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The Effects of a Drama-Based Language Intervention on the Development of Theory of Mind and Executive Function in Urban Kindergarten Children

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ACCEPTANCE

This dissertation, THE EFFECTS OF A DRAMA-BASED LANGUAGE INTERVENTION ON THE DEVELOPMENT OF THEORY OF MIND AND EXECUTIVE FUNCTION IN URBAN KINDERGARTEN STUDENTS, by HEATHER CHRISTINE SMITH, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the College of Education, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chair, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty. The Dean of the College of Education concurs.

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ABSTRACT

THE EFFECTS OF A DRAMA-BASED LANGUAGE INTERVENTION ON THE DEVELOPMENT OF THEORY OF MIND AND EXECUTIVE FUNCTION IN URBAN KINDERGARTEN STUDENTS

by

Heather Smith

Because theory of mind (ToM; Samson, 2009) and executive function (EF; Meltzer, 2010) are important skill domains for children's academic and social success in school, researchers have focused on evaluating the impact of interventions designed to enhance the development of these skills (e.g., Peskin & Astington, 2004; Dowsett & Livesey, 2000). Using an experimental design, the current study evaluated the effectiveness of the Georgia Wolftrap (GWT) program, a drama-based language intervention, at improving ToM and EF in a sample of kindergarten students from low socioeconomic (SES) backgrounds. Researchers (Cole & Mitchell, 1998; Noble, Norman, & Farah, 2005) have indicated that low SES is associated with underdeveloped ToM and EF. Thirteen lessons designed to enhance children's understanding and use of symbols by exploring literature through imaginative role-play were implemented in place of the regular language arts curriculum. This intervention was hypothesized to engender growth in ToM because it incorporates elements found to be associated with ToM development, such as experience with language (e.g., Jenkins & Astington, 1996), mental state talk (e.g., Adrian, Clemente, & Villanueva, 2007), and pretend play (e.g., Cutting & Dunn, 2006). The impact on EF development, particularly inhibition and attentional control, was

expected to be caused by children's participation in intervention activities that require sustained, active engagement and use of motor and cognitive self-control. Consistent with research describing early childhood as a period of dramatic growth in ToM and EF (e.g., Wellman, Cross, & Watson, 2001), the results of paired-sample *t* tests indicated that the intervention (n = 41) and control groups (n = 42) demonstrated significant improvement in ToM, inhibition, and attentional control from pre-test to post-test. Despite a trend for the intervention group to demonstrate stronger performance, analyses of covariance (ANCOVAs) indicated that, after controlling for pre-test scores, there were no significant differences in post-test scores between the intervention and control groups. Possible explanations for the lack of significant differences between the intervention and control groups are discussed. Implications for future research are also suggested.

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Heather Smith

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ABBREVIATIONS

EDD	Eye Direction Detector
EEG	Electroencephalography
EF	Executive Function
GWT	Georgia Wolf Trap
ID	Intentionality Detector
IRB	Institutional Review Board
SAM	Shared Attention Mechanism
SP	Selection Processing
ToM	Theory of Mind
ToMM	Theory of Mind Mechanism
ToMM/SP	Theory of Mind Mechanism/Selection Processing

THEORY OF MIND STRATEGIES FOR EARLY CHILDHOOD EDUCATORS

In virtually all preschool and elementary classrooms, there is at least one child who has difficulty interacting with others in a positive and appropriate social manner. This child may struggle to function independently in social situations and may become argumentative or withdrawn in response to difficult or unsuccessful interactions with peers. He or she may appear to be uncooperative or to have difficulty understanding things from another's point of view. The child's problems with perspective-taking may also hinder his or her ability to understand a character's or author's point of view in a story; thus, he or she may not fully comprehend what is read. When determining how to explain and intervene upon this child's social and academic difficulty, educators should consider directing their attention to theory of mind.

Theory of mind (ToM; Premack & Woodruff, 1978) is a broad term for social cognitive skills involving the ability to attribute mental states (e.g., desires, beliefs, feelings, intentions) to oneself and to other people (Lang & Perner, 2002; Sodian, 2005). These skills guide many social interactions and allow an individual to predict, explain, and manipulate others' behavior as well as modify his or her own behavior as necessary (Doherty, 2009; Flavell, Miller, & Miller, 2002). More specifically, ToM abilities are used to acknowledge and evaluate multiple viewpoints and to make causal links between others' mental states and behaviors (in past, present, and future circumstances). Individuals then use this information to adjust their own behavior accordingly in order to,

for example, avoid conflict or attain a desired outcome (Samson, 2009; Watson, Nixon, Wilson, & Capage, 1999).

Children's ability to understand their own and others' thinking and behavior is a critical part of their academic success in school as well (Gopnik & Astington, 1988; Klein, 1998; Pelletier & Astington, 2004). First and foremost, in order for students to benefit from instruction, they must have sufficient ToM development to recognize the teacher's intention to increase their knowledge or understanding (Tomasello, Kruger, & Ratner, 1993; Ziv, Solomon, & Frye, 2008). As children engage in academic learning, they use ToM abilities to identify gaps or errors in their own knowledge and recognize differences in their knowledge compared to the knowledge held by others (Miller, 2000; Ziv & Frye, 2004). Furthermore, with regard to reading achievement, ToM skills are integral to children's ability to experience a deeper level of comprehension by integrating story characters' mental states and actions (Pelletier & Astington, 2004).

ToM has been the subject of much theoretical debate and scientific research over the last few decades and much knowledge has been gained about the development of ToM in children. However, it appears that the translation of the empirical evidence to practice in school settings has been limited. ToM is highly relevant to educators because it is important for appropriate social functioning (Astington, 1994; Baron-Cohen, 1994; Flavell, 1999; Razza & Blair, 2009; Samson, 2009; Sodian, 2005; Wellman, Cross, & Watson, 2001) and effective learning (Pelletier & Astington, 2004; Ziv et al., 2008). Furthermore, most learning occurs in a social context (e.g., between a teacher and a student, or within a group of students), and well-developed "mind-reading" skills may

facilitate positive and appropriate interpersonal relationships with teachers and peers, which are significant contributors to overall school success (Merrell & Gimpel, 1998).

The main purpose of this article is to create a link between the research laboratory and the school classroom with regard to ToM so that educators can facilitate the growth of this important skill in their students. While a few articles providing ToM-related information for educators exist (e.g., Binnie, 2005), this paper adds to the current literature by developing school-based strategies for educators that are grounded in theory and science. Specific examples of strategies likely to encourage appropriate ToM growth in all students as well as possible approaches to remediate delayed or deficient ToM development will be provided (see Tables 1-4).

Following a brief review of ToM in general, this paper presents three main types of theoretical conceptualizations of children's ToM development as an organizational framework within which to discuss relevant empirical findings. Theories will be presented individually and reviewed in some detail to provide background knowledge about the different explanations for ToM development, but it is not the intent of this article to attempt to verify any one theory as the most accurate or valid conceptualization of ToM development. Rather, this article ultimately will focus on integrating the theoretical and empirical knowledge and applying that information to educators' daily instruction and interaction with students in preschool and elementary school settings. In keeping with this goal, the studies included for review and discussion are those that appear to relate directly to schools.

ToM Development

ToM begins to develop early in life, and children achieve many important precursors to ToM and foundational ToM skills prior to entering kindergarten. For example, in infancy, the majority of children express a strong interest in and preference for human faces and voices, demonstrate understanding of intentionality, and engage in social referencing (Flavell, 2004; Siegler, 1998). During the next few years of life, most children experience rapid growth in early ToM skills, particularly in their understanding of mental states. First, children begin to appreciate that people may have different desires. Subsequently, they recognize that their beliefs about the world may be different from another person's beliefs. Finally, around 4 years of age, children understand that a person may hold a belief that is not only different from theirs, but one that is false (i.e., a belief that does not reflect reality; Wellman & Liu, 2004).

False belief understanding has long been considered the hallmark of ToM and much research has investigated children's ability to successfully demonstrate this skill (e.g., Kloo & Perner, 2003; Slomkowski & Dunn, 1996; Wimmer & Perner, 1983). In fact, for many of the studies presented in the upcoming sections of this article, false belief understanding served as the main indicator of children's ToM status because performance on these types of tasks is related to actual social behavior (Astington & Jenkins, 1995). However, as false belief understanding is only one of many ToM skills, researchers also have explored the development of a wider range of ToM skills (e.g., appearance-reality distinction, deception, perspective-taking, emotion understanding) and results have supported the conclusion that ToM undergoes significant growth between 3 and 5 years

of age (Flynn, 2006; Hughes & Dunn, 1998; Hughes & Ensor, 2007; Wellman & Liu, 2004).

These early milestones of ToM development are considered to be the foundational skills that set the stage for a progression of growth that continues after the early childhood years. For instance, children begin to understand mixed emotions and to develop conceptual perspective-taking from age 5 to 7 years (Ketelaars, van Weerdenburg, Verhoeven, Cuperus, & Jansonius, 2010). Increasingly higher-order and complex ToM skills are acquired during the later childhood and adolescent years, including an understanding of second-order false belief (i.e., to hold a false belief about someone else's belief; Miller, 2009), faux pas (Banerjee & Watling, 2005), and complex perspective-taking (Dumontheil, Apperly, & Blakemore, 2010). Moreover, ToM has been found to facilitate growth in metacognitive knowledge, or thinking about one's own thinking, which has important implications for school performance (Lockl & Schneider, 2007).

Theoretical Accounts of ToM Development

All theories of ToM development have in common the idea that ToM abilities improve with age, however, each perspective provides a unique explanation for how and why that development occurs. For example, some theories emphasize the importance of pretend play and social interaction, while others point to broad, foundational skills like language and executive functions as significant contributors to ToM development. Three main types of theoretical accounts discussed frequently in the literature will be reviewed: modularist perspectives, socialization-based theories, and cognitive components models.

Modularity

Modularity theory in general purports that the brain consists of specialized neural structures, or modules, that are responsible for human development and functioning (Fodor, 1983). These modules are skill-specific and considered to be relatively independent of one another because the flow of information between modules is restricted. Modules operate quickly and their activation is mandatory. For example, a module that is specialized to process visual information will do so automatically every time visual information is available. Due to the encapsulated nature of modules, neither development nor impairment in one skill area typically will transfer to other abilities (Flavell et al., 2002; Fodor, 1983). Modularity models have been proposed to account for ToM development, the most frequently cited of which include the Theory of Mind Mechanism/Selection Processing model (ToMM/SP, Leslie, Friedman, & German, 2004; Scholl & Leslie, 1999) and Minimalist Innate Modularity Theory (Baron-Cohen, 1994; 1998).

In the ToMM/SP model, the ToMM module is an innate component of our cognitive architecture that is triggered by the environment during maturation (Leslie et al., 2004; Scholl & Leslie, 1999). When an individual is presented with relevant environmental input, ToMM "spontaneously and post-perceptually attends to behaviors and infers (i.e., computes) the mental states which contributed to them" (Scholl & Leslie, 1999, p. 147). This module is, in a sense, programmed to provide a response that reflects the natural inclination that a person's beliefs are true. When presented with a false belief, the Selection Processing (SP) component is supposed to inhibit the prepotent but

incorrect response. However, SP develops over time and is not fully formed in children younger than 4 years. Therefore, according to the ToMM/SP model, the reason that children younger than 4 years typically fail false belief tasks is not that they lack the conceptual understanding of belief (because they have a fully functioning ToMM), but rather that their immature SP fails to inhibit the default true-belief response. Additionally, ToMM/SP theory asserts that the environment is necessary to trigger the innate process (i.e., turn the module "on"), but it does not contribute to the essential character of ToM skills (Scholl & Leslie, 1999). Due to modular characteristics, the sequence and end-result of ToM development should be highly consistent and stable across individuals, regardless of environmental differences (Scholl & Leslie, 1999; Scholl & Leslie, 2001).

Another modular interpretation of ToM is presented by Simon Baron-Cohen's (1992; 1994; 1998) Minimalist Innate Modularity Theory, which refers to a mindreading system that has evolved specifically to enable us to connect others' behaviors to their mental states. This model proposes a set of modules that extract basic sensory information from the environment that is important for social interactions and provides critical data for ToM development. More specifically, a young child gathers social information from the environment by way of the Intentionality Detector (ID), which evaluates a person's movements to or away from a target to determine the goal and desire, and the Eye Direction Detector (EDD), which detects the presence and direction of another person's eyes. This information is passed on to the Shared Attention Mechanism (SAM), which analyzes whether the child and another person are both attending to the same thing (i.e., produces joint-attention behaviors) and then activates

ToMM. ToMM integrates the sensory information processed by SAM with the mental-state knowledge held by ToMM in order to produce "a coherent and usable 'theory' for the human child and adult to employ" (p. 536; Baron-Cohen, 1994). Although these modular components are presumed to be present and functioning by age 4 years, Baron-Cohen's Minimalist Innate Modularity Theory does not suggest, in contrast to Leslie's ToMM/SP model, that ToM is fully formed at birth (Baron-Cohen, 1998). Furthermore, the Minimalist Innate Modularity Theory does not adhere to all of the principles of modularity, for example, allowing for some exchange of information between the four components in order to fully process the information and direct an appropriate response (Baron-Cohen, 1994, 1998).

