

**School Readiness in Children Attending Montessori-Style Preschools**  
**Dr. Jennifer LaBounty, Lewis and Clark College**

*Background for our study on school readiness in Montessori Preschools*

In the past decade the American education system has seen a number of sweeping and radical reforms, from No Child Left Behind to the current Common Core standards. Educational policy continues to change at a rapid rate and many of the current reforms are extremely controversial. Many educators and researchers question the methods employed by these programs and the theory behind the reforms. In particular, there is a lack of a clear pedagogical philosophy behind the current standards and little empirical evidence to support these reforms. If lawmakers are going to continue to mandate new educational standards and programs, then educators and experts in different pedagogical techniques should be an integral part of the national conversation.

One bright spot in the current educational climate is a new and promising focus on early childhood education. Many policy makers are becoming aware of the importance of a high-quality preschool education. Numerous studies have shown that preschool education has long-term positive effects on children's development, including successful transitions to kindergarten, stronger academic performance and lower rates of grade retention in primary school (as compared with same-aged peers), and higher high school graduation rates. Preschool is also essential for teaching what many child experts refer to as "soft skills"; the social, emotional, and behavioral skills children must acquire in order to be socially successful.

In this current political and educational climate, with so much change and reform happening at such a brisk pace, and with so much at stake, it is crucially important that teachers and educational researchers are heard. Educators with experience and expertise in different educational philosophies need to be included in the debate. Now is the time to highlight and support educational philosophies such as the Montessori method that teach preschool children the social and academic skills necessary to succeed in elementary school.

The Montessori method differs from other educational philosophies in that it is much more child-focused in its approach. Rather than being teacher-led, Montessori classrooms instead provide children with a number of educational materials and children are allowed to explore different options and activities based on their own self-motivated interest. In the Montessori model children actively build or construct their own knowledge through self-guided exploration. Students and teachers in Montessori schools are thought of as collaborators, jointly exploring and learning, so pedagogy is considerably less formal and direct than in other methods (including current Head Start models). In addition, the curriculum is much more fluid and tailored to the needs of individual children. Importantly, this allows the model to be flexible and to respond to individual children. Montessori schools also spend more classroom time on social and emotional development than other models (Montessori, 1964; AMI, 2011).

To date, only a few studies have focused on the effects of a Montessori-style education on children's development. One study compared students in Montessori middle schools with children in the public educational system on their academic motivation and school experience (Rathunde & Csikszentmihalyi, 2005). Based on interviews with the children, the results showed that Montessori children demonstrated

higher levels of intrinsic motivation and more positive experiences with school. Montessori school children appear to enjoy their school experience and particularly appreciate the ability to direct their own learning. These positive experiences result in a higher intrinsic motivation to learn.

Montessori-style education not only fosters academic motivation, it has also been empirically shown to positively affect social and emotional development as well. A study by Lillard (Lillard & Else-Quest, 2006) compared Montessori school children (aged 5/6 and again at age 12) with a comparable sample of children in public school. Their study demonstrated a Montessori advantage in several domains of development including social reasoning, social problem solving, and behavioral control. These findings were also reflected in a follow-up study with younger children. In the second study, Lillard (2012) compared children from a number of different types of preschool programs, some closely adhering to the original Montessori model of education. Lillard observed that the children attending the preschool programs most faithful to the original Montessori model out-performed same-aged peers on measures of executive functioning (including attention, working memory, planning and inhibition) and social problem solving skills.

The Montessori method of education focuses on the whole child, including their emotional and behavioral development. Thus, it is not surprising that the Montessori style of education fosters social and emotional competence and behavioral control in children (Lillard, 2006). However, less is known about the effect of the Montessori method on children's academic achievement. Both Lillard's original study with school-aged children (2006) and her study with preschool-aged children (2012) found that children in Montessori programs are more advanced in their reading, writing, and mathematics skills as compared with children in public schools (from similar backgrounds and socio-economic statuses). Similarly, a study with high school students resulted in a Montessori advantage, with students who had attended Montessori schools from preschool to fifth grade scoring higher on tests of math and science (Dohrmann, Nishida, Gartner, Kerzner-Lipsky, & Grimm, 2007).

#### *Design of the Current Research with Montessori preschool children*

The research study described in this article builds upon these preliminary studies and continues to document the positive social and academic effects of Montessori education. Our study is the first to focus deeply on Montessori preschool education and its contributions to school readiness in children. Our study is also the first to follow children through two years of Montessori preschool education from age 3 to age 5 and we explicitly focus on how this preschool experience prepares children for success in elementary school.

As a developmental psychologist and child development researcher at Lewis and Clark College I am trained to conduct large-scale studies on child development. In 2010 the board of the Oregon Montessori Association (OMA) approached me because they were interested in collaborating with a child development researcher and were keen to collect data on the effects of Montessori preschools. The purpose of our study was to collect information on children's developing school readiness skills. We chose to focus on the skills that lawmakers are interested in including in the new, universal preschool systems being implemented around the country. Some of the assessments we chose to include in the study have the advantage of being nationally standardized measures with available age-norms. This way we can track the development of Montessori preschool

children in Oregon, and we can also compare our preschoolers' development with a large, national sample of same-aged peers. In choosing our assessments we also attempted to be holistic in our approach, including assessments of multiple domains of learning and development including language development (expressive and receptive vocabulary), early literacy and numeracy, cognitive development, social, emotional, and behavioral development. In addition, we included similar measures of social reasoning, behavioral control and social problem solving skills that were shown to demonstrate a Montessori advantage in the previous Lillard studies.

