

PLAYFUL LEARNING AND MONTESSORI EDUCATION

by Angeline S. Lillard

Although Montessori education is often considered a form of playful learning, Maria Montessori herself spoke negatively about a major component of playful learning—pretend play, or fantasy—for young children. In this essay, the author discusses this apparent contradiction: how and why Montessori education includes elements of playful learning while simultaneously eschewing fantasy. She concludes with a discussion of research on the outcomes of Montessori education and on pretend-play research, clarifying how Montessori education relates to playful learning.

In recent years, educators have begun using the didactic teaching methods appropriate for older children in preschool settings (Zigler and Bishop-Josef 2004). Increasingly, we see children ages three to five expected to sit and listen to lessons without interacting (Hamre and Pianta 2007). Such an approach to learning belies the principles of constructivism that much research on human learning shows to be effective. In fact, many educators now call for one constructivist approach in particular, playful learning, as a developmentally appropriate alternative to didactic instruction (Fisher et al. 2011)—as a way to help preschoolers learn in the ways they naturally learn. Along a line running from free play (in which children play independently), through guided play (where an adult oversees and gently directs—or scaffolds—their play), to didactic instruction (where a teacher directly instructs children), playful learning occupies the span between free play and guided play.

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As described by Fisher et al., *free play* includes object play, pretend and sociodramatic play, and rough-and-tumble play, in all of which children engage without close adult oversight or control. Free play is fun, flexible, active, and voluntary (i.e., without extrinsic reward). Free play also often includes elements of make-believe and also often involves peers. *Guided play* occurs when an adult aims a child towards specific knowledge in a playful, fun, and relaxed way. Guided play often involves specific toys with which a child can interact to gain knowledge. A supervising adult observes the child closely and asks questions to help the child learn but, as with free play, respects the child's own interests and pacing. In contrast, *didactic instruction* is teacher centered and teacher paced and more likely to involve listening to words rather than working with objects. We commonly associate didactic instruction with school, although today's teacher education courses seldom extol its methods.

Again, playful learning spans both free play and guided play. Playful learning is child centered, constructivist, affectively positive, and hands-on. It can involve fantasy but does not necessarily do so. At the guided-play end of the playful-learning span, "teachers might enhance children's exploration and learning by commenting on their discoveries, co-playing along with the children, asking open-ended questions about what children are finding, or exploring the materials in ways that children might not have thought to do" (Weisberg, Hirsch-Pasek, and Golinkoff, in press). Recent meta-analyses suggests that more directed forms of "discovery learning" are optimal (relative to pure discovery learning and didactic instruction) and consistent with the idea that playful learning is an excellent approach for helping children (Alfieri et al. 2010).

Although some researchers cite Montessori education as a prime example of playful learning (Diamond and Lee 2011; Elkind 2007; Hirsh-Pasek et al. 2009), others have noted that founder Maria Montessori thought play "developmentally irrelevant" (Rubin, Fein, and Vandenberg 1983, 694). This article, focusing particularly on Maria Montessori's views about pretend play, discusses how Montessori education resembles and does not resemble playful learning. The article then reviews the research on the results of the Montessori style of playful learning.

WHAT IS MONTESSORI?

Montessori education began in the early 1900s (Montessori [1912] 1964). The first House of Children (Casa dei Bambini) opened in 1907 and served preschool-aged children in a housing project in Rome. Montessori's method quickly spread to serve different populations of children. In just five years, Montessori classrooms had opened round the world, including an outdoor "classroom" at the University of Virginia (Holsinger, Hebich, and Walters 1976). So impressed was Montessori by the transformation of the children in her schools, that despite having expended enormous efforts to become one of the first women in Italy with a medical degree (Povell 2009), she abandoned her career as a doctor and professor. She spent the rest of her life—almost fifty years—developing and refining the Montessori system, extending it for children from birth through age twelve. When she died in 1952, she was developing Montessori methods for adolescents (Montessori [1948] 1976).

Montessori classrooms ideally contain age groupings spanning three years: infant to three years old, three to six, six to nine, and nine to twelve. Working materials, kept on shelves and freely available to the children, are organized into topics such as language, math, and so on. The materials are designed so that if children make mistakes, they can see and correct them without close teacher supervision or intervention. Areas of the curriculum are tightly interconnected. I discuss Montessori education in this article, but the reader can easily find full depictions of the method (Humphryes 1998; Lillard 2005; and Montessori 1967a, 1967b, 1972). For a comparison with other teaching methods like Waldorf and Reggio Emilia, I advise the reader to investigate Carolyn Edwards's excellent "Three Approaches from Europe" (2002). But, before I discuss how Montessori resembles and does not resemble playful learning, I offer three caveats.

First, the descriptions here are of authentic Montessori programs, meaning ones that correspond closely to those Montessori herself described in lectures and those appearing in the training courses of the Association Montessori Internationale (AMI), the organization she founded to carry on her work. Because "Montessori" is not a trademarked term, a variety of schools call themselves Montessori, including ones where children rarely use Montessori

materials and some featuring computer-topped desks set in rows. Unfortunately, many visitors to such schools do not realize how far afield these settings are from those Maria Montessori developed or would have endorsed.

