

The Montessori Method and the Learning Sciences

A review of



Montessori: The Science Behind the Genius

by Angeline Stoll Lillard

New York: Oxford University Press,
2005. 404 pp. ISBN 0-19-516868-2.
\$35.00

Reviewed by
[R. Keith Sawyer](#)

— Angeline Stoll Lillard is an expert in children's pretend play and the child's developing theory of mind. I was a bit surprised to see that Lillard was the author of this book, her first, because she has not previously published any education-related articles. In addition, Maria Montessori believed that pretend play was an unnecessary waste of time (pp. 183-189). However, I understood Lillard's motivation when I read in the preface that her children attended the Peace Montessori School in Portland, Oregon. Lillard brings together her own experience as a Montessori parent with her professional expertise as a developmental psychologist, and the result is a well-written and well-argued book. I agreed to review this book both because I respect Lillard's scholarship and because I am considering sending my two-year-old to a Montessori school next year. I was impressed by this book, enjoyed reading it, and learned a lot about Montessori's method.

— Lillard focuses on eight of Montessori's central ideas about learning, with a chapter devoted to each, and argues that contemporary research in cognitive development supports each of these eight principles: (a) Movement and cognition are closely related, (b) learning is improved when the learner has a sense of control, (c) people learn better when they are interested in what they are learning, (d)

giving learners rewards for learning interferes with learning, (e) collaboration with peers contributes to learning, (f) learning is more effective when situated in meaningful contexts, (g) teachers should find a balance between being overly authoritarian and being overly permissive, and (h) children learn better in an ordered environment. Because I have just finished editing *The Cambridge Handbook of the Learning Sciences* (Sawyer, 2006b), I can confirm that most of these principles are supported by the new interdisciplinary field of learning sciences, which combines psychological and educational research. Lillard argues that Montessori was a genius ahead of her time; only in the 1980s and 1990s did cognitive scientists begin to talk about *embodied cognition*, the idea that knowledge is embedded in physical activity in the world (Principle a; Clark, 1997). At about the same time, education researchers and cognitive scientists began to emphasize the importance of situating learning in meaningful contexts (Principle f; Sawyer & Greeno, in press). The last 20 years have provided impressive support to the idea that children learn better when they collaborate with peers (Principle e; Sawyer, 2006a).

▬ The general strategy of each of the eight chapters is to begin by stating a Montessori principle, then to summarize contemporary developmental psychological research that is related to that principle, and then to describe in more detail how that principle is implemented in Montessori classrooms. These chapters show that developmental psychology is broadly consistent with Montessori methods, but the chapters generally do not argue in support of the specifics of Montessori curriculum. For example, in Chapter 2, "The Impact of Movement of Learning and Cognition," Lillard cites research showing that bodily movement and gesture contribute to learning. Then she moves on to discuss specific Montessori materials: the Pink Tower (p. 57), the Brown Stair (p. 60), the Red Rods (p. 61), and others. However, the research Lillard cites would support the use of any toys that involve movement and manipulation.

▬ For example, Montessori argued that a set of toys should vary only on one dimension and that the child learns better by being forced to focus on that one dimension. The Pink Tower is a set of 10 cubes that

vary from 1 cm³ to 10 cm³ and are all pink. Lillard notes that most children's toys vary in multiple dimensions and points out that Montessori thought this would be detrimental; however, she does not cite any research in support of this specific claim. The research she cites could just as easily be used to advocate for multicolored cubes or for cubes and spheres together.

☞ The one body of research that is missing is research from the learning sciences, a new, interdisciplinary field that is building on research in cognitive development (and other scientific disciplines) and designing new curricula. The classroom environments emerging from this new field are also based on many of the principles that organize Lillard's book. One of the central issues facing learning scientists is the proper balance between freedom and structure. The debate has moved beyond a simplistic polarity between structure and freedom because a substantial body of research has shown that different structures—often called *scaffolds*—are appropriate at different points in learning and that critical to learning is the way that the scaffolds change over time in response to the increasing abilities of the learner.

☞ Perhaps what is most distinctive about the Montessori method is the way that the tension between freedom and structure is resolved. Many parents' first impression of a Montessori classroom is that it is extremely structured and orderly. Chapter 9 addresses this issue, but it is the least convincing of the book. In a Montessori classroom, there is no free play time and no recess. Children are always engaged in a specific task, using one of the many special objects designed by Montessori, and there is a proper way that the child is supposed to interact with each object. Children are not allowed to take the Pink Tower and make a small village from it; they must stack the blocks up to make a tower (p. 189).

