



THE POWER OF PLAY

A Research Summary on
Play and Learning

Dr. Rachel E. White for



Minnesota
Children's
Museum

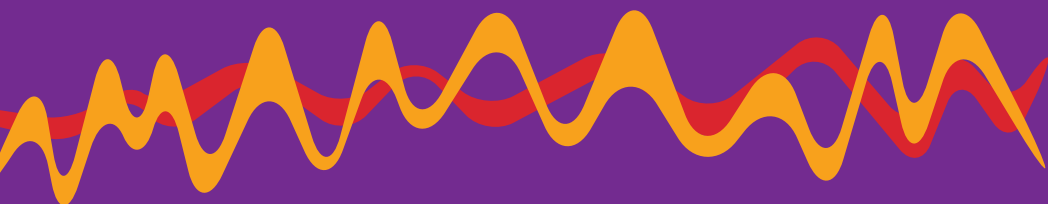


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Dr. Rachel White earned her doctorate in Child Psychology at the Institute of Child Development, University of Minnesota. Dr. White's research focuses on how children can benefit from play and imagination in early childhood. She has also studied young children's creation of imaginary companions, and how pretending relates to early social understanding, cognitive development, and school readiness in diverse populations of preschool-aged children. Research for this paper was collected in fall 2012.



With a mission to spark children’s learning through play, Minnesota Children’s Museum provides hands-on learning experiences to more than 400,000 visitors each year in Minnesota, as well as millions of children around the country through the leading traveling exhibit program for children’s museum. While recognizing that children learn in many ways, the Museum focuses on the learning that occurs through child-centered play.

Play may seem simple, yet it is profound to a child’s development. Play makes learning something that happens naturally and joyfully, when a child laughs and wonders, explores and imagines.

For more than 30 years, Minnesota Children’s Museum has embedded research on play and child development into interactive learning environments through its exhibits and programs. As the Museum embarks on an ambitious expansion, we are presented with a pivotal opportunity to strengthen our connection to child development and high-quality research on the role of play in early learning.

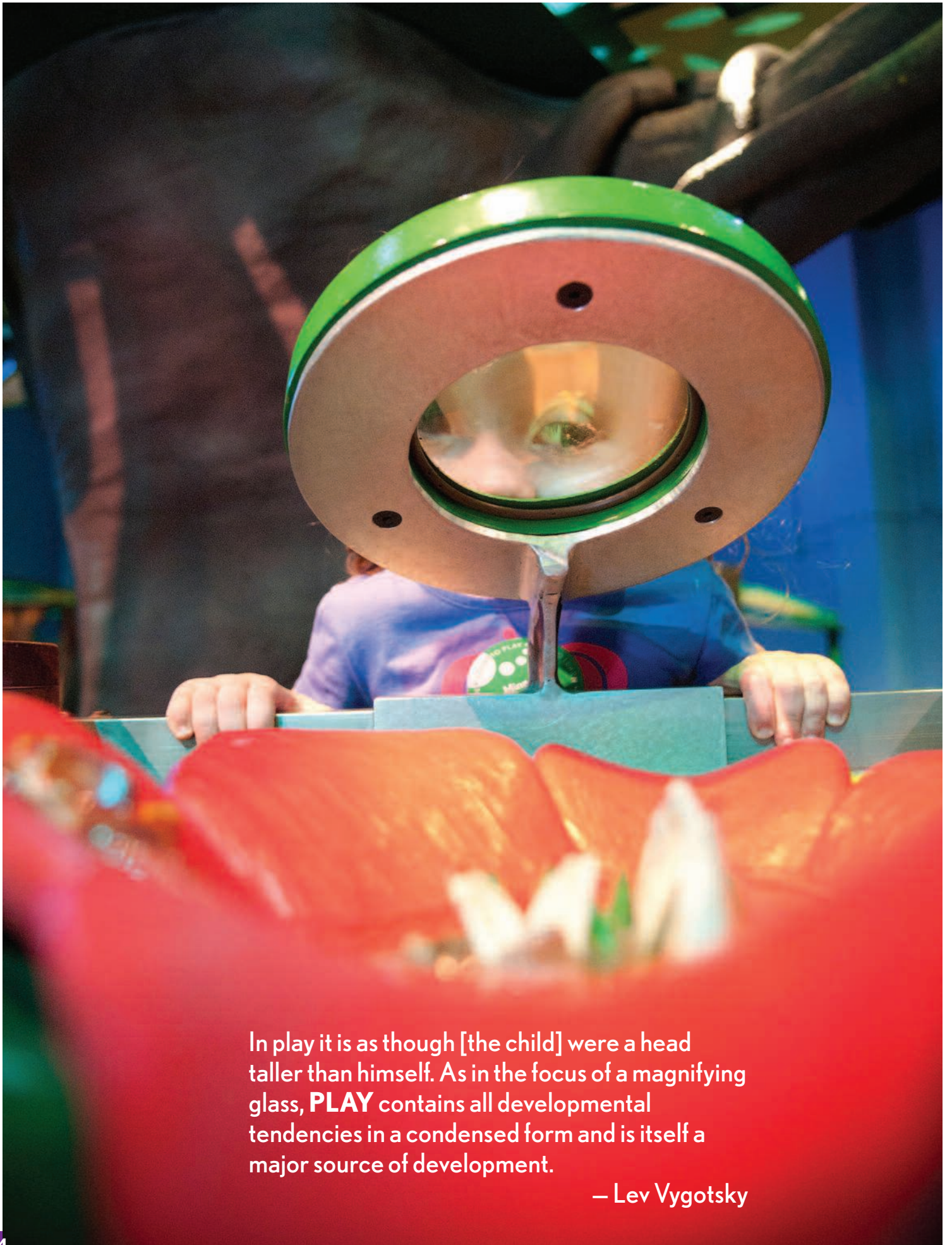
The following research summary is a unique and robust compilation of published research on the major types of play for young children and related learning benefits. We are deeply grateful for the dedication of Dr. Rachel White in amassing, synthesizing and digesting the breadth of research that has been conducted in this field.

A special thank you to the University of Minnesota’s College Readiness Consortium, under the leadership of Kent Pekel, for making Dr. White’s work possible through persistence and funding grounded in the belief that college readiness begins in early childhood. We also thank the numerous researchers and experts who reviewed and advised on the summary, including Dr. Stephanie Carlson, Dr. Megan Gunnar, Dr. Sara Langworthy, Barb Murphy, Dr. Amy Susman-Stillman, and Julie Sweitzer. An additional thank you to Dr. Gunnar, University of Minnesota Regents Professor and Director of the Institute of Child Development, for chairing the Museum’s Research Advisory Council that continues the research partnership started with this summary.

Minnesota Children’s Museum’s staff is eager to apply this research, building on our strengths of engaging children in learning experiences and extending the insights to parents and all the caring adults in a child’s life. We hope you find this research as inspiring as we do.

Playful learning is fun – and it’s powerful. Please join us in fostering the undeniable, incredible, exceptional power of play, wherever the setting.

Dianne Krizan
President
Minnesota Children’s Museum



In play it is as though [the child] were a head taller than himself. As in the focus of a magnifying glass, **PLAY** contains all developmental tendencies in a condensed form and is itself a major source of development.

— Lev Vygotsky



INTRODUCTION

Virtually every child, the world over, plays. The drive to play is so intense that children will do so when they have no real toys, when parents do not actively encourage the behavior, and even in the middle of a war zone. In the eyes of a young child, running, pretending, and building are fun. Researchers and educators know that these playful activities benefit the development of the whole child across social, cognitive, physical, and emotional domains. Indeed, play is such an instrumental component to healthy child development that the American Academy of Pediatrics (Ginsburg, 2007) issued a white paper on the topic, the National Association for the Education of Young Children (2009) named play as a central component in developmentally appropriate educational practices, and the United Nations High Commission on Human Rights (1989) recognized play as a fundamental right of every child.

Yet, while experts continue to expound a powerful argument for the importance of play in children's lives, the actual time children spend playing continues to decrease. Today, children play eight hours less each week than their counterparts did two decades ago (Elkind, 2008). Under pressure of rising academic standards, play is being replaced by test preparation in kindergartens and grade schools, and parents who aim to give their preschoolers a leg up are led to believe that flashcards and educational "toys" are the path to success. Our society has created a false dichotomy between play and learning.

This paper presents an overview of the scientific research that guides the educational philosophy that play is learning, discussing many overlapping forms of child-centered play, including social, object, pretend, physical, and media play. Through play, children learn to regulate their behavior, lay the foundations for later learning in science and mathematics, figure out the complex negotiations of social relationships, build a repertoire of creative problem solving skills, and so much more. Finally, this paper also addresses the important role for adults in guiding children through playful learning opportunities.

While experts continue to expound a powerful argument for **PLAY**, the actual time children spend playing continues to decrease.



WHAT

IS PLAY?

Despite the fact that adults can intuitively identify play (Smith & Vollstedt, 1985), full consensus on a formal definition continues to elude the researchers and theorists who study it. Definitions range from discrete descriptions of various types of play such as physical play, construction play, language play, or symbolic play (Miller & Almon, 2009), to lists of broad criteria, based on observations and attitudes, that are meant to capture the essence of all play behaviors (Burghardt, 2011; Rubin, Fein, & Vandenberg, 1983).

The Play Continuum

A majority of the contemporary definitions of play focus on several key criteria. The founder of the National Institute for Play, Stuart Brown, has described play as “anything that spontaneously is done for its own sake.” More specifically, he says it “appears purposeless, produces pleasure and joy, [and] leads one to the next stage of mastery” (as quoted in Tippett, 2008). Similarly, Miller and Almon (2009) say that play includes “activities that are freely chosen and directed by children and arise from intrinsic motivation” (p. 15). Often, play is defined along a continuum as more or less playful using a set of behavioral and dispositional criteria (Krasnor & Pepler, 1980; Rubin, Fein, & Vandenberg, 1983):



PLAY IS PLEASURABLE. Children must enjoy the activity or it is not play.

