

# Connecting

THROUGH

TALK

NURTURING CHILDREN'S DEVELOPMENT  
WITH LANGUAGE



David K. Dickinson & Ann B. Morse  
Foreword by Catherine E. Snow

FOR MORE, go to <http://bit.ly/Connect-Talk>

# Connecting Through Talk

## Nurturing Children's Development With Language

by

**David K. Dickinson, Ed.D.**

Peabody College  
Vanderbilt University  
Nashville, Tennessee

and

**Ann B. Morse, M.Ed.**

Nashville, Tennessee

· P A U L · H ·  
**BROOKES**  
PUBLISHING CO<sup>®</sup>

Baltimore • London • Sydney



**Paul H. Brookes Publishing Co.**  
Post Office Box 10624  
Baltimore, Maryland 21285-0624  
USA

[www.brookespublishing.com](http://www.brookespublishing.com)

Copyright © 2019 by Paul H. Brookes Publishing Co., Inc.  
All rights reserved.

“Paul H. Brookes Publishing Co.” is a registered trademark of  
Paul H. Brookes Publishing Co., Inc.

Typeset by BMWV, Baltimore, Maryland.  
Manufactured in the United States of America by  
Sheridan Books, Inc., Chelsea, Michigan.

The individuals described in this book are composites or real people whose situations are masked as needed and are based on the authors’ experiences. Real names and identifying details are used by permission.

Cover photo © iStockphoto.com. Cover photo of David K. Dickinson by E. Anne Rayner/Vanderbilt University. Cover photo of Ann B. Morse by Marie C. Dillion. The photographs in this book are used courtesy of Ann B. Morse and the following organizations:

Program profile opening photos for Play and Learning Strategies (PALS), Video Interaction Project (VIP), Home Instruction for Parents of Preschool Youngsters (HIPPY), Imagination Library, Family Reading Partnership, Photo courtesy of Ann B. Morse.

Program profile opening photo for 30 Million Words ©iStockphoto/(monybusinessimages).

Program profile opening photo for Save the Children courtesy of C.J. Clark. © 2015 Save the Children. All rights reserved.

Program profile opening photo for Reach Out and Read courtesy of Reach Out and Read National Center. Program profile opening photo for Bookstart courtesy of Yørgen Koopmanschap. © BoekStart. All rights reserved.

Program profile opening photos for Israel’s Book Distribution Programs courtesy of Maya Haykin © Sifriyat Pijama, and Alaa Zaatre © 2016 Maktabat al-Fanoos. All rights reserved.

Program profile opening photo for the Emerging Programs courtesy of Melissa Baralt.

Figure 2.1 adapted from “The human brain – Illustration” © iStockphoto/(blueringmedia).

The videotaped vignettes were provided by the individuals who are depicted and are used with their permission.

Purchasers of this book may access the videos of adult–child interactions and the literacy support program rubrics for professional use. These materials are referred to within the print book and are also available at [www.brookespublishing.com/downloads](http://www.brookespublishing.com/downloads) with (case sensitive) keycode 34ckDaD1k. These materials may not be reproduced to generate revenue for any program or individual. Photocopies may only be made from an original book. *Unauthorized use beyond this privilege may be prosecutable under federal law.* You will see the copyright protection notice at the bottom of each photocopyable page.

### Library of Congress Cataloging-in-Publication Data

Names: Dickinson, David K., author. | Morse, Ann B., author.

Title: Connecting through talk: nurturing children’s development with language / by David K. Dickinson, Ed.D., Peabody College of Education, Vanderbilt University Nashville, Tennessee and Ann B. Morse, M.Ed., Nashville, Tennessee.

Description: Baltimore: Paul H. Brookes Publishing Co., [2019] | Includes bibliographical references and index.

Identifiers: LCCN 2018032013 (print) | LCCN 2018045687 (ebook) | ISBN 9781681252391 (epub) | ISBN 9781681252407 (pdf) | ISBN 9781681252315 (pbk.)

Subjects: LCSH: Language arts (Early childhood) | Children—Language. | Early childhood development.

Classification: LCC LB1139.5.L35 (ebook) | LCC LB1139.5.L35 D53 2019 (print) | DDC 372.6—dc23

LC record available at <https://lccn.loc.gov/2018032013>

British Library Cataloguing in Publication data are available from the British Library.

2023 2022 2021 2020 2019

10 9 8 7 6 5 4 3 2 1

# Contents

---

---

About the Downloads and Videos . . . . .	vii
About the Authors . . . . .	ix
Foreword <i>Catherine E. Snow</i> . . . . .	xi
Preface . . . . .	xiii
Acknowledgments . . . . .	xx

## **I Research on Early Development, Language, and Literacy**

1 Laying the Foundations: Attachment and Executive Function . . . . .	3
2 The Brain and the Developing Child . . . . .	31
3 Joining the Community of Language Users . . . . .	43
4 Language Systems and Development . . . . .	69
5 Language Environments and Language Development . . . . .	89
6 Enlisting Science to Support Families . . . . .	115

## **II Programs Supporting Early Literacy**

### *Parent Coaching Programs*

Play and Learning Strategies . . . . .	137
Video Interaction Project . . . . .	141
Thirty Million Words Project . . . . .	147
Home Instruction for Parents of Preschool Youngsters . . . . .	151
Save the Children . . . . .	157

### *Book Giveaway Programs*

Reach Out and Read . . . . .	161
Dolly Parton's Imagination Library . . . . .	165
Bookstart . . . . .	171
Sifriyat Pijama and Maktabat al-Fanoos . . . . .	175
Family Reading Partnership . . . . .	179

*Emerging Programs*

Promising Emerging Programs . . . . .	183
The Juniper Gardens Children’s Project . . . . .	184
Háblame Bebé . . . . .	185
Providence Talks . . . . .	185
Project beELL . . . . .	186
Bridging the Word Gap National Research Network . . . . .	186
Children’s Learning Institute’s Interventions to Support Preschool Teachers and Parents . . . . .	187
The Campaign for Grade-Level Reading . . . . .	187
Five Steps to Five . . . . .	187

**III Putting It All Together**

7 The Economics of Providing Support in the Early Years . . . . .	191
References . . . . .	209
Index . . . . .	237

## About the Authors

---

**David K. Dickinson, Ed.D.**, Associate Dean for Research and Strategic Initiatives and Margaret Cowan Chair of Education, Peabody College of Education, Vanderbilt University, PMB 818, 230 Appleton Place, Nashville, Tennessee 37203

David K. Dickinson received his doctorate from Harvard University's Graduate School of Education after teaching elementary school in Philadelphia, Pennsylvania, while earning his master's degree at Temple University. For more than 30 years, he has studied early language and literacy development among children from low-income backgrounds. Using observational and intervention research, he has sought to understand factors that foster short- and long-term development of language and reading comprehension and to improve the quality of support children receive. He has coauthored the widely used preschool curriculum *Opening the World of Learning (OWL)* (Pearson), coauthored three volumes of *The Handbook of Early Literacy Research* (Guilford Press), authored or coauthored more than 100 peer-reviewed articles, and spoken to practitioner and research audiences around the world.

**Ann B. Morse, M.Ed.**, Nashville, Tennessee 37215

Ann B. Morse earned her master's degree in education with a focus in early childhood from Lesley University. For more than 30 years, she has worked on behalf of young children from low-income backgrounds and their families. Through the Head Start National Training and Technical Assistance Network, she provided professional development to programs related to supporting children with disabilities and enhancing literacy skills. She coached pre-K teachers to enhance children's language and literacy skills through intervention research projects at Vanderbilt University. She was a contributing author of the language and literacy-based curriculum *Opening the World of Learning (OWL)* (Pearson).