The academic school-readiness assessments included a phonological processing, a rhyming, and a counting assessment from the Preschool Language Scale – 4 (PLS-4) (Zimmerman, Steiner, & Pond, 2002), an expressive and receptive vocabulary assessment from the Woodcock-Johnson III Tests of Cognitive Abilities (Mather & Woodcock, 2001), a number identification measure from the Test of Early Numeracy (TEN) (Clark & Shinn, 2002), and letter identification and letter-sound correspondence tasks from the Test of Early Literacy (TEL) (Shinn & Shinn, 2002).

The social, emotional, and behavioral school-readiness assessments included behavioral and inhibitory control measures including a child version of the classic Stroop task (happy/sad) (Lagattuta, Sayfah, Monsour, 2011), and a reward delay task where children were asked to wait to play with a car (Kochanska, 2001). We also included a social problem solving task (Denham & Bouril, 1994), and measures of theory of mind (Wellman and Liu, 2004) and emotion understanding (Pons and Harris, 2007).

Data collection for this study is ongoing, however, the results from the first group of children who participated in this study are complete and are presented in this article. The data collection process for this longitudinal study was quite involved. First, the OMA board presented the study idea to preschool administrators in and around Portland. Several schools graciously agreed to participate in our study (and for that I am extremely grateful). Next, families from each school were contacted and asked if they would like to participate in the study. The first group of families who consented to participate in the study was quite large, over 60 families (which was thrilling, and I am so grateful to them as well). The children from these families were then interviewed in their school in the fall of their first year of preschool (when most of the children were 3-years-old). The child interviews took 20-30 minutes each and were spread over the course of two days (to reduce fatigue). Parents and teachers were also asked to complete an online questionnaire about the children's behavior, social, and emotional development.

We collected data again at the end of the following year of preschool when the children were 4/5-years-old. The same assessments and questionnaires were administered a second time so we could directly compare children's scores at the beginning of preschool with their scores at the end of preschool. This design is what makes our study unique. Ours is the first to longitudinally track children's development through their entire Montessori preschool experience.

This data collection process is complete for the first group of children that began the study in the Fall of 2011. The second group of children (N = 30), who started in the Fall of 2012, are finishing the interview portion of the study this Spring.

#### *Results of our research with Montessori Preschool Children*

Overall the results from this first group of children are exciting and speak to the tremendous positive influence that the Montessori style education can have on the lives

of preschool-aged children. The children made significant strides in several areas of academic school readiness during the two years they spent in Montessori preschool programs. First, literacy skills improved dramatically. At three years old, the children could identify an average of 7 letters in one minute. At 4/5 years old the average number of letters identified increased to 12. The result at the second time point is consistent with the nationally normed *kindergarten* sample that averaged 13 letters in one minute. In addition, the children in our study showed significant advancement in their ability to correctly map letter sounds onto the appropriate letter, moving from an average of 3 in one minute at age 3 to an average of 11 in one minute at age 4/5. This is in stark contrast to the national sample, which on average could only correctly identify the sounds of two letters at the beginning of kindergarten. The children in our sample also showed a statistically significant improvement in phonological processing skills (specifically identifying the first sound in a word) from an average of 1 correct identification at age 3 to 3 correct identifications (out of a possible 4 correct answers) at age 4/5. As for rhyming, a marginally significant development was shown, from the ability to rhyme one word at age 3, to two words (out of three) at age 4/5. We also saw an impressive improvement in vocabulary from age 3 (correctly identifying 14 words) to age 4/5 (correctly identifying 18 words).

In addition, the children developed their early numeracy skills; moving from the ability to identify 4 numbers in one minute at age 3 to the ability to identify 13 numbers at age 4/5 (this is less than the national average of 22 for kindergarten students, but still respectable for preschool-aged children). Moreover, they improved in their counting ability from only half of the children correctly counting 8 objects at age 3 to almost all of the students correctly counting by age 4/5.

Children in this first group of Montessori preschoolers also improved in terms of their social, emotional and behavioral development. Children's scores on measures of understanding of other people's thoughts and feelings improved significantly over the course of the two years. They also demonstrated marginal advancement in their propensity to choose positive, prosocial responses to difficult social problems. In addition, inhibitory and behavioral control scores were higher at the second time point, although these improvements did not reach statistical significance. Finally, children were more likely to demonstrate prosocial behavior and more often chose to help the experimenter as they got older (although this difference also failed to reach significance).

In conclusion, we are very excited about these early results from our first group of Montessori preschoolers. These children showed improvement over the course of their Montessori preschool experience in all of the important school-readiness domains including academic, social, emotional, and behavioral development. The skills they have acquired while in Montessori preschools will serve them well in the transition to kindergarten, in fact, these children were already significantly out-performing national samples of kindergartners on one measure. This is exactly the kind of empirical evidence in support of Montessori-style preschools that must be brought to the attention of lawmakers and policy makers in this time of educational change and reform. These early results suggest that the Montessori method works. This method prepares children for school and for life by teaching them the skills that they will need as they grow and develop. We are eager to complete this study and finalize our data analyses. We will

publish the complete results in an academic journal as soon as we finish conducting the interviews this Spring.

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