituted mandatory retention for children who are substantially behind grade level in reading at the end of third grade.

Third grade may have been identified by people interested in continuity in part because many studies have found that the effects of preschool intervention disappear by third grade. The evidence suggests, however, that the effects of preschool diminish gradually, usually beginning long before children reach third grade.

The belief that children have to master basic skills by third grade to succeed in the later grades of school may also motivate the focus on this grade range. As an illustration, the idea that in the early grades children learn to read and after third grade they read to learn is misleading but often repeated. Again, we see no evidence for an abrupt shift in third grade. Children increasingly read to access information and develop knowledge over the early elementary grades. Moreover, with the emphasis on informational text in the Common Core State Standards, students in the first few grades of elementary school are expected to read to learn more than what was envisioned in previous standards. Also, there is no practical reason why basic skills in reading cannot be taught after third grade. By third grade teachers expect children to have mastered the basics of reading, and if they have not (and some have not), these children should be given the instruction they need to master basic reading skills, regardless of their grade.

The evidence also indicates that academic skills and social behavior in third grade are not substantially more predictive of later success than skills and behavior in, for example, the second or fourth grade. Take school completion as an index of school success. An analysis of data from the National Longitudinal Survey of Youth (NLSY) data by Duncan and Magnuson (2011) suggests that fifth grade may be a watershed for predicting high school completion. They found a big increase at age 10 in how well both academic skills and antisocial behavior (the two variables that predicted high school completion the best in their analyses) predicted high school completion. Furthermore, academic skills and antisocial behavior at age 5 predicted high school completion almost as well as they did at age 8. And academic skills at age 7 predicted high school completion somewhat better than at age 8 or 9.

One likely reason for the popularity of PK–3 is that it is more realistic than a longer time horizon. Achieving some alignment between preschool and the early elementary grades may be viewed as more achievable than alignment through later grades and into high school. But we know of no evidence that indicates that alignment between third and fourth grade is any less valuable than alignment between second and third grade.

Our point is simply that there is nothing magical about third grade, and we need to be careful not to let the name of this important movement lure us into thinking that alignment and continuity after third grade matter less than before third grade.

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About the Authors

Cynthia E. Coburn is Professor at the School of Education and Social Policy, Northwestern University. Coburn studies the relationship between instructional policy and teachers' classroom practices in urban schools. In a series of studies she has investigated critical issues facing public schools, including the relationship between instructional policy and teachers' classroom practice, the scale-up of innovative instructional approaches in school and out-of-school settings, the implementation of Common Core State Standards, and the relationship between research and practice for school improvement. In 2011, Coburn was awarded the Early Career Award from the American Educational Research Association in recognition of her contributions to the field of educational research in the first decade of her career. In 2015, she was elected Fellow of the American Educational Research Association, honoring "exceptional contributions to and excellence in educational research." Coburn has a BA in philosophy from Oberlin College, and a MA in Sociology and a PhD in Education from Stanford University.

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Megan Franke is a Professor of Education at the University of California, Los Angeles. Dr. Franke's research focuses on understanding and supporting teacher learning for both preservice and inservice teachers. She studies how teachers' making use of research based information about the development of children's mathematical thinking (Cognitively Guided Instruction) supports students to learn mathematics. She is particularly interested in how teaching mathematics with attention to students' and their mathematical thinking can create opportunities for low-income students of color to learn mathematics with understanding. In addition, Dr. Franke designs, prepares and studies the preparation of early childhood to 6th grade mathematics teachers. She is currently involved in a large-scale professional development and research project that engages teachers in supporting mathematical learning from preschool through third grade, a series of studies that link classroom practice and student outcomes in elementary mathematics classrooms and is a member of the DREME Network team investigating coherence of Early Childhood mathematics. Her research work to support teachers, schools and communities was recognized with the 2012 AERA Research into Practice Award.

Deborah J. Stipek is the Judy Koch Professor of Education, the Peter E. Haas Faculty Director of the Haas Center for Public Service, and the former I James Quillen Dean at Stanford University. Her doctorate is from Yale University in developmental psychology. Her scholarship concerns instructional effects on children's achievement motivation and early childhood education. In addition to her scholarship, she served for five years on the Board on Children, Youth, and Families of the National Academy of Sciences and is a member of the National Academy of Education. She also chaired the National Academy of Sciences Committee on Increasing High School Students' Engagement & Motivation to Learn and the MacArthur Foundation Network on Teaching and Learning. She currently chairs the Heising-Simons Development and Research on Early Math Education (DREME) Network. Dr. Stipek served 10 years at UCLA as Director of the Corinne Seeds University Elementary School and the Urban Education Studies Center. She joined the Stanford Graduate School of Education as Dean and Professor of Education in January 2001.

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Social Policy Report (ISSN 1075-7031) is published four times a year by the Society for Research in Child Development. Its purpose is twofold: (1) to provide policymakers with objective reviews of research findings on topics of current national interest, and (2) to inform the SRCD membership about current policy issues relating to children and about the state of relevant research.

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The *Report* provides a forum for scholarly reviews and discussions of developmental research and its implications for policies affecting children. The Society recognizes that few policy issues are noncontroversial, that authors may well have a "point of view," but the *Report* is not intended to be a vehicle for authors to advocate particular positions on issues. Presentations should be balanced, accurate, and inclusive. The publication nonetheless includes the disclaimer that the views expressed do not necessarily reflect those of the Society or the editors.

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