# 1

---

---

## Laying the Foundations

### Attachment and Executive Function

Imagine the following scene, which you can view in Video 1, available with the downloadable materials for this book at the following link: [www.brookespublishing.com/downloads](http://www.brookespublishing.com/downloads) with (case sensitive) keycode 34ckDaD1k. It is bedtime, and Tanya and her 18-month-old daughter Eliza are preparing to read a book, *Eggs, Eggs!* (Yoon, 2008). Eliza steps to the foot of the bed where there are two large pillows and turns around as Tanya offers her the book, “You hold it.” Eliza opens it and vocalizes with pleasure as her mother sits next to her and says, “Ready?” Eliza hands the book back to her. The following exchanges occur during the first 60 seconds of this book reading.

1. Tanya: The title . . .
2. Eliza [as she points to the cover]: Eh!
3. Tanya: Yeah, it’s a niño. [Tanya is bilingual and is using Spanish and English with Eliza.]
4. Tanya: . . . *Eggs, Eggs!* It’s the title.
5. Eliza: Eigh! [She points, still focusing on the book.]
6. Tanya [as she looks at Eliza]: Eggs!
7. Eliza [carefully, as she points to a picture]: Whey dah?
8. Tanya: Is that a flower? Yeah, look at him. He looks like he’s looking for eggs. Eggs.
9. Eliza [as she points to a picture]: Bah.
10. Tanya: Um hmm. It does look like a ball, doesn’t it? [She looks at Eliza and pauses.] It’s an egg though.
11. Eliza: Bah! [She points again.]

12. Tanya: Um hmm. [She turns to the first page and looks at Eliza as she asks a question.] Shall we start?
13. Tanya [reading the text]: Hooray, it's Easter, a day of fun. There are eggs to find for everyone. Let's grab our baskets, ready-set-go! Search here, search there, search high up, low. . .
14. [As Tanya reads, Eliza reaches for a flap on a page and opens it. Mom continues reading as Eliza opens another flap.]
15. Tanya: Look it. There's niño [points] . . . and they are looking for eggs. [She points to pictures as Eliza watches.]
16. [Eliza opens a flap and vocalizes.]
17. Tanya [pointing]: Remember you and Helly looked for eggs on Easter and put them in your basket [looks at Eliza with slight pause] on Easter? [long pause]
18. Eliza [sitting very still and focusing on the picture as her mother speaks, then opening a flap]: Ba- ba- . . .
19. Tanya: Basket. But are there any eggs? Look it. [She points.] . . . No eggs! Okay! Shall we turn the page? [She pauses.] Wanna turn the page? [She pauses and looks at Eliza.]
20. [Eliza reaches for a page to turn.]
21. Tanya: Good girl!

In this charming scene, we see a carefully choreographed interactional dance between a mother and child. Each is attending to the words and gestures of the other as, together, they enjoy a book they have read on many prior occasions. In lines 4 and 6, Tanya responds to Eliza's pointing and utterances with information—the title of the book and the name of the object (eggs). In lines 7–10, we see Eliza's initial comment result in a series of back-and-forth exchanges, in which Tanya affirms Eliza's thought that the picture shows a ball but gently informs her that it really is an egg. Only after these initial conversations does Tanya suggest, in line 12, that they start reading. At that point, parent and child continue to be closely attuned to each other, with Tanya monitoring Eliza's attention and allowing her time to explore the book. At the same time, Tanya begins to play a somewhat more directive role. Her comment, "Remember you and Helly looked for eggs on Easter and put them in your basket?" is particularly interesting. Here she draws on a shared memory and encourages Eliza to connect it to the book. As will be evident in later chapters, such talk that moves beyond the pages of the book, into the past and future, is powerful. It plays a role in sup-



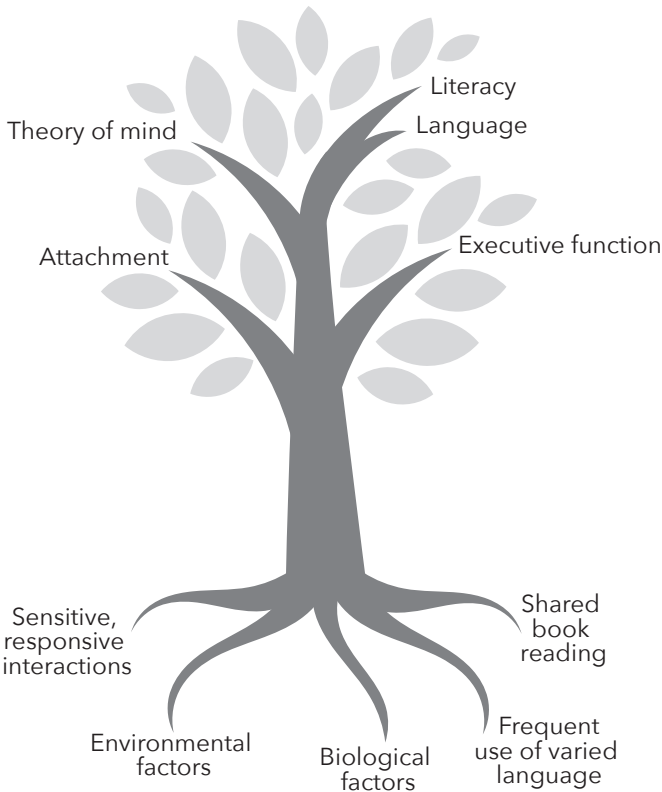
porting the child as she constructs a sense of her own history and her connections with her family and community.

We begin with this scenario because it exemplifies the type of parent–child interactions that support all facets of development that we will investigate in this book. Tanya and Eliza are engaged in a warm, sensitively tuned interaction that suggests they have a secure attachment relationship. Tanya is helping Eliza develop her ability to regulate her own attention and actions while also fostering Eliza’s language and early literacy development. All within 60 seconds! This is the marvel of effective parenting. Joyful minutes spent together, marked by loving, responsive, and language-rich exchanges, can help lay the emotional, linguistic, and conceptual foundations for a lifetime of literacy experiences. Such harmonious and intellectually and cognitively rich moments also nourish brain development during the early months of life that are marked by explosive neural growth. Exchanges such as these can be characterized as responsive adult–child interaction, from which other intertwined aspects of development in early childhood—attachment (and social-emotional development), executive function, theory of mind, language, and ultimately literacy—emerge. This relationship is depicted in Figure 1.1, which we will revisit periodically throughout this book as we explore early development in depth. (Note that sensitive and responsive interactions can occur in homes, centers, and community settings. Optimal environments are free from violence; toxins; food insecurity; and hostility based on race, ethnicity, or religion.)

In this chapter, we first consider parent–child attachment, which is a fundamental building block of emotional and interpersonal health. We explain the concept, discuss factors that foster it and sad cases in which strong bonds are not established, and note the long-term consequences for early development. Then we turn to executive function, explaining what it is, describing early interactions that foster its development, and discussing long-term impact on early development. For both constructs, we highlight the role of language and emphasize the similarities in the patterns of adult–child interaction that give rise to these capacities. We close by considering some interventions that have been found effective and summarizing factors that bolster early development.

## ATTACHMENT

It has long been recognized that the nature of a child’s early relationship with his or her primary caregiver, usually the mother, can have a profound and lasting impact on how she engages with others and handles the challenges of everyday life. This understanding is known



**Figure 1.1.** How responsive adult-child interaction leads to the emergence of other intertwined strands of development in early childhood: social-emotional development, executive function, language, and ultimately literacy.

as *attachment theory*. This section provides an overview of attachment theory and distinguishes between secure and insecure attachment; see Rees (2016) for a practitioner-oriented review of attachment.

## Overview of Attachment Theory

Attachment theory was first developed by Bowlby (1969) and was based on observations of the bonding that occurs among animals—with geese and apes being of particular interest. Bowlby also drew on experimental studies of the traumatic effects on young monkeys as a result of being raised in cages where they lacked the comfort of a mother. Such animals displayed great distress, and they were unable to relate to other monkeys or parent their young appropriately later in life. He postulated that there is an instinctual need to form a bond with a (maternal) parent, and such bonds enable the young to explore

the environment without excessive anxiety and lay the groundwork for their later ability to nurture their own young in a sensitive, loving manner. This theory was refined and tested by Mary Ainsworth, a colleague of Bowlby. (See Bretherton [1992] for a discussion of the development of attachment theory.) Ainsworth found striking variability in how mothers cared for their children during a series of careful observational studies of patterns of mother–infant interactions in different countries. Some were very responsive and sensitive as they adjusted their pace and their requests of the infant to the child’s interests and attention. We note this in Tanya’s reactions to Eliza.