Second, some assume Montessori education is expensive and exclusive and therefore unworthy of consideration in discussions about public education. But Montessori education was initially developed for poor children in the slums of Rome, and public schools have implemented Montessori education successfully at lower-than-average costs in low-income districts in such cities as Hartford, Connecticut, and Milwaukee, Wisconsin. In Hartford, Connecticut, public schools in 2010, the average cost per pupil was about \$13,000, whereas the cost at the city's Capitol Region Education Council's Montessori Magnet school was \$10,500 (Tim Nee, personal communication). Thus, although most Montessori schools in the United States are private and mainly serve children whose parents can afford preschool tuition, there is nothing inherent in the system or its costs that restricts it to the well-to-do.

Third, many assume Montessori education is good only for particular (and sometimes contradictory) populations—boys or girls, children with ADHD (Attention Deficit Hyperactivity Disorder) or children high in executive function (involving prefrontal activities like working memory, planning, and self-control), gifted children or children with learning disabilities, and so on. I discuss research outcomes at the end of this article, but no research available today indicates that Montessori education suits any one type of child in particular (but see Yen and Ispa 2000). With these considerations in mind, let us move on to Montessori and playful learning.

HOW DOES MONTESSORI RESEMBLE PLAYFUL LEARNING?

Montessori resembles playful learning in several ways (see figure 1), and I discuss each of them.

Overall Structure

In a classroom, a daily schedule—with its expectations about what happens when—constitutes one aspect of an overall structure. Another aspect is the level of structure within any given activity. For

example, at art time, is drawing free and unstructured or is there a structured assignment with a prescribed set of steps?

Conventional education tends to be less structured in preschool and more tightly structured thereafter, although in recent years, preschools have become more structured in response to the 2001 federal law called No Child Left Behind (Hamre and Pianta 2007; Zigler and Bishop-Josef 2004). The conventional change in education methods for children at age six from looser to more rigid structures

Element of comparison	Like playful learning	Not like playful learning
Provides overall structure	x	
Involves objects	x	
Involves lessons	x	
Freely chosen/ child directed	x	x
Peer involvement possible	x	
Intrinsic, not extrinsic, rewards	x	
Fun	x	
Structured materials		x
Specific ways to interact with materials		x
Description of activity		x
Pretend play		x

Figure 1. How the Montessori method is and is not like playful learning

corresponds to an uptick in a child's responsibilities and adult expectations at this age across many cultures (Rogoff et al. 1975).

In an educational program that follows the principles of playful learning, the teacher provides structure by guiding the children's learning towards established goals. Children often freely choose their activities, conferring a sense of freedom, but the teacher, however subtly, still leads them. This is true at the level of materials as well: there is some guidance but considerable freedom of choice as the teacher guides the children towards established goals.

In terms of overall structure, Montessori education appears to some observers loose and amorphous and to others, rigid. Montessori education actually falls midway between these characterizations: it embeds freedom within structure and structure within freedom. The overarching principle calls for the child's behavior to be constructive for his or her

Whether one sees Montessori education as loose or rigid depends on the level at which one focuses. If one focuses on the microlevel of table washing, it might seem excessively rigid. If one focuses on the higher level of the freedom children have to choose what they do when and with whom, it seems loose. And, if one focuses on the (at least, in some senses) even higher levels of the curriculum and its expectations for behavior, it seems structured again.

development—and for the community, too. Well-trained Montessori teachers require children to behave in constructive ways. They often ask children who misbehave to stay at their sides, where they can monitor the miscreants closely and, in effect, externally control the misbehavior. Teachers gradually allow the children to move away as the youngsters learn to control themselves and can therefore function more independently. Most children do not need to stand by like this, and those who do rarely need to do so for long. In this sense, then, Montessori education is very structured.

The curriculum presents another structured element of Montessori education. Montessori has a set of lessons and materials for each classroom level, and in any given subject (math or music, for example), the teachers present the materials in a fairly ordered se-

quence. In Montessori teacher-training courses, teachers walk through the presentation of the materials and the theory underlying them. Within this sequencing of precise lessons with specific materials, children in Montessori programs can choose freely what to do, so it is at this level that Montessori education seems so unstructured. But embedded even here, within that free choice, the work itself remains tightly structured. One can opt to wash a table, but there are specific steps one must follow in doing so. One must carry a mat to a table, lift the table onto the mat, fill a bucket to a specific level with water and add a specific amount of soap, carry the bucket and washing materials to the mat, put a sponge in the water, squeeze out the water with a taught squeezing motion, wipe the table from left to right (replicating the direction needed for writing), dry the table with a towel (from left to right), and so on—all, again, very tightly structured.

Thus, whether one sees Montessori education as loose or rigid depends on the level at which one focuses. If one focuses on the microlevel of table washing, it might seem excessively rigid. If one focuses on the higher level of the freedom children have to choose what they do when and with whom, it seems loose. And, if one focuses on the (at least, in some senses) even higher levels of the curriculum and its expectations for behavior, it seems structured again.

Playful learning, too, is structured in some ways but not in others. Teachers guide learning within structures but do so playfully and loosely, with particular focus on the goals they have in mind. By adhering in some ways but not others to a tight, overall structure, Montessori education resembles playful learning.

The Use of Objects

Conventional direct instruction typically lacks any materials that children manipulate to learn. Teachers might illustrate a triangle on a blackboard, for example, but not employ a physical triangle. Such instruction is designed for learning through the eyes and ears, not through the hands.