PLAY IS INTRINSICALLY MOTIVATED. Children engage in play simply for the satisfaction the behavior itself brings. It has no extrinsically motivated function or goal.

PLAY IS PROCESS ORIENTED. When children play, the means are more important than the ends.

PLAY IS FREELY CHOSEN. It is spontaneous and voluntary. If a child is pressured, she will likely not think of the activity as play.

PLAY IS ACTIVELY ENGAGED. Players must be physically and/or mentally involved in the activity.

PLAY IS NON-LITERAL. It involves make-believe.





According to this view, children’s playful behaviors can range in degree from 0-100% playful. A behavior that meets three of the above criteria would be considered more playful than one that meets only two, but importantly, a degree of playful behavior is acknowledged even if only two criteria are met. Rubin and colleagues did not assign greater weight to any one dimension in determining playfulness; however, other researchers have suggested that process orientation and a lack of obvious functional purpose may be the most important aspects of play (e.g., Pellegrini, 2009).

PLAY builds the foundation for a lifetime of learning.

From the perspective of a continuum, play can thus blend with other motives and attitudes that are less playful, such as work. Unlike play, work is typically not viewed as enjoyable and it is extrinsically motivated (i.e., it is goal-oriented). Researcher Joan Goodman (1994) suggested that hybrid forms of work and play are not a detriment to learning; rather, they can provide optimal contexts for learning. For example, a child may be engaged in a difficult, goal-directed activity set up by his teacher, but he may still be actively engaged and intrinsically motivated. At this mid-point between play and work, the child’s motivation, coupled with guidance from an adult, can create robust opportunities for playful learning.

The Role of Free and Guided Play

Critically, recent research supports the idea that adults can facilitate children’s learning while maintaining a playful approach in interactions known as “guided play” (Fisher, Hirsch-Pasek, Golinkoff, Singer, & Berk, 2011; Hirsch-Pasek, Golinkoff, Berk, & Singer, 2009). Guided play also falls on a continuum based on how much adults set up the environment and participate in play. The adult’s role in play varies as a function of their educational goals and the child’s developmental level (Hirsch-Pasek et al, 2009).

Guided play takes two forms. At a very basic level, adults can enrich the child’s environment by providing objects or experiences that promote aspects of a curriculum. In the more direct form of guided play, parents or other adults can scaffold children’s play by joining in the fun as a co-player, asking thoughtful questions, commenting on children’s discoveries, or encouraging further exploration or new facets to the child’s activity (for a review, see Fisher et al., 2011). Although playful learning can be somewhat structured and adult-facilitated, it must also be child-centered (Nicolopolou, McDowell, & Brockmeyer, 2006). Play should stem from the child’s own desire.

Both free and guided play are essential elements in a child-centered approach to playful learning. Intrinsically motivated free play provides the child with true autonomy, while guided play is an avenue through which parents and educators can provide more targeted learning experiences. In either case, play should be actively engaged, it should be predominantly child-directed, and it must be fun.



PLAY AND

DEVELOPMENT



Over the past few decades, researchers in the fields of education and child psychology have amassed significant evidence for the necessity of play in children's lives. There is no denying that play is fun, and certainly fun is its biggest draw for children. However, as children play, they also develop critical cognitive, emotional, social, and physical skills. Play even contributes to proper brain development (Shonkoff & Phillips, 2000). In this way, play is an important end in itself; it is also a means to other ends. The skills children learn through play in the early years set the stage for future learning and success from the kindergarten classroom to the workplace.

Play presents children with a particularly strong opportunity for growth because it meets the needs of the whole, individual child. All domains of children's development – cognitive, social, emotional, and physical – are intricately intertwined. Play benefits each of these skills in direct and indirect ways. Children learn and practice cognitive skills including language, problem solving, creativity, and self-regulation. Socio-emotional growth can be seen in children's ability to interact with others, negotiate, and compromise. They also practice strategies to cope with fear, anger, and frustration. Moreover, block building, drawing, running, and

jumping all contribute to the development of fine and gross motor skills. When children have the chance to direct their own learning through play, they are able to address their own immediate and developmental needs and find activities that are most conducive to their individual learning styles.

In play, children develop a lasting disposition to learn. Having control over the course of one's own learning, as in free play, promotes desire, motivation, and mastery (Erikson, 1985; Hurwitz, 2003). Children also learn how to seek out knowledge; play involves exploration, hypothesis testing, and discovery. What is more, all this is done in a safe, anxiety- and risk-free environment where children are free to test the limits of their knowledge and abilities with relatively few repercussions (Hirsch-Pasek & Golinkoff, 2003). They learn to have confidence in their ability to solve a problem, and they become resilient in the face of a challenge (Erikson, 1985; Hurwitz, 2003; Pepler & Ross, 1981). Play builds the foundation for a lifetime of learning.

In PLAY, children develop a lasting disposition to learn.

Many of these skills, first developed through play, are crucial for success in the 21st century. There is no doubt that amassing knowledge of the world around us continues to be important in our society – and playful learning can help children to learn content-based lessons, too (for a review, see Fisher et al., 2011). Increasingly, however, to achieve success in a global economy, the individuals that make up our workforce must also be socially adept and highly creative. The “6Cs” – Collaboration, strong Communication, knowledge of Content, Critical thinking, Creative innovation, and Confidence to fail and try again – will be essential to our children’s future success. Many of these skills are not easily taught in the classroom; however, they are readily learned through play (Hirsch-Pasek & Golinkoff, 2003; Hirsch-Pasek et al., 2009; Partnership for 21st Century Skills, 2008).

SOCIAL PLAY

Social play is defined as play that occurs in the interaction of children with adults or other children. Typically, social play is not classified as a unique category of play because any type of play – object play, pretend play, and physical play – has the potential to be enacted alone or with others. Interactions within play scenarios, however, provide great benefits to children whether their partners are adults or peers, and are therefore worthy of note.

PLAY with parents sets the stage for children’s ability to successfully play with peers.



The benefits of play begin to accrue early in infancy and though play gradually decreases over childhood, it never really ends. It changes forms according to the needs and skills of children (and adults) at a given age. Some benefits are fairly universal and cross play types; some are more specific to one type or simply stronger in certain types of play than others. Yet, the benefits of play nearly always overlap in some combination to serve the needs of the whole child. The following sections will describe some of the most relevant benefits of social, object, pretend, physical, and media play.

Social Play with Adults

Parents, especially mothers, are often children’s first play partners. Starting in infancy, parents initiate play with children through simple games like peek-a-boo. By the second year of life, parents and children regularly engage in more complex forms of play such as pretending to race cars or care for a baby doll. Early involvement from parents as initiators, directors, and partners in play serves to scaffold young children’s abilities so that play structured by an adult is more sustained and sophisticated than the child

would be able to achieve alone or with peers (Bornstein, Haynes, Legler, O’Reilly, & Painter, 1997; Escalona, 1968; Feise, 1990; Stevenson, Leavitt, Thompson, & Roach, 1988).

As children mature, they begin to take initiative in generating their own activities (e.g., Fein & Fryer, 1995), but parents remain involved on the sidelines through comments and prompting (Haight & Miller, 1993). Play with parents sets the stage for children’s ability to successfully play with peers (Haight & Miller, 1992).

Social Play With Peers

With age and increasingly mature social capacities, children's interactive play with peers becomes progressively more common and complex. Mildred Parten (1932) established four levels of social play that are still used today as a broad framework to describe increasing social maturity in play over the early years (typical age of appearance, according to Parten, in parentheses):

1. Solitary play (2 – 2½ years): The child plays alone.
2. Parallel play (2½ – 3½): Children may be engaged in similar activities but they play separately.
3. Associative play (3½ – 4½): Children are playing separately but may share, pay attention to others, and/or communicate with others about their play.
4. Cooperative play (4½): Children are engaged in play with a common goal and they work cooperatively to achieve the goal.

Although the frequency of social interaction does increase over time, children are quite capable of social interaction from a very early age.

Parten found that children followed a developmental progression through each of the four levels, exhibiting less solitary play from ages two to four in favor of more interactive forms of play. This description implied that solitary play at older ages is a sign of social immaturity. However, solitary play is, in fact, a common occurrence into the school years, and the quality of children's solitary play increases with age (for a review, see Johnson, Christie, & Wardle, 2005). Moreover, Parten's research has also been criticized for underestimating children's ability to engage in social play at younger ages.

More recent research provides a revised account of the development of social interaction in play settings. Although the frequency of social interaction does increase over time, children are quite capable of social interaction from a very early age. Parten described the onset of cooperative play around 4½

years of age, but when children are in the company of a familiar peer, they can cooperate in play through games like peek-a-boo or running and chasing after one another as early as 18 months (Brenner & Mueller, 1982). Around this same time, children reliably interact during play by showing each other their toys, occasionally offering to share, inviting peers to play, expressing disapproval of their playmate's behavior, and communicating their feelings (Hughes, 1999). At two years of age, children can engage in joint activities with shared goals, such as making a bridge out of blocks or having a tea party. By around three years, they can engage in cooperative play with a shared purpose between players and clearly differentiated, complementary roles (e.g., leader-follower, or mother-baby; Howes, Unger, & Seidner, 1989).