Eliza [carefully, as she points to a picture]: Whey dah?

Tanya: Is that a flower? Yeah, look at him.

Tanya has quietly allowed Eliza to guide the interaction, and she has patiently waited as her infant studied the book and then vocalized. Once Eliza vocalizes, Tanya interprets it as a question and responds accordingly and with approval. Note also Tanya’s warm, gentle, and pleasant facial expressions and the physical contact between parent and child.

In the course of learning about the parent-coaching programs profiled in Section II of this book, we were given the opportunity to view videotapes made during home visits. We will discuss one gentle interactional dance between a mother, whom we will call Perla, and her three-month-old infant, whom we will call Rosalita, who was seated in a baby seat. During this visit Perla handed her baby a toy that contained small parts that rolled around as the toy was moved from side to side. Perla quietly held the toy so Rosalita could study it. After roughly 30 seconds, Perla turned away slightly and vocalized. Perla interpreted this as flagging interest and gently removed Rosalita from the baby seat.

In both of these mother–child interactions, the mother gently allowed her child time to examine an object and responded quickly and appropriately to her child’s actions and vocalizations. Also, both mothers accompanied their actions with talk, supplying language to express what they believed their child might be saying, thinking, or feeling.

## Long-Term Effects of Early Attachment

A history of such interactions during the first 2 years of life typically results in a secure attachment (Ainsworth, 1979, 1989; Rees, 2016). Such security allows the toddler or young child to explore the world, returning to the mother or other attachment figure when reassurance is needed. In this way, attachment provides a secure base for exploring

the world. In contrast, very young children who experience distant, unresponsive, or harsh parenting fail to develop such secure attachments. They exhibit anxiety and fearfulness and may resist efforts of the caregiver to soothe them. They lack the security needed to fully engage with the world and the trust needed to accept loving support when it is tendered to them.

**Attachment Styles and Behavior** Researchers elaborated this theory and found three basic types of attachment—secure, anxious/avoidant, and anxious/resistant (e.g., Ainsworth, 1989; Bretherton, 1992; Siegel, 2012). In this book, we only focus on the contrast between children who are securely attached and those who exhibit less secure patterns of attachment (i.e., anxious/avoidant, anxious/resistant) in order to clearly communicate broad patterns of findings. The nature of children's attachments has been studied by putting an infant or toddler in a strange room with her mother, toys, and a stranger. A securely attached child will happily play with toys while her mother is nearby but will become distressed if her mother should leave. The distressed child seeks reassurance and quickly settles when her mother returns. Children who have mothers who are distant, unresponsive, or harsh, however, tend to develop an insecure attachment. Children placed in a strange situation may ignore their mothers and show no response when their mothers leave or when they return. Others may express anger mixed with avoidance when their mothers return.

Longitudinal studies have examined the extent to which early attachment is predictive of later patterns of feeling and action. Looking at the association between attachment and later evidence of internalizing behavior is one way researchers have considered the effects of attachment. *Internalizing behavior* refers to behavior patterns in which a person turns emotional distress inward, resulting in depression, fearfulness, and withdrawal. (In contrast, externalizing behaviors, further discussed next, are those that express in an outward manner a person's emotional distress, resulting in aggressive and hostile behavior.) A meta-analysis that included more than 4,600 children from 42 samples found that secure early attachment had a tendency ( $d = .15$ )\* to help protect children from later internalizing behaviors (Groh, Roisman, van Ijzendoorn, Bakermans-Kranenburg, & Fearon, 2012). Another meta-analysis examined studies that followed children from age 12 months into later life, with one study tracking them until age 22. After taking into account the factors that shape one's life later in adulthood, such as illness and parental loss, the study found that the attachment mea-

---

\*Cohen's  $d$  describes the size of the effect of an intervention. It standardizes differences between groups in a way that allows for comparisons among studies with different-sized samples.

sured at 12 months was a good predictor of later patterns of interacting with others (Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). The results from a single study by Waters et. al. (2000) provide particularly striking evidence of the nature of this long-term stability. Attachment was assessed for 60 Caucasian, middle-class infants at 12 months, and the children were followed for 20 years. When the children were reassessed as young adults, the researchers found that 72% received the same attachment classification as when they were infants. Only 18 of the young adults had shifted in classification. These shifts in classification were most likely (8 of 18) if they had experienced a traumatic life event (e.g., loss of a parent, divorce, life-threatening illness, parental psychiatric disorder, physical or sexual abuse by a family member).

The nature of attachment at an early age clearly has lasting implications for a child's emotional and social functioning. Even though the nature of early attachment is a strong predictor of later functioning, parent support programs provided after this critical early period can still improve attachment relationships. Parents can change, and their infants and toddlers can reap the benefits.

***Effects of Attachment on Social Functioning*** Infants and toddlers experience patterns of interaction that lead them to anticipate how others will respond to them. These early cognitive-emotional patterns and expectations operate below the level of conscious awareness. Although they are based on interactions with primary attachment figures, they are generalized to others (reviewed in Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsley, & Roisman, 2010). Infants and toddlers who develop secure attachments expect sensitive, supportive, and loving responses, and this assurance enables them to explore the world in a focused manner. This can be seen in Video 1, when Eliza studies the book and later joyfully turns flaps to reveal hidden pictures. Her mother supports this by quietly allowing her to explore and then responds approvingly to Eliza's actions and words. The same pattern of supported exploration, followed by a response to the child's initiatives, was visible between Perla and Rosalita when we observed them. A history of emotional support over time enables children to move into the broader world and engage with other people and experiences with relative confidence. In contrast, those with less secure attachments may withdraw or express hostility.

To what extent does early attachment affect how children later engage with others? This question has often been addressed. Given the numerous studies of attachment, meta-analyses are available that provide a solid base for considering the effects of attachment on interpersonal behavior. One such effort looked at the effects of early attachment on later *externalizing* behaviors (Fearon et al., 2010), which are behav-

iors directed outward such as fighting, cheating, lying and stealing. It included 69 separate research samples and nearly 6,000 children. Attachment was evaluated early in the child's life, and the observation of externalizing behavior occurred by age 5 in most cases. The researchers found that children who exhibited externalizing behaviors were less likely to have formed secure early attachments. This association was moderately strong ( $d = .31$ ), and boys were somewhat more likely to exhibit externalizing behavior.

Examining the extent to which a child forms friendships is another way to consider his social competence. Having friends is one of the most important aspects of life to many children, so the ability to get along with peers is very important. A meta-analysis examined effects of attachment on children's later peer relationships (Groh et al., 2014). It drew on 80 studies that included 4,441 children, with some studies including adolescents. It found a moderate association ( $d = .39$ ) between security of attachment and peer relationships. Remarkably, this association was similar regardless of the child's age when attachment was initially assessed. This finding provides further evidence of the enduring importance of attachment.

***Associations Among Attachment, Language, and Cognitive Ability*** Not only is attachment closely related to later social-emotional development and interpersonal relationships, but it is also associated with language development, cognitive ability, and future academic outcomes. These associations come together in the parent-child activity with which we opened our discussion—book reading.