In contrast, playful learning typically involves objects with which children play to learn. Children learning shapes, for example, handle objects of different forms, perhaps tracing the forms with their fingers

in addition to seeing them. In this way, playful learning embodies cognition. A wealth of evidence suggests that learning is enhanced when it is embodied across modalities (Barsalou et al. 2003; Lillard, 2005); and there are specific benefits when hands are involved (Beilock and Goldin-Meadow 2010; Lagnado and Sloman 2002; Sobel and Kushnir 2006; Wagner Cook, Kuangyi Yip, and Goldin-Meadow 2010). Using objects to engage children in learning ensures manual involvement. In addition, object based learning is active rather than passive, and activity is also associated with better learning (Glenberg et al. 2004). Research on preschool programs in seven countries found that learning involving a variety of manipulable objects fosters cognitive development (Montie, Xiang, and Schweinhart 2006).

Montessori education abounds with objects suited to manipulation in the course of learning. Montessori teacher trainers strongly agree on eighty-three sets of materials a Montessori primary classroom (for three- to six-year-olds) should contain (Lillard 2011a), covering curriculum areas of sensorial (including beginning music instruction), math, language, science and geography, practical life, and art. Montessori teacher trainers have further identified materials suited to classrooms for children in the other age groupings (infants to three-year-olds, for example). Teachers in a Montessori classroom learn during their teacher training how to present the materials used for a particular semiscripted lesson to their students. The Montessori training intends the repeated use of these materials to convey specific learning.

For example, the Wooden Cylinders (see figure 2) involve placing a set of ten graduated cylinders into their appropriate slots in a long wooden base. There are four sets of Wooden Cylinders, varying in width, height, and opposing combinations of height and width. Children play with the set of cylinders varying only in width first because it is most simple both dimensionally and because the pieces are easiest for a young child to pull out. The teacher first gives children a lesson in how to take out all the cylinders, mix them up, and place them into their proper holes. After the teacher presents the task, children are free to play with the Wooden Cylinders on their own. Through this work, three-year-olds focus on dimensional concepts they will later apply in formal mathematics (width, height, volume). They also learn to judge, reason, and act on their own

decisions (Montessori [1912] 1964). They receive feedback on the adequacy of their decisions from the materials themselves rather than from the teacher: If there is a cylinder-hole mismatch at the end, children know that they mistakenly put too small a cylinder in too large a hole; they need to figure out which one; and they correct the error.

Thus like playful learning, Montessori education involves objects. In Montessori education, those objects are carefully constructed and presented to confer specific learning. The materials in Montessori also typically are self-correcting; in playful learning these latter aspects are not a given.

Interactive Lessons

Micheline Chi suggests that the best learning comes from contexts that are not just active or constructive (2009), but also interactive. Conventional school lessons are sometimes interactive, sometimes not, depending how many questions a teacher asks. Playful learning often proves interactive when it is more guided and less interactive as it becomes freer. In guided play, the teacher tells or shows the children



Figure 2. A Montessori student plays with the Wooden Cylinders to learn dimensional concepts she will later apply to studying mathematics. (Photograph by An Vu)

how to handle learning materials. In the lesson dealing with shapes, for example, a teacher extends the initial lesson by asking children to consider the ways in which all the triangles are alike, and through such questions, helps the children arrive at a definition of triangles. All the while, the children interact with the materials.

Montessori lessons are also interactive. Most Montessori lessons involve individuals or groups of two to six children, depending on the age of the children and how many in a class are ready for a particular lesson. Younger children are more apt to get one-on-one lessons. The teacher typically determines the children's readiness by watching their interactions with materials they learned about in prior lessons. When the teacher sees that children have mastered one lesson in the sequence, the teacher considers them ready to move on to the next.

For most lessons, the teacher sits at a table or on a rug on the floor and shows children how to use the materials. The children take turns. A teacher might show children a sandpaper "b," for example, and demonstrate how to trace the letter while saying "Buh. Buh. Can you think of a word that starts with *buh*?" The children trace the letter, often first using the teacher's hand as a guide. Thus, Montessori lessons involve a great deal of interaction, as does more guided playful learning.

Freely Chosen

In conventional school programs, teachers typically choose activities for children. The children have little say, although in some preschool settings "free choice" occurs during "stations" time, when children spend a set amount of time (e.g., seven minutes) at a "station" or table offering a particular activity and then move on to another station.

With playful learning, children's own interests drive the agenda. An adult provides the activities and objects and guides the children's engagement with the materials, but an aura of free choice pervades. Important to this aura in playful learning, no one forces children to engage if they choose not to do so. If children choose to engage in some way other than expected, the adult follows the children's lead and tries imperceptibly to return the youngsters to the learning agenda.

Choice in Montessori education varies by level (Lillard 2005). Free choice exists at the macrolevel of classroom environment: most of the time, most Montessori students choose what they work on. A child might decide to iron napkins, cut carrots and offer them around the classroom, wash a table, or take apart and put back together a puzzle map of Europe. As I discuss later, at the more microlevel of exercises within the environment, Montessori education offers less freedom.

The best learning takes place when individuals choose to study what interests them (Cordova and Lepper 1996; Deci, Koestner, and Ryan 2001; Renninger, Hidi, and Krapp 1992; Ryan and Deci 2000). But when possibilities are too openended (as in pure discovery), learning can fail to occur (Honomichl and Chen 2012; Klahr and Nigam 2004; Mayer 2004). The guidance offered by adults in Montessori education and playful learning appears to provide the structure that ensures that learning happens within contexts of free choice.

Peers

Conventional education calls for children to learn by sitting alone at desks and listening to a teacher. Although some conventional educational activities are social (like peer tutoring or group work), these tend to be exceptions.

