

Individual Child Variability Upon Entrance Into Preschool

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Over the past decade, research has supported what teachers and parents have known intuitively for years: children's academic skills are highly variable. Throughout the elementary school years and within a single age group, there are almost always some children who can read simple books while others do not know the letters of the alphabet; there are some children who can add and subtract while others cannot count to ten; and there are some children who thrive academically while others fall behind. This gap in academic successes becomes even more pronounced in later school years, and can, potentially, affect the types of academic and career paths that an individual will follow throughout his or her life. Yet while the existence of individual differences in academic skills among children is indisputable, the question remains as to when these individual differences begin in life, and what they can tell us about the importance of the school and home environments to the cognitive and social development of children.

When researchers first began to address these questions, the focus tended to be on older children who were performing at varying academic levels. In recent years, however, researchers have begun to turn their attention to younger children in an attempt to discover at what age the variability in important academic skills begins to appear. In the past decade there have been a number of studies that have discovered individual differences in children's academic skills when children first enter kindergarten [1,2]. Even in kindergarten, some children possess high levels of vital academic skills whereas others do not. This is an important finding because it suggests that individual differences in academic achievements appear earlier in life than had been previously thought, and indicates that the environmental influences a child encounters before entering kindergarten are important to the child's later academic success.

Researchers also began to recognize the importance of early academic skills for later academic achievement [3]. Studies have found that academic skills in early elementary school can predict some

aspects of children's performance, such as how well a child reads, throughout the rest of their school years. Researchers have found, for example, that a child's relative academic standing remains reasonably stable from around third grade through high school [4]. This means that a child who is performing poorly academically in third grade will most likely perform poorly academically in high school. In other words, if a child does not learn important academic skills early on, perhaps even by the time he or she is in kindergarten, that child has a higher chance of falling behind later in his or her academic career.

All of these studies led to a focus on the search for early predictors of academic skills in children. What is it about one child that makes him or her succeed in school, while another child does not? Although some differences in cognitive ability can be attributed to differences within the child, such as I.Q. or biological factors, increasing evidence suggests that the early experiences a child has at home and at preschool should be considered sources of potential influence [5]. Potential predictors such as ethnicity, gender, family literacy environment, maternal education, and months in child care centers have all been examined in children as early as kindergarten to try to find associations between these factors and academic performance [6]. These studies found, as expected, that what happened in a child's home before he or she started school (for example, how often the parent read to the child at home) seemed to affect how well the child would do in school for years to come.

But when do these differences in academic abilities really begin to appear? Could the individual differences present in kindergarten and early elementary school be attributed to the fact that some children had attended preschool while others had not? Would a group of children who had never had previous formal schooling experiences still show significant variability in academic skills? In other words, what are the nature and sources of individual differences before a child starts school?

This study sought to answer some of these questions, and focused on children entering preschool. Two hundred one preschool children with an average age of four years participated in this study; all were recruited from six public preschool programs within a Michigan school district. As a group, the children could be described as a typical population of preschool children within the United States. Demographically, the children were mainly from middle to upper-middle class families, and identified with a variety of ethnic and religious groups. The majority of children also came from families with moderately high socioeconomic standings. One might expect this large population of young, same-aged children from similar social backgrounds to perform similarly on tests of cognitive abilities. One goal of this study was to determine if this was true.

In order to test this assumption, the study children had to be assessed early in the school year. Within the first few months of their initial entry into a public preschool program, the 201 children in this study were given two 40-minute batteries of assessments. One assessment instrument used was the Woodcock-Johnson III Tests of Achievement [7]. The tests within the Woodcock-Johnson III measure basic skills that have been found to predict academic achievement in elementary school. The assessments analyzed in the present study included: 1) Letter-Word Identification, which measures word identification skills; 2) Applied Problems, which measures analytical and mathematical skills; 3) Picture Vocabulary, which measures word knowledge; and 4) Academic Knowledge, which measures the extent of basic academic information a child has acquired. The second assessment instrument used was the Test of Early Language Development (TELD). This assessment battery contains a Receptive Test, which is designed to measure components of early language, such as listening skills and reading comprehension, and an Expressive Test, which measures skills such as meaningful speech generation. The assessments utilized were designed to determine and describe the status of a child's academic strengths and weaknesses, and allowed researchers to make comparisons between individual children.

