

Introduction

KNOWLEDGE HAS A PROFOUND EFFECT on thinking.¹ Preschoolers are especially susceptible to misunderstanding because they have not yet acquired extensive knowledge. Focusing on this vulnerability leads many adults to the conclusion that preschoolers are not good thinkers. Although we too once held this view, we changed our minds after tracing the mental paths through which we thought specific misunderstandings had emerged. Engaging in this process not only revealed that knowledge gaps conspire against preschoolers' efforts to arrive at correct conclusions, but also highlighted the remarkably good thinking by preschoolers on their way to getting something wrong.

Consider a young child who first thinks that whales and dolphins are fish, because they live in the ocean. The child uses the experience and knowledge he has (i.e., fish live in water) to draw an erroneous conclusion about whales and dolphins. Although all learners do this, no matter their age, older children and adults use their large stores of knowledge to judge whether a prior experience actually applies in a new context. In contrast, preschoolers often apply their knowledge where it does not fit. A psychologist, who described this phenomenon as *runaway transfer*, advised that its reduction depends on the child acquiring knowledge that goes beyond readily observable surface features.²

The child who had concluded that whales and dolphins were fish learned later that these animals not only come to the surface to breathe air through their lungs but also produce milk for their babies. With this new information in hand, the child concluded that whales and dolphins have more in common with other mammals than they do with fish. He also realized that his previous focus on a surface fact—living in water—had led him astray.

MAIN PURPOSES AND PRIMARY AUDIENCES

This book's main purpose is to increase understanding of preschoolers' thinking. A second purpose is to alter the somewhat common belief that the achievement gap is mostly a cognitive capacity gap. These two ideas cause some early educators to conclude that preschoolers from lower-income families are unable to benefit from educational programming that includes both substantial content and opportunities for higher-level thinking. Research indicates that achievement gaps are caused mostly by experience gaps, not by variations in cognitive capacity.³ A third and related purpose of this book is to contribute to ongoing discussions about the indicators of quality preschool programming.⁴ We do this by providing many examples from classrooms in which instruction was both broadened and deepened to increase learning among lower-income preschoolers.

The primary audiences for this book are preschool teachers, their mentors and coaches, and the administrators involved in making decisions about preschool programming. There are two additional audiences, one of which is students enrolled in early education courses that have a field placement. The examples of preschoolers' thinking in this book should increase these students' understanding of the young children they are learning to teach. The second additional audience is students in developmental psychology and child development courses. The examples of preschoolers' thinking should both engage and inform them.

MAIN PROBLEM ADDRESSED

For more than fifty years, preschool education has been used as an intervention to narrow the achievement gap between children from lower- and higher-income families. The goal of increasing academic success among lower-income students has often been stated as a matter of creating a "level

playing field” before kindergarten entry. The truth is, there are two playing fields: one spanning kindergarten through third grade and another that begins in fourth grade and continues for the remaining years of schooling. Research indicates that one cluster of knowledge and skills accounts for success on the first playing field, while an additional cluster supports academic success on the second.⁵ Thus, “leveling the field for academic success” requires preschool programming that builds solid foundations for two fields.

We have known for a long time the features of preschool programming that position preschoolers to succeed in both the short and the long term, but children from lower-income families often receive programming that focuses only on short-term success. This happens because children from lower-income families often enter preschool already behind their peers from higher-income families in terms of early literacy and numeracy skills. Their content knowledge and oral language, including vocabulary, also lag but their teachers often feel that they cannot cover all of these areas adequately. As a consequence, they choose to focus primarily on literacy and numeracy skills, thinking that these are critical for success in learning to read and to do basic arithmetic problems.

Even instruction in these two areas is provided in a way that results in learning that is not very robust because many teachers of lower-income preschoolers use approaches that focus primarily on isolated facts, without any conceptual underpinnings. Teachers also often reduce experiences that build science and social studies content knowledge, and they mostly use predictable-text books to develop oral vocabulary and phonological awareness. Predictable-text books do engage children actively in reading along with the teacher and before long in “reading” these books independently in the library corner. Books with predictable text also expose preschoolers to considerable rhyme and alliteration, and this supports children’s beginning levels of phonological awareness.