Playful learning can occur one-on-one with an adult or involve one or more peers. This is inherent in the definition of playful learning proposed by Hirsh-Pasek and her colleagues, a definition which includes two types of social free play—sociodramatic and rough and tumble. Montessori lessons can involve individuals or small groups. Apart from these lessons—which might typically take twenty minutes for each child—children usually may choose whether to work alone or with peers. At younger ages, many children prefer to work alone, but as they grow older (especially as they reach the elementary-school level), they often choose to work with peers, just as children do at different ages in natural settings (Hartup 1983).

Both Montessori education and playful learning, then, accommodate peer interaction. Although in free play, playful learning

might occur only with peers, in both the guided play and Montessori classes it occurs initially with a teacher and later with individuals or in small groups. In a Montessori classroom, for example, you will find long chains of glass beads that can be linked together to stretch across the entire floor space. The children use these bead chains for counting and then for skip counting (counting by fives, for example). A child might work with these chains alone, stretching the beads along the floor and then placing a numbered arrow every five beads. Or a child could work collaboratively with one or more other children. The point here is that playful learning and Montessori education resemble one another in allowing as much peer interaction as a child chooses.

No Extrinsic Rewards

In conventional didactic instruction, teachers often use gold stars and grades to inspire children to behave well and to learn material. Behind these rewards lies a behaviorist model of children and learning, perhaps because public schools became widely established in the early 1900s when behaviorism was popular among educators.

In contrast, playful learning occurs for its own sake. Children are intrinsically motivated to play. In Montessori education as well, the intrinsic reward of learning is an end in itself. It was not always so: Montessori originally thought children needed rewards, and she offered them nice toys to play with after they successfully read words (Montessori [1912] 1965). But when she saw children cast aside the toys and request more words to read instead, Montessori came to believe that, under conditions of free choice, learning was its own reward. She then eliminated extrinsic rewards from the program.

It sometimes amazes observers that a classroom of twenty-five to thirty children can busily engage in twenty to thirty different activities peacefully without any rewards, especially at the elementary-school level when the children are clearly doing academic work like writing reports. Why do it, one wonders, if not for a grade? A wealth of research shows that rewards can disrupt interest in a previously attractive activity (Deci, Koestner, and Ryan 2001; Warneken and Tomasello 2008). In one classic study, some children who frequently

used markers for drawing were offered a reward for drawing with markers. Afterwards they used markers less than they had before and less than other children who were not offered rewards for using them (Lepper, Greene, and Nisbett 1973). Other studies have also found that extrinsic rewards lower creativity (Amabile, Hennessey, and Grossman 1986). Perhaps never receiving grades or rewards for doing schoolwork allows children in Montessori programs to retain an intrinsic interest in such work (Lepper and Henderlong, 2000). In both playful learning and Montessori education, the activities are intrinsically rewarding, and extrinsic rewards are not offered.

Fun

Many of us assume conventional school is no fun. Hence, people who see children out and about during school hours frequently say, “Aren’t you lucky you are not in school!” It is a time-honored reaction. As William Blake wrote in 1794: “But to go to school on a summer morn/Oh it drives all joy away/Under a cruel eye outworn/The little ones spend the day/In sighing and dismay.”

In contrast, playful learning is, by definition, fun and enjoyable. Montessori education also has an enjoyable sense of “flow” (Csikszentmihalyi 1997). A well-functioning Montessori classroom is full of deeply engaged children enjoying themselves, though the fact that they look like they are concentrating rather than, say, laughing while dancing sometimes gives the impression they are not having fun. Yet (as I describe later) children in Montessori programs seem to like school, even in middle school, when conventionally schooled children often come to strongly dislike classwork (Lillard and Else-Quest 2006; Rathunde and Csikszentmihalyi 2005a).

Summary

In short, Montessori education resembles playful learning in many ways, ways in which both contrast with conventional schooling. Both enjoy a blend of freedom and structure using didactic objects, interactive teacher lessons, freely chosen activities, and engagement with peers—all activities that are intrinsically motivating rather than extrinsically rewarded, and all enjoyable. However, Montessori education also differs from playful learning in key ways.

HOW DOES MONTESSORI EDUCATION DIFFER FROM PLAYFUL LEARNING?

There are four ways in which Montessori education differs from playful learning: the deep structure of the materials, the limits on choice, the description of school activities, and the lack of pretend play (see figure 1).

Structure of the Materials

The kinds of materials used in playful learning generally do not have the depth of structure that Montessori materials have. For example, in preschool classrooms, we often see sets of commercially produced wooden or plastic blocks for construction play. These typically contain four or more shapes of blocks with as many as a dozen of each shape. Children use the blocks to construct from their imaginations an infinite variety of castles, farms, railroads, and other structures. In free play, children engage at will with the blocks; in guided play, a teacher might suggest different constructions, pointing out how the shapes contrast.

Montessori classrooms do not typically use such blocks; indeed, over 70 percent of teacher trainers believe they should not be used in a Montessori classroom (Lillard 2011a). Instead, Montessori primary classrooms use the three sets of blocks Maria Montessori developed to teach the concepts of dimension: the Pink Tower, the Brown (or Broad) Stair, and the Red Rods. Like most Montessori materials, these blocks are both intrinsically logical and relate to other materials in the primary classroom. For example, each set consists of ten blocks, echoing the decimal system, and they vary in size systematically. Pink Tower blocks vary in three dimensions from a 1 cm cube to a 10 cm cube, increasing by 1 cm on each side in each successive block. Blocks of the Brown Stair are all 20 cm long but vary systematically from 1 cm in width and height to 10 cm. Red Rods are all 2.5 cm in height and width, but vary from 10 cm to 100 cm (1 meter) in length.

