

Montessori: The Science Behind the Genius

Book Discussion Questions

Compiled by Margaret Jessen Kelley, Forest Bluff School

Chapter 1: "An Answer to the Crisis in Education"

1. *Two fundamental cornerstones of American schooling today were placed at the turn of the 20th century: the school as a factory and the child as a blank slate. Students of child development know that these ideas are obsolete, but they continue to have a profound effect on how schooling is done. The persistence of these outmoded ideas explains why so few children really flourish in school, and why so many strongly prefer snow days to school days (1).*

What do you remember about your days in school? What are your favorite memories? What was challenging for you? How does what you remember fit into these "cornerstones of American schooling"?

2. *Education discourse in our country does not penetrate the roots of the problem, which are the underlying models on which our education system is founded. To really effect change, reformers must address the fundamental models on which our school system is built, as those models create a host of impediments to children's learning (4).*

What reforms have been tried in the last few decades? Do you know what the positive or negative effects of these reforms are? Why do they not penetrate to the roots of the problem?

3. *In our current information age, when we deal in more of a commerce of ideas and entrepreneurship than in factory production, use of such a model in education should be particularly suspect. The school system in a sense trains children to be alike, whereas the economy thrives on variations in individual initiative, at least at the levels to which most parents aspire for their children (7).*

Do you think the current school system trains children to be alike? Why or why not? Do you see the value in individual initiative? Do you think the current school system is able to effectively do this?

4. *[Edward Lee] Thorndike [a prominent figure in behaviorism] viewed the teacher as the major force in educating the child, and the teacher's task as being to change the child. To do so, he said, the teacher must "give certain information" (Thorndike, 1906/1962, p. 59) and "control human nature" (p. 60). The only means the teacher possessed to do this*

were speech, gestures, expressions (p. 60), and a behaviorist curriculum based on associations between items learned and rewards administered (8-9).

Does this assessment sound like the current school system to you? Do you think behaviorism is an effective way to educate children or support their development?

5. *[Dr. Montessori] found time to observe in the classroom [she established], and the teacher also reported to her in the evenings about what had transpired. Dr. Montessori is said to have worked late into the nights making new materials for the teacher to try. By testing new approaches and materials and noting children's reactions, over the next 45 years, Dr. Montessori and her collaborators developed a radically different system of education (16).*

How might a form of education that is based on this kind of observation and experimentation be different from one that arises from adult's ideas and preconceived notions? What valuable information might Dr. Montessori have gotten by developing her curriculum this way?

6. *A Montessori classroom is usually a large, open-feeling space, with low shelves, different sizes of tables that comfortably seat one to four children, and chairs that are appropriately sized for the children in the classroom... The Montessori classroom is arranged into areas, usually divided by low shelving. Each area has "materials," The Montessori term designating educational objects... Montessori classrooms also contrast with many conventional ones in having a pristine appearance... Children are not assigned seats but are free to work at whatever tables they choose, moving about during the day (18-19).*

How different is this kind of classroom from the one you attended when you were a child? What does it sound like to you? Is it appealing? Do you think it could be effective?

7. *In addition to the use of each material being highly structured, the overarching Montessori curriculum is also tightly structured. Materials within a curriculum area are presented in a hierarchical sequence, and there is a complex web of interrelationships with materials in different areas of the curriculum (20).*

Did you know that the Montessori curriculum had so much structure and interrelatedness? Do you think this would make it an effective method for education and development?

8. *Underlying Montessori education is a model of the child as a motivated doer, rather than an empty vessel (27).*

Knowing your child, do you see them as a motivated doer? Do you think the conventional school system supports this perspective on children? From what you know about Montessori, how does it consider the child in this way?

Chapter 2: “The Impact of Movement on Learning and Cognition”

1. *Movement and learning are perpetually entwined in Montessori education. Beginning in the home or day care, infants sleep on floor beds instead of cribs, so they can move around an entire room to explore and get objects. In Primary classrooms children move to wash tables and trace Sandpaper Letters, to put large wooden map pieces in place as they learn their names, and to play scales and then compose music on Musical Bells. Older children carry out verbal commands written on cards, both to develop semantic precision and to experience what a verb is. They place colored symbol cards next to words to designate parts of speech. Countable squares and cubes illustrate mathematical concepts (37).*

Do you value the relationship between movement and learning? How do these activities and exercises sound to you? How do you imagine your child responding to these freedoms and activities? Do you see how it might serve their education?

2. *The development of manual control also appears to be related to intelligence more generally. In a study of adults ages 18 to 62, finger dexterity was found to be importantly related to general intelligence (Dreary, Bell, Bell, Campbell, & Fazal, 2004). In children, fine motor skills are a strong predictor of later school success (Cameron et al., 2012; Grissmer, Grimm, Aiyer, Murrah, & Steele, 2010) and possibly intelligence as well (41).*

In what ways have you experienced a relationship between your hands and your mind? Does the use of your hands translate to understanding or ability when you are learning?

3. *Purposeful activities are reinforcing for infants, and self-generated movement is clearly tied to even very basic processes of mental development. Even spontaneous movements are important to development. These research findings support Dr. Montessori’s contention that, to assist development, children should be encouraged to move their hands and their bodies from an early age (43).*

How do you understand the concepts of “purposeful activities” and “self-generated movement” as they apply to your child? Is the connection between these and your child’s development intuitive to you? Based on what you’ve read and heard, do you believe it is important to encourage movement for your child?