But the problem is that both receptive and expressive vocabulary are supported better when teachers also read narratives (i.e., stories) and informational texts. Narrative and informational texts also support the deeper levels of oral vocabulary knowledge that become critical for reading comprehension in the middle school years, when textbook vocabulary becomes quite challenging.⁶ Children also learn science and social science content from

good stories and informational texts and continue to increase their knowledge of all aspects of oral language. Their opportunities for learning are diminished if they primarily experience predictable-text books. All of this learning is essential later for good reading comprehension.⁷ When teachers limit lower-income preschoolers' access to a wide range of children's literature and to hands-on experiences that contribute to content knowledge and oral language, the children gain only the knowledge and skills that predict success in kindergarten and the early primary grades, which leaves them vulnerable to both the "fourth-grade slump" and the additional declines that occur year after year as schoolwork difficulty increases.⁸

In contrast, preschoolers from higher-income families have had many educational materials and toys at home since they were infants, including a wide variety of books. Children from highly resourced families also benefit from additional experiences in parks and museums, and they typically attend preschools with programming that supports not only basic literacy and numeracy skills, but also content knowledge and deeper understanding of oral vocabulary (i.e., children can provide information about word meanings), sentence structure (i.e., knowledge of word order—syntax), and word changes across various grammatical contexts (i.e., morphology).⁹

Higher-level thinking (i.e., reasoning) is also prompted when children hear complex fictional narratives and content-rich informational texts and when they converse with teachers and parents, who ask questions and talk with them not only in the read-aloud context but also during hands-on science and social science experiences. Conversations between preschoolers and their teachers also occur in the block area, the dramatic play area, the water table, and the art and writing areas.¹⁰

Preschoolers from lower-income families are often prepared, at least marginally, to succeed in kindergarten and the early primary grades, although their levels of oral language and content knowledge are still lower at the end of preschool than levels found in their higher-income peers. These differences do not show up as remarkably lower achievement in kindergarten and the first few primary grades because the reading materials used at these levels are simplified to support children in learning to read. The limitations in their preschool experiences become apparent quite

abruptly in fourth grade, when textbooks and school assignments become considerably more challenging.¹¹

To be sure, many things stand in the way of academic success in lower-income populations. These impediments include (1) state learning standards written in an individual-items-by-domain format, which leaves integrating the individual standards within rich experiences, as guidelines for the standards advise, to educators without the time or knowledge to do it; (2) publishers' decisions to align preschool curriculum and assessment tools with kindergarten and primary grade products, while ignoring alignment with longer-term goals; and (3) myriad other impediments situated within families and neighborhoods. These include food insecurity; lack of access to health care; inadequate housing; libraries with limited hours, books, and other resources; and large class sizes and limited supplies in public schools.¹² Bias in financial and government sectors helps maintain these impediments and inequality in income. These are serious problems, but it is still the case that preschool education has not done all that it can.

CENTRAL ARGUMENTS

This book has several main arguments: (1) preschoolers are more competent, cognitively, than they might seem; (2) instruction to develop basic literacy and numeracy skills can be designed to include conceptual underpinnings and to prompt thinking; (3) building a child's knowledge during the preschool years can increase academic success, not only in kindergarten and the early primary grades, but also in the years that follow; (4) effective instruction includes explanatory feedback, not just simple corrections; and (5) effective explanatory feedback requires that teachers pinpoint the sources of a child's confusions and misconceptions.¹³

The authors believe that preschool teachers and other preschool personnel are likely to provide all preschoolers, especially those from lower-income families, with experiences that go well beyond the narrow range offered today in many programs, if they can study examples that describe how preschoolers can benefit from substantial content and opportunities to engage in higher-level thinking. We provide such examples, along with analyses to support the reader in learning from them.

THE BOOK'S CONTENT

This book is about knowledge acquisition and thinking in preschoolers, as seen through the lens of their misunderstandings. We face head-on situations that seem too challenging to many teachers for their preschoolers. Rather than simplify instruction for preschoolers by reducing content, cutting what remains into small pieces, and focusing on one piece at a time in instruction, we illustrate how adults can scaffold children's engagement with both substantial content and higher-level thinking. This approach, sometimes referred to as *cognitive apprenticeships*, simplifies instructional contexts while maintaining the complexity of content.¹⁴

Adults commonly treat young children as apprentices when teaching them how to perform physical tasks. For example, adults might show a child how a nesting toy works and then encourage the child to repeat the steps. After the adult models, assists, and coaches for a while, the child is able to play independently with the nesting toy. Adults also show children how to work the zippers on their jackets and coats. For a rather extended period, an adult typically attaches the two sides of a zipper at the lower end of a child's jacket or coat. This behavior is an example of *scaffolding*: doing for the child some part or parts of a task the child cannot yet do independently. The important feature of physical apprenticeships is that the child sees the materials and observes the adult demonstrating their use as the child listens to adult descriptions and explanations.