Empirical evidence. Support for the modularity of ToM comes from research highlighting the universal nature of ToM development; children from all cultures across the world acquire the same ToM abilities (Avis & Harris, 1991; Doherty, 2009; Scholl & Leslie, 1999). In addition, evidence indicating a specific ToM deficit in individuals with autism (Baron-Cohen, 1991, 1992; Scholl & Leslie, 2001) and individuals with focal brain damage (Stuss, Gallup, & Alexander, 2001; Winner, Brownell, Happe, Blum, & Pincus, 1998) suggests that there may be distinct neural circuits or brain structures responsible for ToM that are vulnerable to selective impairment. Over the past decade, an increasing number of investigators have employed functional brain imaging techniques to track brain activity when adults engage in ToM tasks (see Brune & Brune-Cohrs, 2006 and Saxe, Whitfield-Gabrieli, Scholz, & Pelphrey, 2009 for a review). Findings suggested that the neural network subserving ToM abilities included the junction between the

temporal and parietal lobes, particularly in the right hemisphere, and the frontal lobes. Recent studies utilizing neuroimaging and EEG analysis techniques with children have confirmed these findings (Liu, Sabbagh, Gehring, & Wellman, 2009; Sabbagh, Bowman, Evraire, & Ito, 2009) and provided new evidence that the neural organization of ToM becomes increasingly specialized with age (Saxe et al., 2009). The possibility that the neural network underlying ToM develops gradually over time challenges the conceptualization that ToM is an innate, preformed module.

As noted, a basic assertion of modularity theories is that ToM will develop automatically at the appropriate time during maturation. Thus, researchers ascribing to this view have not investigated ways to ensure or enhance ToM development in children experiencing typical development. Rather, their focus has been on studying those children who appear to have a specific impairment in the ToM module and thus have great difficulty understanding and interpreting others' mental states, such as children with autism (e.g., Baron-Cohen, 1991). A growing body of research has focused on developing interventions to address these children's ToM deficits. A review of these training studies will be presented in this section. Subsequently, the conclusion section of this article will highlight the ways that educators can utilize the training strategies in the school setting.

Some of the first studies in this area focused on training children with autism to pass ToM tasks, for example by allowing repeated trials, modeling, and giving feedback about appropriate answers to a false belief task. Generally, these attempts have resulted in the children successfully passing the trained false belief task, but demonstrating limited

to no generalization of their training to other ToM tasks or to real-world social situations (e.g., Hadwin, Baron-Cohen, Howlin, & Hill, 1996; Swettenham, 1996). These results suggested that children with autism were unable to truly understand that mental states are representations of the world (what is seen, what is heard, etc; McGregor, Whiten, & Blackburn, 1998a). In contrast, strategies that teach children with autism to represent the world through physical or visual states have produced success on both training and transfer tasks. These physical representations have been used to stand in for mental states as well as to facilitate the understanding that mental states represent the world (e.g., Swettenham, Baron-Cohen, Gomez, & Walsh, 1996; Wellman, Baron-Cohen, Caswell, Gomez, Swettenham, Toye, et al., 2002).

One approach that has been investigated is the use of photographs to represent another person's thoughts and beliefs (McGregor et al., 1998a; McGregor, Whiten, & Blackburn, 1998b; Swettenham et al., 1996). These photographs are inserted into a specially-constructed slot in a mannequin or doll's head to physically show the children that "the eye is like a camera and that people have pictures in their heads" (Swettenham et al., 1996; p. 75). Results from one study revealed that emphasizing to children that the picture represents a person's thoughts, and that it is the thought that directs the action (not the picture) was an important factor in children's success in learning and applying the strategy to other ToM tasks (McGregor et al., 1998a). Emphasizing the role of thought appeared to enable the children with autism to demonstrate a higher level of conceptual understanding and generalize their learning to another laboratory false belief task; however, they remained unable to transfer their knowledge to a false belief task which

presented people in natural settings (McGregor et al., 1998a). This issue was addressed in a subsequent study, which used videos of real people rather than scenarios with dolls to help children and adults with autism to apply their learning to scenarios more similar to real life (McGregor et al., 1998b). After training the participants to use the picture-in-the-head strategy, the researchers narrated short videos of false belief scenarios. They explained that "we can't put a picture in Heather's head, but she does have a thought in her head like a picture of where she saw her coat," and directed the participants to track the protagonist's eyes to determine what she saw (p. 384, McGregor et al., 1998b). Following only a few hours of training, the majority of the participants (7 of 10) were able to pass at least two of three new video scenarios (McGregor et al., 1998b).

Wellman and colleagues (2002) investigated how another type of physical representation, thought bubbles, might improve ToM in children with autism. The thought-bubbles format was selected based on the notion that children have some familiarity with thought- and speech-bubbles through their appearance in comics, cartoons, and some children's books. Additionally, the researchers believed that use of thought-bubbles over actual photographs and mannequins would enhance the practicality of the intervention strategy while hopefully facilitating the same gains in understanding mental states (Wellman et al., 2002). In this study, the children were taught that people think about what they see in the world and that thought-bubbles show what a person is thinking. The children's performance on false belief tasks as well as related ToM transfer tasks improved significantly from pre-test to post-test, even when thought-bubbles were no longer present. Their improved performance "suggests that they were indeed adopting

a more mentalistic strategy, probably the one instructed, which asked them to treat thoughts as thought-bubbles and thus pictures in the head" (Wellman et al., 2002, p. 360).

Socialization-based Theories

Two main theoretical perspectives, theory theory and simulation theory, can be considered socialization-based accounts of ToM development in that both propose social experiences as a critical factor in acquiring ToM abilities (Flavell, 1999; Hughes & Leekam, 2004). In contrast to modularists, those ascribing to socialization-based theories do not believe that ToM development is hardwired. These individuals, rather, assert that ToM development is stimulated and influenced by interactions with others and exposure to ToM-related language and situations (Meltzoff, 1999; Slaughter & Gopnik, 1996).

According to theory theory, children acquire ToM through generating and revising informal theories about their experiences. More specifically, children create, test, and modify rules (e.g., does not see = does not know) about their own and other people's mental states and subsequent behaviors. Changes in these rules, or theories, promote growth in the child's concept of the mind, which will ultimately allow them to use progressively complex ToM abilities to predict, explain, and manipulate behavior (Doherty, 2009; Flavell et al., 2002; Gopnik & Wellman, 1992, 1994). From this perspective, knowledge about the mind is considered to be a system of interrelated mental-state concepts, such as the concepts of belief, desire, and perception. Therefore, new understandings and growth in one aspect of ToM (e.g., desire) will spur development in another ToM domain (e.g., false belief; Slaughter & Gopnik, 1996). Social interactions with siblings, parents, and other people are thought to facilitate these conceptual changes

by providing children with the opportunity to gather the evidence needed to test and modify their theories (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Hughes & Leekam, 2004; Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 1996; Perner, Ruffman, & Leekam, 1994).

Simulation theory proposes that children use their own experiences to generate an understanding of others' experiences (McGlamery, Ball, Henley, & Besozzi, 2007; Wellman et al., 2001). Relying on the generally veritable assumption that all minds work in the same basic way, children explain and predict another person's behavior by imagining what they themselves would think, do, and feel in the situation the other person is in (Doherty, 2009). According to simulation theory, children develop the ability to identify and understand their own mental states first (through introspection), and then generalize those mental states to other people. Role-taking and pretend play activities are the types of social experiences considered to activate this simulation process and thus to be important for the development of ToM abilities (Flavell et al., 2002).

Though initially proposed as distinct theories, some investigators have considered the idea that ToM development involves both theory revision and simulating others (e.g., Nichols & Stich, 2003; Perner, 1996). It has been suggested that we can make accurate predictions about many routine, everyday behaviors using simulation, but that some theoretical knowledge often is required to initiate the process (Doherty, 2009). Indeed, much of the empirical evidence investigating the influence of social environments and experiences on ToM development can be interpreted as supporting both theory theory and simulation theory.

Empirical evidence. A great deal of effort has been put into understanding how young children's social environments and experiences impact their ToM development. Researchers consistently have found that children's performance on various ToM tasks is related to the number of siblings they have (e.g., Jenkins & Astington, 1996; McAlister & Peterson, 2007; Perner et al., 1994), the amount and quality of pretend play they engage in (e.g., Astington & Jenkins, 1995; Dunn & Cutting, 1999), and the amount of mental-state language they are exposed to and use themselves (e.g., Brown, Donelan-McCall, & Dunn, 1996; Furrow, Moore, Davidge, & Chiasson, 1992). These factors will be discussed in detail in this section and then translated into practical school-based strategies for ToM development in the conclusion section of the article.

Siblings. A consistent finding in the literature is the positive relationship between number of siblings and performance on tasks assessing false belief understanding by 4-year-old children (Jenkins & Astington, 1996; Perner et al., 1994; Peterson, 2000; Ruffman, Perner, Naito, Parkin, & Clements, 1998). This means that as the number of siblings a child has increases, their performance on false belief tasks improves, even after improvements related to age and language ability are accounted for (McAlister & Peterson, 2007). While some studies have found that the "sibling effect" is present only for children with older siblings (e.g., Ruffman et al., 1998), other studies have revealed a relationship between both older and younger children and false belief performance (e.g., Jenkins & Astington, 1996). Conversely, children with no siblings "are delayed significantly behind their preschool peers with child siblings in developing the concepts of false belief that underpin a theory of mind" (Peterson, 2000, p. 451). In fact, there is

evidence showing that children with two siblings gain as much as one year's worth of experience over children with no siblings (Perner et al., 1994).

Investigators have proposed that a principal reason why siblings are important for ToM development is because they provide children with an increased number of interactions highlighting the ways in which beliefs impact behavior (e.g., teasing, tricking, mistaken actions based on false beliefs; Jenkins & Astington, 1996; McAlister & Peterson, 2007). Opportunities to converse with siblings directly may not be the only way social interaction impacts ToM development. Indirect learning and reflection may occur when children have opportunities to overhear or listen in "upon conversations, negotiations, reminiscences, pretence, or disciplinary encounters between siblings and parents" (McAlister & Peterson, 2007, pp. 268-269). Additionally, research suggests that some of the effectiveness of siblings in aiding ToM development may be a function of the explanation provided by mothers when conflict between siblings arises (Dunn et al., 1991). For example, mothers frequently were observed to explain how one child's beliefs influenced his or her behavior when attempting to straighten out misunderstandings or arguments between siblings (e.g., "He thought it was his turn", Dunn et al., 1991, p. 1363). Other research suggests that social interactions with individuals other than siblings may similarly influence ToM development (Lewis et al., 1996). The more frequently children interacted with adult relatives living nearby, the better those children performed on tasks assessing false belief understanding (Lewis et al., 1996).

Pretend play. The research on pretend play suggests some of the ways that social interaction may benefit ToM development in children. A positive relationship has been

found between children's performance on false belief tasks and the quantity (Cutting & Dunn, 2006; Hughes & Dunn, 1997) and, perhaps more importantly, the quality (Astington & Jenkins, 1995; Youngblade & Dunn, 1995) of their pretend play with siblings and friends. In other words, children who demonstrate more advanced false belief understanding tend to engage in pretend play more frequently and to demonstrate a more sophisticated, complex style of pretend play. These children use more frequent joint proposals (e.g., "Let's play house") and explicit role assignments (e.g., "You be the mommy") and engage in more role enacting than children who display less developed false belief understanding. It has been argued that "a complex and interdependent relationship" exists between pretend play and ToM development in that each one facilitates and benefits from the other (Jenkins & Astington, 2000, p. 218). It may be that the child's experience with pretend play, the acting out of different roles and perspectives, allows for some ToM development, and as his or her ToM skills become more advanced, the child is able to enhance the quality of the pretend play.