4. *The research presented here suggests that over the short term, there might be psychological impacts, such as advanced social cognition. However, one principle of development is that very little of a given experience is needed to set a normal developmental trajectory in motion, so whether such arrangements would have any effect beyond the first year is questionable and would require careful study. In addition, babies who lack self-locomotor experience owing to developmental problems otherwise appear to function normally, so there are alternative paths that can be taken to “normal development” in broad strokes. Whether there are developmental differences that only more refined tests would reveal is an empirical question (47).*

What does this qualification mean for your understanding of the relationship between movement and development? Does knowing that there may not be any measurable effects of early movement beyond the first year change your belief in the importance of it? What might be some intangible benefits that research has not yet quantified for?

5. *When one moves with a purpose, there is a sense in which one’s body is aligned with one’s thought. Thought guides action. In the embodied cognition perspective, the purpose of the brain is to guide action, and we think as we do because of the bodies we have (Glenberg, Witt, & Metcalfe, 2013) (51).*

How do you understand the link between body and thought? What does the term “embodied cognition” mean to you? Do you believe that our bodies and brains are connected in this way?

6. *Children who are more expert at using the abacus are more proficient at solving math problems, even when they are not using the abacus. This proficiency apparently stems from the fact that abacus experts imagine the movements they would make were the abacus present. Thus, even in the absence of the actual movement of the abacus beads, rendering the symbolic concrete via routine use of the abacus improved calculation [(Stigler, 1984)] (53).*

How does this anecdote affect your understanding of the way movement and cognition are connected? What does this tell us about our mind’s ability to translate concrete to symbolic?

7. *Abundant research shows that movement and cognition are closely intertwined. People represent spaces and objects more accurately, make judgments faster and more accurately, remember information better, and show superior social cognition when their movements are aligned with what they are thinking about or learning. Conventional classrooms are not set up to capitalize on their relationship between movement and cognition. In contrast, Montessori has movement at its core (56).*

In what ways does conventional education fall short in integrating movement with the curriculum? Do you think there are ways to introduce it to the system that already exists? How is movement inherently present in the Montessori curriculum?

8. *It is worth noting here the brilliance of Montessori education in introducing mathematics through spatial concepts. Mathematics is fundamentally about measuring the world. Conventional education begins with numeracy, but spatial understanding is conceptually more foundational to math (Mix & Cheng, 2012). In keeping with this, preschool children's performance on spatial tasks, including learning geometric figures, predicts their later performance on numeracy-related tasks (Verdine, Golinkoff, Hirsh-Pasek, & Newcombe, in press). First introducing the child to spatial dimension and then to its measurement is a fundamentally different approach to math education, as radical as Dr. Montessori's idea of introducing reading through writing (59).*

How is spatial understanding foundational to math? Why would emphasizing this rather than numeracy benefit a developing child? What do you remember about the way you learned mathematical concepts? How is spatial understanding related to your individual mathematical abilities?

Chapter 3: "Choice and Perceived Control"

1. *Children in Montessori classrooms freely choose their work. They arrive in the morning, look around the classroom, and decide what to do. They work on it for as long as they are inspired to, then they put it away and select something else. This cycle continues all day (81).*

What does this kind of day for children sound like to you? What seems beneficial? Do you have any concerns or questions about it?

2. *Psychological research clearly shows that restriction of choice and control are not optimal for human learning and well-being. People have a basic need for autonomy (Deci & Ryan, 2011; Ryan & Deci, 2000), which American culture particularly nourishes*

(Iyengar & Lepper, 1999); Kitayama & Uskul, 2011; Markus & Kitayama, 1991). Feeling one can make choices fulfills this need and allow people to flourish (82).

What has been your experience with a restriction of choice and control? How does it make you feel? Do you think your creativity and productivity is better or worse when you are autonomous? How might this translate to children? Do you think they should also have access to choices?

- 3. Children's locus of control has also been related generally to academic performance, both for school grades and for achievement tests (McGhee & Crandall, 1968). The longer children spend in conventional school environments, the more external their locus of control in those environments becomes (Harter, 1981), but children who buck that trend and manage to retain an intrinsic locus of control do better (Carol Dweck, 1999) (86).*

What do you remember about your own schooling experience? Would you say you had an external locus of control or internal? Was it different at different levels of schooling? How might a child maintain an internal locus of control while at a conventional school? Do you believe it has value?

- 4. Children's perceptions of the degree to which they control the classroom environment and are free to make choices were therefore related to several variables pertinent both to well-being and to school performance: technical skill, effort, lack of aggression, and creativity (90).*

What did you think when you heard the results of this study? Do the benefits make it seem worthwhile? Why do you think control and choices relate to these positive effects?

- 5. Dr. Montessori believed that for a child to make productive choices, the environment had to be prepared - specially designed to stimulate constructive activity in children. Free choice in an environment that did not have an appropriate quantity of materials designed for organized activity, and that was not populated with concentrating, constructively engaged classmates might lead to chaos (93).*

Why is a prepared environment so important for making productive choices? How do the right materials support productive choices? And what effects do the classmates have on a child's ability to choose? When have you witnessed the difference between productive choices and chaos?

6. *Although children freely choose what to do in Montessori classrooms, there are several limits on their choices. Choices are limited by the amount of material, by what children know how to use, and by the requirement that they be constructive and responsible (95).*

Why might these specific limits make a difference in the quality of choices a child makes in their classroom? How do you understand the limit of “constructive and responsible” activity?