***Language Development*** The quality of children's attachment relationship is associated with their language development. Tanya's warm and sensitive interaction with her child included considerable talk; the language she used was often too complex for Eliza to understand, but Tanya engaged her as a conversational partner. Likewise, when we observed Perla and her infant, Rosalita, we noted that precisely the same qualities characterized their interaction. Such exchanges foster language growth. This association between attachment and language use results in children's improved language ability, as revealed by longitudinal studies that have found that secure attachment and language growth are positively related. A meta-analysis of 32 studies found a modest association ( $d = .28$ ) between attachment and language (Van Ijzendoorn, Dijkstra, & Bus, 1995). This was replicated by a study that followed 99 children from age 24 to 36 months (Spieker, Nelson, Petras, Jolley, & Barnard, 2003). The analysis of the National Institute of Child Health and Human Development (NICHD) Child Care data

by Belsky and Fearon (2002) also found that expressive language measured at 36 months was related to attachment. Interestingly, children from modest social and economic backgrounds who were securely attached had language abilities that were on par with those of more affluent peers. This finding of parity is contrary to the many studies we discuss later that find slower rates of language growth in this population. This important finding suggests that parents from all economic and educational backgrounds can provide good support for their children's language growth between birth and 36 months if they also have habitually engaged in the responsive interactions that foster and result from strong attachment relationships. The role of socioeconomic status (SES) is further explored next.

*Cognitive Ability and Academic Outcomes* In general, studies of early development find relatively little evidence of association between attachment and general cognitive ability (Belsky & Fearon, 2002; Spieker et al., 2003; Van Ijzendoorn et al., 1995), but there is a small, long-term association between attachment and academic skill. A study that followed 1,023 children from age 24 months to fifth grade evaluated attachment at 36 months and tested reading and math skills in fifth grade (McCormick, O'Connor, & Barnes, 2016). After controlling for many background variables, the researchers found that securely attached children did slightly better on the academic tasks. Interestingly, this improvement was partly accounted for by the fact that more securely attached children were better able to stay attentive to tasks. Note what we saw watching Eliza. She experienced moments of highly focused attention to the book as her mother responded to Eliza's interest and patiently held the book so she could study it. Similarly, Rosalita experienced moments of highly focused attention to an object as her mother responded to her interest and patiently held the toy so she could study it. Caregivers who are sensitive to children's interests and assist them as they explore novel objects are not only deepening emotional bonds, but they also are fostering their child's attentional capacities.

*Book Reading* Book-reading time between Tanya and Eliza was very conducive to fostering close emotional bonds. Researchers have taken advantage of that fact and used book reading as an activity in which to observe how attachment affects mother-child interaction. Adriana Bus and Marinus van Ijzendoorn observed middle-class Dutch mothers and children ages 1½, 3½, and 5½ years as they read a storybook and looked at a booklet with letters and words. The researchers determined the nature of the child's attachment relationship at 18 months. As mothers and children read books, children who were more



securely attached needed less discipline to maintain their focus and more often tried to read on their own and examine illustrations (Bus & Van Ijzendoorn, 1988). Mothers of securely attached children tended to provide more literacy instruction, and children who received such tuition had stronger literacy knowledge. In a subsequent study, these researchers examined book reading among four groups—parents with either low or high SES who reported they read to their children either frequently or infrequently (Bus & Van Ijzendoorn, 1995). Securely attached children were much more likely to be from homes in which reading was common. This finding indicated that securely attached children are better able to engage in literacy-related activities. Mothers with a history of responsive, emotionally rich book reading use it as an opportunity to deepen attachment bonds while also fostering language growth (e.g., Tanya and Eliza).

Conversely, children who have an insecure or anxious attachment relationship may be harder to engage in book reading, making it a less pleasurable activity for the mother or child. Although this pattern may naturally emerge, it is possible to change. For mothers whose infants and toddlers are difficult to engage, it may be possible to help the infants learn to engage more successfully in activities such as play and book reading. This might improve the quality of the attachment bond while also building language, which is what many teams of researchers and educators have attempted. We will discuss these interventions after we have reviewed research on executive function.

## EXECUTIVE FUNCTION

Establishing a strong emotional bond with a nurturing adult is fundamentally important to children. Learning to regulate one's actions, feelings, and thoughts is a second fundamental developmental challenge. This is needed if one is to interact with others in a socially acceptable manner and focus on tasks. Different terms are used to refer to the abilities drawn on to control one's attention, behavior, and emotions—*executive function*, *self-regulation*, and *cognitive control*. We will use the term *executive function*.

### Importance at School Entry

To grasp the importance of executive function for school success, imagine a teacher with 25 6-year-olds in her classroom. When the teacher is reading a story to the group, she notes that four or five children frequently become distracted and play with their shoes or try to engage their friends. They also are prone to blurt out answers rather than waiting to be called on. Those who attend to stories are more likely to



engage in sustained focused play during independent activity time, creating elaborate structures with blocks or assembling puzzles. Yet, a few flit from one activity to the next and occasionally pose management problems. Children who have trouble sustaining attention in groups or engagement in tasks fit the profile of those with weak executive function skills. Their patterns of participation in the classroom mean that they lose out on opportunities to gain the skills and knowledge being taught and honed in school.

## Measuring Executive Function

One way to evaluate a child's executive function skills is to ask teachers to rate the extent to which a child can engage in and stay attentive to tasks in school and comply with classroom expectations and social norms. Teachers are able to distinguish among children when making ratings, and the ratings assigned by a teacher one year tend to correlate reasonably well with teachers' ratings the following year. That stability suggests that the capacity is somewhat stable and different teachers respond in a similar manner to questions used to assign these ratings. Teacher ratings as a measure of children's executive function skills have some limitations, however. Researchers also need measures that can be used before children attend school; moreover, different teachers may have different expectations for behavior. As a result, a host of clever methods have been devised to directly test children's executive functioning.

To understand how these tasks measure executive functioning ability, it is helpful to reflect on what is involved when one regulates one's own behavior. In order to comply with a classroom expectation, such as learning to raise one's hand before talking, children must translate the teacher's words into meaning, store this message as a cognitive representation, retrieve it at appropriate times, and use it to restrain the overwhelming urge to share some exciting piece of information (e.g., "I have a hamster too!") without first raising one's hand and waiting to be called on for an answer. Also, children engaging in a sustained activity, such as building a city using blocks, must formulate a plan and hold it in mind while dealing with the challenges of placing one block at a time. They need to monitor their own behavior and also check on whether they are complying with classroom rules (e.g., "No buildings taller than you"). Finally, they need to monitor their interactions with peers (e.g., "I'm building the tower, and you are working on the fence"). These complex tasks require memory, the use of language to formulate and communicate plans, and the ability to regulate one's emotions and impulses (Kopp, 1982).

What makes self-regulation so complex is that it is not a purely cognitive enterprise. Emotions color all people's interactions with the world. For example, fear or anxiety may lurk below the surface of awareness while a child is interacting with peers as memories of past engagements with caregivers are triggered and activate emotional responses deep in the brain (Blair, 2002). Strong emotions may burst forth as a building made of blocks suddenly collapses or another child bumps a carefully constructed tower and sends it crashing to the floor. At such a moment, emotion-driven urges to strike out, cry, or yell may be dampened if the child recalls socially approved responses, inhibits her immediate emotion-laden impulse, and acts in a socially approved manner. For example, the tower builder may say, "You messed up my tower. Why did you do that?" instead of hitting other children.

One type of assessment of executive function evaluates children's ability to resist temptation and delay gratification. Performance on these tasks is said to measure hot executive function ability—the use of executive control in the face of emotions or desires. One amusing hot executive function task is the wrapped gift task. The experimenter brings a gift and wrapping supplies for the child. The child is asked to sit with his back to the experimenter and not to peek while the experimenter spends 1 minute wrapping the present. The experimenter puts the gift on the table and leaves for 2 minutes to get a bow. The child is told not to touch the gift. The child's score is based on the number of times he turns, peeks, or touches the gift. Tasks such as these have been used with children as young as 22 months old (Kochanska, Murray, & Harlan, 2000). Performance on such tasks relates to teacher ratings of children's ability to engage in classroom activities in ways that reflect use of executive function ability (Fuhs, Nesbitt, Farran, & Dong, 2014; Nesbitt, Farran, & Fuhs, 2015).