Children learn to use these materials in sequence, beginning with the Pink Tower because variation in three dimensions seems easiest to perceive. Next, using the Brown Stair, they learn to perceive variation in two dimensions. Finally, they move on to the Red Rods, which vary in only one dimension. From there, children take

up the Red and Blue Rods, the first of the Montessori mathematics materials. Essentially, the Red and Blue Rods are the Red Rods with alternating 10 cm sections painted blue. Children learn to number the sections “1,” “2,” and so on, which leads to counting by naming lengths. Montessori also developed materials for a later learning sequence in which the lengths are broken apart so children learn to count items.

In short, Montessori’s sets of blocks vary systematically in size and progression of complexity and cede naturally into math materials. Such logical progressions rule the entire collection of Montessori materials and distinguish them from the more free-form materials often used in play. The Montessori materials are each carefully structured to impart specific information in a specific place in a sequenced curriculum. Thus Montessori education differs from playful learning by providing a large set of highly structured materials from which to learn.

Limits on Choice

Even free play involves some limits. A child pretending to be a fierce dog cannot actually bite his playmates without crossing the line from play to aggression (Bateson 1972). Thus playful learning has its restrictions. But Montessori education is more restrictive. For example, in Montessori schools, children cannot choose to play with materials teachers have not yet shown them how to use. Before children can take materials from the shelves, they receive a lesson on how to use the materials in a way that is believed to extract the intended benefits from the items. A playful-learning classroom is unlikely to have such a restriction. More gener-

...Recent research suggests that our tendency to think young children prefer fantasy may be misguided. Given a choice between a fantasy story and a real one, children show no preference.... when books are embellished with engaging pop-up features, children are less apt to learn from them. Thus, fantasy elements, which adults add to children’s lives with the idea that youngsters prefer fantasy or find it more fun and more engaging, can backfire.

ally, in a Montessori classroom, children cannot choose to engage in unconstructive activities. A teacher must decide whether activities are constructive and stop those that are not, and they usually consider using materials for purposes other than intended to be unconstructive. In other words, children can't take the Brown Stair blocks and build houses with them.

There are at least three reasons for such restrictions. Playing freely with materials that have a symbolic purpose can interfere with children learning the specific purpose. For example, in DeLoache's research (2000), a model room serves as a symbol for an actual, bigger room. When children play with the model room as if it were a dollhouse, they are less likely to see it as a model of an actual, bigger room. Thus, if a set of blocks is intended to convey dimensional change, using them to explore dimension systematically would serve their intended purpose and be beneficial, but using them to build a house might not.

The second reason for restricting the use of Montessori materials involves classroom order. Ample research suggests that children thrive when their environments are more orderly, so this limitation on choice could be positive (Lillard 2005). That the Montessori method calls for a specific orderly way in which to interact with the materials probably in itself contributes a sense of order in a classroom. If children used the materials in myriad ways, this sense of order could be disrupted.

A third reason for limiting the use of materials involves self-discipline. Children in classic Montessori classrooms excel in executive function compared to children in looser Montessori classrooms and in conventional classrooms (Lillard 2012; Lillard and Else-Quest 2006). Perhaps the requirement that children use each material specifically as they have been shown may explain this enhanced executive capacity, since the children must inhibit all the other ways in which they might interact with the objects.

For all this concern with restrictions, some variance exists in the Montessori method in the way children can use the materials. If a teacher judges that a child's alternative use of a material engenders important learning (and hence is constructive), the teacher allows

it. For example, a child might realize independently that two sides of the blocks of the Brown Stair are equal in dimensions to the sides of the cubes of the Pink Tower and might line the two materials up side by side to explore this realization. A Montessori teacher would likely view this as a wonderful discovery. The fact that Montessori teachers sometimes embrace variation in use can complicate teaching. They must decide on the spot if a child's alternative use of the material is constructive. If the variation seems constructive, the teacher will not interfere; if the teacher decides the child's varied use is not constructive, she re-presents the material's proper use to the child.

In general, relative to pure playful learning, a Montessori program will more likely restrict children's use of classroom materials. Whether this limitation benefits children might make an interesting topic for empirical study. For example, if children can build houses with the Brown Stair, does it impede their progress in the activities—say, math—that eventually follow?

Description of Activity

A third difference between Montessori education and playful learning involves their semantic designation or how activities are described. Educators engaged in playful learning label the children's activities as play; in Montessori classrooms, we call it work. Maria Montessori believed that in her method, children engaged in self-construction and, they enjoyed the work that helped in their self-construction (Montessori 1972). She spoke of "the delight that children find in working" (Montessori 1970, 67). Advocates of playful learning, however, view play as the opposite of didactic schoolwork involving sitting in desks and listening to instruction (Hirsh-Pasek et al. 2009).

Pretend Play

Besides the structured learning materials, perhaps the greatest contrast between Montessori education and playful learning concerns their respective approaches to make-believe or pretend play. Pretending has no place in Montessori education, and this strikes many educators as odd given the popular belief that pretending helps children's development (Ginsburg 2007). In addition, children love

to pretend, and they do it even in cultures that restrict it (Carlson, Taylor, and Levin 1998; Gaskins and Goncu 1992; Lillard, Pinkham, and Smith 2011). Children in a Montessori classroom might want desperately to play house with the little broom and mop set (as I did as a child), but the teachers gently direct them to other, real work, like actually mopping the floor. Why this resistance to an activity that comes so naturally for children?