7. *What is important is that these externally imposed structures remain minimal for what a particular child requires, so the child’s personal control is maximal for what that child can handle. The Montessori teacher watches each child carefully and uses a level of structure - a degree of freedom - that fits what that child is ready for and adjusts it as the child changes (102).*

Why is it so important that a Montessori teacher finds the right balance of structure and freedom? Have you seen your own children change throughout their development, or even the course of a day, in what degree of freedom they can handle? How do you adjust structure at home? How do you imagine this working in the classroom?

8. *Can Montessori children adapt to conventional school settings?... The best scientific evidence is from studies presented in chapter 11. Montessori Head Start children who went on to conventional schools were by second grade showing academic outcomes superior to those of children in conventional no-choice, whole-class learning programs. Other evidence is from a Milwaukee study in which children were in Montessori through fifth grade. When tested in high school, with the comparison sample matched at test and thus a very high standard of comparison, the Montessori children fared as well as (in English and Social Studies) or better than (in Math and Science) children who had been in other pre- and elementary school situations (103).*

Do you have concerns about your children transitioning to a conventional school? What specific worries do you have? What anecdotal stories have you heard about this transition? What expectations do you have about the transition?

Chapter 4: “Executive Function”

1. *In Montessori education the emphasis is on helping children to build self-control, so each child independently becomes responsible for his or her own behavior... Self-control arises in an extraordinary way - by setting children free in an environment that has been specially prepared to correspond to their needs at their current stage of development.*

Discovering those needs and inventing those environments was the genius of Dr. Montessori and her collaborators (105).

Why is self-control so important for a productive and happy life? How is freedom connected to self-control? How is a specially prepared environment connected to self-control?

- 2. There are many processes involved in [executive function]; psychologists often focus on three in particular (Miyake, Friedman, Emerson, Witzki, & Howerter, 2000): inhibition (of a thought or behavior), working memory (which can range from simply holding information in mind to manipulating that held information), and shifting (e.g., following one set of rules and then a different set of rules). There are certainly other executive functions; sometimes people also include planning, and I would also include attention (see also Garon, Bryson, & Smith, 2008; Petersen & Posner, 2012). In fact, I think willed inhibition (or excitation) is the heart of all executive function: We choose what to attend to and do, initiating some thoughts or behaviors while inhibiting others in order to carry out a plan and reach a goal (see Logan, Van Zandt, Verbruggen, & Wagenmakers, 2014; Miyake & Friedman, 2012 (107)).*

How do you understand these elements - inhibition, working memory, shifting, planning, and attention - as relating to executive function? How might they work together to serve this purpose?

- 3. Executive function predicts measures of life success as well as specific cognitive and social outcomes. For example, in the marshmallow task, children's ability to wait for a plate of marshmallows, rather than eat a lesser amount immediately, when they were age 4, predicted social competence 10 years later (Mischel, Shoda, & Peake, 1988), and SAT scores and other measures of executive function at the end of high school (Mischel, Shoda, & Rodriguez, 1989; Shoda, Mischel, & Peake, 1990), and even body mass in their 30s (Schlam, Wilson, Shoda, Mischel, & Ayduk, 2013) (109).*

How do you understand executive functioning as relating to quality of life in later years? How do you specifically see "the marshmallow test" as relating to social competence, SAT scores, and body mass? Why does executive functioning matter?

- 4. According to Dr. Montessori, being free to make constructive choices in a specially prepared environment develops positive personality characteristics... She wrote, "And each time that such a polarization of attention took place, the child began to be completely transformed, to become calmer, more intelligent, and more expansive"*

(1917/1965, p. 68). This reminds one of the association seen in conventional settings between concentration and self-regulation and positive character outcomes (116).

Have you seen a connection between calm concentration and positive personality characteristics at home? What does it mean to you to hear Dr. Montessori's observation in the early 1900s confirmed by research 100 years later?

- 5. Regular interruptions, by definition, disrupt concentration. Concentration, according to Dr. Montessori, is necessary for children to tune into the postulated inner guides that help them to make good choices. Every adult-imposed interruption at which children are removed from their freely chosen work during 3-hour morning and afternoon work periods diminishes the quality of concentration children can achieve (126).*

What is a "postulated inner guide"? Why is concentration necessary in order for children to tune into them? Why is it so important to reduce interruptions to the work cycle? Have you ever considered the detrimental effect of interruptions on concentration?

- 6. There are several ways in which Montessori education is aligned with mindfulness. The first way... is concentration. Mindfulness also involves and privileges deep concentration; meditation is after all a form of concentrated attention. Second, both mindfulness and Montessori privilege mind-body awareness... A third intersection... concerns the Exercises of Practical Life... Children are taught to perform all steps of the exercises with great care (132-133).*

What do you know about mindfulness and its benefits? How are concentration, mind-body awareness, and attention on an activity involved in mindfulness? How do you understand these elements as being present in the Montessori environment?

Chapter 5: "Interest in Human Learning"

- 1. Regarding topic interests, Montessori materials and activities have been very carefully developed over many decades to appeal to children's interests. Dr. Montessori would create a material and then test it, observing how children interacted with it. Materials that did not capture their interest and serve their learning were rejected, and she revised each material until she got good results. This same care was put into the development of the lessons (137).*

How does this approach to curriculum development affect the child's experience in the classroom? What role does this kind of preparation play in conventional education, given what you know or experienced in it? Did you know that Dr. Montessori put this kind of work into her materials?