Correlational research, like that discussed thus far, is helpful in discovering relationships between variables but cannot determine whether one or all of these factors of pretend play actually cause growth in ToM skills. Causal connections can only be revealed through the use of training and/or intervention studies, where one group of participants receiving a treatment of some sort is compared to another group of participants not receiving any additional or different training or intervention. In one such study carried out in a preschool setting, a group of 4-year-old children participated in an intervention aimed at improving their ToM skills by increasing the complexity of their

pretend play (Dockett, 1998). Complex pretend play involves imitative role play, make-believe with objects, actions, and situations, persistence, interaction, and verbal communication (Smilansky, 1968). It is believed that complex pretend play provides opportunities for children to develop and display an increased understanding of ToM. At the beginning of the three-week intervention, the children visited a pizza restaurant and observed the chef making a pizza. Over the course of the intervention period, the children were given large segments of time to make, cook, serve, and eat their own pizzas in a special area of the classroom created specifically for the pretend play activity, including appropriate props and so forth. While the children engaged in this shared pretend play activity, adults stepped in to direct and guide the play. The adults did not model or actively engage in the play, but rather made comments and suggestions to elevate the play to a more complex level. Compared to peers at the preschool who did not receive the intervention, the children demonstrated significant increases in the amount and complexity of pretend play and in ToM development. These results strongly support the notion that social interaction, particularly complex shared pretend play, positively impacts ToM development (Dockett, 1998).

Mental-state talk. Another strong predictor of ToM performance in young children is mental-state talk, or children's verbal references to their own or another person's thoughts, beliefs, desires, and feelings. Children who exhibit mental-state talk more frequently when playing with their siblings and friends demonstrate more advanced false belief understanding (Brown et al., 1996; Hughes & Dunn, 1997, 1998). While children have been observed to use mental-state terms more frequently during pretend

play than nonpretend play, it appears that the frequency of mental-state talk outside of play situations also impacts children's ToM development. For example, the frequency with which mothers referred to mental states when discussing scenarios in pictures predicted their child's later performance on ToM tasks, even after taking into account any contribution made by the child's earlier language or ToM competence. The results suggested that mothers' mental-state talk had a direct facilitative effect on their children's ToM development (Ruffman, Slade, & Crowe, 2002). In a different study, the children of mothers who reported being in favor of explaining and elaborating upon mental-state concepts during natural social interactions with their children demonstrated significantly advanced false belief understanding (Peterson & Slaughter, 2003). Furthermore, a mother's use of mental-state language when disciplining her child was found to relate to her child's performance on false belief tasks (Ruffman, Perner, & Parkin, 1999). For example, it appeared that a child may be prompted to take on the perspective of another person when a mother asks, "How would you feel if…" during a disciplinary encounter, and that this type of role taking may promote ToM development. Conversely, no relationship was found between children's false belief performance and disciplinary tactics not involving mental-state language, such as general discussion of the issue or basic reprimands, perhaps because these tactics do not explicitly invite children to engage in perspective- or role-taking (Ruffman et al., 1999).

Researchers also have investigated how ToM development might be impacted by young children's reading materials, which often recount social situations and contain mental-state language and concepts (Cassidy et al., 1998). In fact, in an extensive review

of 90 books for children aged 3 to 6 years, references to and expressions of characters' emotions, beliefs, and intentions were found to occur once in approximately every three sentences (Dyer, Shatz, & Wellman, 2000). The prevalence of mental-state language in young children's reading materials may be likely to provide a "rich source of information" for ToM development (Dyer et al., 2000, p. 31). Consistent with this claim, the reported frequency with which parents read picture books to their children at home has been found to relate positively to the children's level of false belief understanding (Adrian, Clemente, Villanueva, & Rieffe, 2005). In addition, observations of parent-child picture book reading have revealed that the more often that mothers used cognitive-state terms (e.g., know, think, believe) when telling stories, the better the children performed on ToM tasks (Adrian et al., 2005; Adrian, Clemente, & Villanueva, 2007). Mothers were observed to use mental-state terms when explaining the characters' thoughts and behaviors in the story, and also when referring to their own and their children's thoughts during questioning and reflecting about the story. More frequent use of emotional-state terms (e.g., happy, sad, scared) has also been linked to higher levels of ToM development (Adrian et al., 2005).

An intervention study suggested that the actual expression of mental-state terms may not be required and that children's interaction with reading materials that present mental-state concepts (e.g., trickery, lies, false beliefs) implicitly may be sufficient, and even better, for ToM development (Peskin & Astington, 2004). A sample of 4-year-old prekindergarten students listened to six different stories read aloud on multiple occasions by teachers, research assistants, and parents over the course of four weeks. The plot lines

of the stories were the same, but the presentation of mental-state terms differed between the experimental and control groups. For the children in the experimental group, the stories contained explicit belief terms (e.g., think, know, guess, remember), while the stories presented to the control group did not contain belief terms but referred implicitly to mental states in general. The intense exposure to mentalistic stories produced significant gains in ToM development for both groups of children. Interestingly, the children in the control group did as well as the children in the experimental group at predicting false beliefs and were significantly better at explaining false beliefs. The investigators interpreted these results through the lens of Vygotsky's socio-cultural theory of constructivism, and stated:

> The implicit mentalistic concepts in the text and illustrations may have provided an optimal level of scaffolding to challenge the listeners to make inferences such as not seeing Toby in the physical world and, therefore, not knowing in the mental world. These inferences lead to an understanding that may be all the deeper because the children had to strive to infer meaning. Ironically, the more direct, explicit condition may have produced less conceptual development precisely because it was explicit (Peskin & Astington, 2004, p. 266).

A recent study confirmed the relationship between the frequency of children's book reading and ToM development and extended it to include the frequency of exposure to children's films (Mar, Tackett, & Moore, 2010). In contrast, exposure to television was not found to be related to ToM development. The authors proposed that films may be more effective at facilitating ToM development because, due to the extended length in viewing time, parents may be more likely to watch films rather than television shows with their children. This would make films more of a social viewing experience and may encourage parents to discuss events and characters with their children. Alternatively,

films may provide more opportunities for mental simulation than television shows.

Cognitive Components Conceptualizations

Cognitive components conceptualizations propose that one or more cognitive skill areas are related to or involved in ToM development in some way. The majority of investigative efforts have been focused on language or executive functions (EF), particularly the abilities to exhibit self-control (inhibition), temporarily hold in mind and manipulate relevant information (working memory), and shift flexibly between tasks or ideas (cognitive flexibility, or set-shifting). Like ToM, language and EF also are undergoing significant growth during the early childhood years (Astington & Jenkins, 1999; Hughes & Ensor, 2007; Perner & Lang, 1999). Thus, there has been a lot of interest in investigating the developmental relationships and determining whether growth in these skill areas is independent or interdependent. Different theoretical models have been proposed and tested, the results of which will be reviewed below.

Generally speaking, these theorists conceptualize that one of these cognitive skills are necessary either for the emergence or the expression of ToM, or both (Perner & Lang, 1999). Emergence accounts suggest that a certain level of skill in language or EF must be obtained before children are able to develop an understanding of mind, while expression accounts indicate that an individual must use language or EF skills in order to demonstrate that they have developed ToM. For example, with regard to EF, one theoretical model presents a combination of emergence and expression positions and posits that not only are EF skills, such as inhibition and working memory, involved in performing ToM tasks (i.e., expression), but also that they are prerequisites for children's

ToM development (i.e., emergence; Carlson & Moses, 2001). A contrasting perspective that ToM skills are essential to the development of EF has also been presented (Perner, 1998). Still another view speculates that ToM and EF are interdependent and the influence on development is bidirectional (Sodian & Hulsken, 2005).

Similarly, with regard to language skills, researchers have proposed an integral role for language in both developing and expressing ToM skills, with some debate over whether the critical building block is general language ability or a specific component of language, such as syntax (Astington & Jenkins, 1999; de Villiers, 2000; see also Astington & Baird, 2005). Like EF, a reciprocal relationship between language and ToM development has been proposed (de Villiers, 2007).

Theories that consider the role of both EF and language skills in ToM development and use have also been presented (Hasselhorn, Mahler, & Grube, 2005; Samson, 2009; Schneider, Lockl, & Fernandez, 2005). For the purpose of brevity, one example of this combination model recently proposed by Klaus Oberauer (2005) will be discussed. Building on many of the specific EF theories and language theories previously mentioned, Oberauer asserted that the following components together undergird the development of ToM: inhibition, working memory, syntax, and the phonological loop. More specifically, Oberauer hypothesized that individuals need adequately developed inhibitory skills to be able to set aside their own knowledge of the reality of the situation before being able to form a mental representation of another person's false belief and subsequently predict their future behavior based on that false belief. The phonological loop is proposed to help with this effort by providing verbal self-instructions. Working

memory capacity might contribute to the emergence of ToM by providing cognitive space to consider and contrast multiple beliefs and situations, while syntax might assist by allowing for the creation of complex sentences that express complex thoughts (Oberauer, 2005).

Empirical evidence. Studies into the relation and impact of language and EF on ToM development have been plentiful. Correlational research will be reviewed first, followed by intervention and training studies addressing the potential contributions of language and EF to ToM development. Finally, in the conclusion section of this article, the empirical evidence will be integrated and translated into usable school-based strategies.

Investigations into the associations between ToM and language have revealed significant correlations between the two skill areas. Children who have strong overall language ability tend to perform well on ToM tasks, and children who have weak general language skills typically perform poorly on ToM tasks (Jenkins & Astington, 1996; Joseph & Tager-Flusberg, 2004; Schneider et al., 2005). When researchers have looked at whether specific aspects of language are associated with ToM performance the results have been inconsistent. For example, one study revealed that syntax, but not semantics (Astington & Jenkins, 1999) was related to ToM, however, another study found the opposite (Ruffman, Slade, Rowlandson, Rumsey, & Garnham, 2003, Experiment 1). Overall, stronger support has been garnered for the link between general, rather than specific, language skills and ToM (Ruffman et al., 2003; Slade & Ruffman, 2005; Tardif, So, & Kaciroti, 2007).

Similarly, research examining the relationships between ToM and EF generally has found a positive association between the two developing skill areas. In other words, children with more advanced ToM skills tend to demonstrate a stronger ability to inhibit their behavior (Carlson & Moses, 2001; Chasiotis, Kiessling, Hofer, & Campos, 2006; Razza & Blair, 2009), use working memory (Gordon & Olson, 1998; Hughes, 1998a; Slade & Ruffman, 2005), and shift flexibly between thoughts and actions (Müller, Zelazo, & Imrisek, 2005; Kloo, Perner, & Giritzer, 2010). These relationships may exist because "executive processes are recruited in…social understanding where multiple perspectives have to be considered, self-knowledge inhibited, and beliefs considered in relation to subsequent emotions or actions" (Bull, Phillips, & Conway, 2008, p. 670). Several studies have found that children are more successful on ToM tasks when the EF demands inherent in the tasks are reduced (Carlson, Moses, & Hix, 1998; see also Wellman et al., 2001); however, contradictory evidence exists (e.g., Perner, Lang, & Kloo, 2002). Alternatively, these relationships may exist because EF skills are involved in ToM development (i.e., emergence accounts).

Longitudinal studies have looked at language-ToM and EF-ToM relationships over time to determine if early ability in one skill predicts later ability in another skill. Most consistently, studies have found that early inhibition (Carlson, Mandell, & Williams, 2004; Flynn, 2007; Hughes, 1998b; Hughes & Ensor, 2007a), general language competence (Astington & Jenkins, 1999; Schneider et al., 2005), and syntax (Astington & Jenkins, 1999; de Villiers & Pyers, 2002) predicted later ToM. This evidence suggests that these cognitive components play a critical role in ToM development. The data

regarding early working memory is less clear, however, and evidence has been found for (Hughes & Ensor, 2007a) and against (Schneider et al., 2005; Slade & Ruffman, 2005) a predictive relationship with later ToM. When the reverse relationships have been considered, early ToM skills have not been found to be a significant predictor of later EF ability (Carlson et al., 2004; Flynn, 2007; Hughes, 1998b; Pellicano, 2010; Schneider et al., 2005), however, the findings with regard to language have been inconsistent. Some evidence indicated that early ToM does predict later language skills (Slade & Ruffman, 2005), but other data indicated that it does not (Astington & Jenkins, 1999). Taken together, these results provide strong support for the view that inhibition and language are critical building blocks of ToM, and partial support for the notion that the relationship between language and ToM is reciprocal. However, as previously discussed, these types of studies cannot identify a causal connection with certainty.

Fortunately, intervention and training studies are able to provide answers to questions about whether development in one skill area serves as an underlying (causal) factor for development in another skill area. If inhibition and language are prerequisites for ToM development, then providing children with training in these underlying skill areas should result in improved ToM. These training procedures, if found to be effective, have the potential to be translated into school-based strategies to improve ToM. While a good number of studies have attempted to train particular EF and language skills in children, only those that have aimed to improve ToM through EF or language training will be reviewed.

With regard to EF, preschool children who received brief training (two individual

sessions) on a card sorting task requiring inhibition and cognitive flexibility greatly improved their performance on tasks assessing false belief understanding, though not significantly so when compared to the control group (Kloo & Perner, 2003). A complementary effect was found for a different group of children who received training on false beliefs and false statements. These children, who were led through a step-by-step explanation of how a false belief occurs, showed considerable improvement on the card sorting task. Together these results suggest that the developmental link between EF and ToM is bidirectional; however, no strong causal explanation can be made due to lack of statistically significant findings (Kloo & Perner, 2003).