First, Maria Montessori was essentially an empiricist. Initially, she offered traditional toys in her classrooms (Montessori 1972), but the children did not use them, preferring the learning materials she had developed. Because Montessori classrooms are kept simple and uncluttered, anything not used gets removed. However, I know of no indications that Montessori was adverse to play. In fact, she described the home as a place for a child to work and play (Montessori 1970). She contended that play might well be something children enjoy in their leisure time but not all the time, as adults might enjoy a good game of bridge but would probably tire of the game if they played it constantly (Montessori 1972).

On the other hand, Montessori clearly opposed adults imposing fantasies like Santa Claus on children, which she saw as adult amusement: “We alone imagine, not they; they merely believe” (Montessori 1997, 43). Credulity is a feature of children’s minds, and she thought for adults to give children incorrect information was to abuse their trust. Montessori’s ideas about fantasy should be interpreted against the historical backdrop of Victorian culture, in which fairy tales flourished (Mario Montessori 1976; Schacker 2003). Although she claimed to enjoy fairy tales herself, Montessori described young children in her schools who left the room when adults told fairy tales (Montessori 1989). Such behavior led her to believe that children under age six, in an environment truly serving their needs, had no interest in fairy tales.

And she took it a step further. Montessori even disliked adults engaging in basic object-substitution pretense with children, as when, for example, they gave a child a Froebel block and called it a horse (Montessori 1997). She strove to develop her educational system to help children move towards independence (Montessori [1949] 1974), and she found adult-imposed fantasy unhelpful to that end.

Some child-development specialists maintained that pretending paves the way for later acceptance of religious ideas (Cadman 1926). In response to this idea, Montessori wrote, “religious persons well know that . . . myth must cease to be real as soon as the child’s mind matures, whereas faith must accompany a human being until the end of his life” (Montessori 1997, 46). One recent relevant study found that children who accepted a new fantasy creature, a “Candy Witch” that replaces candy with a toy after Halloween, associated the figure with other fantasy characters like Santa Claus and the Tooth Fairy (Boerger, Tullos, and Woolley 2009). This finding suggests that some children create a category of entities that do not conform to physical laws; once they have such a category, they add new entities to it. Perhaps this suggestion supports Cadman’s views (1926) on the role of fantasy characters with respect to religious belief rather than Montessori’s outlook.

Despite concern about adults imposing fantasy on young children, Montessori clearly valued imagination highly—indeed imagination is the basis of the Montessori curriculum for the elementary classroom (Montessori [1948] 1976). However, she maintained that truth underpins all great acts of imagination and, thus, that young children should be told the truth.

Although many of Montessori’s books discuss her views on pretense and fantasy in general, I know of no discussion in her works about pretending in the classroom other than her reference to children appearing uninterested in the toys she initially supplied. My guess is that she would not have stopped children from pretending in the classroom had special materials been provided for that purpose and that she would have expected the pretending to cease naturally when the children became engaged with other materials. However, there are no Montessori materials intended for pretend play. The closest might be the miniature farm animals provided for The Farm, but they are part of a nomenclature exercise, not a pretend-play diorama. Like Jean Piaget, who was for many years president of the Swiss Montessori Society (Kramer 1976), Montessori saw children’s pretense as a manifestation of their unsatisfied desires (Montessori 1997), and she believed that if there were real mops to use, children would not want to play house. Thus for her, children’s pretense seems a key to learning about children (as in play therapy), but it does not appear as a

means to development. In this sense, Montessori's views of pretense are very much at odds with playful learning.

Which view has more merit: pretending is important to development, or it is not? And if it is important, how much pretense is needed and when? Should children be allowed to pretend with materials in a Montessori classroom? Some believe that Montessori education would be improved by some pretense (Adele Diamond, personal communication, 2010; Soundy 2009). Evidence that pretend play is key to development—that the more there is of it, the better—is thin at best (Lillard et al. 2013), and much of this evidence comes from correlational studies showing that children who pretend more are more advanced in other ways (Bates et al. 1980; Kavanaugh 2006). But, of course, correlation is not causation. Other studies are problematic, and a hard look at the literature shows little support for the idea that pretending causes positive development. It might, but the evidence for this position, despite a forty-year effort to find it, remains elusive.

Consider the Tools of the Mind program (Bodrova and Leong 2007), a preschool program emphasizing pretend play inspired by the work of Russian psychologist Lev Vygotsky. In two randomized controlled trials, this program has shown pretend play led to better executive function (Diamond et al. 2007) although not to better math or language skills (Barnett et al. 2008). Specialists usually attribute the executive function boost to its pretend-play component, yet the tools program also contains a strong planning component: participants' pretend play must be planned in advance, and they must adhere to the plan. At first blush, this actually seems counter to the aspects of pretend play most valued in playful learning. And, indeed, to take the finding that Tools of the Mind assists executive function as evidence that pretend play assists executive function would be wrong. One would need to study systematically different aspects of the tools program to learn which aspect helped children. Until some researcher does this, we cannot know if the planning or the pretend play or some other aspect is the important element in the tools program assisting executive function. In addition, the three most recent large, randomized, and controlled trials with the tools program have not replicated the original results (Clements et al. 2012; Lonigan and Phillips 2012; Wilson et al. 2012).