For the purposes of the present study, the 201 preschool children were split into two groups that will be referred to as "young preschoolers" and "old preschoolers". The groups were split on the basis of the formal cut-off date that the school district set as a requirement for entry into its public preschool

programs. Children in this Michigan school district must be at least 2 years 11 months old to enter preschool, and any child 2 years 10 months or younger when school begins must wait until the next year. For this study, the children were split into two groups: the first group (the young preschoolers) was composed of the children who had been too young to enter into preschool the previous year, and the second group (the old preschoolers) was made up of those children old enough to have attended preschool the previous year. As a result, many of the old preschoolers were entering their second year of preschool, while all of the young preschoolers were entering the public preschool program for the first time. At the time of testing, the young preschoolers group consisted of 83 children, ages 3 years 10 months and younger, and the old preschoolers group consisted of 118 children, ages 3 years 11 months and older. The average age of the young preschoolers was 3.44 years, and the average age of the old preschoolers was 4.33 years. The intent of this division was to examine the importance of schooling in the very early years. All of the children were close in age, separated only by an arbitrary cut-off date set by the school district. Would the children who might have had an extra year of preschool perform better on tests of academic achievement, or is preschool not as integral to academic development as the later school years have proven to be? Would variability in academic skills be present within the two groups, as well as between them?

To help answer these questions, the scores that the children in this study received on the four Woodcock-Johnson III tests and the two TELD tests were analyzed and compared. In order to make the results easy to compare, each child's raw scores on the assessments were first converted into age-equivalent scores. Age-equivalent scores were calculated based on the average scores of a large representative sample of an age group in the entire population of the United States. For example, an age-equivalent score of 4 years 3 months means that a child has scored at the level of an average 4-year-3-month-old child in the United States. Since all of the children in this study were approximately 4 years old, the age-equivalent scores can be used to assess how well the study children were doing in comparison to a representative sample of other children in the United States. These scores also give a clear picture of the variability present in a sample, and illustrate the range that a group of scores spans.

TELD Receptive Score Age Equivalency Distribution for Preschoolers

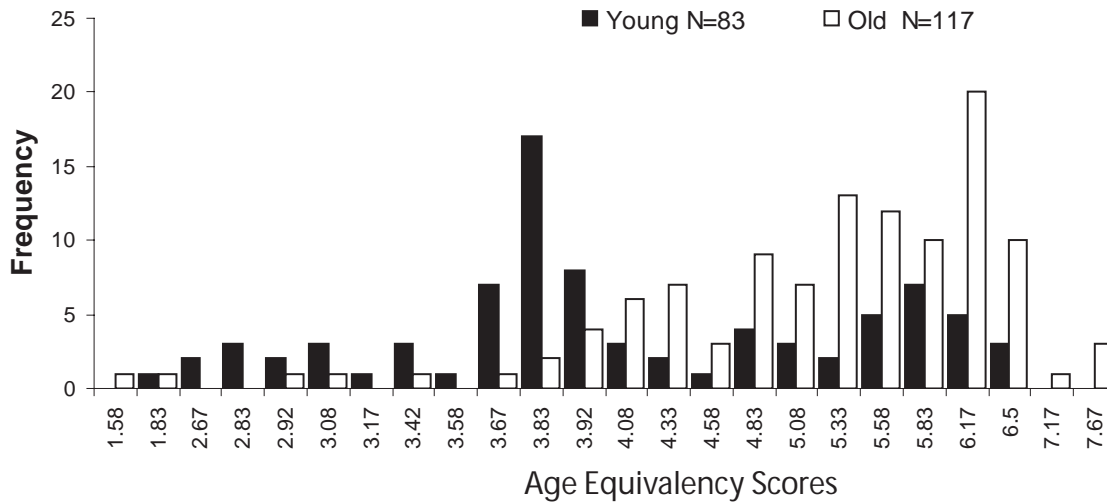


Figure 1

This figure displays the range and distribution of preschoolers' scores on the TELD Receptive Test. Age equivalency scores were computed from raw scores, and based on the average scores obtained by a large representative sample in the United States. Both young and old preschoolers in this sample displayed a wide range of variability in their age equivalency scores, with old preschoolers achieving higher scores overall.