By providing children with the opportunity to exert greater control over their situation, play with peers sets up a robust context for the development of the whole child, including benefits to cognitive, social, and emotional development. In contrast to parent-child relationships in which parents are typically in charge, peer interactions have a relatively even distribution of power. Thus, in play among peers, children must jointly establish the rules of the game (e.g., "We're building a bridge," "I'll be the princess, you can be the dragon," "This towel is the moat"), and in doing so they practice the skills of



planning, negotiation, and cooperation (Hughes, 1999). Importantly, play with peers is rife with conflict, as when both partners want to be the mommy or one child takes a block the other wanted. As they navigate their way

through such situations, children learn how their own desires may differ from those of another child, how to advocate for their own ideas, how to deal with frustration, how work in a group, and how to respond in socially appropriate ways (Berk, Mann, & Ogan, 2006; Hirsch-Pasek et al. 2009; Pellis & Pellis, 2009; Tepperman, 2007; Vygotsky, 1978). The diverse skills that children gain through social play with peers help them feel competent in social situations (e.g., Connolly & Doyle, 1984; Hirsch-Pasek et al. 2009; Singer & Singer, 2005), while also contributing to cognitive and emotional growth.

OBJECT PLAY

As soon as children acquire the physical capacity to pick up and manipulate objects, they begin to play with those objects (Hughes, 1999). Throughout childhood, object play remains a large part of the daily routine, occupying approximately 10-15% of children's waking hours by conservative estimation (Smith & Connolly, 1980).

Children can use **PLAY** to scientifically reason about novel objects and test hypotheses about how those objects operate.

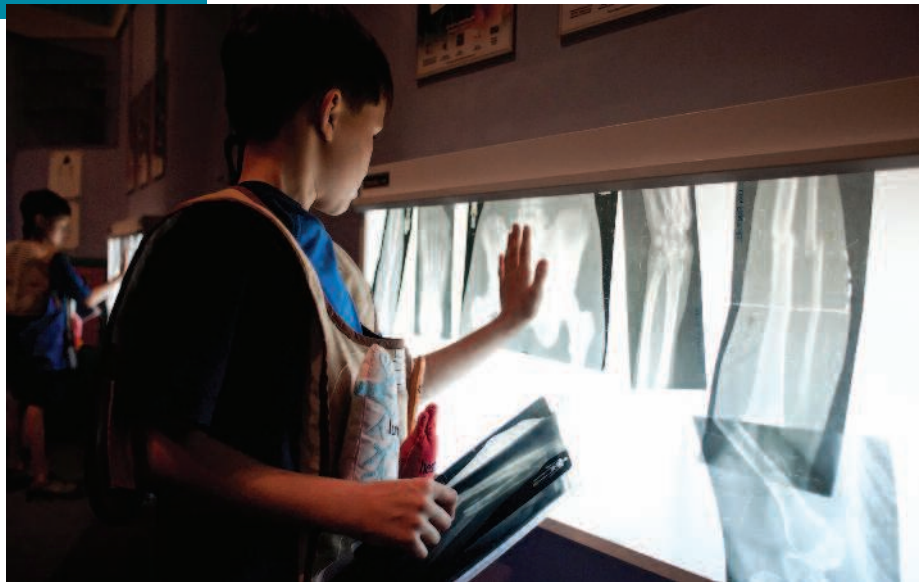
Object play can be formally defined as the active, playful manipulation of objects (Bjorklund & Gardiner, 2009). Examples of object play include throwing a ball around or building a racetrack out of blocks. Although debates exist as to whether children's exploration of objects or construction play (i.e., organized, goal-oriented play, in which children use various materials to build symbolic structures) can rightly be considered play (see Pellegrini, 2009; Hughes, 1999), several notable researchers have recently included these interactions with objects as examples of playful learning (e.g., Fisher et al., 2011; Hirsch-Pasek & Golinkoff, 2003). Thus, this paper will also take a liberal view on the inclusion of exploratory and construction play within the overarching category of play with objects.

Exploratory Play

Exploratory play is the first form of object play and typically begins around five months of age. By the second year, children begin to combine objects in play (e.g., put play food on a plate or build a tower of a couple of blocks). Around this time children also start to treat objects according to their intended function (e.g., blocks are for stacking). Then later within the second year, children begin to treat objects symbolically; for example, a block may represent a piece of cake (Hughes, 1999). Over the following few years, children's use of objects in play continues in large part through the use of objects in pretend play and the creation of increasingly complex and representationally realistic structures in construction play (Reifel, 1984). They also use art materials to create symbolic representations of their thoughts and the world around them (DeLoache, 2004). By age four, construction play may account for as much as half of children's free-play time in preschool classrooms (Pellegrini & Bjorklund, 2004; Rubin et al., 1983), and children's interest in building extends well into the elementary school years (Christie & Johnsen, 1987).

Object Play

Play with objects is believed to make significant contributions to children's physical, social, and cognitive development. Manipulation of small objects gives children the chance to practice fine motor skills, and play with larger loose parts



involves gross motor skills. As discussed earlier, interactive object play with adults and peers benefits children's social development. Object play also contributes to cognitive development, including learning about the nature of objects, problem-solving, creativity, and foundational skills for science, technology, engineering, and mathematics.

Cognitive Benefits

Conceptual Knowledge through Exploration

Piaget believed children to be little scientists, who were driven to perform everyday “experiments” that would reveal the nature of their world. Through solitary object play and exploratory play, children are introduced to the ways objects work (“What does it do?”) and how they can exert control over those objects (“What can I do with it?”; Bjorklund & Gardiner, 2011, p. 154). Research has shown that children can indeed use play to scientifically reason about novel objects in their environment and to test hypotheses about how those objects operate. Studies have demonstrated that when young children are presented with a puzzling new toy, their first instinct is to engage in exploratory play, touching and manipulating parts of the toy to figure out how it works (Schulz & Bonawitz, 2007).

PLAY has been described as practice in divergent thinking, because in play, children are constantly coming up with new ideas and recombining them to create novel scenarios.

Amazingly, children’s play with objects not only teaches them about the particular objects with which they personally interact, but the knowledge gained through exploratory play can help children generalize about broad categories of similar objects. In a study conducted by Baldwin, Markman, and Melartin (1994), 9-16 month-old babies were presented with novel toys such as horns or castanets that had non-obvious properties (i.e., honking, clacking). After only a brief exposure to the toy, the researchers showed children a similar toy. Upon receiving the new object, children immediately tried to produce the non-obvious property; they had learned not only about the toys they

played with, but also about a category of objects. Through exploratory play, children are able to learn about the properties of and uses for objects that they can touch, hear, and see, but they can also make inferences to learn about properties that are not so easy to ascertain.

Problem-solving and Creativity

Given the imaginative and flexible nature of play, special attention has been given in child development research to its contributions to creative problem-solving. When children play, they experiment with different behaviors – build new block towers, create new shapes in sculpting clay – which help them develop the creativity and strategies necessary to successfully tackle novel problems (Johnson et al., 2005).

Convergent and Divergent Problem Solving

Convergent problems require children to organize pieces of disparate information to arrive at one correct answer. The ability to solve convergent problems has been linked to children’s performance on standardized intelligence and classroom tests where there is a single solution to each question (Guilford, 1967). A classic study illustrates the impact of play on children’s ability to generate solutions to convergent problems. Sylva (1977) directed



children to retrieve an object that was placed out of their reach, without moving from their seat. The experimenter provided each child with two short sticks that could reach the faraway object only if they were connected to one another to form a longer stick. Children who had an



opportunity to play with the sticks before this task were better at finding the correct solution to this convergent problem (i.e., connecting the two sticks) than children in a control group who previously had not seen the sticks. Although children in a third group who observed an adult model the solution also correctly solved the problem more often than the control group, they were not as motivated or persistent in their problem solving as children in the play group. They often gave up if they failed to immediately solve the problem, whereas children in the play group were more likely to keep trying new strategies until they solved the problem.

Divergent problems seem to call upon creativity to a greater extent (Hirsch-Pasek & Golinkoff, 2003), since they require problem solvers to consider a range of possible solutions; there is no single right answer to a divergent problem. Play has been described as practice in divergent thinking, because in play, children are constantly coming up with new ideas and recombining them to create novel scenarios (Pearson, Russ, & Spangel, 2008; Singer & Singer, 1990). Experimental evidence supports this claim. For example, children who were given 10 minutes to freely play with paperclips, matchboxes, or other small everyday objects were subsequently able to produce more creative uses for those objects than children who imitated the play

of an adult or had no prior exposure to the objects (Dansky & Silverman, 1973¹).

Research also indicates that the characteristics of children's play materials impacts divergent problem-solving ability. Pepler & Ross (1981) assigned preschoolers to play with a single-solution puzzle (i.e., a convergent toy) or a multiple-option block set (i.e., a divergent toy). On later tasks, children who played with the divergent toy were more innovative and flexible in their approaches to solving problems than their peers who played with convergent toys. While the benefits of experience with convergent toys were limited to problem solving in similar convergent tasks, the benefits of divergent experiences transferred more broadly. Children who played with the divergent toys were generally successful on a range of both divergent and convergent problem solving tasks, suggesting that engaging in divergent playful activities might instill the idea that there can be numerous creative solutions to a problem.

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¹While this study remains one of the most commonly cited pieces of experimental evidence for the effect of play on divergent problem solving in recent years, it is important to note that the results are controversial. When Smith & Whitney (1987) tried to control for possible experimenter bias through a double-blind experimental paradigm, these effects of play on divergent thinking did not replicate.

PLAY lays the foundation for higher-order thinking and later learning of formal STEM concepts.



Science, Technology, Engineering, and Math

Recently, the field of education has experienced a push to develop the STEM (Science, Technology, Engineering, and Math) skills that are important to success in the 21st century. Through play with objects – blocks, sand, balls, crayons, and paper – children begin to understand logical scientific thinking, such as the concept of cause and effect. They also practice mathematical skills such as measurement, quantification, classification, counting, ordering, and part-whole relations (Gelfer & Perkins, 1988; Ginsberg, Inoue & Seo, 1999; Piaget, 1962; Ness & Farenga, 2007). The informal understanding children gain through experimentation, observation, and comparison in play lays the foundation for higher-order thinking and later learning of formal STEM concepts (Bergen, 2009; Ginsberg, 2006; Shaklee et al., 2008 as cited in Fisher et al., 2011; Tepperman, 2007).