A second type of executive function task assesses what some researchers call *effortful attention* (Kochanska et al., 2000) and others refer to as *cool executive function*. The name is designed to contrast with the challenges posed by the hot executive function tasks. Cool executive function tasks draw on a child's memory and attentional focus to a complicated task, rather than the child's ability to resist doing something he wants to do. In cool executive function tasks, children are given a rule to guide their behavior, tested to see if they can follow it, and given a second rule that requires a shift in focus. For example, in the dimensional change task, children are given a set of cards that have star and truck shapes in blue and red. Children first are asked to sort a set of cards according to one dimension, color (red vs. blue), and then according to shape (star vs. truck). Head-Toes-Knees-Shoulders is another popular cool executive function task in which children are told

to touch their toes when the assessor says to touch their head and to touch their heads when the assessor says to touch their toes.

## Executive Function and Academic Achievement

Acquisition of strong executive function abilities is a slow process that draws on emerging intellectual and language skills. Between birth and school entry, caregivers support its emergence in ways that are similar to how caregivers foster attachment. Children who develop strong executive function abilities early in life reap long-term benefits in the form of better subsequent peer relationships. These abilities also tend to translate into stronger academic performance.

Kindergarten teachers realize the importance of children's ability to regulate their attention and behavior. When kindergarten teachers were asked to rate the most important factors that contribute to a child's readiness for school (U.S. Department of Education, 1993), the top two responses were being physically healthy and well rested (78%) and being able to verbally communicate their needs and wants (64%). Close behind these responses were a cluster of behaviors associated with executive function, including being curious as indicated by engaging well in new activities (57%), not being disruptive (60%), following directions (60%), sitting still and paying attention (42%), and finishing tasks (40%).

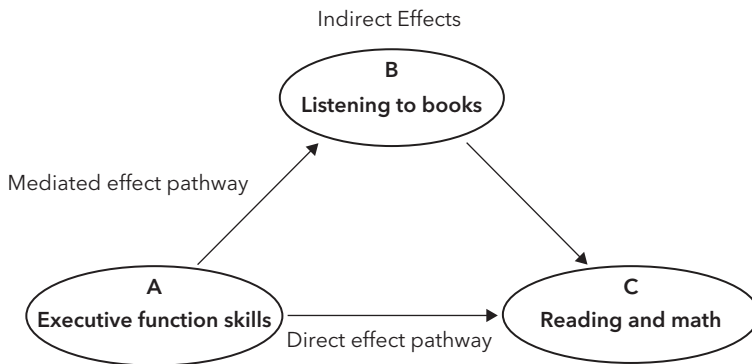
Teachers are right to rate these as key indicators of readiness to learn. Multiple large longitudinal studies have explored the associations among children's academic, social, and intellectual abilities in kindergarten and later school success. One study sought to identify the behaviors and abilities measured at school entry that predict later school success. The researchers combined results from six large longitudinal studies conducted in the United States, Canada, and the United Kingdom (Duncan et al., 2007). The combined sample included more than 36,000 children. These studies provided data from school entry through fifth grade and included teacher interviews about children, direct assessments, and observational data. In their analyses, the researchers took into account information about children's parents and economic circumstances. They found that early attentional skills (cool executive function) made a significant, small ( $d = .10$ ), but educationally important contribution to the prediction of reading and math skills in fifth grade. Surprisingly, challenging behaviors were not predictive of later academic success. Both teacher ratings of attentional skills and assessments of these skills predicted later achievement, a finding that lends support to the value kindergarten teachers place on behaviors that reflect self-regulatory ability. Further evidence of the unique

importance of cool executive function came from a study of 173 kindergarten children (Brock, Rimm-Kaufman, Nathanson, & Grimm, 2009). These researchers used measures of hot and cool executive function and explored the effects of children's ability to maintain attention on their math growth and learning-related behaviors. They found that it was the cool executive function measures that were predictive of math achievement.

At the same time that children are acquiring executive function, they are also gaining linguistic and cognitive abilities. How are these emerging competencies related? We discuss research that tries to answer this challenging question in the next section. We will pause and discuss two concepts that are needed as the complex interrelationships among competencies that develop between birth and school entry—mediation and bidirectional effects—are explored.

**Mediation and Bidirectional Relationships** Mediation is the process that occurs when the improvement in an ability, such as reading, is related to earlier experiences, such as book reading, and to improvement in another ability, such as oral language development. Book reading may foster later reading skill because it improved children's language abilities. We will discuss the results of a study conducted by Kimberly Nesbitt, Mary Fuhs, and Dale Farran (2015) to help you understand mediation and how it applies to development of executive function.

Nesbitt and her colleagues (2015) examined how the executive function ability of preschool children affects their growth in math and reading. They assessed the executive function, literacy, and mathematical abilities of 1,103 children in 80 prekindergarten classrooms in the fall and spring. (In Figure 1.2, executive function is represented



**Figure 1.2.** Direct, indirect, and mediated effects in the relationship among executive function skills, listening to books, and reading and math skills.

by A, learning-related behaviors by B, and literacy and mathematical abilities by C.) They hypothesized that the strength of a child's executive function skills in the fall (A) would be predictive of the child's reading and math skill in the spring (C). They also anticipated that stronger executive function ability (A) would enable children to effectively engage in learning-related activities (B), and engagement in these activities would help predict growth in academic skills (C). That is, they anticipated that executive function (A) would have direct effects on reading and math (C), and learning-related behaviors (B) would also help predict later academic skills because these behaviors would enable children to engage in the classroom in more productive ways. That is, they expected learning-related behaviors would mediate the association between fall executive function and spring academic skills.

They tested this theory by collecting detailed descriptive information about children's classroom behaviors. They observed children as they engaged in routine activities three times during the year. Each child was observed for 3 seconds using a snapshot technique, after which the researcher coded for four types of learning-related behaviors: 1) the child's level of involvement; 2) engagement in a task that included multiple steps (e.g., doing a puzzle, reading a book, playing make-believe); 3) participation in a social activity; and 4) disengagement or disruptive behavior. They also asked teachers to report on children's learning-related behaviors. Teacher reports were reasonably well correlated with the direct observations. Nesbitt and colleagues (2015) used statistical methods that allowed them to take into account information about the children's backgrounds and academic and executive function competencies in the fall. They found that 1) fall executive function predicted spring academic abilities, 2) fall executive function predicted learning behaviors during the year, and 3) learning-related behaviors predicted spring academic skills.

To put these results in technical terms, fall executive function was directly related to spring academic skills. Fall executive function was also indirectly related to spring reading and math because some of its effects were mediated by the child's participation in learning-related behaviors in the classroom. Children with strong executive function skills were more able to engage in learning-related behaviors in the classroom and able to benefit more from classroom instruction. Learning-related behaviors mediated the effect of fall executive skills on spring academic abilities.

Bidirectional relationships between emerging abilities are another important phenomenon that will be repeatedly encountered as early development is explored. When two abilities are related to each other, it can be hard to determine the nature of the association between them.

Consider the relationship between a child's interest in hearing books and her oral language skills. A researcher might well find that growth is correlated across both areas; interest in listening to books improves at the same time that oral language grows. This could be because strong interest in books helps fuel language growth or because strong language ability fosters interest in books. And there is a third option—both may be happening. Interest in listening to books may foster language growth that increases interest in books, and increased book reading may lead to language growth. Such a pattern would reflect bidirectional effects. It is important to be aware of this possibility because reciprocal effects can increase the potency of both of the two related capacities.

An example of bidirectional effects comes from an analysis of the emergence of executive function and academic skills in preschool. Fuhs and her colleagues (2014) were interested in further understanding the association between growth in executive function and children's engagement in learning activities in preschool. In our discussion of mediation, we noted that stronger executive function at the beginning of preschool increased the chances that children would engage in beneficial behaviors; that engagement enhanced learning. Could children who engage in productive learning activities improve their ability to sustain focus while engaged in an activity, thereby improving their executive function skills? Fuhs and her team addressed this question using data from 2 years. Children were tested at the beginning and end of preschool and again at the end of kindergarten. Executive function predicted growth in academic skills and language. In addition, the researchers found a bidirectional relationship—improved math and language skills also supported growth in executive function. Thus, strength in executive function can support growth in an academic area as children begin their schooling careers, and stronger academic abilities can foster growth of executive function.