Woodcock-Johnson III Picture Vocabulary Age Equivalency Distribution for Preschoolers

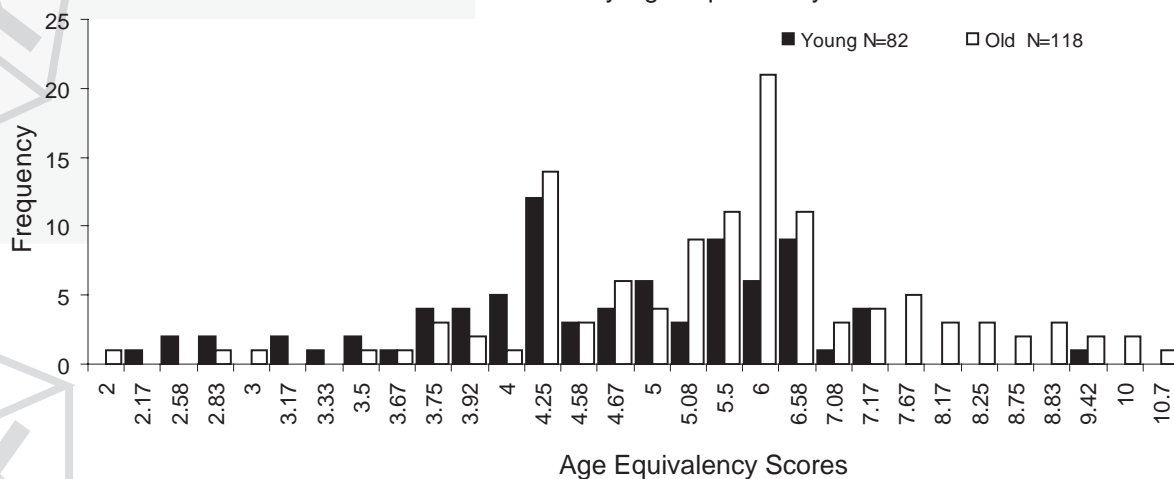


Figure 2

This figure displays the range and distribution of preschoolers' scores on the Woodcock-Johnson III Picture Vocabulary Test. Age equivalency scores were computed from raw scores, and based on the average scores obtained by a large representative sample in the United States. Both young and old preschoolers in this sample displayed a wide range of variability in their age equivalency scores, with old preschoolers achieving higher scores overall.

The results of this study show that children enter preschool with widely varying levels of academic skills in all areas (See Figures 1 and 2). When examining the age-equivalent scores of both the young and old preschoolers, it is apparent that, while many children's scores cluster between 3 and 5 years, there is a great deal of variability within this range, and also outside of it. In almost all of the tests, there were some children who obtained scores equivalent to that of average one or two-year-olds, and others who obtained scores equivalent to that of six-, seven-, or eight-year-olds. In one test, the TELD Receptive Test, two children scored at an age-equivalency of 1 year 10 months, while two others of approximately the same age scored at an age-equivalency of 8 years 2 months on the same test (Figure 1). In the Woodcock-Johnson III Picture Vocabulary Test, one old preschooler achieved an age-equivalent score of 2 years 10 months, while another old preschooler achieved an age-equivalent score of 10 years 8 months (Figure 2). Similar variability occurred in each of the other tests.