A card sorting task was utilized in another training study that investigated the EF-ToM relationship in a sample of children with autism, who are known to have deficits in both skill areas (Fisher & Happe, 2005). The EF training explained and emphasized the need to change problem-solving strategies during the card sorting task. Children in this training group watched demonstrations of the task and were given time to practice. For the children in the ToM training group, the "photos in the head" strategy previously discussed was utilized (Swettenham et al., 1996). For both groups, training was conducted individually in brief daily sessions over the course of about a week. Interestingly, the EF training was found to improve ToM performance, but the effects were not seen until follow-up testing two months later suggesting that the children needed time to process and apply the new skills. The investigators suggested that set-shifting training may have facilitated the children's ability to see different perspectives, which then led to growth in ToM skills. For the ToM-trained children, improved ToM,

but not EF, skills were demonstrated.

With regard to language, at least two training studies have addressed the questions raised about what aspects of language (e.g., syntax) might impact ToM development. Training in one study was centered on one-on-one discussion between a preschool child and adult about deceptive objects (objects that appear to be one thing at first, but have another function when examined more closely; e.g., an apple that is really a candle). The type of language used in these discussions varied across the different training groups. The results revealed that simply providing the children with experience with deceptive objects was not enough to promote ToM development. Rather, the children "needed to have that experience structured by some language from other persons" (Lohmann & Tomasello, 2003, p. 1139). The training condition that combined perspective-shifting discourse and a form of syntax called sentential complements (e.g., I think *that it is an apple*; You know *that it is a candle*) had the most significant impact on the children's ToM development (Lohmann & Tomasello, 2003). Further support for the role of syntax in ToM development was found in a study that focused specifically on training children to report the content of sentential complements that did not include mental-state verbs or a deceptive context (Hale & Tager-Flusberg, 2003). Rather than discussing what a person *thinks* or *knows*, the child was asked to report what someone *said* (a communication verb) in a story. This strengthens the claim that the growth in ToM was facilitated by learning about syntax, rather than learning about mental-state terms or deception (Hale & Tager-Flusberg, 2003).

Applications and Implications for Schools

Thus far, this paper has provided a review of three main types of theoretical explanations for ToM development and the related empirical evidence. With regard to the theoretical information, it seems to be most valuable to consider how each perspective might explain one piece of the puzzle. In other words, their differences do not necessarily make them incompatible. Therefore, rather than focusing on the disparities among the theories, it may best to merge those conceptual differences into a coherent framework and consider that ToM development may have a uniquely human, innate component that is impacted by interactions with family members, friends, and other individuals as well as supported by growth in related cognitive skills like language and executive functions. Children's ToM development likely will experience the greatest benefit if we are able to address as many potential routes of influence as possible.

Overall, the empirical evidence supports the conceptualizations indicating that opportunity for social interaction and development in language skills and executive functions provide children with the resources/building blocks for ToM development. Furthermore, studies have shown that there are ways to facilitate growth in children whose ToM development is delayed or deviant. The final section of this paper will highlight the applicability of these scientific results to the school setting. Although some children will acquire ToM skills without additional intervention, all children would benefit from direct instruction of ToM skills. When a skill is taught directly, children are able to learn the skill in a more efficient manner. The more efficiently and comprehensively a child is able to acquire ToM, the more available he or she will be to

all of the benefits of education. In accordance with Vygotsky's view, instruction is particularly effective at facilitating development in cognitive skills, such as ToM, during the initial period of growth for that skill (Gredler & Shields, 2008). As the preschool and early elementary period is a time ripe for ToM development (Wellman et al., 2001), this section will provide research-based strategies that early education teachers can implement to provide direct instruction in ToM.

Strategies to encourage growth in ToM skills have been developed in various ways from the theoretical and empirical evidence reviewed in this paper. One way that strategies were developed was to directly replicate a training scheme that was tested empirically and found to facilitate ToM development. Another method of strategy generation was to modify or adapt an effective intervention implemented in a different setting or with a different group of students to better fit the school environment. Additionally, frequently-used teaching practices that are consistent with research-based methods of ToM development are included as strategies. Two types of strategies will be presented: *universal strategies*, which are likely to encourage ToM development in all students, and *intensive strategies*, which may be appropriate for students who appear to demonstrate delayed or deficient ToM skills and to need more focused support and remediation. Also included in this section are several tables that present specific, practical strategies for educators to use in their daily instruction and interaction with students. The strategies in the tables are grouped by grade level(s) so that they are developmentally appropriate for children in the specified grade level. In the earlier grades (prekindergarten through grade 1), the strategies address foundational ToM skills as well as provide higher

levels of direct instruction and support. Strategies designed for grades 2 and 3 either involve less support from the teacher or introduce higher-level ToM skills.

Universal Strategies

It appears that there are three main ways that teachers can implement strategies to encourage ToM development in all children: instructional techniques, socialization opportunities, and disciplinary methods. These will be discussed in more detail in the subsequent paragraphs, with specific examples of strategies presented in Tables 1-3. Some strategies involve more than mode of intervention, but will be discussed within the category that the strategy is most closely tied to.

Instructional techniques. There are many ways that teachers can incorporate ToM strategies into their current instructional practices. For example, the research related to mental-state terms and concepts in children's stories and films is particularly relevant for educators and appears to be easily translated into feasible school-based strategies (see Table 1). In many preschool and early elementary school classrooms, teachers read books to their classes on a daily basis. An easy way to address ToM development at the same time would be to select books that have a high level of mental-state content in the text or storyline to read during this instructional segment on a weekly or monthly basis. Table 1 suggests three ways to extend this strategy for use with older students. In a related strategy, when teachers occasionally show short films or full-length movies to students they could follow up with a class discussion of ToM content or concepts from the video (e.g., discussion of mistaken beliefs, trickery, surprises, changes in knowledge). Encourage students to reflect on the characters' thoughts, knowledge, desires, and

Table 1. *General Instructional Strategies for ToM Development* 31

Grade Level	GENERAL STRATEGIES: INSTRUCTION
PreK – 1	Read books that have a high level of explicit or implicit mental state content (e.g., Three Little Pigs, Hanzel and Gretel, Little Red Riding Hood). In books with a high level of explicit mental state content, you will often find words such as "think", "know", "want", "feel", and other mental state terms in the text. Books that have a high level of implicit mental state may not use mental state terms in the text, but the storyline/pictures will cover situations involving trickery, misunderstanding, lies, etc. When discussing the books with the children, teachers should highlight characters' mental states and ask questions about what they are thinking, what they know, what they want, and how they feel, and how those mental states might influence what the character does or says later in the story.
2-3	In higher grades, the teacher may not need to lead this activity and students can discuss these concepts in small groups or pairs (discussion of mental states; prediction of future behavior based on what is known about the character at that point in the story). After exposure to this strategy, advanced variations could include: Ask students to create new endings to stories by changing what one of the characters believed or felt (e.g., if the Prince knew that the glass slipper belonged to Cinderella, what might he have done differently?). This can be done orally or in writing, individually or in small groups/pairs. Have students create their own ToM-related stories from beginning to end, using mental state terms and/or storylines involving misunderstandings, different perspectives/beliefs/desires, trickery, or deception. Related References: Adrian et al., 2005, 2007; Peskin & Astington, 2004
PreK-3	Show a movie, such as The Fox and the Hound, to the class and lead students in discussion of characters' mental states (thoughts, desires, feelings, memories, etc) and situations involving misunderstandings, trickery, deception, etc. Related Reference: Mar et al., 2010

PreK-3	Instruction in Extracting Content of False Complements Depending on grade level, teachers (or students) read short stories in which one character tells another character one thing, but does something else (e.g. Tommy is in the kitchen eating cookies. Tommy's mom called to him from the living room and asked him what he was doing. Tommy said, "I'm eating an apple."). Children are asked to report what the character said (e.g., What did Tommy say?), which requires them to extract the content of the false complement. Provide feedback and correction as necessary. Teachers should aim to implement this strategy in three to four brief sessions over the course of a few weeks. Potentially, teacher could monitor the students' performance across these sessions to roughly assess their rate of development and mastery. Related Reference: Hale & Tager-Flusberg, 2003
PreK-3	Exposure to Deceptive Objects Select items that demonstrate the idea that there can be a difference between what something seems to be and what it really is (e.g., a candle that looks like an apple; a pen that looks like a flower). When discussing these deceptive objects with students (in whole-group setting), be sure to highlight different perspectives between students as well as within each student (i.e., what the student initially thought the item was versus what they now know it is after gaining a new perspective) and to use sentential complements in your expressions. An example depicting one way to utilize perspective-shifting discourse and sentential complements is presented in the Appendix. Related Reference: Lohmann & Tomasello, 2003

Table 2. *General Social Interaction Strategies for ToM Development* 33

Grade Level	GENERAL STRATEGIES: SOCIAL INTERACTION
PreK-K	Pretend Play Regularly scheduled sessions of pretend play for preschool and kindergarten students; teachers monitor and guide play to increase complexity. (Complexity is evidenced by frequency of role assignments ("I will be the mommy"), role enactment (pretending to be the mommy), reciprocal, verbal communication between play partners, and engaging in make-believe with objects (e.g., using a hat as a bucket) and actions (e.g., pretending to drink a cup of milk).
1-3	During "inside" recess, divide students into small groups and give them roles and scenarios to act out. Provide materials to use as props. Possible scenarios might include: hospital operating room, pizza restaurant, school classroom, baseball game, bird watching, shipwrecked on an island. Monitor play and provide guiding questions and comments as needed to increase complexity. Related References: Cutting & Dunn, 2006; Astington & Jenkins, 1995; Youngblade & Dunn, 1995; Hughes & Dunn, 1997; Dockett, 1998; Jenkins & Astington, 1996
All grades	Teacher interaction with students Elaborate (verbally or behaviorally) on mental state concepts whenever possible when conversing with students. See examples of elaborative mental state talk in Appendix. For example, describe thoughts as images in the mind (when seeing leads to knowing) that can slip out of the mind through forgetting. Act out an unconventional pretence in play (e.g., use a banana as a telephone). Explain people's puzzling or disturbing behavior (e.g., fear, sadness, lying) by drawing attention to the relationship between inner mental states and the resulting behavior. Related Reference: Peterson & Slaughter, 2003

Table 3. *General Discipline Strategies for ToM Development* 34

Grade Level	GENERAL STRATEGIES: DISCIPLINE
All grades	Use mental state language when helping students resolve conflicts (e.g., think, feel, believe, know, want, remember) and discuss others' thoughts and feelings Ex: Teacher sees Timmy yelling at Coby. Following appropriate disciplinary action and consequence, discuss the situation with Timmy. "Timmy, why did you yell at Coby? (Because he was using the brown marker that I was going to use for my drawing.) Did Coby know that you wanted to use the brown marker? (I don't know.) Did you tell him or ask him for the brown marker? (No.) It seems to me that Coby did not know that you wanted to use the brown marker. If he had known, he probably would not have used that marker." Ex: "How do you think that Bobby felt when you called him a 'dummy'? How would you feel if someone called you a 'dummy'? Do you think that Bobby wants to be friends with a person who called him a 'dummy'?" Variation: When appropriate, facilitate the process of students sharing with each other their respective thoughts and feelings when resolving conflict. Related References: Dunn et al., 1991; FitzGerald & White, 1995; Ruffman et al., 1999

emotions and explain how those mental states impacted the characters' behavior and thus the story line of the book or movie.

This "reflect and explain" strategy can be utilized during instruction in all academic areas. Astington (1998) recommends that teachers ask children to think about and explain their knowledge (e.g., "How do you know that?") and problem-solving process (e.g., "Tell us how you figured out that 5 + 3 = 8."). Educators can model the strategy by explaining their own thought processes and acknowledging aloud when they have learned something new or realized they held a mistaken belief.

Additionally, the research that indicated the important role of general language

ability as a building block for ToM development is highly relevant to educators. From the time children enter school, language is an important area of instruction that relates to children's success in almost every academic skill. Now that the impact of language on children's social skills through its role and relation to ToM development is evident, educators have even more reason to help their students develop strong language skills. Furthermore, they can consider supplementing their current language instruction with the ToM-related language strategies presented in Table 1 (false complements and deceptive objects). The ToM-related language strategies could be implemented in a single session or in multiple sessions over the course of the year to gain a rough assessment of students' conceptual development with these skills.