Free play provides rich opportunities for children to experiment with mathematical concepts. Ginsburg, Pappas and Seo (2001; see also Sarama & Clements, 2009) found evidence of mathematical activity during almost half of their observations of preschoolers' play. Specifically, they noted that children spent 25% of their time exploring patterns and shapes, 13% comparing the magnitude of objects, 12% on enumeration, 6% exploring transformation, 5% on spatial relations such as direction and distance, and finally 2% on the classification of objects into groups. Even without specific adult guidance in the moment, children's free play is rich with STEM lessons.

Moreover, research has linked early object play with positive math and science outcomes. Object play, including play with art materials, has been shown to be related to better visuo-spatial skills (Caldera et al., 1999; Hirsch, 1996). Wolfgang, Stannard, & Jones (1996) followed a group of 37 children over 16 years and found that the complexity of their play with blocks as 4-year-olds was significantly and positively related to their level of achievement in mathematics during middle and high school, even controlling for IQ and gender. This research suggests that complex object play could provide children with the early mathematical understanding that supports later learning in formal contexts.

In summary, research on object play suggests it can benefit children's cognitive development in the short- and long-term. Giving children the chance to freely experiment with diverse objects provides information about the world and the child's place in it, allows them to create and express themselves by making new objects or art, encourages creative problem solving, and builds the foundation upon which formal math and science training can be built. As discussed in the section on social play, interactive object play also builds children's social, emotional, and regulatory skills as they learn to cooperate with one another and regulate their own behaviors in order to jointly plan play activities.

PRETEND PLAY

Pretend play is a hallmark activity of early childhood. Pretending involves creating alternate realities to the real world. Children can enact different people, places or times, and objects become symbols for what is imagined (Fein, 1981; Lillard, 2011). Here, pretend play refers to a range of behaviors including symbolic play (i.e., mentally transforming objects to represent pretend entities, as when a child pretends a banana is a telephone) as well as socio-dramatic play (i.e., pretend play with a group in which children cooperate and take on complementary characters).

The Timeline for Pretense

The developmental timeline for pretense is well established (Carlson & Zelazo, 2008; Fein, 1981; Garvey, 1991). Pretend play first appears around 12 months of age. At this point, it is typically directed toward the self, as when children pretend to sleep or eat (Piaget, 1962). Later, children begin to direct their play toward other people and objects. By the middle of the second year, children transform objects in their environment by giving animate characteristics to inanimate objects like dolls or stuffed animals. Shortly thereafter, they also assign new, pretend identities for objects (e.g., a banana becomes a telephone). Two-year-olds can understand pretend actions by adult play partners and respond appropriately within the pretend context. For example, if an adult pretends that a cardboard box is a bathtub, the child can then fill the bathtub with “water” (Harris & Kavanaugh, 1993; Lillard & Witherington, 2004).

Gradually from toddlerhood to preschool age, pretending becomes increasingly decontextualized so that play can occur independent of tangible objects, and children can create imaginary characters and situations. By preschool, children have reached the “high season” of pretend play (Singer & Singer, 1990), and up to two-thirds of the time they spend in make-believe play is interactive (i.e., socio-dramatic play; Rubin, 1982, 1986). Overt pretending is thought to wane in middle childhood as children become more interested in organized games, but reports indicate that older children are most likely to engage in fantasy privately or in the context of technological media (Bergen & Williams, 2008, as cited in Bergen, 2009; Singer & Singer, 1990).

The Benefits of Pretend Play

The benefits of play are perhaps best addressed in the area of pretend play, both theoretically and empirically. Several eminent scholars (e.g., Erikson, 1950; Freud, 1958; Piaget, 1962) of the last century spoke of the significance of this type of play in cognitive, social and emotional development. Vygotsky was perhaps most resolute in his belief that pretend play is a “leading factor in development,” noting that in play children develop a range of skills and learn culturally valued competencies (Berk, Mann, & Ogan, 2006).

Research over the past few decades has supported Vygotsky’s bold claim, underscoring the ability of pretend play to serve the development of the whole child. The following sections will review several ways in which pretend play impacts children’s growing abilities in the social, cognitive, and emotional realms.

The benefits of play are perhaps best addressed in the area of pretend **PLAY**.



Cognitive Benefits

Creativity

As in play with objects, pretend play has been linked to creativity, and creative problem solving in particular (e.g., Dansky, 1980; Russ, 1993, 2004; Saracho, 2002). A meta-analysis of play studies found that one of the strongest links among a long list of correlates of pretend play was to divergent thinking, a key component of creativity (Fischer, 1992). In one study, Dansky (1980) assigned children to one of three conditions (1) free play, (2) imitation of an adult's actions, or (3) problem-solving experience, and found engaging in free play increased performance on a later divergent problem-solving task. However, this relation held only for children who were observed to display high levels of pretense in their play, suggesting that there might be something special about the nature of pretend play, over and above other forms of play, for promoting flexible and creative problem solving.

Language and Literacy

Pretending and language are each, at their core, modes of symbolic thought. Just as a block can stand in for a car in pretense, in language, letters and words represent concepts, objects, or events in our world. Pretend play allows children to practice creating symbols as they mentally transform objects within a play scenario. As such, pretending contributes to children's understanding of symbols and their meaning, which is essential for counterfactual thinking, empathy, and formal learning (consider using numerals in math or diagrams to represent atomic structures in chemistry). It is also particularly relevant to literacy-related learning. Hanline, Milton and Phelps (2010) found that preschoolers who had high levels of representation in their block constructions had higher reading abilities and a faster rate of growth in reading in early elementary school.



Pretend PLAY has been linked to creativity, and creative problem solving in particular.

Although these and similar studies related to object play together are suggestive of positive effects of play on divergent thinking, the research on pretend play and divergent problem solving is correlational. Without further experimental study it is premature to assume that pretending causes increased divergent thinking; the relation could also be due to a third factor such as intellectual flexibility, which is believed to be a prerequisite for both constructs (Carlson & White, 2012).

The large amount of time children spend pretending also provides opportunities to practice language use. During pretend play, children talk more, speak in lengthier utterances, and use more complex language (e.g., future tense, interrogative clauses, conditional verbs, descriptive adjectives, mental state verbs) than when they are engaged in other activities (Fekonja, Umek, & Kranjc, 2005 as cited in Fisher et al., 2011; Singer & Singer, 1981). Moreover, in their research, Dickinson and

Early pretense is related to later literacy outcomes including reading comprehension and the ability to communicate clearly through speech and writing.

Moreton (1991, as cited in Fisher et al., 2011) found that kindergarteners' vocabulary was positively related to the amount of time they spent talking with other children during pretend play sessions at three years of age.

In addition to oral language proficiency, dramatic play contributes to children's developing narrative abilities (i.e., thinking in stories). In jointly creating a story with a partner or group, children must communicate their own ideas in ways that others can understand and integrate each partner's ideas into a single coherent narrative (for a review, see Fisher et al., 2011). Fisher and colleagues (2011) suggest that children may be better prepared to understand narratives when they have experienced similar concepts through play, such as identifying and acting out characters or creating contextual descriptions to support a fantasy scenario. Pretense and narrative ability do appear to be related in the preschool years: Trionfi and Reese (2009) reported that children with imaginary companions tended to produce richer narratives than their peers who were not so fantasy prone.

Moreover, pretense in the early years is related to later literacy outcomes including reading comprehension and the ability to communicate clearly through speech and writing (for a review, see Nicolopoulou, 2006 and Tepperman, 2007). Bergen and Mauer (2000) found that children who engaged in more play with literacy materials (e.g., pretend reading to stuffed animals, making shopping lists) at age four had more advanced language abilities and reading readiness in kindergarten. Finally, experimental research has repeatedly shown that when children listen to and reenact a story, they comprehend and remember more about the story than children who did not play out the scenes (Pellegrini & Galda, 1982; Saltz, Dixon, & Johnson, 1977; Williamson & Silvern, 1984).



Executive Function

In psychological terminology, the cognitive abilities behind conscious self-control of thought, action, and emotion are known as executive function. They involve a group of related processes including inhibition of impulses, working memory, planning, and cognitive flexibility. Executive function develops rapidly in childhood, concurrent with maturation of prefrontal brain regions (for a review, see Carlson, Zelazo, & Faja, 2012), and continues to strengthen into the mid-20s (Zelazo, 2012). Early executive function abilities have been implicated in school readiness, (Blair & Razza, 2007) as well as the development of memory, attention, intelligence, morality, and emotion regulation (for a review, see Zelazo, Carlson, & Kesek, 2008). Moreover, measures of executive function at age four have been shown to predict a host of long-term outcomes including physical health, substance dependence, personal finances, and criminality (Shoda, Mischel, & Peake, 1990; Moffitt et al., 2011). Such research is contributing to a strong case that building a child's executive function skills should be a priority in early education.

Noted Russian psychologist, Lev Vygotsky, believed that “a child's greatest self-control occurs in play (1978, p. 99).” He proposed that pretend play, in particular, could be a leading factor in the development of the child's ability to self-regulate. Indeed, pretending provides practice in many aspects of executive function: for example, children must be able to flexibly view an object both as what it truly is and as its pretend identity, inhibit their own desires in order to follow the rules of the group, and plan elaborate story scenarios.

Playful preschool curricula can improve children's executive function skills. Following Vygotsky's theory, the Tools of the Mind preschool program (Bodrova & Leong, 2006) was developed with the goal of improving

Early executive function abilities have been implicated in school readiness, the development of memory, attention, intelligence, morality and emotion regulation.





