

# **How Parents Can Help Children with Their Achievement in Mathematics**

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## **Introduction**

Parents have the both the opportunity and responsibility to nurture their children (Hartog & Brosnan, 1994). This nurturing process takes place in several areas of development: physical, emotional, and intellectual. While, usually, parents can find time to read a story to their children and, thereby, instill a love for literature, often, they are at a loss as to how to instill a love and appreciation for mathematics. Like reading, mathematics is a subject that is necessary to function adequately in society. More than that, mathematics is a subject that should be more enjoyable than it sometimes is.

Frequently, parents ask, "How can I help my child with math at home. And what role will math play in my child's future schooling and work? Is it possible to have fun with math?" According to Yee (1986), children's attitudes about mathematics are influenced by: (a) parents' perceptions of their own academic abilities, (b) the value and importance that they place on various academic subjects, and (c) the ways in which they structure their children's

environment.

However, many parents may differ in their expectations for their children, as well as their socialization practices, in terms of their attitudes and beliefs about children's school achievement. The relationship between parents' attitude and children's mathematics achievement has been studied in families in the United States, in particular, Anglo American (i.e., of European descent) and Chinese American families (Blevins-Knabe & Musun-Miller, 1991; Huntsinger, Huntsinger, Ching, & Lee, 2000).

### **Research in the United States**

Blevins-Knabe and Musun-Miller (1991) suggested that parental beliefs are related to parental actions and, thus, these beliefs influence the environment that parents provide for their children. For many children, early number skills are intuitive and develop with little direct intervention from parents.

Jayaratne (1987) found that parents exerted a strong influence on the development of their children's attitudes toward achievement. Also, Jayaratne suggested that children's beliefs about achievement appeared to be related to their parents' expectations about their children's achievement but not to the parents' attitudes in regard to their children's abilities and experiences. Blevins-Knabe and Musun-Miller (1991) reported that parents saw themselves as having more impact on the learning of counting than on other types of number tasks. Typically, they perceived that they had a greater effect on their child's achievement than other parents who did not work with their children to teach them to count.

Peressini (1998) examined parents' involvement in mathematics education through the lens of the school mathematics reform literature. Peressini maintained that it was important to study the role of parents in school reform as well as their role in their children's mathematics education. Also, parents should be involved in the mathematics reform movement. Peressini stated that: "To effectively involve parents in the reform of school mathematics, the mathematics education community needs both an understanding of the research regarding parental involvement and a commitment to future research on parents in mathematics education" (pp. 556-557).

Wigfield (1983) found that parents' beliefs about their own achievement in regard to mathematics and their background in mathematics were not related to their children's mathematical beliefs. However, parents' beliefs about their children were related to their children's beliefs. Although some parents may have lower expectations for girls in mathematics, they did not appear to directly influence the intentions of either girls or boys to take more mathematics. The children seemed to have less sex differentiated views in regard to mathematics than did their parents.

In their study of parental beliefs about the development of preschool children's number skills, Blevins-Knabe and Musun-Miller (1991) found that parents predicted that their children would solve counting tasks prior to computational and number concept tasks. Also, they expected that their own children would solve all types of number tasks earlier than other parent's children. In addition, parents of boys expected them to solve all types of number tasks earlier than did the parents of girls. Finally, parents believed that

they and the educators in schools had the most impact on their children's early number development.

Anderson (1997) conducted a study which was focused on families and mathematics. In this study of parent-child interactions, three interrelated theoretical perspectives were examined: (a) contextualized learning, (b) social constructivism, and (c) mediated learning. A number of researchers (Anderson, 1997; Baroody, 1993; Irwin, 1992; Resnick, 1992; Steffe & Cobb, 1988) have investigated the mathematical development of young children prior to enrollment in school, in particular, children's conceptual development as well as their early mathematical knowledge and competence. Through task based interviews, these researchers confirmed that preschool children have considerable knowledge of counting and related number sense. In studies of parent-child interactions (Rogoff, Ellis, & Gardner, 1984; Saxe, Gubernab, & Gearhart, 1987), often in clinical settings, it was found that, not only do parents support their children's learning of mathematics, but that the context influences the instructional strategies they use. In case studies of preschool children, several researchers (Anderson, 1991, 1993a; Lawler, 1990; Winter, 1987; Zeman, 1989) identified the various ways that parents and children engage in mathematical activity at home. Specifically, they noted the use of mathematics in daily life especially in the use of money. It was recommended that preschool children should be asked questions related to mathematics in everyday life such as: Why do we use money? What time is it? What is Grandma's telephone number? How many dolls do you have? These researchers confirmed that young children were capable of understanding fairly sophisticated ideas and concepts. Finally, with the use of surveys and

interviews with parents, Leder (1992) and Young Loveridge (1989, 1991) studied the relationships between home experiences and mathematical skills. It was found that parents from a variety of backgrounds reported a number of different activities and games they provided in the home in order to support their child's mathematical development. Also, the provision of such mathematical activity seemed to be correlated with success in school. For the review of literature for this current article, this author did not find any research about the nature of parent-child interactions nor the specific types of mathematical activities in which parents and children engage.

### **The Perspective of Chinese American Families**

Huntsinger et al. (2000) studied 120 immigrant families of Chinese origin; also, the recent literature on Chinese and Chinese American families was investigated (Huntsinger, Jose, & Larson, 1998; as cited in Huntsinger et al.). In regard to attitudes toward mathematics, they found that children's achievement in mathematics was more important for the Chinese parents than for parents in the United States. They reported that many Chinese American parents believe that teachers in the U. S. do not assign enough homework in the primary grades. Therefore, because mathematical skills are so important for children, often, these parents gave their children additional homework as early as the preschool years. Before the children could watch television or play outside, parents expected them to complete their school homework as well as extra academic lessons.