### ***Long-Term Effects of Executive Function on Later Academic Competencies***

Evidence is accumulating to indicate that executive function ability has beneficial effects on academic abilities beginning at school entrance and continuing through the primary grades. A long-term study was carried out by Smith, Borkowski, and Whitman (2008), who followed children from ages 3 to 14. They assessed children's IQ, receptive vocabulary, and reading readiness at school entry, and they assessed children's reading comprehension and IQ at age 14. Teachers rated students' cognitive and social-emotional self-regulation (part of executive function skills) when they were 10 years old. As expected, later reading was predicted by early vocabulary and



reading. Also, early reading helped predict executive function at age 10, which itself was correlated with reading comprehension at age 14. When age 10 executive function ratings were taken into account, the association between reading skills at age 5 and at age 10 was reduced. These findings indicate that age 10 executive function partially mediated the effects of early reading on later reading comprehension.

Bidirectional associations have been found between executive skills and academic abilities in preschool and kindergarten (Fuhs et al., 2014). Will that continue to occur once children enter school and engage in formal educational activities? That is the question posed by researchers who followed 379 children who were being reared in low-income homes. Children's reading skills were first assessed in kindergarten or first grade and then again in third and fifth grade (Stipek, Newton, & Chudgar, 2010). At each time point, teachers also rated children's ability to engage in work-related tasks. As expected, reading scores were moderately correlated with each other over time, and teacher ratings were generally consistent across the three time points. More important, teacher reports of children's work-related behaviors in kindergarten and first grade predicted reading in third grade, and third-grade teacher reports predicted fifth-grade reading. There was no evidence that literacy ability in kindergarten and first grade fostered growth in work-related skills in third grade, but third-grade literacy did contribute to work-related skills in fifth grade. Thus, the ability to productively engage in school learning at school entry sets children on a path to reading success. They continue to benefit from the ability to sustain engagement in academic learning tasks through the primary grades. In addition, as children gain skills as readers and receive teacher approval for their efforts, their ability to remain engaged in learning tasks improves.

**Summary of Connections** Children are positioned to benefit from school if they enter with good executive function capacity and reasonably strong academic skills. Executive function abilities appear to have bidirectional effects in the more informal learning environments of preschool and kindergarten. Engagement in activities such as listening to stories, looking at books, writing, and playing with math manipulatives builds academic and self-regulatory capacities. Children with strong executive function skills continue to benefit more from school than those with weaker skills, and academic success begins to translate into improved executive functioning by the later grades. All of this raises the question: What early experiences equip some children with strong executive function skills by the end of their preschool years?

## The Emergence of Executive Function Abilities

Caregivers are constantly responding to infants' and toddlers' entreaties to interact and play with them, their resolute efforts to master skills such as walking and eating, and their unrelenting desire to explore the world. As children play with objects and interact with others, they must focus and maintain their attention. Recall how, in Video 1, Eliza studied the pictures in the book and stayed engaged in the reading activity. (We observed similar focus and engagement when we watched how Rosalita intently examined the objects moving about in the toy her mother held for her.) Also, as they enter into the social world, children need to learn to express their needs and desires in acceptable ways. Research is beginning to find that the way parents respond to and support children's efforts to master skills has an impact on children's emerging executive function abilities. Interestingly, the caregiving behaviors we will highlight are similar to those associated with attachment.

***Caregiving and Executive Function: Perla and Rosalita*** To consider the many subtle ways in which caregivers engage infants that have implications for the growth of executive function, we will consider the interaction between Perla and Rosalita that we mentioned earlier and describe it in somewhat greater depth. When we met Perla, she was playing with Rosalita, her 3-month-old infant, in an infant chair. The entire interaction was possible because Rosalita was positioned so she could see her mother and the object her mother gave her, and Rosalita's mother was fully engaged with her. This arrangement provided the context that enabled them to share the following experience. Perla handed her infant a round plastic toy with objects that slid around under a transparent cover whenever the toy was moved. It was somewhat heavy, and when Rosalita grasped it, she held it up to her face, covering her face. As we observed, Perla paused, peeked behind it quietly, and then said, "Oh, where are you?" as she initiated a kind of hide-and-seek game. She then took control of the toy and held it at a slight angle so the infant could see the objects move around. The infant heard the sound and looked down. The mother held the toy for about 30 seconds, moving it slightly so the objects moved around. The infant attended closely as Perla commented on what was happening. Eventually Rosalita lost interest, grunted, and strained forward in her seat. Perla immediately stopped playing with the toy and interpreted Rosalita's grunt and movement as a request to get up. She said, "Oh! You wanna get up?" as she removed her from the chair and held her.



Perla was gentle, warm, and keenly attuned to all of Rosalita's signals throughout the interaction. She noted what interested Rosalita and immediately responded. She helped Rosalita explore the toy by moving it slightly. She did not press her own agenda in an intrusive manner; rather, she allowed her daughter to look at the moving objects and listen to the sounds they made. She also used language to narrate her interpretations of the infant's desires by asking "Oh, where are you?" when the infant's face was covered. As Rosalita looked at the toy, Perla said, "That's fun. It's got sea animals, yeah." Finally, when Rosalita tired of the toy, Perla said, "Oh! You wanna get up?" Perla helped Rosalita to explore the world in these few moments of play. This support for Rosalita's actions is called *scaffolding*, a concept further explained in the next section.

Perla gave Rosalita some control of objects, the activity, and her own location. By so doing, she gave her daughter autonomy support. She was able to support her autonomy because she was highly responsive to Rosalita's verbal and nonverbal signals. What she did not do was abruptly engage Rosalita, forcing an activity on her or insisting that she continue after she became bored. Such negative interactions are referred to as *being intrusive* or *controlling*. Perla also accompanied her actions with language that mapped directly onto the activity. She also put into words what she believed were the child's mental and emotional states. This was most clear when she said, "You wanna get up?" This effort to understand the child's mental state is called *mind-mindedness*. That is, she was attentive to the child's mind and verbalized what she believed Rosalita wanted and was thinking. Finally, Perla was gentle and loving during her interaction with Rosalita.

Rosalita was encouraged to be cognitively and linguistically engaged while also feeling loved and safe throughout the entire time. Various studies found that these caregiving strategies foster development of executive functioning (Bernier, Beauchamp, Carlson, & Lalonde, 2015; Grusec & Maayan, 2010).

***Parental Scaffolding of Children's Engagement*** Parents begin to have an impact on their child's emerging executive function skills from an early age as they help their infants sustain attention to objects and events. This process of supporting a child's ability to carry out a difficult task has been referred to as *supplying scaffolding* for the child, a construct initially formulated by Vygotsky (1978). Vygotsky advanced an influential theory of child development and proposed that the development of children's higher cognitive abilities is the result of their gradual internalization of their culture's ways of interacting, acting, and learning what he called their *culture's tools* (Wertsch, 1991). Lan-

guage is one of society's most powerful tools that plays an important role in children's development of executive function abilities. According to Vygotsky, adults initially provide strong guidance for children as they learn the skills and behaviors required of them. Those supports are gradually reduced and removed as children gain competence and can function without assistance. The guidance adults provide is called *scaffolding*, evoking the construction metaphor in which buildings are supported until they are strong enough to stand on their own.

The metaphor of scaffolding may also apply to children's acquisition of executive function. Evidence suggests that children's ability to regulate their own attention and actions can be viewed as a shift from being regulated by others to being regulated by themselves, which reflects gradual internalization of the culture's ways of acting. Caregivers may help children acquire executive function skills by providing strong guidance toward methods that are less directive and are designed to help children maintain their engagement in tasks.