Stepping into the shoes of a character and imagining what he would say, do or feel might help children to develop an understanding of other people.

young children's self-regulatory abilities. Through the training of mature pretend play, children learn to use toys and props symbolically, develop consistent and extensive narratives, maintain rules and roles, and plan play scenarios from beginning to end (Bodrova, Leong, Atwill, Ko, & Saifer, 2009). Several evaluation studies have found the Tools of the Mind program to be effective in improving participants' executive function relative to control groups (Barnett, Jung, Yarosz, Thomas, Hornbeck, et al., 2008; Bodrova & Leong, 2006; Diamond, Barnett, Thomas, & Munro, 2007).

Within the field of child psychology, studies have established consistent links between executive function and pretense abilities (Albertson & Shore, 2009; Carlson, White, & Davis-Unger, 2012; Elias & Berk, 2002; Kelly & Hammond, 2011; Taylor, Carlson, & Shawber, 2007). Experimental studies have further shown direct effects of

pretend play on children's self-regulatory abilities. Saltz, Dixon, and Johnson (1977) developed a pre-tense training program for low-income preschoolers. After a full year of participation in the program, children who were trained in thematic pretense (i.e., fairy tales) tested higher on executive function than children who received socio-dramatic training in realistic roles, those who heard fantasy stories without enactment, and the regular curriculum control group. Researchers concluded from these findings that the abstract or symbolic nature of imaginative activities could be responsible for the improvements seen in executive function.

Recent research shows that even a small dose of pretend play – less than 10 minutes – improves children's performance on a subsequent executive function task, further suggesting that pretending may encourage the flexible thinking required for children to overcome impulses and successfully control behavior (White & Carlson, 2011). Taken as a whole, this line of research indicates that encouraging children to engage in pretend play, and furthermore cultivating more mature forms of pretend play, could be a natural vehicle by which we can promote executive function within and outside of formal educational environments.



Through conflicts and negotiations with other children or the creation of characters, children become aware that other people have intentions and desires that may not match their own.

Social and Emotional Benefits

Navigating Interpersonal Interactions

Social pretense has been discussed at length above, but still, it bears repeating here that socio-dramatic play is particularly well-suited to teaching children to navigate complex social interactions with peers and adults because it is, by definition, so intensely interactive in nature. In addition to the negotiation and cooperation that takes place in planning a pretense narrative in collaboration with another and jointly determining the rules of engagement, children frequently engage in problem-solving and conflict resolution during socio-dramatic play (Russ, 2004). Within the intricate negotiation process that takes place during and before complex socio-dramatic play, children can learn to persuade one another and resolve disagreements in socially appropriate ways (e.g., de Lorimier et al., 1995; Doyle & Connolly, 1989; Doyle et al., 1992). That play can foster the development of early friendships (Singer & Singer, 1990), may be related to the fact that children's ability to successfully negotiate with their peers during play is related to peer social acceptance (Doyle & Connolly, 1989). In fact, training children on socio-dramatic play has been shown to increase perspective taking abilities, positive peer interaction and cooperation (e.g., Rosen, 1974).

Socialization

Play is a way for children to learn about the realities and expectations of their culture. During play, children internalize scripts for how to act in society and how things are done (Carlson, Taylor, & Levin, 1998; Farver & Howes, 1993; Vygotsky, 1967). In dramatic play, a child can experiment with a variety of different roles; one day he is a fireman, and the next day a baby. Stepping into the shoes of a character and imagining what he would say, do or feel might help children to develop an understanding of other people (Hughes, 1999). Another socialization benefit of dramatic play is that it allows children to master scripts for events in their lives. Hirsch-Pasek and Golinkoff (2003) use the example of the supermarket at the Please

Touch Museum of Philadelphia to illustrate this concept. As children play in the market, they shop for canned goods and produce, place their goods in miniature carts and wheel them up to a register where they check out. Similarly, children

could rehearse the events of going to the doctor's office or being a teacher. They are pretending to adhere to the rules of the society they live in (albeit, often with creative modifications or misunderstandings).

PLAY can help children to regulate their emotions by providing an outlet to deal with stress in the moment.



Social Understanding

Play could be a major factor in developing an understanding of one's self and others (e.g., Taylor & Carlson, 1997; Lillard, 1993). Through conflicts and negotiations with other children or the creation of characters, children become aware that other people have intentions and desires that may not match their own (de Lorimier, Doyle, & Tessier, 1995; Kavanaugh & Engel, 1998).

The ability to attribute mental states – beliefs, intent, desire – to oneself and others and to understand that others' mental states could be different from one's own is an ability known as theory of mind. Research into the link between play and theory of mind has revealed a robust relation between pretending and the frequency and nature of children's talk about mental states (e.g., thoughts, beliefs, memories; Hughes & Dunn, 1997).

Furthermore, Cassidy's (1998) research suggests that the make-believe context may give children a boost in theory

of mind ability. She showed that children were able to understand that a character could hold a belief that the child knew to be false (a common test of theory of mind) when the scenario was situated in the context of pretend play, but not in a "real" context. As Vygotsky (1978) noted, a child often shows her highest level of functioning in pretend play, and skills applied in pretense may gradually transfer to other contexts.

Within the realm of pretend play, role play may be particularly well-suited to help children appreciate mental states (Harris, 2000) as it may promote perspective-taking and help children to understand how others think and feel (de Lorimier, Doyle, Tessier 1995; Kavanaugh & Engel, 1998). Numerous studies have revealed that the amount and quality of a child's role play is related to their theory of mind abilities (Carlson & Taylor, 1997; Hughes & Dunn, 1997; Jenkins & Astington, 1996; Youngblade & Dunn, 1995), but arguably the best evidence for role play's impact on mental state reasoning comes from a study by Dockett (1998, as cited in Kavanaugh, 2011 and Pellegrini, 2009).

Four-year-old children were trained in role playing over three weeks. Compared to children who did not receive this training, the role-play group performed better on theory of mind tasks both immediately after the program and again after three weeks. Similarly, after a year of acting classes, children and adolescents showed increased empathy, and adolescents showed increased theory of mind (Goldstein & Bloom, 2007).

they will go. Moreover, young children may lack the cognitive and linguistic abilities to verbally work through problems or difficult emotions. Play can help children to regulate their emotions by providing an outlet to deal with stress in the moment, allowing children to revisit and understand disturbing experiences after the fact, and giving them the tools to cope with distress in the future (Johnson et al., 2005).



PLAY and fantasy give children means to exert control over their environment and to regulate their thoughts and feelings.

Notably, this ability to successfully take the perspective of another person – to understand what they are thinking and feeling – is necessary to establish close interpersonal communication (Harter, 1983), and is related to altruism (Froming, Allen, & Jensen, 1985), empathy (Bengtsson & Johnson, 1992), and social popularity (Kurdek & Krile, 1982).

Coping and Emotion Regulation

Play and fantasy give children means to exert control over their environment and to regulate their thoughts and feelings. Play is an especially important outlet in this sense because young children are often at the mercy of others to determine rules of behavior, what they will eat, or where

Several studies have found pretend play to be positively related to coping (e.g., Cristiano & Russ, 1996) and emotion regulation (Gayler & Evans, 2001; Russ, 2004). Theorists have suggested that play offers children the opportunity to master negative feelings in a risk-free context by exploring and modifying their emotional experiences (Bretherton, 1989; Fein, 1989). A study by Barnett and Storm (1981) supports this idea. The researchers randomly assigned preschoolers to watch a movie clip with a stressful ending or one with a positive ending. As one might expect, the children who watched the stressful clip

were more anxious and unhappy following the movie than their peers who watched the positive clip. When given the opportunity to play following the movie, children in the negative group spent more time enacting events related to the movie clip than children in the positive group, and they were able to attenuate their anxiety and negative emotions. Another study shows that play is related to children's repertoire of emotion regulation and coping skills during a distressing situation: of a group of seven to nine year-old children undergoing an invasive dental procedure, those who expressed more affect and fantasy in their play reported implementing a greater number and variety of coping strategies and felt less distress during the

Pretend PLAY is a powerful tool for learning in childhood.

procedure than children who were not as advanced in their play. Some have suggested that the symbolic nature of art may have similar effects on coping, as children can represent and deal with thoughts and feelings via artistic media in a similar fashion to what they do in dramatic play (Russ, 2004). Russ (1988) has proposed that divergent thinking skills may play a role in helping children to come up with various ideas on how to regulate their emotions.

Benefits to the Whole Child

Although, the lists of benefits to specific areas of play are long, the most impressive evidence for the impact of pretend play comes from those studies that consider influences in multiple domains of development. Studies in which researchers have trained children to engage higher quality pretend play have shown improvements in verbal fluency, vocabulary, language comprehension (Smilansky, 1968), IQ, ability to distinguish fantasy from reality, controlling impulsive behavior (Saltz, Dixon, & Johnson, 1977), story interpretation, memory (Saltz & Johnson, 1974), verbal comprehension, story sequencing, creativity, causal reasoning (Dansky, 1980), and empathy (Saltz, Dixon & Johnson, 1977; Saltz & Dixon, 1974). Of course, the benefits revealed by these studies likely underestimate the reach of play in development because of a lack of resources to measure all possibilities. Still, together with the benefits described above in the areas of creativity, language, social skills, socialization, social understanding, coping and emotion regulation, this research makes a clear statement: Pretend play is a powerful tool for learning in childhood (cf., Lillard et al., 2012).





Active **PLAY** among youngsters has plummeted by 50% over the last forty years.

PHYSICAL PLAY

Physical play, also known as locomotor play or exercise play, involves physical activity in a playful context such as kicking, running, jumping, chasing, and climbing (Pellegrini, 2009). Generally, scholars believe that physical play follows an inverted-U shaped trajectory, gradually increasing from infancy through the school years and then declining during adolescence (Power, 2000). Unfortunately, despite the potential physical and cognitive benefits bestowed by physical activity, physical play is one of the least researched forms of play (Pellegrini, 2009). It is also one of the most endangered forms of play in our schools and society: recess in schools is disappearing at an alarming rate (Pellegrini, 2005) and active play among youngsters has plummeted by 50% over the last forty years (Juster, Ono, & Stafford, 2004).