Regarding children's love of and need for fantasy, recent research suggests that our tendency to think young children prefer fantasy may be misguided. Given a choice between a fantasy story and a real one, children show no preference (Guillot, Olson, and Bloom 2011). Given a choice of how to end a story, young children prefer realistic endings to fantasy ones (Weis-

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berg and Bloom 2009). Children are also misled by fantasy. When read a story about fantasy trains that had mothers and fathers and that experienced feelings, young children evidence misconceptions about trains that aligned with the stories (Ganea et al. 2004). When shown letters in the shapes of animals, children do not learn letters as well as they do when shown plain letters, and children do not learn new words as well from cartoon pictures as from line drawings (Simcock and DeLoache 2006). Children are also less likely to draw analogies from fantasy characters to the real world (Richert et al. 2009; Richert and Smith 2011). And when books are embellished with engaging pop-up features, children are less apt to learn from them (Tare et al. 2010). Thus, fantasy elements, which adults add to children's lives with the idea that youngsters prefer fantasy or find it more fun and more engaging, can backfire.

Regarding adult engagement with children in live pretending, I know of no research suggesting it is harmful to children when adults pretend with them. For example, when adults pretend to have a snack with children, although there might be temporary confusion (Lillard and Witherington 2004), we have no evidence of any lasting or important disruption to children's sense of a real snack. There is evidence that children whose parents pretend with them themselves pretend at a more advanced level, for example, using object substitutions and animating characters earlier (Haight and Miller 1992). Even within a pretend episode, children's play proves more advanced when a parent or an older sibling gets involved (Lillard 2011b). Adults usually give specific signs of pretense that children appear to interpret correctly (Lillard et al. 2007; Lillard and

Witherington 2004; Ma and Lillard 2006; Nishida and Lillard 2007). And at least in some cases, children even appear to learn things in pretend that they then apply in real domains (Hopkins, Dore, and Lillard 2012; Sutherland and Friedman 2012a, 2012b). Thus adults pretending with young children seems innocuous, and children might even learn from it. But Montessori did not endorse adults pretending with children because her preference was for adults to give children information grounded in reality (Montessori 1970).

Summary

Although Montessori education shares some important similarities with playful learning, there are also key differences. Montessori education involves specific materials developed by Maria Montessori and her colleagues designed to work together to convey specific understandings. Although much free choice exists in Montessori education, the choices are more limited in some ways than in playful learning. In Montessori classrooms, children's activities are dubbed "work"—the work of self-construction—whereas in playful learning these activities are called "play". And finally, Montessori education differs widely from playful learning in its attitudes about pretend play and fantasy.

EVIDENCE OF MONTESSORI'S EFFICACY

Playful learning would appear to be a more positive approach to early-childhood education than didactic instruction. Is there evidence that playful learning Montessori-style is helpful to children's learning and development? The results of existing studies are not consistent. However, if one considers them in light of program fidelity or adherence to the Montessori method (O'Donnell 2008), a consistent picture emerges supporting the efficacy of high-fidelity Montessori programs for social and cognitive development. Here I review studies concerning academics and self-regulation (self-control), then I examine studies of social and personality outcomes.

Cognitive Outcomes

Some of the earliest research on Montessori education occurred in Head Start programs in the 1960s (Karnes, Shwedel, and Williams 1983; Miller and Bizzell 1983; Miller and Bizzell 1984; Miller and

Dyer 1975). Montessori was one of several programs compared in two studies—one in Louisville, Kentucky, that followed children through tenth grade and the other in Urbana, Illinois, that followed children through high school. In the Miller study of the Louisville students, the Montessori program did not at first outshine the other programs, but there were sleeper effects. By second grade, Montessori boys had better outcomes than any other group. They sustained this superiority through ninth and tenth grades, though by then attrition had made for a very small sample. In the Karnes study of the students in Urbana, there were few notable outcomes initially, but the Montessori children had the highest high school graduation rate and scored highest on a composite rating of their success in school.

In terms of fidelity, however, these Montessori Head Start programs left much to be desired. The Louisville study included just two Montessori classrooms, with a total of thirty-three children, so roughly sixteen students per group; Montessori classrooms are expected to have thirty to thirty-five children and traditionally often have fifty. Each Head Start classroom included only four-year-olds, not the full three-year age grouping. Each was in its first year of existence during the period of study. Each also had teachers with minimal training of just eight weeks. In contrast, the AMI training course for primary teachers lasts nine months. In the Miller study, a consultant rated programs for fidelity, and the Montessori classrooms scored 6.5 on a 10.0-point scale (with 10.0 being very high). In the Karnes study, the Montessori program showed the same problems regarding limited ages and teacher training, and children worked for just thirty minutes per day with the Montessori materials rather than working the expected three hours for three- and four-year-olds and twice that for five-year-olds. In sum, both Head Start Montessori studies involved lower fidelity programs and did not show immediate effects. Still, both showed some Montessori program advantage over time.

Lillard and Else-Quest (2006) studied children's outcomes at age five and again at age twelve, after three and nine years in a high-fidelity Montessori public school serving low-income children. Importantly, admission to the Montessori school was by lottery

(parents had applied to send their children to the school). Children who were not admitted to the school and who went to other schools became the control group. Most of the students in the control group were in the same school district, and some of the schools in this district also admitted students by lottery. Such schools ranged from language-immersion schools (in which much of the instruction occurs in a foreign language—these schools often have high test results) to traditional public schools. The Montessori programs were associated with AMI, which sends consultants to the schools every three years to ensure that programs maintain AMI standards of program fidelity.