To understand how mothers foster early development, consider how Perla assisted Rosalita. Perla provided strong scaffolding for Rosalita's attention throughout the brief interaction that we witnessed. She positioned Rosalita so she could see the toy, held it in a way that ensured Rosalita would look at it, and moved it to draw her attention to the moving objects. Perla was sensitive to her daughter's involvement and held the toy still to help Rosalita maintain her attention and study it intently. She quickly shifted the activity when Rosalita became tired. Similarly, Tanya provides scaffolding for Eliza's attention in Video 1. When Tanya reads with Eliza, we see that Eliza has internalized the routines associated with book reading. She knows what will happen as she reads with her mother, where to sit, how to look, and the kind of conversation in which to engage. At several points, she initiates playful interactions around the book. Tanya takes a directive role at times. She points to pictures and asks questions that are meant to prompt specific responses, and she moves the activity forward by turning pages. Yet, she also helps Eliza maintain her attention and engagement, pausing and holding the book still as Eliza looks at pictures and following Eliza's comments and questions in a way that encourages continued attention to a picture or idea. This kind of scaffolding helps very young children learn to direct themselves and regulate their own attention and actions.

*Research on the Effects of Scaffolding* Susan Landry and her colleagues studied this process of movement from being other-directed to self-directed (Landry, Smith, Swank, & Miller-Loncar, 2000). They drew on Vygotsky's (1978) approach to development and hypoth-

esized that very young children would benefit from having parents who helped them direct and maintain their attention as they learned to engage in activities and acquired skills needed to carry them out. They hypothesized that there would be a slow shift in the extant mixture of strategies that would be helpful. During the study, as each of the parents played with their own child, the researchers coded parents' behaviors for help they offered children in maintaining their attention to an activity or object. Strategies that Landry et al. found included offering children choices through verbal methods, such as questions or suggestions, or nonverbal methods, such as pointing. The researchers also coded times when the caregiver directed the activity, including verbal or nonverbal strategies that offered children little choice, such as verbal requests (e.g., "Point to the birdie") or showed the child the specific desired behavior. The researchers expected that children would always benefit from assistance maintaining their engagement, but highly directive supports would decrease in utility because they sometimes force the child to shift attention away from what the child was doing or interrupt a child as she was starting to do something different from what the adult wanted the child to do.

Landry and her team (2000) tested these hypotheses by following 289 children and primary care providers from age 2 to 4½. They tracked children's language and cognitive development and observed how their caregivers played with them. They also coded children's participation in activities at age 4½ for the extent to which they initiated and sustained actions when they were playing with their parents. A caregiver could strive to help a child maintain focus and direct the child's attention. Thus, the researchers found that maintaining and directing behaviors are beneficial. They found that children at all ages benefitted from parents who used strategies that helped them maintain their engagement. These benefits showed up in enhanced cognitive and language abilities. In addition, those improved cognitive and language skills that were acquired by age 3½ were indirectly linked to a child's ability to initiate and sustain an activity at age 4½. Directives had different effects. When children were 2½ years old, caregiver directives were associated with children's enhanced cognitive and language growth, but at age 3½ parental directives were related to less independent activity for children at age 4½. Thus, as children become more able to regulate their own attention, they benefit from engaging in sustained activities, and directives tend to interrupt such engagement.

The ability to initiate and sustain activity is a strong indicator of the emergence of executive function. Therefore, this study provides good evidence that caregivers play a role in supporting the emergence of executive function from the time children are 2 years old. Support

for a child's capacity to sustain engagement is beneficial throughout early childhood. Directives are helpful when very young children initially need heavy scaffolding, but they decline in value as children get older.

Replicating findings is critical in science and is rather rare in social science. It is therefore interesting to note that other results consistent with Landry's findings have been reported. Bindman, Hindman, Bowles, and Morrison (2013) studied 127 children between age 3 and the age just before they entered kindergarten. They assessed children's language, cognitive, and executive function skills. The summer before children entered kindergarten, researchers observed parents and children as they prepared for a pretend birthday party. They found that parents of children with stronger executive function abilities used hints and suggestions, actions that served to sustain the child's engagement, and less directive language.

*Fine-Tuning Adult Scaffolding* The study by Landry and colleagues (2000) indicated that children benefit when parents help them sustain engagement in an activity. But what enables them to do that? Why are some better than others? A longitudinal study that followed 80 children from age 12 months to 26 months examines this question (Bernier, Carlson, & Whipple, 2010). Children's homes were visited four times, mothers were videotaped, and children were assessed for their executive function, memory, and cognitive abilities. The mothers' interactions with their children were coded for three features of parenting that the researchers surmised could help children's emerging executive function skills:

- *Sensitivity*: mothers' gentle responsiveness
- *Mind-mindedness*: indications that mothers were attempting to understand their child's mental and emotional states (e.g., "You really don't like that, do you?")
- *Autonomy support*: instances when mothers helped their child carry out a task

The researchers found two patterns of results on the executive function tasks, referred to as *two dimensions of ability*. One dimension reflected use of hot executive function ability and the other included cool executive function. Sensitivity, autonomy support, and mind-mindedness measured before children were 2 years old all predicted cool executive function at age 26 months. None of these predicted hot executive function. These features of parenting are related. Mothers who are tuned into their child's mental and emotional states (mind-mindedness) are

able to help them accomplish tasks (autonomy support). Sensitive parents are attentive to the child's rhythms and respond in a gentle, supportive manner that can foster autonomy. This finding aligns with the videotaped interaction between Tanya and Eliza and the interaction the authors observed between Perla and Rosalita.

**Language: Private Speech** Vygotsky (1978) hypothesized that language is a tool society passes on to children. As we discussed earlier, it is woven into the parent-child interactions that build strong attachment bonds and is a means for parents to convey the norms and behavioral expectations of their group (e.g., "Use your inside voice in school." "You need to listen and wait your turn"). Language also is used for cognitive purposes, such as when individuals make plans and carry out complex tasks ("Okay, I turn left at the first light . . ."). Adults direct infants' and toddlers' actions by showing and telling them what to do. Children slowly internalize these expectations and the associated talk. As children strive to do things, the role of language sometimes is evident when children quietly talk to themselves. This is called *private speech*. Vygotsky hypothesized that it is a manifestation of children's incorporation of societal norms and evidence that language is being used to help regulate actions. With time, this vocalization disappears because children have fully internalized the use of language. A charming example of this process was conveyed to me by a preschool teacher. One child often arrived at school in an agitated state. The teachers found that when he was having trouble settling and focusing, they could take him aside; look him in the eyes; say, "Matthew, focus;" and encourage him to say "focus" as well. This helped him settle and gave him a strategy to use independently.

Researchers have explored Vygotsky's (1978) hypothesis about private speech. They do so by observing children as they engage in complex tasks, recording their vocalizations, and determining if there is an association between private speech and success in completing the task. Two longitudinal research studies used this approach, one with children between ages 3 and 4 (Berk & Spuhl, 1995) and one with children from first to third grade (Bivens & Berk, 1990). In each case, researchers found that children used private speech. Its use among the preschool children was associated with better performance on the task they were asked to do, and its use among the older children doing a math task was associated with stronger mathematics performance the following year (Bivens & Berk, 1990). An investigation done with 5- and 6-year-olds found that use of private speech increased as tasks got harder, and its use was related to better performance on the task (Ferryhough & Fradley, 2005). Winsler, Diaz, Atencio, McCarthy, and Chabay (2000)

followed children from age 3 to 5, half of whom had been identified as having challenging behavior. All of the children used private speech, but those with challenging behavior were more likely to use it. Consistent with Vygotskian theory, researchers found a decrease in use of private speech as children got older. In addition, they found an association between the use of private speech and results on measure of executive skill.

A theory advanced by Zelazo (2015) has added precision to Vygotsky's (1978) theory. Zelazo also posited that individuals control their attention and direct actions to accomplish tasks using language to formulate and hold in mind rules and goals, and he described the neural activation patterns associated with planning and regulating action.