Opportunities for social interaction. Significant correlations between false belief performance and quality and quantity of pretend play, frequency and complexity of mental-state talk, and number of siblings suggest that these factors are important for children's ToM development and, by extension, their social lives. Considered broadly, this evidence implies that "abundant and successful social interactions most likely provide the opportunity for increased learning about thought-behavior relations" (Watson et al., 1999, p. 390).

The research indicating the importance of socialization opportunities for ToM development reinforces at least two activities already utilized in most classrooms and schools. These activities are time for free play and social interaction during the school day (e.g., recess, lunch) and use of cooperative learning dyads and groups (e.g., active listening, Think-Pair-Share, Doughnut, Jigsaw, Round Robin). Providing students with

these opportunities for peer interaction is likely to increase their exposure to others' perspectives and beliefs and subsequently support appropriate ToM growth.

Another type of social interaction that is closely tied to ToM development is pretend play. Schools seem to be well-suited for providing opportunities for students to engage in shared pretense in a supportive environment and with the potential for adult intervention. Table 2 proposes four specific ways to provide and structure these social interactions at different grade levels in the school setting. For example, at the preschool level, it may be possible for educators to incorporate pretend play sessions into the daily or weekly schedule throughout the school year. At the elementary level, when time for social activities can be limited, teachers could use pretend play as an activity for "inside" recess (i.e., when it is raining, or outside recess is unavailable for some other reason). Scenarios and roles could be provided by the teacher or created by the students. Across all grade levels, teachers should monitor the play and increase the complexity by making comments and suggestions about how to assign specific roles, engage in role play, and use objects as representations of other things.

Furthermore, the manner in which teachers interact with students can be important for ToM development. Educators are encouraged to elaborate on mental-state concepts whenever the opportunity arises in their conversations with students (see Table 2 and Appendix for examples). During these teachable moments, educators should focus on linking thoughts with behaviors and explaining ToM concepts (e.g., seeing leads to knowing; people have different desires, beliefs, feelings).

Disciplinary Methods. Based on the evidence regarding mothers' use of mental-

state talk during discipline, teachers and administrators are recommended to use mental-state terms (e.g., believe, think, want, know) when resolving conflicts among students. Instead of simply saying "No" or "Don't do that," educators should aim to discuss a child's behavior in terms of the thoughts and feelings the behavior might provoke in another person (see Table 3 for an example). Furthermore, when appropriate, have the students share with one another the thoughts and feelings they were experiencing during the particular event. It is important for educators to understand that these suggestions are intended to complement, not replace, behavioral and punitive approaches to student discipline by attending to the cognitive component when appropriate.

Intensive Strategies

Intensive strategies would be appropriate for students who demonstrate a more significant level of social, emotional, or behavioral problems than most of their peers that may in part be due to insufficient ToM development. In order to address the greater needs of these students, the intensity of a universal strategy could be increased by providing it in a small-group or one-on-one setting and on a more frequent basis. In order to increase the intensity of the mental-state book reading strategy, for example, a teacher could lead a small group of students through 20-minute reading sessions three times each week, rather than once a week or once a month. The small group setting would allow the teacher to better assess each student's current level of understanding and intervene more frequently and directly in order to facilitate a higher level of ToM development. Table 4 provides additional examples of translating universal strategies into intensive strategies.

Alternatively, a student may benefit from a different type of approach to ToM

Grade level	INTENSIVE STRATEGIES
PreK-3	Increased intensity of a general strategy in small-group or one-on-one setting • Book reading with emphasis on mental state content/language (3-5 days per week for 20 minutes)
PreK-5 (mental age of at least 4 years)	Picture-in-head training Materials needed: doll or mannequin head; camera; printed pictures of objects, scenarios (e.g., ball in the garage) Main purpose of training: to teach children that "the eye is like a camera and that people have pictures in their heads" Model task, providing explicit step-by-step instructions on how to use the strategy, begin the training with an explanation that seeing leads to knowing. For example, tell children that when a person sees something (e.g., a marble in box) they have a thought in their head of what they saw. Then, introduce photographs of what the person saw to show that pictures can "stand in" for thoughts. Emphasize that the picture represents a person's thoughts and that it is the thought that directs the action, not the picture. For example, the strategy might be explained in the following way: When I see the ball in the garage, I make a picture in my head of the ball in the garage. That picture means that I think that the ball is in the garage. So, when I want to play with my ball, I will look for the ball in the garage because that is where I think it is. In using this type of explanation, the children learn to understand that a person's thoughts, which are taken from or represented by the pictures in their head of what they see, direct their behavior or actions (McGregor et al., 1998a). Repeat training over multiple sessions. Related References: McGregor et al., 1998a, 1998b; Swettenham et al., 1996

PreK-5 (mental age of at least 4 years)	Thought bubbles training Materials needed: paper and pencil (alternatively, thought bubbles could be created on the computer) In individual or very small group setting, teach students that people think about what they see in the world and that thought-bubbles show what a person is thinking. Demonstrate how to use the thought-bubbles to predict thoughts and behavior in various scenarios (e.g., when the environment changes, but the person does not see it change; when a desired object is secretly moved from one location to another). Provide feedback during the student's practice and training. Repeat training over multiple sessions. Consider tailoring the content and delivery of the instruction to the student's specific interests or strengths to enhance the learning effect when possible (e.g., change situational details of the false belief story to fit an area of interest). Related Reference: Wellman et al., 2002

development that is supplemental to the universal strategies already in place. These types of strategies may be more effective and appropriate for use with students who demonstrate significant difficulty with ToM-related social and communication skills. Students with an autism spectrum disorder may display those types of deficits. Studies have shown that training children with autism to use physical representations such as pictures and thought-bubbles has promise as an effective and practical strategy to help them reach a higher level of ToM development. In contrast to the limited number of training sessions provided in these studies, educators may be able to provide intervention over a longer term thereby potentially increasing the positive impact on ToM development. Moreover, if the student is provided with special education services at school, the special education classroom may be a particularly good environment to provide this instruction as the teacher-student ratio is often lower and the student's

schedule is often more flexible. It is recommended that, prior to implementation, educators refer to the original training studies for specific materials and procedures (see McGregor et al., 1998a, 1998b, Swettenham et al., 1996, and Wellman et al., 2002). It also should be noted that the children who participated in these studies had a mental age of at least 4 years, while their chronological ages ranged from 5 to 18 years.

Concluding Comments

The benefits related to well-developed ToM skills are likely plentiful and wide-ranging and will no doubt continue to emerge as this important construct is further researched. Nevertheless, currently, a positive connection with at least two important life domains, socialization and academic achievement, is clear (Astington, 1994; Klein, 1998; Pelletier & Astington, 2004; Razza & Blair, 2009; Wellman et al., 2001). In order for students to be successful at school, they must develop "a more advanced understanding of the mind and of how knowledge is acquired" (Homer & Tamis-LeMonda, 2005, p. 202). This article provided teachers with school-based ToM strategies that have the potential to encourage such growth and thus facilitate students' success in social interactions and academic endeavors.

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THE EFFECTS OF A DRAMA-BASED LANGUAGE INTERVENTION ON THE DEVELOPMENT OF THEORY OF MIND AND EXECUTIVE FUNCTION IN URBAN KINDERGARTEN STUDENTS

Over the past few decades, researchers have actively pursued a heightened understanding of the development of theory of mind (ToM) and executive function (EF). A strong impetus behind these efforts is the importance of these domains for children's academic and social success in school (Meltzer, 2010; Samson, 2009). The present study will evaluate the effectiveness of a drama-based language intervention at improving ToM and EF development in kindergarten students predominantly from low socioeconomic (SES) backgrounds. First, this article will highlight the contributions of ToM and EF to children's learning and social functioning at school. Subsequently, intervention studies that share common elements with the current intervention under evaluation will be reviewed.

ToM involves the ability to attribute mental states to oneself and others (Doherty, 2009; Premack & Woodruff, 1978). These skills are integral to children's academic achievement in that children need adequately developed ToM to understand their teacher's intention to increase their knowledge as well as to recognize differences in their own and others' thinking and knowledge (Olson & Bruner, 1996; Ziv & Frye, 2004; Ziv, Solomon, & Frye, 2008). Additionally, ToM provides the foundation for metacognitive skill development, which allows children to think strategically about their thinking and

learning (Lockl & Schneider, 2006, 2007). With regard to social functioning, in order to experience successful social interactions and communications, it is often necessary for children to appreciate that others may have an interpretation of the world that is different from their own. An awareness and understanding of others' beliefs and desires helps children to explain and predict others' behavior and subsequently adjust their own behavior as necessary (Flavell, Miller, & Miller, 2002; Watson, Nixon, Wilson, & Capage, 1999).

EF is defined in various ways in the literature and may best be described as "an umbrella term for the complex cognitive processes that serve ongoing, goal-directed behaviors" (Meltzer, 2007, p. 1). Children's ability to effectively utilize these higher-order processes, including inhibition, flexibility, attentional control, planning, organization, and initiation, has important implications for their learning and socialization. Success in academic endeavors often requires the use and coordination of many EF skills such as sustaining attention, organizing materials and information, using working memory, and planning and evaluating problem-solving approaches (Meltzer, 2010). In terms of social interactions, EF skills are involved in the "online updating, evaluation, and selection of appropriate responses to a constant stream of multifaceted (verbal, nonverbal, contextual) information" (Joseph & Tager-Flusberg, 2004, p.138). In addition, the quality of children's social functioning and resiliency is related to the level of flexible regulation and control they have over their emotions and behaviors (Eisenberg, Spinrad, & Morris, 2002).

While typical development of ToM and EF prepares children to do well in school

and to develop socially, atypical or delayed development can hinder learning and social development. Poor ToM is correlated with behavior problems (e.g., Hughes & Ensor, 2006), attention problems (e.g., McGlamery, Ball, Henley, & Besozzi, 2007), and poor social skills (e.g., Dunn & Cutting, 1999; Watson et al., 1999). Weaknesses in certain aspects of EF have been implicated in conditions that often negatively impact children's functioning at school, such as learning disabilities (e.g., Meltzer & Krishnan, 2007), Attention Deficit Hyperactivity Disorder (ADHD; e.g., Barkley, 1997), and behavior disorders (e.g., McCloskey, Perkins, & Van Divner, 2009).

Additionally, research has indicated that underdeveloped ToM and EF may be associated with low SES (Cole & Mitchell, 1998; Hackman & Farah, 2008; Hughes & Ensor, 2005; Noble, Norman, & Farah, 2005). Compared to same-aged children of higher SES levels, children from low SES backgrounds have been found to have more difficulty understanding the concept of false belief (e.g., Cutting & Dunn, 1999; Cole & Mitchell, 2000), demonstrating inhibitory control (Noble et al., 2005), and regulating attention (Mezzacappa, 2004). It can be difficult to explain the mechanisms that might be involved in this relationship because SES can be measured in different ways (e.g., parent education level, parent occupational status, income level, children's free/reduced lunch status) and because there are numerous factors that vary with SES level and may impact the relationship, including physical health, home environment, level of chronic stress, early education opportunities, and neighborhood characteristics (Hackman & Farah, 2008; Noble et al., 2005).

Researchers have started to investigate the role of language as a potential

mediating factor in the relationships between SES and ToM and EF (Hughes, Jaffee, Happe, Taylor, Caspi, & Moffitt, 2005; Noble et al., 2005). Not only is language related to ToM (e.g., Jenkins & Astington, 1996) and EF (e.g., Wolfe & Bell, 2004), but language is also related to SES (Hoff & Tian, 2005; Noble et al., 2005; Pungello, Iruka, Dotterer, Mills-Koonce, & Reznick, 2009). Results of a seminal study in this area indicated that low SES children demonstrated significantly reduced rates of vocabulary growth and use at age 3 years when compared to middle and high SES children (Hart & Risley, 1995). With regard to ToM, Hughes and colleagues (2005) hypothesized that reduced levels of maternal speech may be the mechanism by which language mediates the impact of low SES. This hypothesis is supported by Hart and Risley's (1999) work, which revealed that low SES parents addressed half as many words to their children as did middle SES parents. Concerning EF, one study found that "SES does not statistically account for any variance in executive function ability over and above that predicted by language performance. Perhaps, then, SES has an effect on language, which then drives independently drives executive function performance" (p. 83, Noble et al., 2005).

Thus, if the hypothesis that language mediates the relationships between SES and ToM and EF is accurate, it would be reasonable to assume that intervening upon children's language development may provide an opportunity to spark growth in ToM and EF. The current study will test this assumption by evaluating the effect of a school-based language intervention on the development of ToM and EF in low SES urban kindergarten students. The specific language intervention employed in this study may be particularly effective because it utilizes dramatic story-telling and role-playing activities,

which also have been found to be related to growth in ToM (e.g., Cutting & Dunn, 2006) and EF (e.g., Diamond, Barnett, Thomas, & Munro, 2007).