2. *Regarding specific personal interests, Montessori education encourages children to pursue issues that fascinate them, allowing more general learning to accrue through pursuit of those individual interests. For example, a child who is obsessed with frogs can obviously learn about biology through frogs. More generally, though, the child can also learn how to find information for - and write - a report, can practice penmanship, spelling, and punctuation, and can develop skill at realistic drawing. The child might also use frogs as a springboard to study sound (beginning with croaking) or adaptation (how different species of frogs have adapted to different biomes) (138).*

How much were you able to pursue personal interests in school? Can you envision how a child could access many subjects through one particular passion? What are some other examples of this? Does this freedom of choice concern you?

3. *For passages embedded in context that students have identified as interests, students were “more likely to recall more points, recall information from more paragraphs, recall more topic sentences, write more sentences, provide more details information about topics read, agave no errors on their written recall, and provide additional topic-relevant information” (Renninger, 1992, p. 381) (141).*

Have you experienced this anecdotally in your own life? How easy is it for you to pay attention or remember when it is something that does not interest you? How much do you retain when you are interested?

4. *Interest drives young children’s acquisition of knowledge. They are more apt to notice and to remember items of particular interest, which is bound to lead to further accumulation of knowledge about those interests. Interest thereby influences the early organization of children’s mental representations of the world. They pay attention to, recognize, and recall the world in terms of what most interests them (145).*

Do you notice this in your own children, whatever their age? From a developmental perspective, why do you think interest is so important for learning and growth? How might engagement with topics and activities that *are* inherently interesting to someone serve engagement with topics and activities that *are not* inherently interesting to them?

5. *Dr. Montessori saw the world of humans as based on five critically important developments... described in the five Great Lessons, given early in the fall every year in Elementary classrooms... The stories are delivered with drama and are often accompanied by demonstrations... The stories are intended to leave the children with more questions than answers, inspiring them to go learn more (154-155).*

How much do you know about the great lessons (mention blog post “What’s so great about the great lessons)? Can you imagine how learning about history in this way would inspire further exploration? What do you remember about how you learned history? What were the most interesting methods?

6. *In Montessori education, the materials and lessons, rather than the teacher, are intended to operate for the child as organizing structures. Rather than an expert teacher providing core principles around which the child can organize his or her knowledge, the materials provide those principles. The Montessori materials embody basic principles, and they structure knowledge in each area of the curriculum (172).*

How is this setup different from a conventional classroom? How do you think a child experiences their education differently when the organization of knowledge comes from materials and not the teacher? When you consider this concept, which Montessori materials come to mind as representing structured knowledge?

7. *It is interesting to consider research on mastery versus performance goals in learning (Dweck, 1999, 2006)... People with mastery orientations, in brief, are people who are interested in learning in order to master a topic. They tend to like challenges, and they persist at them. People with performance goals, in contrast, tend to like to do easy jobs that make them look good... And it ends up that the particular conditions under which people are more apt to adopt mastery goals bear striking similarities to Montessori environments (Ames, 1992) (173).*

Most people have both mastery and performance goals, depending on many variables; what have you noticed about your own goals - when they tend towards mastery and when they tend towards performance? Can you see how mastery goals serve education? Based on what you know about the Montessori classroom, how does it support mastery goals?

Chapter 6: “Extrinsic Rewards and Motivation”

1. *The use of extrinsic rewards, particularly grades, in conventional schools may stem from a cultural assumption that children do not like school and cannot be motivated in school any other way. This assumption is often true for children after they have been in school for a time, and may stem from such factors as that schoolwork is not interesting and that children have little choice in the classrooms. If one really is not motivated to do something, extrinsic rewards can get one to do it (177).*

Did you like school when you were growing up? Did you always feel that way? What manifestations do you see in our culture of the assumption that children do not like school? How does this assumption affect the way that adults interact with children? How does it affect the way the conventional classroom is set up?

2. *Research shows that if a person was already motivated to do an activity, expected rewards actually interfere with their subsequent interest in that activity. This result often surprises people, but the research supporting it is very strong. Learning is something young children are interested in and are intrinsically motivated to do (179).*

Have you had any experiences of this in your own life? Was there something you loved to do that change because of prizes or rewards? Have you seen this phenomenon with your own children's activities? Do you believe that young children are intrinsically motivated to learn? Have you witnessed this in your own children?

3. *One particularly interesting study involved fifth-graders from three elementary schools... Students who are just reading for reading's sake, attending to their own interest and the difficulty of the passage, apparently develop deeper conceptual understanding and later retain most of the factual information gleaned during their initial reading. Their long-range factual retention is equal to that of students who were specifically trying to memorize for a test, but they also have conceptual knowledge (185-86).*

How is reading different for you when you know you are going to be assessed on your performance or comprehension? Is the experience different? Is your comprehension different? What is the importance of maintaining deeper conceptual understanding? Why do you think being tested changes this?