Notably, even though the young preschoolers were too young to have entered a public preschool program prior to the year of testing, these children still showed a great deal of variability in their academic competencies (See Figure 1 and 2). This is important because it removes previous preschool experience as a possible source of variability in this group. In other words, since the children in this group were too young to have attended preschool before, and since they still showed vast individual differences in academic skills, then other experiences during the children's first few years of life, such as home or day care experiences, can be regarded as significant sources of variability in academic skills when the children first enter preschool.

Some differences also existed between the groups of young and old preschoolers. As expected, the old preschoolers achieved higher average age-equivalent scores than the young preschoolers on all six tests that were administered. The difference between the average age-equivalent score of the young preschoolers and the average age-equivalent score of the old preschoolers was 9 months for the Letter Word and Picture Vocabulary Tests, 11 months for the Applied Problems and TELD Expressive Tests, 12 months for the Academic Knowledge Test, and 13 months for the TELD Receptive Test (See Table 1). While some of the difference between young and old preschoolers' test scores can be attributed to

the fact that the old preschoolers were slightly older than the young preschoolers, prior preschool experience must also be considered as an influence. Previous studies have shown that the number of years spent in preschool is related to achievement test scores in later grades; children who had more years of preschool scored higher on various tests of academic skills [8]. The present study supports this finding, because the previous schooling experience of the old preschoolers most likely contributed to the higher average scores that they achieved.

The results of this study highlight the importance of both early home experiences and early preschool experiences to the development of crucial academic skills. In all of the academic areas tested and throughout the entire span of ages that the preschoolers represented, a high degree of variability was present. In every test, some of the children scored as low as toddlers would, while others scored as high as fifth or sixth graders. The fact that all of these children were approximately the same age, from relatively similar backgrounds, and attending the same preschools indicates that other factors, such as early home environment and parenting practices, should be considered important predictors of academic abilities in children as young as 3 years old. Early experiences in a preschool classroom were also found to be important, and this study signifies that an extra year of preschool may contribute to higher scores on tests of academic achievement.

Since academic proficiency in the early years has been found to predict academic success in later years, the fact that a child enters preschool with relatively weaker academic skills can also potentially affect and predict how well the child will do academically in elementary school, high school, and beyond. The results of this study indicate the importance of both the early home environment and early preschool experiences to the development of academic abilities. Future studies will focus on both of these areas in order to elucidate the home and schooling factors, and their complex interactions, that shape children's development of crucial early academic skills. Hopefully, this study has set the foundation for future work exploring ways in which to help those children who lag behind in school early on, so they do not remain behind for the rest of their school years.

Average Age-Equivalent Scores for Young and Old Preschoolers

TEST	CUT-OFF GROUP	MEAN AGE-EQUIVALENT SCORES
Letter Word	Young Preschoolers	4 yrs. 5 mo.
	Old Preschoolers	5 yrs. 2 mo.
Applied Problems	Young Preschoolers	4 yrs. 1 mo.
	Old Preschoolers	5 yrs. 0 mo.
Picture Vocabulary	Young Preschoolers	5 yrs. 0 mo.
	Old Preschoolers	5 yrs. 9 mo.
Academic Knowledge	Young Preschoolers	4 yrs. 2 mo.
	Old Preschoolers	5 yrs. 2 mo.
TELD Receptive	Young Preschoolers	4 yrs. 4 mo.
	Old Preschoolers	5 yrs. 5 mo.
TELD Expressive	Young Preschoolers	3 yrs. 9 mo.
	Old Preschoolers	4 yrs. 8 mo.

Table 1: This table displays the mean age-equivalent scores for both young and old preschoolers on the six different assessments that were given to children upon entering preschool. The old preschoolers obtained higher mean age-equivalent scores than the young preschoolers did on all tests administered.

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About the Author

Lisa Slominski is a third year undergraduate in psychology and anthropology at the University of Michigan. She participated in the Undergraduate Research Opportunity Program her sophomore year, and worked in the Pathways to Literacy lab in the department of psychology. She continues to work in the lab under the guidance of Dr. Fred Morrison and Dr. Carol Connor.