In this study, my coauthor and I found that Montessori five-year-olds scored higher on many cognitive and academic measures, including reading, math, executive function, and social understanding; these youngsters scored lower than the control group on none of the measures. At age twelve, Montessori children scored higher on writing (sentence complexity and story creativity). Interestingly, on academic measures, we found significant differences at age twelve for boys but not for girls (unpublished data). The girls scored about the same across school programs on the academic achievement measures. The boys in the Montessori program scored significantly better than boys in the entire sample, and boys in the more traditional public school programs scored worse. The sample size was small, and the findings await replication; but coupled with the Miller and Dyer findings, there is the suggestion that low-income boys in particular might benefit from Montessori programs over time.

In a closer look at the impact of program fidelity on outcomes, Lillard (2012) tested middle-income children ages three to six in classic Montessori classrooms (those providing only standard Montessori materials), supplemented Montessori classrooms (those supplementing the standard set with typical preschool activities like LEGO sets and workbooks), and more traditional classrooms. In my study, I found no differences in scores across the three types of classrooms at the beginning of the school year. By the end of the school year, however, the students in the classic Montessori programs had shown the greatest increases in executive function, reading, vocabulary, math, and theory of mind. These results suggest that fidelity of implementation is an

important consideration in Montessori research and might explain contradictory findings across studies.

In other studies of older children, differences in the fidelity with which the Montessori program was implemented might also explain contradictory findings. One study of high school students showed significantly better math and science scores for children who had attended Montessori schools from ages three to eleven, as compared to demographically matched classmates who had previously attended other schools (Dohrmann et al. 2007). In this case the Montessori schools were also associated with AMI. In contrast, another study found worse reading scores in eighth grade (but not fourth grade) for Montessori students as compared with matched controls, but here there was no consideration of Montessori program fidelity (Lopata, Wallace, and Finn 2005). An investigation of the school that was most likely the subject of this study—the sole public Montessori school in the author’s home city at the time of the study—showed significant deviations from Montessori practice, like homework, grades, and special teachers for different topics. Low fidelity of implementation thus could explain the pattern of results.

Another study compared children in Montessori and conventional classrooms for the occurrence of private speech (internal dialogue), a behavior that has been correlated with developing self-regulation (Krafft and Berk 1998). It found less private speech in the Montessori classroom but did not test for self-regulation. Yet, here again, there were clear deviations from program fidelity.

For example, free-choice periods lasted for just forty-five minutes in the morning and one hour in the afternoon, whereas high-fidelity Montessori programs include a three-hour work period in both the morning and the afternoon (AMI Standards 2010). In addition, teachers arranged materials in work stations on the floor and tables. In high-fidelity Montessori programs, as described in the founder’s works, children pull their activities off the shelves and return them to the shelves; there are no work stations. A third study found better reading outcomes from second-grade children in a Montessori curriculum compared to traditional programs; the descriptions of the Montessori program here also suggested higher fidelity (Rodriguez et al. 2005).

Social and Personality Outcomes

The study reported earlier by Lillard and Else-Quest (2006) also looked at social outcomes for students aged five and twelve years. It found that, at five, Montessori children were significantly less likely to be engaged in ambiguous rough-and-tumble play on the playground and significantly more likely to be engaged in positive, shared peer play than were children in the control group. The study also showed higher levels of perspective taking when children were asked how they would resolve social conflicts. It found that, at age twelve, Montessori children were significantly more likely to choose a positive, assertive response to a difficult social situation, by directly and without aggression addressing a social problem. An example of a positive, assertive response to someone taking one's chair would be to say, "Excuse me, but that's my seat. Would you please take another one." Children in the control group were more likely to opt for passive avoidance, for example, just finding another seat without saying anything. In keeping with this comparison, the twelve-year-olds in the Montessori program gave higher ratings to their school social climate than did those in other programs.

Also studying high-fidelity Montessori programs, Rathunde and Csikszentmihalyi (2005a, 2005b) compared children attending Montessori middle schools with children at conventional schools matched for socioeconomic status. They found a more positive social climate at the Montessori schools. For example, Montessori middle school students were more likely to report that their classmates were also their friends. They also found that Montessori students reported feeling more "flow" and intense engagement when doing schoolwork than did the students of the control group. Outside of school, the two groups were equal on this variable.

In sum, children in high-fidelity Montessori programs do well in academic and cognitive as well as social domains compared to those in conventional programs. Thus there is good support for Montessori education's style of playful learning for assisting human development.

SUMMARY

Montessori shares many elements of playful learning, including overall structure, the use of small objects for learning, individualized lessons, free choice, peer involvement, fun, and lack of extrinsic rewards. It differs by having a specific set of materials, less free choice in interacting with materials, in calling children's activity "work," and, especially, in its lacking any pretend play. The requirement of specific materials makes Montessori education more restrictive than playful learning. On the other hand, having a specified set of lessons and materials can be helpful to teachers and might promote program longevity. The popularity of Montessori education today relative to strict Dewey programs (Zilversmit 1993), for example, might in part grow from the guidance offered by the set of materials and lessons (Lillard 2005). Maria Montessori's reasons for not including pretend play in the educational program derived from her empirical observations. Our current cultural view that pretending is important to development might not have a particularly solid empirical foundation; we need more compelling research to substantiate this claim. Whether adding pretend play to Montessori classrooms would help, hurt, or make no difference to development is an empirical question. Finally, evidence reviewed here shows that when Montessori programs are of high fidelity, outcomes in social and cognitive realms have been superior to those of conventional and of less authentic Montessori programs.

When it comes to how guided play helps development, it might be the case that the important elements concern not pretend play, but rather, other aspects of playful learning like freedom to choose activities, interactive hands-on lessons, and the ability to involve peers in learning activities.

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