Benefits of Physical Play

Physical Benefits

Promoting the physical benefits of locomotor play is perhaps more relevant today than at any other time in recent history. Obesity among children is at an all-time high;

approximately one-third of American children between the ages of 2-19 are overweight or obese (American Heart Association, 2011). The American Academy of Pediatrics (2006) considers physical activity to be an important strategy in promoting healthy lifestyles, and some in the medical community have suggested that encouraging children to play is key to boosting levels of physical activity (Budette & Whitaker, 2005). In addition to practicing gross motor skills, children receive vast health benefits from physical activity including aerobic endurance, muscle growth, strength, coordination, growth stimulation of major organs (Pica, 2008), and increased bone mineral content (Gunter et al., 2008). Extended periods of activity may be required in order to accrue such benefits (Byers & Walker, 1995); the Centers for Disease Control and Prevention (2011) suggest that children aged 6-17 should play for 60 minutes per day. Studies show that children naturally gravitate to physical play given the chance. Approximately 20% of children's free play behaviors can be classified as vigorous physical activity (McGrew, 1982, Smith & Connolly, 1980 as cited in Pellegrini, 2009). Giving children the time to play could contribute to immediate and deferred physical health benefits.

Cognitive/Academic Benefits

Physical play can also provide benefits in the cognitive and academic domains. First, physical activity could contribute to the development and expression of self-regulation. When running around in a game of chase for example, children are at a high level of arousal, but when the game is over they must control their behavior in order to disengage and settle down (Hughes, 1999). Several intervention studies have shown that moderate to vigorous levels of physical activity can improve executive function in school age children (for a review, see Diamond & Lee, 2011). Organized activities like sports may be even more effective, because they require sustained attention and disciplined action.

If physical play can impact executive function in young children, it may in turn affect academic outcomes (Blair & Razza, 2007). Taking breaks for physical play also has immediate impacts on learning, which may be due to children's increased attention to academic tasks (Pellegrini, 2009). School-aged children who were assigned to five additional hours per week of physical activity performed better on standardized academic assessments than their peers who did not take part in physical activities (Shephard, 1983).

In another study, third graders were found to be more attentive to in-class activities after recess than they were before it (Pellegrini & Davis, 1993). While the connection may not be immediately obvious, recess and other forms of physical play may be crucial to children's ability to learn cognitive and academic lessons.

Further research is needed to understand the full range of benefits physical play has to offer. In the meantime, we know that this type of play can boost physical development, promote healthy lifestyles, and even help children perform better in school. As our society continues to face the obesity epidemic and strives for higher academic standards, the need for physical play in childhood should become ever more apparent.

MEDIA PLAY

Technology is more prevalent in children's lives today than ever before. On average, children under three spend

PLAY can boost physical development, promote healthy lifestyles, and even help children perform better in school.





Technology-based games can be a powerful tool to promote playful learning beyond the point in early childhood when interest in traditional forms of **PLAY** begins to wane.



3-4 hours per day engaged with screen media (Christakis, 2009), and by eight years of age, that number increases to 7.5 hours per day (Rideout, Foehr, & Roberts, 2010). Research on children's use of technology and its effect on learning and development is currently in an early stage, but thus far it suggests that interactive technology, including video and computer games, can be a valuable tool in promoting playful learning.

Popular opinion is not always in favor of the rise of media use; gaming has been accused of inhibiting the development of social skills, increasing rates of obesity, and promoting violent behavior (Gray, 2012). For the most part, however, research does not support such claims. In reality, video game players are reported to be more likely to participate in sports, less likely to be obese, more interested in civic involvement, more obedient of parents, more likely to have academically-minded friends, less likely to have risk-seeking friends, and no more violent than non-video game players (Durkin & Barber, 2002; Ferguson, 2010; Williams, Yee, & Caplan, 2008).

Cognitive/Academic Benefits

Technology-based games can be a powerful tool to promote playful learning beyond the point in early childhood when interest in traditional forms of play begins to wane. Like other forms of play, games are fun and they provide children with the opportunity to exert relatively high levels of control and self-direction in their learning. Games also guide children toward advanced knowledge and skills through the graduated levels of complexity built into their programs. Moreover, the presentation of materials in multiple modalities (i.e., visual, tactile, auditory) can serve the needs of children with a wide range of learning styles (Mayo, 2009). Together, these properties of games motivate children to play; they stay on task longer, and that gives the benefits of this type of play more time to take hold (Owston, Wideman, Sinitskaya, & Brown, 2009).

Video and computer games can promote learning even when they have not been designed with specific educational goals in mind (Gee, 2003; Shaffer, 2008). Games require children to make decisions, present increasingly difficult challenges, and encourage exploration, experimentation, and creativity in problem solving (Goldstein, 2011; Fischer & Gillespie, 2003). Such behaviors feed into the foundational skills of science and mathematics: hypothesis testing, experimentation, and discovery (Goldstein, 2011). Among the many additional cognitive benefits of video game experience are increased visuo-spatial abilities (including tests used as components of IQ assessments; e.g., Green & Bavelier, 2003), memory, critical thinking, problem solving,

Like other forms of **PLAY**, games are fun and they provide children with the opportunity to exert relatively high levels of control and self-direction in their learning.



executive function, and qualitative thinking (Goldstein, 2011). Technology can even promote social learning when children must cooperate with one another to achieve goals in multi-player games (Prensky, 2004).

Games are also a valuable resource in imparting specific content-based lessons. For example, a recent study found that young children's (3-7 years) self-initiated play with the educational iPhone application "Martha Speaks" increased vocabulary scores as much as 31% over two weeks (Chiong & Shuler, 2010). In contrast to this finding, a recent study found that preschool-aged children correctly responded to more content and chronology questions after reading traditional books with a parent than when they read electronically enhanced books, a finding which could be due to decreased levels of dialogic reading tactics employed by parents reading electronic books. (Hirsch-Pasek, personal communication).

More positive results for media play can be found in research with older children. A review of educational video games for middle-school to college students also found 7-40% increases in learning over lecture-based programs

(Mayo, 2009). Games can and have been applied to a range of content areas including language, civics, and STEM (Goldstein, 2011; Mayo, 2009). Video games, computer simulations, and virtual reality allow users to experience and manipulate infinite environments, objects, or situations – the Oregon Trail, outer space, atoms, coral reefs, ancient Greek Parliament – that are outside of their reach (Strangman, Hall, & Meyer, 2003). The largest gains in learning seem to occur in the areas of science and mathematics. (Roschelle, Pea, Hoadley, Gordon, & Means, 2000). Overall across content areas, technology-based learning has largely contributed to positive outcomes and has a distinct advantage in that children find it to be a fun way to learn (Ainge, 1996).

Technology should never replace traditional forms of play. Children still need to play with blocks, pretend, and run around outside. It may, however, be time to eschew the automatic stigma attached to video games and similar media. They can introduce rich content and provide the opportunity for children to practice a wide range of skills. Used appropriately, games are a valuable tool for playful learning.



FACILITATING PLAY

The preceding sections have demonstrated the profound importance of play for learning and development in childhood. An abundance of research and theory suggests that children may accrue maximum benefits of playful experiences when activities are scaffolded by adult play partners. As noted above, adults can guide children's play by setting up the play environment or through direct involvement in play activities (e.g., Fisher et al., 2011). Importantly, adults can further scaffold children's behaviors during play to achieve higher levels of play and learning (e.g., Fisher et al., 2011; Vygotsky, 1978). This section will explore research on the role of the adult in guiding and facilitating children's playful learning experiences.

The idea that children can benefit from sensitive, child-directed adult guidance and participation in play is empirically supported. In addition to the benefits mentioned above for social play with adult partners, evidence to support the power of scaffolding children to higher levels of play and learning can be seen in the Tools of the Mind preschool program. Based on the works of Vygotsky, teachers in this program provide individually-tailored guidance based on children's developmental level, including hints, props, and modeling behaviors. This guidance

includes support for mature intentional play in which children carefully plan and enact specific roles in pretense.

Research has revealed significant gains in executive function and literacy for children in this learning environment. Although, one cannot be certain that adult guidance in play was responsible for the benefits seen in Tools of the Mind students, the results are suggestive that proper scaffolding helps to raise children's level of learning and subsequent performance on a variety of tasks (Tools of the Mind, 2012). More direct evidence comes from experimental manipulations of adult intervention in play. Fisher and colleagues (2009, 2010 cited in Fisher et al., 2011) found that guided play is more beneficial to children's learning than even direct instruction. When the experimenter guided children through play with shapes by encouraging them to explore and prompting explanations about the number of sides or other properties, children gained a better understanding for new, complex shapes than when the experimenter simply showed children relevant properties of the shapes. Together, these studies speak to the potential for adults to positively impact learning outcomes through play.

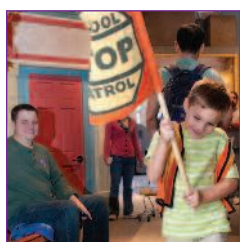
Overall, research on adults' various roles in **PLAY** suggests that they need to be sensitive to the child's needs in the moment, flexible in choosing the way they intervene, and willing to follow the child's lead.