4. *Mark Lepper has noted that when he describes the body of work on rewards to teachers, he gets two sorts of reactions.*

*When the results of this literature were described to audiences of educators who worked primarily with young children, the typical response was unadulterated approbation... By contrast, when these same findings were presented to educators who themselves worked more with older students... they were quick to point out its lack of relevance to their own classroom situations. After all... they routinely indicated, students in their classes rarely displayed any intrinsic motivation whatsoever. **There was simply nothing to be undermined*** (196-97).*

**Emphasis added*

Why is the experience of teachers of young children so different from teachers of older children? How do you think it affects students' learning experience when they are taught

by adults who do not believe that they have natural intrinsic motivation to learn? What does this tell you about the state of conventional education?

5. *Children in early Montessori environments were not just uninterested in rewards - they outright rejected rewards. Dr. Montessori believed that this rejection was in part because the children had achieved a sense of dignity in the classroom (199)*

How does receiving rewards for learning affect someone's sense of dignity? Why does this matter in an education setting? In what ways have you seen your own child take on a sense of dignity? What does it feel like when your own dignity is disturbed?

6. *It is certainly important in any educational system that learners be given some way of knowing when they have been correct or not, but Dr. Montessori believed that vesting that authority in the adult was problematic. She also saw marks of right and wrong in written work to be demotivating... Instead, she incorporated feedback in the Montessori materials themselves (200). **Suggestion: Lay out a material with obvious control of error, such as graduated wooden cylinders, spindle box, pink tower, as mentioned in the book.***

Why might giving the adult absolute authority regarding correctness problematic? And why are marks of right and wrong demotivating? What has your experience been with these two conditions? How is a learning experience different when the environment provides the feedback? When you look at the materials presented below, can you tell how the control of error works? Can you imagine a child determining this for themselves?

7. *Montessori teachers also evaluate children by constantly observing their work. Making the teacher's task easier, children's work is normally spread out and easily visible, so observations can be made without the teacher's appearing to look closely at the work. Dr. Montessori admonished teachers not to interfere with the children's ongoing work for correction. "If you interfere, a child's interest [evaporates, and] the enchantment of correcting himself is broken. It is as though he says, 'I was with myself inside. You called me, and so it is finished. Now this work has no more importance for me'" (1989, p. 16) (204).*

Can you imagine how the Montessori materials allow the teacher to evaluate the children's work without intrusion? Why does this matter for a child's experience? Have you seen how an adult's interference affects a child's learning experience? What does it mean to you when Dr. Montessori says of the child's thought, "I was with myself inside"? What role does this play in learning?

Chapter 7: “Learning From Peers”

1. *“In conventional elementary school classrooms, children learn mainly from the teacher and texts. The teacher stands before the children, who are seated at individual desks, and delivers knowledge. Elementary school classrooms are engaged in this form of instruction (on average) 60-70% of the time, with much of the rest of the time spent in individual seat work and transitioning” (219).*

Does this description recall your personal experience in school as a child? What did you like about it? What was challenging for you? Were you able to learn effectively in all subjects this way? When did you interact with your peers? Did you want to interact with them more than you were allowed to?

2. *“[S]ocial learning arrangements are increasingly being implemented in conventional schools... and are recommended by the National Association for the Education of Young Children (2009) and many other educational organizations. However, in a conventional system, such forms of learning are additions, because the system was not designed for peer interaction” (220).*

What does it mean for a social learning arrangement to be an “addition” in a conventional school? How effective do you think it can be, knowing it has been layered on top of a pre-existing design? Do you think it is more effective to design a method of education where peer interaction is built in?

3. *“Clearly all people learn in part by observing and imitating others... Conventional schooling capitalizes very little on this ubiquitous form of learning” (222).*

Based on your experiences and observation, in what ways does conventional schooling take advantage of observation and imitation for education? Do you think it is a shortcoming of the system that it is not able to fully embrace it?

4. *“Dr. Montessori described an early case in which it became apparent to her that children’s tendency to imitate others can be a useful source of inspiration in school... This observation... recurs annually in well-functioning Montessori Primary classrooms when the first 4-year-old suddenly realizes, after months of working with the preparatory materials, that he or she can write... Other 4-year-olds, having also been indirectly prepared to write through [classroom materials]... spontaneously began writing in reaction to having observed a first child reaching that milestone... [W]hat is unique in Montessori is the series of steps, all visible and imitable, that lead children along the*

path to writing, so that a community of 4-year-olds can discover they already have the ability to write once they see it done by another child” (224-225).

Have you heard about this “explosion into writing”? What do you know about it? Why would this particular experience be effective and / or meaningful for children learning to write? How does observation and imitation play a role in this phenomenon?

5. *“In one demonstration of these benefits [of peer tutoring], a follow-up study expanded the peer tutoring to cover reading, math, and language, and examined children’s performance over multiple years. Children in the tutoring program performed significantly better than those in the control group on all three topics both immediately and 2 years later, when they had moved on to middle school and no longer had the program. They also performed better in two nontutored topics: science and social studies. They even performed as well as children in a higher SES group in all these areas” (232).*

Did you have any experience with peer tutoring as a tutee? What do you remember about it? Was it helpful? Effective? Why do you think it was or was not? Did it translate into other subjects? Were there any effects that carried over into the future?

6. *“The psychologist Deanna Kuhn colorfully recounts ‘the orangutan test’: ‘If I have some new ideas and I go into a room with an orangutan to explain them, the orangutan will simply sit there and eat its banana. I will come out of the room, however, knowing more than I did before’. Several studies support the idea that tutors benefit at least as much as tutees in peer learning situations” 235.*

Can you relate to this description? When have you been in a position of explaining ideas to someone? Did you find your knowledge was enhanced after the experience? Why do you think this works?