***Language Development and Executive Functioning*** Language ability has effects on children's ability to regulate their thoughts and actions that goes well beyond use of private speech. Indeed, there is strong evidence that language plays a major role in supporting the emergence of executive functioning from a very early age. Pointing is an early and important means by which children engage others in attending to objects of interest and eliciting information about them (see Chapter 3). It is therefore interesting to learn that a large study that included 1,117 children found that infants' gesturing at 15 months was correlated with language at age 2 and 3 (Kuhn, Willoughby, Wilbourn, Vernon-Feagans, & Blair, 2014). Early gesturing also was associated with executive function at age 4. The effect of early gesturing was mediated by children's language at age 2 and 3. This finding is a preview of findings in discussed in Chapter 3, showing continuity between preverbal communication and later language. It also calls attention to the deep connections between language and emerging executive functioning capacity.

Vocabulary has been found to have a particularly strong association with executive function. Catherine Ayoub and colleagues found that it serves both cognitive and social functions (Ayoub, Vallotton, & Mastergeorge, 2011). They were interested in its role in supporting emerging self-regulatory skills. They pursued that question by examining data from an evaluation of Early Head Start. Data from nearly 3,000 children, collected at 14, 24, and 36 months of age, included measures of language and self-regulation. Children's vocabulary at 24 months contributed to predicting the growth in self-regulation between that age and age 36 months. Also, children with larger vocabularies at 24 months performed slightly better than others on the self-regulation measure at later points. Receptive vocabulary was found to be correlated with 4- and 5-year-olds' performances on assessments of hot and



cool cognition (Carlson & Wang, 2007). It also was related to parents' ratings of their children's abilities to control their impulses (e.g., "Does the child think before he or she acts?") and regulate their emotions (e.g., "After receiving a disappointing gift from someone, how likely is your child to pretend to like the gift?").

Additional evidence of the central role of vocabulary came from a study that followed children from age 15 months to 60 months, the point when most were beginning formal schooling (Kuhn, Willoughby, Vernon-Feagans, & Blair 2016). Vocabulary predicted improving executive function throughout this time span. It is interesting to note that the rate of growth between 15 months and 36 months was an especially strong predictor because this is the period when children are beginning to display symbolic ability and make rapid progress in language learning (see Chapter 3). The complexity of language among older children, measured in terms of the length of sentences they used, began to be an important predictor. This shift reflects that growing ability to use language for more complex cognitive tasks, a topic discussed in Chapter 4.

Associations between language and self-regulation have also been found among bilingual children, and the relationship is bidirectional. Researchers followed a mixed-income group of monolingual and bilingual children from the beginning of preschool at age 4 through the end of kindergarten (Bohlmann, Maier, & Palacios, 2015). Self-regulation was tested in the child's dominant language. In an analysis of children's English receptive vocabulary, the researchers found that language scores predicted later self-regulation and, in turn, self-regulation supported later language growth. This finding echoes the finding discussed early among primary grade children.

Clear lines of association can be drawn among parenting practices, language, and development of executive function abilities. Longitudinal studies have followed children during the toddler and preschool years to assess the effects of parenting on language and self-regulation. Researchers in one study visited homes when children were 15, 24, and 36 months old (Matte-Gagne & Bernier, 2011). They observed as mothers helped children play with toys and complete tasks they supplied. They found that mothers of 15-month-old children who used language as they helped children complete tasks had children with stronger language development at age 24 months. Children who performed best on self-regulation tasks a year later at 3 years old were more likely to have had good vocabulary scores a year earlier. Vocabulary at age 2 mediated the effects of early parenting on later development of executive function ability. Other studies that used similar methods also found that enhanced language mediates the effects of parenting, measured

at age 2, on later self-regulation (Bernier, Carlson, Deschenes, & Matthe-Gagne, 2012; Hammond, Muller, Carpendale, Bibok, & Liebermann-Finestone, 2012).

One final study merits discussion because it examined naturally occurring events in the home, unlike other studies discussed. Also, its sample was drawn from families with a diversity of backgrounds in low-income households. Landry and colleagues observed 70 minutes of routine interactions between mothers when children in the home were 3 and 4 years old (Landry, Miller-Loncar, Smith, & Swank, 2002). They coded for occasions when mothers supplied verbal scaffolding. These were times when they supplied conceptual links among objects, people, or activities (e.g., “Where is the shirt that goes with those shorts?” “That’s a giraffe.” “You saw one at the zoo.” “Hit the nail. It’s the one that’s round on top”). The researchers tested children’s language when they were age 4 using the Clinical Evaluation of Language Fundamentals–Preschool (CELF-P;) and their problem-solving and memory skills using an intelligence test; they assessed executive function ability at age 6. When they were 4 years old, children whose mothers supplied more verbal scaffolding had stronger language and nonverbal skills (i.e., problem solving, memory). At age 6, those who performed well on the self-regulation task were more likely to have done well on the nonverbal task. Also, language ability at age 4 had an indirect effect on later executive function skills. Finally, those with strong language at age 4 also did better on the nonverbal tasks, and enhanced nonverbal ability helped boost later executive function ability.

## **SUMMARY: ATTACHMENT, EXECUTIVE FUNCTION, AND EARLY DEVELOPMENT**

This chapter charted the development of children’s emotional attachments to their caregivers and their emerging capacity to regulate their thoughts and actions using their growing executive function abilities. Parents play a central role by providing the emotional support and responsiveness needed to form secure relationships, by scaffolding children’s attention to objects and engagement in activities, and with verbal enrichment that builds children’s language abilities. There are profound long-term consequences of this early development on later emotional, social, cognitive, linguistic, and academic abilities. The consistent and strong message that early patterns of caregiver–child interactions can play a significant role in shaping later development is particularly important. The place of language in these interactions is of pivotal importance. Simply put, children benefit enormously when



their parents are responsive and sensitive and engage with them using informative language as they guide, direct, and respond to the children. In the short term, such exchanges lead to improved parent–child attachment bonds and stronger language. These enhanced abilities set in motion a cascade of later benefits because early abilities lead to later strengths that then fuel later growth. Early language and executive functioning are related to children’s developing ability to understand the thoughts and feelings of others—their theory of mind (see Chapter 4). Language will again be encountered as a potent force that fuels development as this fascinating aspect of development is explored.

**“Bravo! At last a book that captures the range of factors that contribute to early literacy!”**

—Roberta Michnick Golinkoff, Ph.D., The University of Delaware

**“[T]he most comprehensive analysis of children’s early language development to date.”**

—Susan Neuman, Ed.D., New York University

**“Erudite, well written, engaging, and wise.”**

—Timothy Shanahan, Ph.D., Distinguished Professor Emeritus,  
University of Illinois at Chicago

**“Based on decades of research, co-authored by the leading scholar in the field, and as practical as it is theoretically deep.”**

—James Paul Gee, Ph.D., Arizona State University

**H**ow do responsive adult-child interactions influence early language development? How do a child’s language skills develop in tandem with social-emotional development, executive function, and literacy? What are effective ways to help parents support their child’s development? Uncover the answers to these questions in this fascinating book, which draws on current research to examine connections between language, social-emotional, and literacy development. The book also gives you snapshots of more than a dozen programs that support language and literacy development by **coaching parents** and **providing books** for young children.

Essential reading for researchers, administrators, and educators, this synthesis of science and practical guidance will help you foster foundational language skills and nurture the healthy development of every young child.

**SEE IT IN ACTION!**  
Videos demonstrate responsive caregiver-child interactions and how they support language and literacy development.



**ABOUT THE AUTHORS**

**David K. Dickinson, Ed.D.**, is Associate Dean for Research and Strategic Initiatives and the Margaret Cowan Chair of Education at the Peabody College of Education, Vanderbilt University.



**Ann B. Morse, M.Ed.**, has worked for over 30 years on behalf of young children from low-income backgrounds and their families. She has also coached pre-K teachers through intervention research projects at Vanderbilt University.

· P A U L · H ·  
**BROOKES**  
PUBLISHING CO.®  
www.brookespublishing.com

ISBN-13: 978-1-68125-231-5  
ISBN-10: 1-68125-231-7



9 781681 252315 >