In contrast, when an adult responds to a child's request for a word's spelling by dictating the letters, the adult's thinking is not visible. Moreover, the child has only the word that was requested on this occasion, with no idea at another time how to select the letters for this word or any other. In cognitive apprenticeships, adults make their thinking visible to the child. For example, as the adult pronounces the word a child requests, the adult isolates some of the word's individual sounds (i.e., phonemes) and says, "We use the letter B to write the /b/ sound at the beginning of *big*, the letter I comes next, and then we use the letter G to write /g/, the last sound in *big*." With information like this from adults about what they are doing and thinking, a child begins to realize two things: (1) letters in a printed word represent sounds in the spoken counterpart, and (2) the sounds in a letter's name provide good clues about the sound a letter typically represents.¹⁵

The critical feature of cognitive apprenticeships is the child's access to the adult's thinking, which includes explanations about the manipulation of knowledge, such as letter selection for representing sounds the adult isolates in words when modeling spelling. Children learn both literacy skills (e.g., letter identification and naming, phoneme awareness) and conceptual information about the writing system (e.g., that letters in printed English words represent sound heard in spoken words; that the sounds that comprise a letter's name are a good clue about the sound the letter is used to represent). With this information in hand, children are positioned to generalize what they learn and apply it to subsequent situations that vary from the specific examples that adults used in cognitive apprenticeship contexts.

BODY OF EVIDENCE

Many of the misunderstandings in this book came from the lead author's extensive collection that started with observation-based note-taking in a preschool practicum (1975–2002). Additional observations and many discussions with teachers and administrators took place in several projects located in a number of Boston childcare centers (1976–1981), in a university-based preschool (1984–2002), and in public schools (1990–1993). Between 2004 and 2012, both the lead and second authors worked in a variety of programs that received Early Reading First funding. This work involved hours in classrooms, both observing and modeling, followed by conferencing with teachers and their mentors. The observations captured more misunderstandings. Many of the misunderstandings came from classrooms serving children from lower-income families that were committed to preparing children not only for the early grades, but also for the years beyond. A few misunderstandings came from the authors' direct interactions with friends' children, or from their parents who passed misunderstandings on to us.

The authors have used many of these misunderstandings in their courses, in conference presentations, in professional development (PD), and in journal articles.¹⁶ In 2005, when a preschool-level tool for assessing the quality of instruction was available, preschool teachers, mentors, and administrators became especially interested in PD that focused on teachers' instructional feedback.¹⁷ Although we had always worked with teachers

on instructional feedback, because we knew that it mattered for children's learning, our PD began to focus more on teachers' instructional feedback when many programs began to include this specific aspect of instruction as an official measure of preschool program quality.

In PD sessions, we analyzed misunderstandings to pinpoint how a child's knowledge gaps and errors in reasoning had contributed to them. We also brought information about typical phases of development to these sessions and provided the instructional materials (e.g., storybooks, science artifacts) that were used in a misunderstanding episode. Once reasonable agreement was reached on the likely causes of a child's confusion, the discussion moved to the teacher's responses, which were often simple corrections, not informative explanations. Sometimes a teacher continued on with whatever was in progress (e.g., reading a book, explaining activities for the day's choice time) without responding at all to a misunderstanding. When considering simple corrective feedback, the teachers in the PD session were asked to improve upon it. When feedback was lacking entirely, teachers generated feedback possibilities from scratch.

Finally, many of the misunderstandings selected for this book came from a collection of over 150 videotaped story-reading sessions. Three experienced early childhood educators with doctoral degrees, including two of this book's authors, coded the episodes independently in a project funded by a small grant awarded to the book's second author.¹⁸ The coding focused primarily on the quality of teachers' feedback, which requires figuring out a child's knowledge gaps and the likely paths of her thinking when drawing inferences. This coding project gave the authors experience in analyzing preschoolers' thinking and confidence in their ability to understand what leads a preschooler to a misunderstanding in a specific situation.

Although the authors could not interview children to obtain information about a misunderstanding, teachers sometimes talked with a child later and passed the information on to us. Teachers also sometimes shared information about a child's recent experiences that they thought might have come into play. But even without information directly from the child or the teacher, it was usually possible for us to figure out the likely causes of a misunderstanding based on an examination of materials and the comments of the teacher and child immediately before a misunderstanding emerged,

or a day or two earlier if the teacher thought of a connection from that time period and shared it with us.

BOOK AND CHAPTER ORGANIZATION

This book has four parts. Each part opener offers a brief introduction to its chapters and some background information the authors thought readers would find useful. The chapters in part 1 are concerned with word misunderstandings. The chapters in part 2 focus on misunderstandings that arose as children tried to comprehend fictional narratives (i.e., stories). The part 3 chapters are concerned with misunderstandings about literacy skills and print conventions, and part 4 chapters feature misunderstandings about number and science concepts.