7. *Choose one of the materials from pages 244-245 (Bank Game, Grammar Box Command Cards, Peg Board, Racks and Tubes) and show briefly how children collaborate to do the work.*

Describe the ways in which collaborative learning is embedded in this activity. How does working with peers enhance this particular educational experience? Did you learn like this as a child? Would you have liked to? What seems appealing or effective to you?

1. *“If conventional education represents a factory for transforming the behaviorist child into a knowledgeable citizen who can pick the right answers on standardized multiple-choice tests, Montessori is more of a secular monastery for the encouragement of the realization of each person’s full potential as a connected, aware, intelligent being” (251).*

What do you think of this description of Montessori? Does it sound accurate? Does it sound like you want for your children? Do you have any concerns about it?

2. *“[In a study examining the importance of meaningful context] the results were clear. When interesting contexts had been provided, children showed better knowledge of how parentheses affect arithmetic operations and were better able to transfer that knowledge to non-computer contexts. Personalization augmented these effects” (256).*

Have you experienced this phenomenon? When? How is it different to learn when there is context compared to when there is not? Why might personalizing the concept produce even better effects? Do you think this concept is important for education? What are some of the elements of Montessori that you know create this kind of meaningful context?

3. *“When new information can be interpreted in the context of other information... or familiar objects... new information is more easily incorporated. This appears to be largely because the prior knowledge - the meaningful context - provides a structure into which the new information can be assimilated” (260).*

Have you experienced this before? Was this a part of your own education? If so, how did your educators accomplish this? As an adult, do you have a practice of creating a context for new materials that you need to learn? How is this related to metaphors or analogy?

4. *“Montessori education is distinguished by involving lessons and materials that were developed with the entire educational program from birth to 12 in mind... Montessori education [has] a remarkably high degree of rationality, coherence, and human relevance. The fixed set of lessons and materials also lends stability across authentic Montessori schools” (262).*

How would a context like this affect children’s learning? Have you noticed this element of Montessori education when you have walked through the classrooms or heard your children talk about their experience?

5. *Choose one of the materials from page 263 that is used throughout a child’s Montessori education (Geometry Cabinet, Bead Bars for multiplication and snake games and*

squaring, Fraction Insets, Grammar Symbols). Describe a few of the ways it is used over the years.

What do you think of utilizing materials this way for a child throughout their Montessori experience? How would it support their education?

6. *“Children consider the import of the part of speech ‘adjective’ in conjunction with science experiments in which they discover which membranes are permeable and impermeable. Grammar and science are deliberately connected, and the child can see the use of a normally abstract set of concepts (grammar) in the hands-on context of understanding the world through science... These connections are explicit and preconceived” (264).*

What is the value of utilizing concepts across subjects? Why is this a meaningful way for children to learn? What difference does it make to know that connections like this are prevalent throughout the entire curriculum, and that they are “explicit and preconceived”? What does it tell you about Dr. Montessori to know that her educational system was designed like this?

7. *Show the Pythagorean theorem material.*

Do you remember how you learned the Pythagorean theorem? How was it different? When did you learn to visualize the squares of each side of the triangle? What would it have been like to learn the squares first, and be able to manipulate them?

8. *“Mathematics classes that appear to be very well taught, with teachers carefully going over material and children apparently understanding the material and performing well on tests and homework, can be prime examples of this. Despite the pedagogy, students often fail to apply concepts outside the narrow context in which they were taught” (270).*

Why does this method of teaching not always result in a successful transfer of knowledge? Why does it matter? Do you value this for your child’s education? What was your experience with transfer in your education? When were you able to apply information from school to the world? What methods did you use to be able to do this?

9. *Montessori materials have both surface and deep structural similarities both within classrooms and across levels. The same materials are often used in presenting different lessons or concepts, making materials familiar and reducing the encoding demands of the child.*

Why would using familiar materials help a child learn? Why does this reduce encoding demands? How does this affect a child's experience?

10. *Transfer from school to world (and back) is probably facilitated by the frequency with which Montessori children leave the classroom to study in the world... Primary children might occasionally go for walks to find plant or animal specimens, and venturing into the world becomes very common in Elementary, formalized in the Going Out program. A child or small group of children arranges to leave the classroom to learn more about a topic they have been studying in the classroom... Transfer of learning from Montessori class to world is also exemplified in the culmination of Montessori schooling, the adolescent program... where Dr. Montessori prescribed... practical application of knowledge in an environment with closer adult supervision (279).*

Do you remember going on field trips or out into the world in different ways when you were in school? How were those experiences related to classroom learning? Do you remember connecting the two? What would it have been like if you had done this regularly? What would it have been like if you had been able to direct these experiences from your own interest?

Chapter 9: "Adult Interactions Styles and Child Outcomes"

1. *Dr. Montessori maintained the teacher should serve as a safe haven whenever the child needs that. Yet when the child is ready to explore, the Montessori teacher was advised to be sensitive to the child's need for increased independence, heeding the child's call to "Help me to do it alone!" (291)*

How do you view this balance for adults working with children? Is this the same at home as it is in the classroom? How have you seen this balance work with your own children, whether at school or at home?

2. *Like the sensitive parents described by [researcher] Ainsworth, teacher's thresholds for perceiving signals should be low. They should be trained to notice and correctly interpret the behavioral manifestations of the child's inner state, in order to know what to do next (292).*

What "behavioral manifestations" do you see in your own children that reveal their inner state? Why is this important in a classroom? Have you ever considered that teachers would develop their skill in this area so as to better serve their students?