Intervention Studies

This section will review studies that evaluated the effectiveness of interventions, trainings, or curricula implemented in the school setting that involved similar elements (e.g., use of mental state terms and narrative discourse, pretend or dramatic play, reading/telling stories, experience with self-regulatory activities/tasks) to the intervention under evaluation in this study. Previous efforts to facilitate ToM development in young children will be discussed first, followed by studies aimed at improving children's EF development.

Several interventions have been successful at improving ToM in young children by engaging them, on an individual or small group basis (3 to 4 students), in narrative discourse with an adult about stories involving ToM-related topics (e.g., false belief, deception; Guajardo & Watson, 2002) and stories that contained a surprising element but did not explicitly reference mental states (Lu, Su, & Wang, 2008, Study 2). A practical limitation of these interventions, however, is the need for a low teacher/experimenter-to-student ratio (e.g., one teacher for every three students).

In contrast, positive results have been generated by two other interventions that, similar to the design of the current intervention, were implemented with larger groups of children (i.e., 15 or more). In one of the studies, Peskin and Astington (2004) investigated whether exposing children from low SES backgrounds to a significantly increased level of mental-state terms in story texts resulted in more improvement in ToM than exposing

them to mental-state concepts on an implicit level. Over the course of four weeks, prekindergarten teachers read two stories containing either explicit (i.e., written in the text) or implicit (i.e., shown in pictures) references to mental states to their classes three days each week. Graduate students read three books to small groups of children two days each week and parents read the books at home with their child. A subset of children from the explicit (n = 24; M age = 4 years, 5 months) and implicit (n = 24; M age = 4 years, 7 months) classes were tested before and after the intervention. While both intervention conditions resulted in significant gains in ToM development, the children in the implicit condition, who were required to construct their own interpretation of characters' perspectives from the storylines and pictures in the books, actually significantly outperformed the children in the intervention group on false-belief explanation tasks. This finding was interpreted as consistent with Vygotsky's notion of scaffolding in that the implicit condition provided the optimal level of support for the children to actively construct their own inferences about the characters' mental states (Peskin & Astington, 2004). The intervention under evaluation in this study encouraged children to practice a similar type of active construction of mentalistic interpretations when listening to and re-telling stories and when engaging in role-play activities.

Another whole-group ToM intervention was implemented by Dockett (1998) and focused on improving preschoolers' ToM development by enhancing the complexity of their pretend play. At the beginning of the three-week intervention period, a group of approximately 15 intervention children (M age = 4 years, 2 months) visited a pizza shop and observed the process of making a pizza. A special area of the preschool was set up as

a “pizza restaurant” with appropriate props for the intervention children to use during pretend play. Compared to their control counterparts, the intervention children were given an increased amount of time to engage in shared pretend play with each other. Adults monitored the play situations and facilitated more complex shared pretend play through guiding comments and suggestions. Results indicated that the intervention was successful in increasing the complexity of the intervention children’s pretend play to a statistically significant level as evidenced by higher rates of imitative role play, make-believe with objects and situations, persistence, and verbal communication (Smilansky, 1968). Additionally, intervention children demonstrated statistically significant improvement on ToM tasks compared to their control counterparts. Similar role-play activities included in the current intervention are expected to impact ToM as well.

With regard to EF, studies involving one-on-one training with children have produced significant positive results and suggest that providing children with repeated practice with tasks requiring response inhibition or attentional control enhances their development of those skills (e.g., Dowsett & Livesey, 2000). However, similar to the intensive ToM trainings discussed above, the need for individualized instruction reduces the ability for the intervention to be practically utilized in the school environment. The intervention activities in the current study should provide students with the opportunity to practice regulatory behaviors such as sustaining attention to the activity, screening out distractions, and controlling impulses, but on a whole group level so as to maximize the time and resources available for such intervention. Unfortunately, electronic search results in Academic Search Complete, MEDLINE, PsycARTICLES, PsycINFO, and

Psychology and Behavioral Sciences Collection databases from 1900 to June 2010 did not yield any EF training studies at the group level involving elements comparable to the intervention under evaluation in the present study.

However, some insight may be gained by a brief discussion of the Tools of the Mind curriculum (Bodrova & Leong, 2007) for prekindergarten students, which utilizes many of the same types of activities as the present intervention yet is implemented on a daily basis over the course of an entire school year. The Tools of the Mind (Tools) curriculum is based on Vygotsky's work and focuses on the role of self-regulation (i.e., ability to attend, solve problems, plan, and remember) in learning and academic achievement. In this program, teachers facilitate growth in children's self-regulation by helping them increase the maturity and complexity of their dramatic play. From the perspective of Tools, dramatic play is believed to be an effective mechanism for the development of self-regulation because "dramatic play leads to the internalization of rules and expectations and places demands and constraints on a child's behavior" (Barnett et al., 2008, p. 302). In one evaluative study that examined the impact of Tools on low SES prekindergarten students, Tools was found to produce statistically significant improvement in children's self-control (i.e., inhibition), memory, and cognitive flexibility over the traditional literacy curriculum (Diamond, Barnett, Thomas, & Munro, 2007). These results lend strong support to the hypothesis that the dramatic role-play component of the intervention under evaluation in the present study will engender growth in EF skills related to self-regulation, such as inhibition and sustained attention. In order to maintain their role, children must sustain attention to the play interaction and inhibit behaviors that

would be inconsistent with that character or situation. Additionally, the role play element of the current intervention is hypothesized to impact children's ToM development as role play encourages children to experience the perspective, language, and emotions of different characters and situations.

Rationale

The particular intervention evaluated in this study is hypothesized to engender growth in ToM because it incorporates many elements found to be associated with ToM development, such as experience with language (e.g., Jenkins & Astington, 1996), mental state talk (e.g., Adrian, Clemente, & Villanueva, 2007), pretend play (e.g., Cutting & Dunn, 2006), and story recall (e.g., Lu et al., 2008, Study 1). Researchers also have found a relationship between language and EF (Hughes, 1998; Wolfe & Bell, 2004); therefore, the impact on EF development is expected to be engendered by the language component of the intervention. In particular, the intervention is hypothesized to improve two specific EF skills (i.e., inhibition, attentional control) due to children's participation in intervention activities (e.g., role play) that require sustained, active engagement and use of motor and cognitive self-control.

Most of the previous intervention studies have been conducted in preschool environments (e.g., Peskin & Astington, 2004) and have focused on either ToM or EF. This study offers a unique contribution to the literature by evaluating an intervention program that is implemented in the elementary school setting and may impact multiple skill domains. Additionally, the intervention is delivered in a whole-group format and thus may enhance our ability to impact a greater number of students in need compared to

individualized or small-group interventions. The main aim of this study is to determine whether there were significant differences in children's development of ToM and EF, namely inhibitory and attentional control skills, following participation in a drama-based language arts intervention compared to traditional language arts instruction. The children's performance on tasks measuring these skills was compared after controlling for pre-intervention functioning.

Method

Context and Participants

Six public elementary schools in a large metropolitan school system in the Southeast were recruited to participate in a three-year intervention study. These schools were identified as having the highest rates of children receiving free and reduced lunch in the county. Three schools were randomly assigned to receive the intervention services and three schools were randomly assigned to serve as waiting controls (e.g., Year 1 control schools received intervention services in Year 2). All kindergarten students enrolled at the intervention schools received the intervention services, but only a subsample of the students were randomly selected to participate in data collection. Data from the three-year study indicated that the language skills of these students were generally within the lower end of the average range for their age. A waiver of consent was granted from the university's Institutional Review Board (IRB).

Using a computer-generated list of random numbers, a sample of 80 students (40 intervention; 40 control) were randomly selected from the intervention and control schools to participate in this study. A total of 7 students (3 intervention; 4 control)

withdrew from their respective schools before pre-testing started. New participants were randomly selected from the remaining pool of students to compensate for these losses and protect against further attrition during post-testing (13 intervention; 11 control). An additional 14 students (9 intervention; 5 control) withdrew from their respective schools before post-testing began. A series of one-way analyses of variance (ANOVAs) indicated no significant differences between students who withdrew after pre-testing and those who participated in both pre- and post-testing.

The final sample consisted of 83 students in total (42% male; 94% African American), with 41 students in the intervention group (41% male; 100% African American) and 42 students in the control group (43% male; 88% African American). At pre-test, the average age of the full sample was 68.4 months (SD = 3.82). At post-test, the average age of the full sample was 72.8 months (SD = 3.79). The students' eligibility for free- or reduced-price lunch was provided to the researchers via school records and used as an indicator of their SES level. Data was unavailable for 42% of intervention participants and 33% of control participants. However, general school data indicated that, on average, 87% of the student populations of the participating schools were eligible for free- or reduced-price lunch. Thus, it is likely that the majority of the students participating in this study would have this eligibility and be considered of low socioeconomic status. Of the participating students with intact data (24 intervention students; 28 control students), 81% received free or reduced price lunch (71% of intervention group; 89% of control group).

Georgia Wolf Trap Program

"The Wolf Trap Early Learning Program," from here forward called the Georgia Wolf Trap (GWT) program, is a drama-based language intervention developed and implemented by Georgia Wolf Trap/Alliance Theatre Institute for Educators to address the needs of students from disadvantaged backgrounds who are often at-risk for academic failure due to limited language development. The GWT program provides arts-integrated learning experiences for students aged 3 – 5 years through a drama-based language arts curriculum. This program is intended to produce significant improvements in language skills (both oral and written) and in understanding of emotional expressions as well as introduce children to drama and theatre. The GWT program is in line with recent guidelines for developmentally appropriate practices in early literacy education created by the National Association for the Education of Young Children and the International Reading Association. Additionally, the intervention is connected to the state curriculum standards.

Each year, a research team from a nearby university conducted an independent evaluation of the effectiveness of the GWT program by pre- and post-testing a subsample of the participating kindergarten students using measures of expressive and receptive language, emotional understanding, academic achievement, and drama achievement. Empirical studies have indicated that the GWT program produces significant growth in emergent writing (Kruger, Flanigan, Kapsch, Samuelson, & Harris, 2003) and emotion understanding (Kruger, Kapsch, Samuelson, & Harris, 2005). In Year 3, additional data was collected to investigate whether the GWT program also impacted ToM and EF. This

article describes the results of that additional data analysis. University institutional review board (IRB) approval was granted for data collection and analysis.

Intervention and Control Conditions

From February to April 2008, students in the intervention classrooms received 13 lessons designed to enhance children's understanding and use of symbols by exploring literature through imaginative role-play. The 45-50 minute intervention lessons were provided by teaching artists from a local professional theatre company who were trained to deliver educational programs to children in schools. The lessons took the place of the students' typical instruction in language arts. Specific skills targeted by the intervention lessons included vocabulary development, story-telling and re-telling, exploration of character, discovery of meaning, and use and understanding of emotional expression. At the beginning of the intervention period, children in the intervention group attended a professional production of a play based on a children's book. During the subsequent intervention lessons in the kindergarten classrooms, the teaching artist (and, at times, the classroom teacher) read the children's book again and led the participating students through a range of activities to create new versions of the story through drama. These activities involved elaborating on the story themes, creating new characters and plots, and role-playing.

Students in the control classrooms received standard direct instruction in language arts as prescribed by the state curriculum. Kindergarten standards include recognizing all letters of the alphabet, applying phonics skills to reading, acquiring and using grade-level words to communicate effectively, demonstrating comprehension of orally presented text,

beginning to write in a variety of genres (e.g., narrative, information, persuasive), and using oral and visual skills to communicate.

Measures

The NEPSY-Second Edition (NEPSY-II; Korkman, Kirk, & Kemp, 2007) is a standardized and norm-referenced instrument designed to assess neuropsychological development across a range of skills in children aged 3 to 16 years. As indicated in the manual, validity studies with clinical and non-clinical populations provided evidence for content, concurrent, and construct validity. Recent test reviews of the NEPSY-II indicated that the evidence for construct and concurrent validity is generally strong (Brooks, Sherman, & Strauss, 2010; D'Amato, Titley, & Napolitano, 2010; Davis & Matthews, 2010). Selected subtests from the NEPSY-II were administered to evaluate ToM and EF (inhibition and attentional control, in particular). Subtest scaled scores have a mean of 10 and standard deviation of 3.