All chapters start with a detailed description of “what happened.” This description is followed by an analysis that addresses the question, “What might the child have been thinking?” Comments about the teacher’s feedback, if provided, come next. If not provided, the authors suggest feedback that they thought would have been helpful. Ideas for additional instruction follow next. Each chapter’s final section is a discussion that focuses on one or two instructional issues that were raised by the featured misunderstanding or the teacher’s feedback.

TO OUR READERS

First, we hope you, our readers, enjoy this book. We considered the children the stars in the chapters, and we tried to make their thinking shine through. We have found it interesting, enlightening, and quite humbling to study preschoolers’ thinking within specific classroom contexts. Two of us have worked in the early childhood education field for more than fifty years. Early on, the theory that most affected early education practices assumed that development was controlled by internal maturation. Experience was thought to matter little for a child’s cognitive development, and preschool teachers were taught not to meddle with nature.

Even decades ago, there was strong evidence indicating that this genetic maturation explanation for cognitive development was incomplete and, therefore, inaccurate. The evidence included Joe McVicker Hunt’s book *Intelligence and Experience*, published in 1961; Charles Read’s book

Children's Categorization of Speech Sounds in English, published in 1975; and Dolores Durkin's critique of the readiness view in her 1970 book *Teaching Them to Read*.¹⁹ At the same time, other influential books, such as *Before the Child Reads*, published in 1958 by the well-known and charismatic early childhood leader James Hymes, pleaded for sticking with the genetic-maturation view.²⁰ Moreover, the first publication by the National Association for the Education of Young Children (NAEYC) about developmentally appropriate practice (DAP), published in 1987, did the same.²¹ Although NAEYC's second DAP publication in 1997 moved away to some extent from a strong version of the genetic-maturation view, it was not until the publication of *Learning to Read and Write: Developmentally Appropriate Practices for Young Children*, in 2000, and the publication of the third edition of *Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth to Age 8*, in 2009, that NAEYC's recommendations were truly consistent with current evidence.²²

The main concern of NAEYC and many preschool educators, including this book's authors, was that kindergarten and first-grade practices would be pushed down to the preschool level. During the years that intervened between solid evidence for the importance of experience in cognitive development and changes in preschool practices, some preschool educators wrote about new instructional approaches that might provide support in ways that were suitable for the young child. For example, in 1986, NAEYC published Judy's book, *More than the ABCs: The Early Stages of Reading and Writing*. This was just one year before NAEYC released the first DAP document, which, as noted, still adhered to the genetic maturation view. When Judy attended the NAEYC conference that year, three ladies noticed her name badge as they walked toward her. One lady wagged her finger and said, "My young lady, you have opened a can of worms with that book."²³ During the years that followed, that result did occur in some places. But rather than pull back to practices for which there was no solid evidence, some of us continued to develop new practices that were consistent with the evidence against the old theory, yet suitable for young children. For example, in 1999, NAEYC published an updated version of *More than the ABCs*, called *Much More than the ABCs*. Then, in 2013, Judy and Molly revised *Much More than the ABCs*, creating *So Much More than the*

ABCs. In addition, in 2009, NAEYC published a book by Judy and Renee Casbergue, titled *Writing in Preschool: Learning to Orchestrate Meaning and Marks*.²⁴ Many other early childhood educators, including Bill Teale and Elizabeth Sulzby, and Marie Clay, wrote books aimed at addressing the same goal of providing a larger role for experience in cognitive development, in ways that differed appropriately from kindergarten and early primary grades instruction.²⁵

Young children living in financially secure families have many educational toys at home (e.g., books, magnetic letters, paper and writing/drawing tools), have access to materials and resources beyond school and home, and attend preschools where the programming includes much more than the bare-bones, basic skills in literary and numeracy. Providing so much less for children from under-resourced families and neighborhoods amounts to structural racism. This book moves forward in a new way to provide information about instructional practices that we think are both suitable for preschoolers and are likely to narrow the achievement gap. We know that many excellent teachers working with lower-income preschoolers lack the material resources, staffing, and other support that would allow them to offer their children more. We hope this book helps chart a way for them to accomplish more.

This book does not provide a curriculum, nor does it advise about selecting one, although the misunderstandings it presents came from classrooms that did use a commercial curriculum. We know that the teachers who read this book will bring a wide variety of unique experiences to it and will implement what they have learned in a way and at a pace that makes sense for their circumstances. Our hope is that this book will help preschool teachers narrow the current achievement gap between lower-income and higher-income children and therefore help the field of early education make good on its long-standing but unfulfilled promise that preschool will make a difference.