3. *Dr. Montessori... advised teachers to develop self-understanding, so they do not misinterpret children's signals in ways that align with their own needs (292).*

What did Dr. Montessori mean when she cautioned against this? Have you ever experienced or witnessed this, in yourself or in another? Why would this cause a problem in the classroom, or generally when working with children?

4. *The Montessori teacher must structure the environment in such a way that children can make discoveries on their own.*

Why is it important that the classroom is set up for children to explore and learn on their own? Have you ever witnessed your own child making a discovery? What was the experience like for them?

5. *Dr. Montessori advised that adults show great emotional warmth when dealing with children. Children must have "a teacher who looks on them with love and hope" (297).*

What does it mean to you to hear this concept? Why would it matter to a child that they are seen in this way? Do you remember teachers or any adults in your life who looked at you this way? What do you remember about it?

6. *The adult's ultimate control of the environment was clearly a high priority... Some Montessori teachers, like some parents, err in this regard. They do not provide ultimate control over the environment, deal effectively with unproductive behaviors, or guide children's decisions in positive ways. Freedom can thus be taken to an extreme, and Dr. Montessori counseled against this repeatedly (297).*

In what ways can freedom be taken to an extreme? Why is this an issue for children? Have you seen this at home or in an educational setting?

7. *Dr. Montessori's ideas about how teachers should behave toward children were clearly in line with today's research on parenting styles. They should provide an appropriately structured environment in which children are free to make their own decisions and discoveries. They should intervene only when children's behavior is not constructive. They should have high expectations and give reasons, all with warm love (298).*

How does this description of a teacher or parent sound to you? Do you agree with it? Why or why not? When did you personally experience someone who treated you like this - or not - when you were a child and how did it affect you?

8. *Condoning a mastery approach to one's mistakes, Dr. Montessori advised that "it is well to cultivate a friendly feeling towards error, to treat it as a companion inseparable from our lives, as something having a purpose, which it truly has." Teachers were advised to have this sense about themselves and to pass this sense on to children. An attitude that mistakes are valuable because we can learn from them is consistent with a mastery approach to learning and with an incremental theory of intelligence (303).*

What is your relationship to mistakes? How do you think it affects children? What do you know about "mastery approach"* and its relationship to mistakes? Do you believe mistakes have purpose? Do you model this with your children?

*Mastery approach is the belief that a person can overcome a challenge, and that mistakes are learning opportunities. This is in contrast to the "fixed entity" belief, which holds that mistakes are a reflection of a person's character and therefore are to be avoided.

Chapter 10: "Order in Environment and Mind"

1. *At the macro level, there is little imposed order [in other words, there are no tightly ordered daily schedules]. At the micro level, however, Montessori education is very ordered. There is a specific set of steps one goes through to work with any material. Research suggests that this blend of order at the micro, routine level and freedom at the macro, daily-schedule level might be optimal for children's development (319).*

What does this combination of order and freedom sound like to you? How are order and freedom balanced in conventional education? Was your education like this? What sounds appealing about it? Do you have any concerns?

2. *In this study, across the school year, achievement gains were greatest in classrooms that had an intermediate level of stimulation: not too dull, and not too complex (Barrett, Davies, Zhang, & Barrett, 2015). Specifically, these researchers concluded that "the overall appearance, including the room layout and display on the wall has to be stimulating, but in balance with a degree of order, ideally without clutter. Similarly, colours with high intensity and brightness are better as accents or highlights instead of being the main colour theme of the classroom." Other studies have also found that an orderly environment is associated with better functioning" (333).*

What is your relationship with an orderly environment and your functioning? Is this finding true for you? Does this sound like a typical classroom in American culture? How is it the same or different? Does this sound like a Montessori classroom?

3. *Montessori environments are very ordered in the physical-spatial sense as well as the temporal one. Objects have their place, in the classroom, on the shelf, and even on the tray. Sets of objects have their particular colors. Activities are often about putting things in order, making them clean, or getting them to their proper places (337).*

Do you find Montessori environments to be particularly ordered? What do you remember about classrooms that you've seen? What do you think about this level of order in an educational environment?

4. *Montessori classrooms, particularly Primary ones, are often very quiet, because the children are concentrating on their activities... Across all ages, the variables most consistently and repeatedly related to cognitive development were those concerning noise. Children whose homes received affirmative responses for "high sound level in house"... had lower cognitive scores (339).*

Do you remember the first time you toured a Montessori Primary classroom? Was it quiet? What did you think of that quiet? Do you have concerns about a classroom that isn't noisy? Why or why not? Does it change your perspective to know that the quiet is not enforced by the teacher, but arises naturally from children's concentration when they are working?

5. *Children in noisy environments block out stimuli; under some circumstances that is adaptive, but it also hinders some developments. Most obviously, blocking out stimuli in noisy environments would likely affect auditory discrimination skills (340).*

How do you function in a noisy environment? How does your child function in a noisy environment? Do you realize that you're blocking out stimuli? What would be the issue for a child who has learned to block out stimuli?

6. *The results [of this study] are suggestive and consistent with other research showing an effect of noise on auditory discrimination and language, and suggest that even in preschool classrooms, less noise is related to more optimal development (341).*

What is your relationship to noise and silence? Why would a quiet classroom lead to more optimal development?