☞ For readers unfamiliar with Montessori's method, Lillard's description of the Table Washing activity is instructive. The activity is supposed to be done exactly as follows: First, the child selects a table to wash. Then the child goes to the shelf with table washing materials and takes a plastic mat designed

for this activity, carries it over to the table, and places it on the floor beside the table. The child moves the chairs aside and then lifts the table onto the mat. Next, the child returns to the shelf and gets an empty pitcher, fills it half full at the sink, returns to the table, and places the pitcher on a specific spot on the mat—a spot that is chosen by the teacher. The child returns to the shelf a third time for a basin to be filled with wash water from the pitcher and a bucket for waste water. On the fourth trip to the shelf, the child brings a tray that contains a neatly organized set of matching materials: soap in a dish, a sponge in a dish, a scrub brush, and a towel. This tray also has its own assigned place on the mat, which has been selected by the teacher. Now the washing can begin, and there is an equally specific sequence of steps. First, the child pours a half inch of water from the pitcher into the wash basin, wets the sponge in it, squeezes it, and then wets the table using a left-right motion that has been modeled by the teacher (and that is thought to prepare the child for the left-to-right nature of handwriting). When the table is entirely wet, the child wets the brush, wipes it on the soap, and scrubs the table using the same left-right motion (p. 302)—and so on until the table is rinsed and dried. Many parents find this level of rigidity to be excessive, and the questions that remain unanswered in this book are whether this amount of structure and order is optimal and whether these specific activities contribute to learning better than alternative activities would.

— One of the strengths of the Montessori curriculum is how these activities are connected across the curriculum (p. 143). Recent research in the learning sciences has shown that children learn more deeply and retain knowledge better when it is connected and integrated with other knowledge rather than isolated and compartmentalized into 50-min classes and four-month semesters. One reason that the Montessori curriculum is so structured is that each activity is designed to have a relation with prior and later activities (e.g., washing the table from left to right is supposed to prepare the child for writing left to right). The problem is that one cannot change anything without knowing everything, and the result is that the Montessori system has remained remarkably static since Montessori's death in 1952. In two pages of the conclusion, Lillard discusses the

lack of innovation in the Montessori system, but her discussion is devoted to the danger that innovation might reduce the effectiveness of the method (pp. 330-331). Just one example of how Montessori schools should change in response to contemporary research is as follows: Learning scientists have developed new kinds of computer-supported learning environments that implement many of the eight principles, but in ways that can support a much broader range of topics and knowledge, including relatively advanced and abstract science and math through high school and beyond. Yet the computer is noticeably absent from Montessori schools. Lillard defends the lack of technology in these schools (pp. 335-337), but her defense does not address this new style of computer learning environment.

☞ This book successfully argues that many of the underlying principles of Montessori's method are supported by research. Lillard concludes, "Montessori education, then, seems to be more in line than traditional schooling is with what we know about children's development, how they learn, and the conditions under which they thrive" (p. 328). However, "traditional schooling" is a straw man; all education researchers now know that the traditional school that Montessori attacked (children sitting in rows, quietly working alone, on decontextualized curricular materials) is ineffective. The question is not whether to stick with traditional schooling; now that we are armed with a large body of findings from the learning sciences, the question is how to design the schools of the future (Sawyer, 2006c). The most controversial aspect of the Montessori system, and its most unique feature, is the ordered and structured nature of the curriculum, and Lillard does not successfully argue that curriculum is supported by contemporary research. The risk is that sticking with the particular materials, activities, and sequences originally developed by Montessori could prevent any movement forward, freezing the classroom in the early 19th century. Still, Lillard's book has convinced me to pay a visit to our local Montessori school and to seriously consider it as an option for my own child.

References

- Clark, A. (1997). *Being there: Putting brain, body, and world together again*. Cambridge: MIT Press.
- Sawyer, R. K. (2006a). Analyzing collaborative discourse. In R. K. Sawyer (Ed.), *Cambridge handbook of the learning sciences* (pp. 187-204). New York: Cambridge University Press.
- Sawyer, R. K. (Ed.). (2006b). *Cambridge handbook of the learning sciences*. New York: Cambridge University Press.
- Sawyer, R. K. (2006c). The schools of the future. In R. K. Sawyer (Ed.), *Cambridge handbook of the learning sciences* (pp. 567-580). New York: Cambridge University Press.
- Sawyer, R. K., & Greeno, J. G. (in press) Situativity and learning. In M. Aydede & P. Robbins (Eds.), *Cambridge handbook of situated cognition*. New York: Cambridge University Press.

PsycCRITIQUES

June 14, 2006 Vol. 51 (24), Article 11

1554-0138

[© 2006 by the American Psychological Association](#)

For personal use only--not for distribution.