ROLES

Research shows that the **quality** of adult interactions in play scenarios may be more important than the **quantity**. When adults respond in a sensitive and child-directed manner, children's play can be more elaborate (Feise 1990; Sylva, Roy, & Painter, 1980), creative (Shmukler, 1981), and sustained (Dunn & Wooding, 1977). Children engage in more social play (Farran, Silveri & Culp, 1991) and cognitive activity as well (Howes & Smith, 1995). On the other hand, when adults become too bossy or are insensitive to the needs of the child in the moment, children tend to lose interest and stop playing (Howes, Unger & Matheson, 1992; Shmukler, 1981). Between the extreme positions of being completely uninvolved and taking over the play scenario, adults (in this case, teachers) have been observed to interact with children in several roles that can facilitate play (Johnson et al., 2005; Singer & Singer, 1977).

Knowing which role is best for a given situation can be difficult and often takes quite a bit of practice. Children will differ on the level of adult involvement they want or need on a particular day, or in a particular space, and as such adults may need to take on several different roles even within one session (Gronlund, 2010; Johnson et al., 2005). Roskos and Neuman (1993) found that, experienced teachers flexibly and frequently shift between several different roles depending on children's needs. Overall, research on adults' various roles in play suggests that they need to be sensitive to the child's needs in the moment, flexible in choosing the way they intervene, and willing to follow the child's lead.

A study by Shine and Acosta (2000) on parent-child interactions at a children's museum suggest that parents may need some guidance to successfully facilitate play. While visiting a grocery store exhibit, children were likely to role play, while parents mostly prompted, taught concepts, and directed pro-social behaviors from outside of the play frame. As such, interactions between parents and children were brief, often non-contingent between partners, and sometimes disruptive to play. Follow-up interviews revealed that parents felt a desire and duty to teach their children about real-life experiences while at the museum, which can sometimes be detrimental to the flow of the play scenario (Wood, McMahon, & Cranstoun, 1980) They also



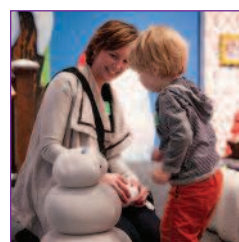
ONLOOKER

As onlookers, adults observe children from nearby and may make an occasional comment, but do nothing to enhance or disrupt play. Observation can help the adult to understand children's play habits and in turn, to know when they need to intervene with one of the more involved forms of play described below.



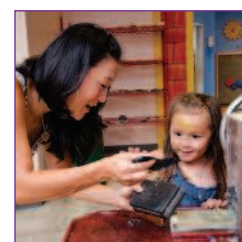
STAGE MANAGER

In this role, adults do not directly take part in play. Instead, they help children set the stage for various activities and offer assistance when asked (e.g., get materials, make costumes). A stage manager may also propose extensions to a play scenario (e.g., a new imaginary obstacle to overcome in socio-dramatic play), but children are free to follow or ignore the suggestions as they please.



CO-PLAYER

Co-players join in play activities. Typically they take small supporting roles, while the child takes the lead. Co-players might make suggestions to extend play and often model play skills for the child, such as sharing or role playing.



PLAY LEADER

In this role, the adult actively guides children's play from within the activity. Play leaders aim to enrich and extend play by suggesting new themes, props, or plot twists to the current scenario. Teachers are likely to take on this high level of involvement when children have trouble starting or maintaining play.

avoided participation in play because they felt exposed and uncomfortable in the role of co-player in public. To encourage parent involvement in pretend play, Shine and Acosta suggest that museums provide private, enclosed spaces and adult-sized props to prompt parents to join in the play, as well as parent education about the benefits of parent-child play through classes and signage.

in successful socio-dramatic play training studies (Dockett, 1988, as cited in Kavanaugh, 2011 and Pellegrini, 2009; Smilansky, 1968). Finally, adults can give children the time they need to play and explore. Research shows that children

Research shows that children often need at least half an hour to plan, set up, and execute **PLAY**.



FACILITATION TECHNIQUES

Based on a review of relevant literature, Johnson and colleagues (2005) recommend several specific techniques to help adults scaffold children's play. Perhaps the most important aspect to any intervention is to follow the child's lead. Adults can observe what children like and do, and respond to it accordingly. They can also engage children in theme-relevant conversation, ask leading questions, respond to their requests for help, and address questions in a way that encourages critical thinking (i.e., not necessarily giving away the answer; Mind in the Making, Ellen Galinsky).

Another suggestion for adults is to ground new experiences at the museum in children's knowledge of the outside world, as play is contingent on an understanding of the situation or materials at hand: for example, providing children with preparatory experiences has been a key factor

often need at least half an hour to plan, set up, and execute play. Specifically, in one study, preschoolers exhibited more mature forms of social and cognitive play, and higher percentages of group play, constructive play, and socio-dramatic play during 30 minute play sessions than 15 minute sessions (Christie, Johnsen, & Peckover, 1988). By using a few child-centered techniques, adults can help to boost children to higher levels of play and learning.

Overall, this line of research suggests that in addition to enhancing children's experience at the museum, targeting the education of adult visitors could provide a unique opportunity to impact playful learning in a broader sense. Given that the time children spend within the walls of the museum is relatively short, and many of the benefits of play accrue over the long term, helping parents to realize the importance of play and how to foster playful learning in a home environment could be particularly important.

CONCLUSION

Play is learning. As Vygotsky (1978) noted, it “contains all developmental tendencies in a condensed form and is itself a major source of development (p. 102).” Through the presentation of research on various, overlapping styles of play, this paper illustrates the impact of play on the whole child. In the short and long term, play benefits cognitive, social, emotional, and physical development. Children learn cognitive skills such as creativity, problem solving, divergent thinking, mathematics, and language. They learn to negotiate social relationships, regulate their emotions, and control their own behaviors. Play also fosters the development of fine and gross motor skills. When play is fun and child-directed, children are motivated to engage in opportunities to learn. Moreover, when given choices in play, children can find activities that are best suited to their individual needs.

Together, the research summarized here makes a strong statement for the benefits of play. We must, however, take caution in the interpretation and application of some individual studies. Much of the research is 30 years old or more. With the passage of time, it is hard to predict whether the same outcomes would hold for children in today’s world. Also, much of the research on the benefits of play is correlational; we cannot say for certain whether play itself is the cause for learning or development in those cases. Finally, we know that culture can impact parents’

opinion on play and how children play. Although, care was taken to include research with diverse groups of children in this paper, the majority of play research is done with middle-class, Western samples. While these limitations do not negate the overall argument that play benefits learning and development – it will be important to keep these limitations in mind when applying individual findings.

The mission of Minnesota Children’s Museum is to promote playful learning for young children. By providing children with rich play experiences, and helping parents to understand the importance of playful learning in children’s lives, we can help children to learn, build successful relationships, be happy, and find success in the 21st century. In an age where

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play is under siege (Zigler, 2004) in many educational circles, promoting opportunities for children to learn through playful contexts could not be more important. Through play, we can begin to build the foundations for motivated, healthy and happy children, and a productive society.