7. *Sensory discrimination might feed into a multitude of higher-level abilities. For one, language is enabled by fine auditory discriminations between phonemes, and by making such discriminations very quickly (343).*

How do you understand the relationship between sensory discrimination and higher-level abilities? Why would this matter for the acquisition of language? What else might it affect?

8. *Sensory discrimination is an exceedingly important ability that we tend to take for granted... Research suggests that the quality of one's sensory discrimination capacities is influenced by sensory experiences one has early in life (344).*

Why might early sensory experiences be important for sensory discrimination capacities later in life? What are the components of a beneficial sensory experience for a young child or a baby? What do you know about the Montessori environment that supports this development?

9. *Show two Sensorial Materials in a sequence (e.g., Color Tablet Box 1, Color Tablet Box 2; or Pink Tower, Brown Stairs; or Rough and Smooth Boards, Touch Tablets).*

How do these materials embody order? How do they isolate the feature of interest? Do you see how these materials fall in a sequence of increasing refinement? How do these materials involve putting materials in a particular order?

Chapter 11: "Recent Montessori Research"

(Note: This section will not have quotes for every question, as some of them are based more generally on Montessori research, and on studies that have come out since the most recent publication of this book)

1. Does knowing about Montessori research help with your faith in the Montessori approach? Is having a research-based education program for your child important to you? Did you factor in studies or this book before you found Montessori?
2. *"When I [Dr. Angeline Lillard] told her [Elizabeth Spelke, a chaired Professor of Psychology at Harvard University] about my first Montessori study [which showed the advantages of a Montessori education across a variety of academic and non-academic skills], she responded by declaring that I was challenging her belief that no school program can really make a difference to children's outcomes." (351)*

Do you believe that a school program can make a difference in children's outcomes? Based on what you've observed as a parent, and / or read about in research, what does Montessori offer that can change a child's life?

3. *Dr. Lillard’s wellbeing study hypothesizes that there are three important aspects to Montessori education which may account for the greater wellbeing that Montessori students experience: 1) Self-determination (which shows up as the autonomy that children experience when they choose their work), 2) Meaningful activities (work that has a clear purpose, and 3) Social stability and cohesion (children are in a classroom for three years with their teacher and many classmates).*

Read as three separate questions:

- a) Why is self-determination important for later wellbeing? How do you experience this in your own life or observations of others? How do you see self-determination as being uniquely present in Montessori?
- b) Why are meaningful activities an important part of wellbeing? What are the meaningful activities in your life, and how do they affect you? Have you observed the presence and relevance of meaningful work in your child’s life?
- c) What role does social stability play in having a positive, productive life? How have you experienced this? How do you see the Montessori environment serving this important aspect?

Chapter 12: “Education for Children”

1. *Although some children manage to excel in the system regardless, the common cultural attitude is that school is painful and not particularly fun. This should suggest to us that something is very wrong. Learning can be an engaging, inspiring activity, so schooling should be looked on with joy (377).*

What are your memories of school? Do you remember school being painful? Was it fun? Did this change over the years? Do you enjoy learning? Do you think school has the potential to be fun?

2. *The right approach for designing a system of education that suits children’s nature would be to study how they learn and develop, and change schools accordingly. This is exactly what Maria Montessori did a century ago. Her insights about children brilliantly forecast several main tenets of psychological research today (378).*

Do you think that education should be developed from a study of how children learn and develop? If not, what do you think it should be based on? Why might it make sense to observe children first and design education afterwards? If you’ve read the book, which of the main tenets of psychological research that Montessori forecasted did you find most compelling?

3. *Although in a sense Montessori is a “discovery learning” approach, it is not the unguided sort that research shows does not work as well as direct teaching. Montessori education guides children closely in their discoveries, with the intention that with repeated use, they cannot fail to discover what the materials are explicitly designed to teach (381).*

How is this approach different from discovery learning approaches that you may have heard of? Are you concerned that Montessori depends too heavily on children’s discoveries? Does it help to know that the curriculum is designed to have a vigilant teacher who ensures that children learn what the materials are intended to teach?

4. *[Some people are concerned that] Montessori schools are too free... [Some worry that Montessori schools are too strict.]... Dr. Montessori was quite clear [about] what she meant by liberty. Freedom comes with a responsibility to be constructive for oneself and society... Children need freedom and limits (384).*

Are you concerned that Montessori is too free or too strict? Why? What does true liberty mean to you? Do you believe that freedom comes with responsibility? How should freedom be limited? What does it mean to be constructive for oneself and society? How do you see Montessori serving this purpose?

5. *[Some people are concerned that] there is too little parental involvement in Montessori... To help the children, schools must help the parents to understand the system, and parents must find time to become educated about it. Parent participation in the classroom, however, is antithetical to Montessori, because a key ingredient is that the Montessori classroom is the children’s place... Parents need to respect that their day-to-day involvement in a Montessori classroom, contrary to conventional systems, may not be positive, because Montessori is about helping children become independent, whereas conventional education has relatively more emphasis on adults transmitting knowledge to children and controlling their behavior, goals that are more readily achieved when more adults are present (387).*

Why is it so important in Montessori in particular for parents to become educated on the system? Why is the classroom “the children’s place” in a Montessori school? What does that mean to you? Why is it problematic for there to be extra adults in a Montessori classroom? How is that different from the objectives of a conventional classroom?