ToM. The Theory of Mind subtest was used to examine the ability to understand others' mental states and perspectives. This subtest is appropriate for children aged 3 to 16 years and is comprised of two major sections. In the Verbal portion of the subtest, the child is presented with scenarios or shown pictures and is then asked questions that require knowledge of another individual's point of view to answer correctly. These items assess the child's "ability to understand mental functions such as belief, intention, deception, emotion, imagination, and pretending, as well as the ability to understand that others have their own thoughts, ideas, and feelings that may be different from one's own" (Korkman et al., 2007, p. 15). The Verbal portion of the subtest contains 15 items. A

child can earn one point for a correct response on nine of the items, up to two points for a correct response on five of the items, and up to three points for one of the items (maximum of 22 total points). Items on the Verbal portion of the subtest measure the following concepts and skills: seeing leads to knowing, false belief, recognizing mental states, imitation/pretending, mental-physical distinction, bluff, double bluff, appearance-reality, and understanding figurative language. The Contextual portion of the subtest uses pictures depicting social contexts to evaluate the student's ability to relate emotion to social situations. For each of the six items in the Contextual task, the student is asked to select (by pointing) one photograph from four options that shows the appropriate affect of the target person in the picture. The student is awarded one point for a correct response. The points received for correct responses on the Verbal and Contextual portions of the Theory of Mind subtest are summed to generate a Theory of Mind Total Score (TM Total) ranging from 0 to 28 points. The reliability coefficient for children aged 5-6 years is .84 for TM Total.

Inhibition. Participants' ability to inhibit dominant responses and produce new, incompatible responses was assessed by the Inhibition subtest. This subtest is appropriate for children aged 5 to 16 years. In this subtest, the child is presented with five rows of eight black and white shapes (circles and squares) or arrows (facing up and down) and is instructed to name either the shape or direction (Naming trials) or an alternate response (Inhibition trials). While the children participated in the Naming trials as well, only their performance on the Inhibition trials was analyzed as these are the scores that are indicative of inhibitory control. In the Inhibition trials, the child is asked to suppress the

correct response and provide an alternate response. For example, in the first trial, the child is instructed to call a square a "circle," and a circle a "square." In the second trial, the child should say "up" if the arrow points down and vice versa. For each Inhibition trial (shapes and arrows), the student receives a score for the total amount of time elapsed from the first to the last item on the page and the total number of errors. These scores are summed across the two trials to generate two raw scores for the Inhibition condition of this subtest: Inhibition Total Completion Time (in seconds; INI Total Time) and Inhibition Total Errors (INI Total Errors). The reliability coefficients for children aged 5-6 years are .64 for INI Total Time, and .74 for INI Total Errors.

Attentional Control. The Auditory Attention subtest was used to assess the ability to focus attention in the face of distracting or competing stimuli (selective attention) and the ability to stay focused on a task for a continuous period of time (sustained attention). This subtest uses an auditory continuous performance paradigm and is appropriate for children aged 5 to 16 years. For three minutes, the child is instructed to listen to a series of words presented through an audio CD (e.g., box, thing, put, red, now, yellow) and touch the red circle on the accompanying stimulus page (containing four colored circles: black, yellow, blue, red) when he or she hears the target word, "red". The target word is presented 30 times during the 3-minute task and the child is awarded one point each time he or she appropriately touches the red circle within two seconds of hearing the target word. Thus, the maximum raw score for this subtest is 30. The reliability coefficient for children aged 5-6 years is .74 for Auditory Attention Total Correct (AA Total).

Procedure

The primary author conducted the majority of the pre- and post-testing. On a few occasions, one of two additional examiners assisted with subtest administration. These examiners were graduate students who were completing doctoral degrees in a School Psychology and had prior training and experience with assessment of children. The superintendent of the school system as well as the principals of the participating schools granted permission to test students in their schools during the school day. Each student participated in one individual testing session lasting approximately 30 minutes before and after the intervention time period. The EF and ToM tasks (NEPSY-II subtests) were administered in one of three fixed orders, which were counterbalanced across participants. The three fixed orders of presentation were: (1) Auditory Attention – Inhibition – Theory of Mind; (2) Inhibition – Theory of Mind – Auditory Attention; and, (3) Theory of Mind – Auditory Attention – Inhibition. At post-testing, each participant was administered the subtests in the same order in which they were presented during pre-testing in order to control for test order effects.

Pre-testing was conducted from November 2007 to January 2008. The 13 intervention lessons were delivered from February to April 2008. Post-testing was conducted in April and May 2008. On average, 4 months and 15 days elapsed between pre- and post-testing (with a range of 3 months, 14 days to 5 months, 10 days).

Data Analysis

Ninety-nine percent of participants successfully completed all three NEPSY-II subtests administered during pre- and post-testing. One control participant was unable to

complete the Inhibition subtest at pre- and post-testing. Rather than remove this participant's scores from all data analyses, the mean raw scores earned by the control group for INI Total Time and INI Total Errors were applied to the missing data (Tabachnick & Fidell, 2007). SPSS Version 14 for Windows was used to run statistical analyses.

Results

This section begins with a review of preliminary analyses conducted to evaluate the equivalence of the intervention and control groups at pre-test. Subsequently, exploratory analyses of the data will be presented. Pre-test raw scores were converted into scaled scores to determine how the intervention and control students' performance compared the NEPSY-II standardization sample. Paired-sample *t* tests were conducted to examine the changes of ToM and EF from pre-test to post-test in the intervention and control groups. Additionally, Pearson product-moment correlations were conducted to ascertain relationships between pre- and post-test scores on the dependent variables (TM Total, INI Total Time, INI Total Errors, and AA Total) in the full sample. Finally, the results of tests assessing the effects of the intervention will be discussed. An individual one-way analysis of covariance (ANCOVA) was conducted to examine the effects of the intervention on each of the dependent variables. The Holms' procedure was utilized to control for the effect of multiple testing in each set of analyses.

Preliminary Analyses

Table 5 shows the pre-test means and standard deviations of all dependent variables for the intervention and control groups. A series of one-way analyses of

Table 5

Differences in Children's Performance on Theory of Mind and Executive Function Tasks from Pre-test to Post-test

	Group									
	Intervention (n = 41)					Control (n = 42)				
Dependent variable	Pre *M* (*SD*)	Post *M* (*SD*)	*MD*	*d*	*p*	Pre *M* (*SD*)	Post *M* (*SD*)	*MD*	*d*	*p*
TM total (# correct out of 28)	12.39 (4.02)	15.27 (4.44)	2.88	.68	< .001*	10.76 (4.87)	14.05 (4.23)	3.29	.72	< .001*
INI total time (in seconds)	144.34 (29.16)	124.05 (28.89)	20.29	.70	< .001*	140.31 (30.05)	121.91 (24.57)	18.40	.67	< .001*
INI total errors	18.59 (12.19)	10.63 (8.95)	7.95	.74	< .001*	19.02 (10.79)	12.38 (7.51)	6.64	.71	< .001*
AA total (# correct out of 30)	21.59 (6.40)	25.46 (4.08)	3.88	.72	< .001*	21.83 (4.99)	24.48 (4.92)	2.64	.54	.001*

Note. All mean values are raw scores; MD = mean difference between pretest and posttest; *d* = effect size.
* Indicates significance at the .05 level after controlling for the effects of multiple testing.

variance (ANOVAs) were performed to test for differences between the groups in age, gender, socioeconomic status, and pre-test scores. There was no significant difference between the intervention and control groups in any of these variables: age at pre-test, $F(1, 81) = 1.30$, $p = .258$; gender, $F(1, 81) = .016$, $p = .899$; socioeconomic status, $F(1, 81) = 1.51$, $p = .222$; TM Total pre-test, $F(1, 81) = 2.76$, $p = .101$; INI Total Time pre-test, $F(1, 81) = .385$, $p = .537$; INI Total Errors pre-test, $F(1, 81) = .03$, $p = .863$; AA Total pre-test, $F(1, 81) = .039$, $p = .844$.

Exploratory Analyses

When compared to NEPSY-II normative data, the mean pre-test raw scores of the full sample corresponded to scaled scores falling within the average range of functioning for their age (scaled scores within the range of 8 to 12). Additionally, the normative performance of the full sample was examined on a case-by-case basis. In a normal distribution, 68% of scores fall within the average range and 32% of scores fall above and below the average range (16% below average; 16% above average). In the current study, the scores of the full sample were not normally distributed. For TM Total, 59% of pre-test scores fell in the average range, 40% fell in the below average range, and 1% fell in the above average range. For INI Total Time, 72% of pre-test scores fell in the average range, 18% fell in the below average range, and 10% fell in the above average range. For INI Total Errors, 55% of pre-test scores fell in the average range, 33% fell in the below average range, and 12% fell in the above average range. Finally, for AA Total, 60% of pre-test scores fell in the average range, 17% in the below average range, and 23% in the above average range. While the percentages of below average performance for INI Total

Time and AA Total were within the range expected based on the standard normal distribution (16%), the percentages for TM Total and INI Total Errors indicated that more students than would be expected were functioning below the average range for their age at pre-test. Additionally, a higher proportion of the sample than would be expected demonstrated above average performance on the Auditory Attention subtest (AA Total).

Means and standard deviations of all dependent variables for the intervention and control groups at pre- and post-test along with mean differences from pre- to post-test are shown in Table 5. Paired-sample *t* tests of each dependent variable were conducted separately for the intervention and control groups to assess improvement from pre-test to post-test. Effect sizes were calculated using Cohen's (1988) effect size formula (*d*), where an effect size of .20 is considered small, an effect of .50 is considered medium, and an effect of .80 is considered large. All pre-post comparisons were significant in the intervention group as well as the control group. In the intervention group, significant improvement was observed in TM Total, $t(42) = -5.43$, $p < .001$, $d = .68$, AA Total, $t(42) = -4.99$, $p < .001$, $d = .72$, INI Total Time, $t(42) = 4.40$, $p < .001$, $d = .70$, and INI Total Errors, $t(42) = 4.82$, $p < .001$, $d = .74$. Similarly, children in the control group significantly improved their TM Total, $t(41) = -6.01$, $p < .001$, $d = .72$, AA Total, $t(41) = -3.60$, $p = .001$, $d = .54$, INI Total Time, $t(41) = 4.19$, $p < .001$, $d = .67$, and INI Total Errors, $t(41) = 4.45$, $p < .001$, $d = .71$. Effect sizes were comparable between intervention and control groups for pre-to-post-test improvement on TM Total, INI Total Time, and INI Total Errors. In contrast, a notable difference in effect size occurred between the intervention and control groups on improvement in AA Total scores. While a medium to

large difference was observed for the intervention group's pre-post performance, the control group's growth from pre-test to post-test was consistent with a medium effect size.

Associations between the dependent variables at pre- and post-test for the full sample (n = 83) were assessed by conducting Pearson's product-moment correlations. Significant correlations were found between the pre- and post-test scores on each dependent variable (see Table 6). Additionally, post-test AA Total was significantly related to pre-test TM Total and post-test INI Total Errors. Finally, post-test INI Total Time was significantly correlated with pre- and post-test INI Total Errors.

Effect of Intervention

Preliminary analyses evaluating the homogeneity-of-regression (slopes) assumption indicated that the relationship between the covariates (pre-tests) and the dependent variables (post-tests) did not differ significantly as a function of group status: TM Total, $F(1, 79) = .798$, $p = .374$; INI Total Time, $F(1, 79) = .265$, $p = .608$; INI Total Errors, $F(1, 79) = .148$, $p = .702$; AA Total, $F(1, 79) = .784$, $p = .378$. Adjusted post-test mean scores for all dependent variables are presented in Table 3. More detailed results of each individual ANCOVA are presented in Tables 7 through 11.

Theory of mind. In order to examine the effects of the intervention on theory of mind, a one-way ANCOVA was conducted for post-test TM Total. Pre-test TM Total was entered as the covariate. The ANCOVA was not significant, $F(1, 80) = .035$, $p = .853$.

Table 6 80

Pearson Correlations of Performance on ToM and EF Tasks at Pre-test and Post-test

Variable	1	2	3	4	5	6	7	8
1. Pre-test TM total	---							
2. Post-test TM total	.697*	---						
3. Pre-test INI total time	-.189	-.211	---					
4. Post-test INI total time	-.302	-.275	.477*	---				
5. Pre-test INI total errors	-.319	-.170	-.040	.332*	---			
6. Post-test INI total errors	-.295	-.188	-.021	.417*	.514*	---		
7. Pre-test AA total	.312	.256	-.240	-.247	-.232	-.246	---	
8. Post-test AA total	.363*	.264	-.108	-.257	-.282	-.337*	.565*	---

* Indicates significance at the .05 level after controlling for the effects of multiple testing.