- Bergen, D. (2009). Play as the learning medium for future scientists, mathematicians, and engineers. *American Journal of Play*, 1.
- Bergen, D. (2006). The role of pretend play in children's cognitive development. *Early years education: major themes in education*, 193.
- Bergen, D. (2002). The role of pretend play in children's cognitive development. *Early Childhood Research Practice*, 4(1), 13.
- Berk, L. E., Mann, T. D., & Ogan, A. T. (n.d.). Make-believe play: Wellspring for development of self-regulation.
- Berretta, S., & Privette, G. (1990). Influence of play on creative thinking. *Perceptual and Motor Skills*, 71, 659-666.
- Bretherton, I. (1989). Pretense: The form and function of make-believe play. *Developmental Review*, 9, 383-401. doi:10.1016/0273-2297(89)90036-1
- Broadhead, P. (2010). *Play and learning in the early years: From research to practice*. (P. Broadhead, J. Howard, & E. Wood, Eds.). Thousand Oaks, CA: SAGE Publications Inc.
- Brown, S., & Vaughan, C. (2009). *Play: How it shapes the brain, opens the imagination, and invigorates the soul*. Avery.
- Carlson, S. M., & Zelazo, P. D. (2008). Symbolic thought. In M. M. Haith & J. B. Benson (Eds.), *Encyclopedia of Infant and Early Childhood* (pp. 288-297). Boston: Elsevier/Academic Press.
- Christie, J. F., & Roskos, K. A. (n.d.). *Standards, science and the role of play in early literacy education*.
- Christie, J. F., & Johnsen, E. P. (1985). Questioning the results of play training research. *Educational Psychologist*, 20, 7-11.
- Christie, J. F., & Johnsen, E. P. (1983). The role of play in social-intellectual development. *Review of Educational Research*, 53, 93-115. Cohen, D., & Mackeith, S. A. (1991). *The development of imagination: the private worlds of children*. New York: Routledge.
- Dias, M. G., & Harris, P. L. (1988). The effect of make-believe play on deductive reasoning. *British Journal of Developmental Psychology*, 6, 207-221.
- Dunn, J., & Hughes, C. (2001). "I Got Some Swords and You're Dead!": Violent Fantasy, Antisocial Behavior, Friendship, and Moral Sensibility in Young Children. *Child Development*, 72, 491-505.
- Elder, J. L., & Pederson, D. R. (1978). Preschool children's use of objects in symbolic play. *Child Development*, 49, 500-504.
- Elias, C. L., & Berk, L. E. (2002). Self-regulation in young children: Is there a role for sociodramatic play? *Early Childhood Research Quarterly*, 17, 216-238.
- Elkind, D. (1988). Play. *Corsini Encyclopedia of Psychology* (pp. 1-2).
- Elkind, D. (2007). *The power of play: Learning what comes naturally*. Cambridge, MA: Da Capo Lifelong Books.
- Fantuzzo, J., Perry, M. a., & McDermott, P. (2004). Preschool approaches to learning and their relationship to other relevant classroom competencies for low-income children. *School Psychology Quarterly*, 19, 212-230. doi:10.1521/scpq.19.3.212.40276
- Fein, G. G. (1981). Pretend play in childhood: An integrative review. *Child development*, 52, 1095-1118.
- Fisher, K. R., Hirsh-Pasek, K., Golinkoff, R. M., & Gryfe, S. G. (2008). Conceptual split? Parents' and experts' perceptions of play in the 21st century. *Journal of Applied Developmental Psychology*, 29, 305-316.
- Frahsek, S., Mack, W., Mack, C., Pfalz-Blezinger, C., & Knopf, M. (2010). Assessing different aspects of pretend play within a play setting: Towards a standardized assessment of pretend play in young children. *British Journal of Developmental Psychology*, 28(2), 331-345.
- Gagnon, S. G., & Nagle, R. J. (2004). Relationships between peer interactive play and social competence in at risk preschool children. *Psychology in the Schools*, 41, 173-189.
- Galyer, K. T., & Evans, I. M. (2001). Pretend play and the development of emotion regulation in preschool children. *Early Child Development and Care*, 166, 93-108. doi:10.1080/0300443011660108
- Gaskins, S. (2008). The cultural meaning of play and learning in children's museums. *Hand to Hand*, 22. Washington D.C.
- Gleason, T. R., Sebanc, A. M., & Hartup, W. W. (2000). Imaginary companions of preschool children. *Developmental Psychology*, 36, 419-428.
- Gronlund, G. (2010). *Developmentally appropriate play: Guiding young children to a higher level*. Saint Paul, MN: Redleaf Press.
- Guddemi, M. (2010). *The Role of Play In an Overly Academic Kindergarten*. Report by the Gesell Institute of Human Development. New Haven, CT.
- Harris, P. L. (2000). *The work of the imagination*. Malden, MA: Blackwell.
- Harris, Paul L, Kavanaugh, R. D., Wellman, H. M., & Hickling, A. K. (1993). Young children's understanding of pretense. *Monographs of the Society for Research in Child Development*, 58, 1-107.
- Heidemann, S., & Hewitt, D. (2009). *Play: The pathway from theory to practice*. Saint Paul, MN: Redleaf Press.
- Hirsh-Pasek, K., & Golinkoff, R. (2008). *A mandate for playful learning in preschool: Applying the scientific evidence*. New York: Oxford University Press.
- Hirsh-Pasek, K., & Golinkoff, R. M. (2008). Why play= learning. *Encyclopedia on Early Childhood*.
- Hirsh-Pasek, K., Golinkoff, R. M., & Eyer, D. (2003). *Einstein never used flash cards*. Rodale.
- Hirsh-Pasek, K., & Golinkoff, R. M. (2011). The great balancing act: Optimizing core curricula through playful pedagogy. In E. Zigler, W. S. Gilliam, & S. Barnett (Eds.), *The Pre-K debates: Current controversies and issues*. Brookes.
- Howard-Jones, P. (2002). The effect of play on the creativity of young children during subsequent activity. *Early Child Development and Care*, 172, 323-328.
- Hughes, C., & Dunn, J. (1997). "Pretend you didn't know": Preschoolers' talk about mental states in pretend play. *Cognitive Development*, 12, 477-497.
- Hughes, F. P. (2009). *Children, play, and development* (Third.). Boston: Allyn and Bacon.
- Hyvonen, P. (2011). Play in the School Context? The Perspectives of Finnish Teachers. *Australian Journal of Teacher Education*, 36, 65-83.
- Kaugars, A. S., & Russ, S. W. (2009). Assessing preschool children's pretend play: Preliminary validation of the Affect in Play Scale-Preschool. *Early Education & Development*, 20, 733-755.
- Kelly, R., Hammond, S., & Dissanayake, C. (2005). The relationship between symbolic play and executive function in young children, (1994), 21-28.
- Kolb, A. Y., & Kolb, D. A. (2010). Learning to play, playing to learn: A case study of a ludic learning space. *Journal of Organizational Change*
- Lillard, A. (2002). Pretend play and cognitive development. In U. Goswami (Ed.), (pp. 188-205). Oxford: Blackwell Publishing.
- McAloney, K., & Stagnitti, K. (2009). Pretend play and social play: The concurrent validity of the Child-Initiated Pretend Play Assessment. *International Journal of Play Therapy*, 18, 99-113.
- Millar, S. (1969). *The psychology of play*. Baltimore, MD: Pelican.
- Miller, E., & Almon, J. (2009). *Crisis in the Kindergarten: Why children need to play in school*. Crisis. College Park, MD: Alliance for Childhood.
- Milteer, R. M., & Ginsburg, K. R. (2012). The importance of play in promoting healthy child development and maintaining strong parent-child bond: focus on children in poverty. *Pediatrics*, 129, 204-13. doi:10.1542/peds.2011-2953
- Mitchell, R. W. (Ed.). (2002). *Pretending and imagination in animals and children*. New York: Cambridge University Press.
- Morrison, D. C. (Ed.). (1988). *Organizing early experience: Imagination and cognition in childhood*. Amityville, New York: Baywood Publishing Company, Inc.
- Myck-Wayne, J. (2010). In defense of play: Beginning the dialog about the power of play. *Young Exceptional Children*, 13, 14-23.
- Nicolopoulou, A. (2010). The alarming disappearance of play from early childhood education. *Human Development*, 53, 1-4.
- Pearson, B. L., Russ, S. W., & Cain, S. (2008). Pretend play and positive psychology: Natural companions. *The Journal of Positive Psychology*, 3, 110-119. doi:10.1080/17439760701760617
- Pellegrini, A. D. (2011). Play. In P. D. Zelazo (Ed.), *New York: Oxford University Press*.
- Pellegrini, A. D., & Nathan, P. E. (Eds.). (2010). *The Oxford handbook of the development of play*. New York: Oxford University Press.
- Pellegrini, A. D., & Smith, P. K. (1993). School recess: Implications for education and development. *Review of Educational Research*, 63, 51-67.
- Pellegrini, A. D., & Smith, P. K. (1998). The development of play during childhood: Forms and possible functions. *Child and Adolescent Mental Health*, 3, 51-57. doi:10.1111/1475-3588.00212
- Pellegrini, A. D., & Smith, P. K. (1998). Physical activity play: The nature and function of a neglected aspect of play. *Child Development*, 69, 577-598.
- Pepler, D. J., & Ross, H. S. (1981). The effects of play on convergent and divergent problem solving. *Child Development*, 52, 1202-1210.
- Piaget, J. (1951). *Play, dreams and imitation in childhood*. New York: Norton.
- Resnick, M. (2007). All I really need to know (about creative thinking) I learning (by studying how children learn) in Kindergarten. *Proceedings of the 6th ACM SIGCHI conference on creativity and cognition*. New York.
- Richert, R. A., & Smith, E. I. (2010). Preschoolers' Quarantining of Fantasy Stories. *Child Development*, 82, 1106-1119.
- Rotherham, A. J., & Willingham, D. (2009, September). 21st century skills. *Educational Leadership*, 16-21.
- Root-Bernstein, M., & Root-Bernstein, R. (2006). Imaginary worldplay in childhood and maturity and its impact on adult creativity. *Creativity Research Journal*, 18, 405-425.
- Rosoff, A. (2007). The reality of unreality: Using imagination as a teaching tool. *English Journal*, 96, 58-62. Ruff, H. A., & Lawson, K. R. (1990). Development of sustained, focused attention in young children during free play. *Developmental Psychology*, 26, 85-93.
- Saltz, E., Dixon, D., & Johnson, J. (1977). Training disadvantaged preschoolers on various fantasy activities: Effects on cognitive functioning and impulse control. *Child Development*, 48, 367-380.
- Sharon, T., & Woolley, J. D. (2004). Do monsters dream? Young children's understanding of the fantasy/reality distinction. *British Journal of Developmental Psychology*, 22, 293-310.
- Singer, D. (1977). *Partners in play: A step-by-step guide to imaginative play in children*. New York: Harper & Row.
- Singer, D. G., & Singer, J. L. (1990). *The house of make-believe*. Cambridge, MA: Harvard University Press.
- Singer, D. G., Golinkoff, R. M., & Hirsh-Pasek, K. (2006). Play = Learning. *Narrative*. Oxford University Press. doi:10.1093/acprof:oso/9780195304381.001.0001
- Smith, P. (Ed.). (1984). *Play in animals and humans*. New York: Blackwell.
- Stephens, K. (2009). Imaginative play during childhood: Required for reaching full potential. *Exchange: The Early Childhood Leaders Magazine*, 53-56. Redmond, WA.
- Taylor, M. (1997). The role of creative control and culture in children's fantasy/reality judgments. *Child development*, 68, 1015-1017.
- Taylor, M., & Carlson, S. M. (2005). Imaginary companions and impersonated characters: Sex differences in children's fantasy play. *Merrill-Palmer Quarterly*, 51, 93-118.
- Taylor, M., Carlson, S. M., Maring, B. L., Gerow, L., & Charley, C. M. (2004). The characteristics and correlates of fantasy in school-age children: Imaginary companions, impersonation, and social understanding. *Developmental Psychology*, 40, 1173-1187.
- Taylor, M. (1999). *Imaginary companions and the children who create them*. New York: Oxford University Press.
- Vandenberg, B. (1980). Play, problem solving, and creativity. *New Directions for Child and Adolescent Development*, 1980, 49-68.
- Vygotsky, L. S. (1967). Play and its role in the mental development of the child. *Soviet psychology*, 5, 6-18.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological functions*. Cambridge, MA: Harvard University Press.
- Woolley, J. D. (1997). Thinking about fantasy: Are children fundamentally different thinkers and believers from adults? *Child Development*, 68, 991-1011.



Mission

Sparking children's learning through play

Foundational Beliefs

Early learning is the foundation for lifelong learning.

Families are our children's first teachers.

All children deserve a time and place to be children.

Diverse perspectives enrich children's lives.

Playing is learning.