Table 7

Analysis of Covariance Adjusted Mean Scores by Group

Variable	Intervention (n = 41)	Control (n = 42)	*p*	Partial eta squared
TM total (# correct out of 28)	14.717	14.586	.853	.000
INI total time (in seconds)	123.172	122.761	.938	.000
INI total errors	10.716	12.301	.313	.013
AA total (# correct out of 30)	25.520	24.421	.185	.022

Table 8

Analysis of Covariance Summary for Auditory Attention

Source	DF	Sum of Squares	Mean Square	F Value	P Value	Partial Eta Squared
Pre Test	1	541.093	541.093	38.664	.000	.326
Group	1	25.051	25.051	1.790	.185	.022
Error	80	1119.579	13.995			

Table 9

Analysis of Covariance Summary for Inhibition Total Errors

Source	DF	Sum of Squares	Mean Square	F Value	P Value	Partial Eta Squared
Pre Test	1	1464.370	1464.370	28.933	.000	.266
Group	1	52.081	52.081	1.029	.313	.013
Error	80	4049.047	50.613			

Table 10

Analysis of Covariance Summary for Inhibition Total Time

Source	DF	Sum of Squares	Mean Square	F Value	P Value	Partial Eta Squared
Pre Test	1	13129.924	13129.924	23.347	.000	.226
Group	1	3.479	3.479	.006	.938	.000
Error	80	44989.598	562.370			

Analysis of Covariance Summary for Theory of Mind

Source	DF	Sum of Squares	Mean Square	F Value	P Value	Partial Eta Squared
Pre Test	1	724.088	724.088	72.602	.000	.476
Group	1	.345	.345	.035	.853	.000
Error	80	797.866	9.973			

Inhibition. In order to examine the effects of the intervention on inhibition, separate one-way ANCOVAs were conducted for post-test INI Total Time and post-test INI Total Errors. Pre-test INI Total Time and pre-test INI Total Errors were entered as the covariate, respectively. The ANCOVAs were not significant, INI Total Time, $F(1, 80) = .006$, $p = .938$; INI Total Errors, $F(1, 80) = 1.03$, $p = .313$.

Attentional control. In order to examine the effects of the intervention on attentional control, a one-way ANCOVA was conducted for post-test AA Total. Pre-test AA Total was entered as the covariate. The ANCOVA was not significant, $F(1, 80) = 1.79$, $p = .185$.

Discussion

The purpose of this study was to evaluate the effectiveness of the GWT program at improving ToM and EF in a sample of urban kindergarten students primarily from low SES backgrounds. This drama-based language intervention was hypothesized to impact these skills because it incorporated many of the elements identified by previous research (e.g., Cutting & Dunn, 2006; Jenkins & Astington, 1996; Wolfe & Bell, 2004) as associated with the development of ToM and EF skills. Unfortunately, the results indicated that, after taking pre-test scores into consideration, post-test scores between the

two groups were not significantly different. Although a positive trend was observed for the intervention group to perform better on ToM and EF tasks than the control group (based on the fact that the adjusted post-test means for the intervention group were generally better than the control group), the difference was not statistically significant. These results suggested that the growth observed in ToM and EF, as measured by the NEPSY-II tasks, may be due to maturation.

The findings in this study were in contrast to previous studies (e.g., Dockett, 1998; Diamond et al., 2007) that have found significant effects on ToM and EF development with interventions comprised of components similar to the GWT program. For example, Dockett's (1998) pretend play intervention was found to significantly improve preschool children's performance on ToM tasks. Additionally, an intervention that exposed children to stories involving high levels of explicit or implicit mental state information resulted in significantly improved ability to understand and explain false beliefs (Peskin & Astington, 2004). Although the GWT intervention contained similar role-play and story-telling elements, there were three notable differences between the current and former studies that may explain the inconsistent findings.

One difference was the age range of the samples, with the current study using kindergarten students (*M* age = 5 years, 8 months) and the previous studies using preschool-aged children (4 years, 5 months old on average; Docket, 1998; Peskin & Astington, 2004). ToM has been found to undergo significant growth during early childhood years, with the hallmark of ToM, false belief understanding, often achieved around 4 years of age (Wellman et al., 2001). It is possible that the younger children in

the previous studies were in a sensitive period of ToM development and thus may have been able to benefit more from the interventions. Given their advanced age, the current sample of kindergarten students may have moved beyond that sensitive period or may have already mastered early ToM milestones addressed by the GWT program. The fact that the overall sample's average pre-test score on the Theory of Mind subtest was consistent with the average range for their age supported this explanation. There will be further discussion of this particular result at a later point in this section.

Another difference between the current investigation and the previous studies (Dockett, 1998; Peskin & Astington, 2004) was the type of measures used to assess ToM. Both Dockett (1998) and Peskin and Astington (2004) utilized experimental tasks to assess growth in discrete ToM skills, such as false belief understanding or appearance-reality distinction. In contrast, the current study utilized the Theory of Mind subtest from the NEPSY-II, which has the benefit of being a standardized, norm-referenced test with strong psychometric properties. A possible disadvantage of using a measure like the Theory of Mind subtest on the NEPSY-II is that it assessed a much wider range of ToM skills, which may have masked our ability to detect the growth in specific ToM skills (e.g., false belief) that may have occurred as a result of participation in the GWT program. It would be interesting for future research to further explore this methodological issue, possibly by comparing the sensitivity of the NEPSY-II to the precision of experimental tasks in detecting growth within a single sample of children. Additionally, future endeavors may wish to investigate the utility of other standardized, norm-referenced measures of ToM and EF for pre-post comparisons.

Finally, a difference observed between the current study and the work of Peskin and Astington (2004) was that of parent involvement. In Peskin and Astington's (2004) study, children were exposed to story books containing mental-state information five days a week at school and at least four to six times per week at home. In contrast, the intervention in the current study did not involve parents and was implemented solely during the school day. The added "intervention" time provided by the parents in Peskin and Astington's (2004) study may have substantially elevated the intensity, and thus effectiveness, of the four-week long mental-state book reading intervention. Future research may wish to confirm the degree to which parent involvement contributed to the impact of the intervention on ToM development in Peskin and Astington's (2004) study.

With regard to EF, the emphasis on dramatic role play was previously noted as a common intervention component shared by the GWT program and the Tools (Bodrova & Leong, 2007) curriculum. While a recent evaluation revealed that Tools had a significant impact on EF development in low SES preschool children (Diamond et al., 2007), the results of the current study did not demonstrate a significant impact on EF development. A possible reason for these discrepant findings is the vastly different level of intervention intensity. As mentioned earlier, Tools is a curriculum that is implemented on a daily basis over the course of a full academic year. In contrast, the GWT intervention was delivered in 13 45-minute lessons. It is possible that the GWT program was not of sufficient duration and frequency to effect substantial growth in inhibitory or attentional control skills. Future endeavors should investigate the specific levels of intervention frequency

and duration necessary to produce growth in ToM and EF, yet remain practical for school-based provision.

It is of note, however, that while the GWT program was not found to bring about statistically significant improvement in attentional control, it did produce a larger effect size than the growth observed as a result of standard language arts instruction. That is, the intervention group improved almost three-quarters of a standard deviation from pre- to post-test, while the control group improved about one-half of a standard deviation. While this difference was not statistically significant, it may have a practical impact in the classroom with regard to how well these children are able to regulate their attention to a task. Although observational measures (e.g., teacher rating scales, direct behavior observation techniques) of children's attentional control in the classroom environment were not included in the current study, future investigations may do well to incorporate such a measure in order to address the practical significance of children's performance on experimental tasks. As children's ability to regulate their attention has been found to relate significantly to their academic achievement (Polderman, Boomsma, Bartels, Verhulst, & Huizink, 2010), an important measure of "significance" may in fact be observational in nature.

The results of the exploratory correlational analyses in the current study generate some interesting discussion points. While no *a priori* hypotheses were stated regarding expected relationships between ToM and EF, the general finding of previous research would lead us to assume that significant correlations between ToM (TM Total) and inhibition (specifically, INI Total Errors) would occur at, and possibly between, pre- and

post-test time points. These “expected” results did not occur in the current sample of students. However, an important distinction between the present study and most previous investigations is, again, the age-range of the participating children. Much of the prior research that found significant correlations between ToM and inhibition was conducted with children of a younger age than the current sample (e.g., Hughes & Ensor, 2005). It may be that the degree of association may vary over the course of natural development as well as in response to different types and levels of environmental input present at different ages. A study by Hughes and Ensor (2007) provided some support for this idea and suggested that the relationships between ToM and inhibition may diminish, or become more variable, over time. In their study, children (n = 124) were administered sets of ToM and EF tasks at three different time points, beginning when the children were 2 years of age. Correlational analyses indicated statistically significant relationships between aggregate measures of ToM and EF (including inhibition) of .44 and .46 at age 2 and 3, respectively. Interestingly, while it remained statistically significant, the ToM-EF relationship weakened to .28 at age 4. In addition to the possible impact of developmental differences on the ToM-EF relationship, the association between ToM and inhibitory skills at both time points in this study may have been impacted by the disproportionate number of students who had earned below average pre-test scores on the Theory of Mind subtest and on the number of errors on the Inhibition subtest.

This comment regarding the pre-intervention functioning of the current sample in ToM and EF leads to the final discussion point in this article. As noted in the introductory section of this article, previous research has indicated that low SES children tend to

demonstrate underdeveloped ToM and EF (e.g., Hughes & Ensor, 2005; Noble et al., 2005). In contrast to previous research, the pre-intervention mean raw scores of the full sample of low SES children in the current study were found to be within the average range when converted to scaled scores, which indicated age-appropriate functioning in ToM and EF. When the data was examined more closely, it was determined that there were more children performing in the below average range prior to the intervention on the Theory of Mind subtest and the Inhibition subtest (number of errors, specifically) than would be expected based on a normal distribution of scores. However, the greatest proportion of this sample's pre-test scaled scores fell within the average range for each of the four dependent measures. Additionally, a higher percentage of students demonstrated above average performance on the Auditory Attention subtest than would be expected. Therefore, the results of this study suggested that it may be inaccurate to characterize children from low SES backgrounds as demonstrating weak, or below average, ToM and EF performance. It may be valuable for future research to seek out larger sample sizes so that these patterns could be more definitively examined and understood.

Concluding Comments

This study contributes to the literature by painting a different picture of the development of ToM and EF in children from low SES backgrounds. The results of this study suggested that children from low SES backgrounds may demonstrate a wider range of ability in these skill domains than previous research has identified. In contrast to the overwhelmingly subaverage ToM (e.g., Cole & Mitchell, 2000) and EF (Noble et al., 2005) skills found in prior studies, the majority of the current sample of low SES

kindergarten children entered the study with age-appropriate performance on ToM and EF tasks, and significant change due to the drama-based language intervention was not captured statistically. Still, a greater proportion of these students demonstrated subaverage performance than would be expected; thus, this group of children remains an important target group for future research and intervention. As has been discussed, well-developed ToM and EF skills are associated with success in school, both academically and socially. In order to ensure the success of all students, investigation of ToM and EF, especially in terms of methods to foster these skills in the natural environment, continues to be a necessary and worthwhile endeavor.

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APPENDIXES

APPENDIX A

Example of Perspective-Shifting Discourse about Deceptive Objects

Sarah, what do you think this is? (An apple.) You think that it is an apple. I think that it looks like an apple, too. Bobby, what do you think this is? (It looks like a real apple, but it also looks like a fake apple.) Let's look at it more closely. Here, Sarah, you hold it for a minute. What do you think it is now, Sarah? (It's a candle!) Right, at first you thought it was an apple, but now know it is a candle. When you first saw it, what did you first think it was? (An apple.) Right, at first you thought it was an apple. It looks like an apple, so you thought it was an apple. But what is it really and truly? (A candle.) Exactly. Really it is a candle.

Example of Elaborative Mental State Talk (Peterson & Slaughter, 2003, p. 427)

SCENARIO: Mum and Joshua, age 4, are visiting Grandpa in his high-rise unit. While they are there, he receives a parcel in the mail and opens it. It is a card from an old friend enclosing a packet of seeds. Grandpa sighs and looks unhappy. On the way home, Joshua asks Mum why Grandpa was sad when he got such a nice present of flower seeds. Mum says:

RESPONSE: "It is hard to know what someone else is thinking. Even though Grandpa is my Dad, I do not always know what thoughts are in his mind. But sometimes I can guess his thoughts. I think maybe he was sad to get seeds because they reminded him of his garden at the home before he moved into the unit, and he misses it."

Example of Elaborative Mental State Talk (Peterson & Slaughter, 2003, p. 426)

SCENARIO: Mum is collecting Kevin, age 4, from preschool, and meets a friend at the gate. They are conversing when Kevin comes up. So Mum does not notice that Kevin has slipped his empty flask into her things, sliding it under the cover of her shopping bask. The friend leaves, and Mum says to Kevin, "Quick run back into your classroom and get your flask: You forgot to bring it!" Kevin looks a little puzzled, but hurries obediently back inside. Then Mum opens her basket and sees the flask. She goes in and collects Kevin, saying:

RESPONSE: "Come on Kevin. I am sorry I sent you back for your flask. It was my mistake. I wasn't paying attention when you came out, so I didn't see you put the flask in my basket. Because I hadn't seen it, I did not know it was there. But it was, and I should have looked. Even grown-ups' minds get mixed up sometimes! Let's go home."