Typically, the Chinese regard all academic subjects as important, but there

are two reasons why Chinese American parents emphasize mathematics to a greater degree than many other U.S. parents (Huntsinger et al., 2000). First, mathematics is an international language, and it is easier for immigrant parents, whose native language is not English, to teach mathematics to their children than to teach reading or social studies, for example. Second, in China, Taiwan, and Japan, some mathematics topics are taught earlier in the primary grades than they do in the U. S. For example: based on the third grade mathematics text, Math Surf (1998), published by Scott Foresman, fractions are taught during the third grade in the U. S. However, in Taiwan, fractions are taught during the second semester of second grade (Ministry of Education, 1997). Chinese American parents want their children to achieve as well as their counterparts in Taiwan or China especially if they should decide to return to their country of origin. Huntsinger et al. found that Chinese American children were very advanced in mathematics during the primary school years in comparison to their Anglo American peers.

Chinese American parents tended to use several different methods to teach their children (Huntsinger et al., 2000). Because cultural values play an important role in the educational achievement of Chinese students, Chinese parents are known for their willingness to sacrifice for the sake of their children's education. In Zang and Carrasquillo's (1998) review of the literature, it was found that Chinese parents had an important influence in the academic performance of their children. Parents assigned mathematics homework to their preschoolers and kindergartners; some bought workbooks in Taiwan or Hong Kong; and many developed their own mathematics work sheets for their children. This early formal teaching of mathematics by parents was linked

closely to these children's higher than average scores on mathematics assessments in comparison to their Anglo American peers (Huntsinger et al., 1997; Huntsinger, Jose, & Larson, 1998; Huntsinger, Larson, & Balsink Krieg, 1998; all cited in Huntsinger et al.). However, Huntsinger et al. did not find significant differences for ethnicity between Chinese American and European American parents' ratings of the importance of developing their children's competence in mathematics. Both groups of parents in the study rated it highly, although it was clear that the Chinese American parents did much more to foster their children's competence in mathematics.

### **Recommendations to Improve Children's Competence in Mathematics: Activities in the Home**

There are many methods that parents can utilize to become involved in their children's mathematics education. There are several resources, which can provide parents with games and activities in order to engage children in mathematical thinking and problem solving and to build their self-confidence and appreciation for mathematics at the same time. Kanter's (1994) book, *Helping Your Child Learn Math*, contains 26 activities for children ages 5-13. These activities are based on the kinds of mathematics that children experience at home, at the grocery store, and while traveling.

Family Math (2001), one of the EQUAL programs from the University of California in Berkeley, is another source for parents and children who are interested in learning mathematics. The purpose of this course is to teach parents how to help their children learn mathematics. The focus is on family

members learning mathematics together. Through the related school mathematics curriculum which is provided, parents can help their children to learn mathematics. The families who participate in this program reflect a diversity of ethnicity, gender, language, and economic status. Another important focus is to help children develop problem solving skills and build a conceptual understanding of mathematics with hands-on materials. The developers of Family Math believe that all children can learn mathematics and have fun with it. For further information, visit the EQUALS Program web site at: <http://www.lhs.berkeley.edu/equals/FMnetwork.htm>. The stated goals of Family Math are:

1. to provide parents with activities to help their children with mathematics at home;
2. to provide parents with information about the importance of mathematics in future schooling and work;
3. to inform families about the equity issues around mathematics;
4. to inform parents that mathematics is important for all students;
5. to build awareness that mathematics consists of more than arithmetic and rote computations;
6. to develop problem-solving skills and the ability to talk about mathematics;
7. to build positive attitudes toward mathematics;
8. to help parents feel that they can and do make a differences in their children's mathematics education; and
9. to provide an opportunity for all members of the family. (Thompson & Kreinberg, 1986, p. 2)

In the Family Math program, parents can find lesson plans that are suitable for their children; also, they can find mathematics based games which can be played by the whole family and provide quality time for everyone. Finally, professionals who are associated with Family Math, are available to answer questions and provide information; such individuals are available in many states in the U.S.

In addition, parents' attitudes toward mathematics have an impact on their children's attitudes. Children whose parents show an interest in and enthusiasm for mathematics around the home will be more likely to develop that enthusiasm themselves. Parent-child participation in activities, such as those provided by Kanter (1994) and the EQUAL Project (2001), helps parents communicate the importance of mathematics to their children especially when they become more involved in their children's mathematical education (Hartog & Brosnan, 1994).

Reading to children is a valued activity in many homes. What better way to integrate mathematics into the lives of children than to read them stories that bring mathematical ideas to life? According to Silverman, Strawser, Strohauer, and Manzano (2001), "Children's literature offers a context for teaching and learning mathematics, especially in the elementary grades" (p. 330). These authors provided a number of strategies to support children's learning of mathematics. Whether the purpose of such activities is to encourage academic achievement or language development, the combination of literacy and mathematics is not only enjoyed by children, but it is an effective way to support children's learning development. Children's books that are related to

mathematics can be separated into four categories: (a) counting books, (b) number books, (c) storybooks, and (d) concept books. Gailey (1993) compiled a bibliography of 159 children's books that are connected to mathematics. In this bibliography, there are many excellent suggestions for mathematically based children's literature to be read at home.

Another important way that parents can help children in mathematics is to exhibit attitudes and values that are supportive of learning. Ravitch (1995; as quoted in Haury & Milbourne, 1998), addressed the following words to parents "All children have two wonderful resources for learning--imagination and curiosity. As a parent, you can awaken children to the joy of learning by encouraging their imagination and curiosity" (p. 2).

Sutton (1998; as quoted in Haury & Milbourne, 1998) offered the following suggestions for parents who want to encourage mathematics achievement in their children.

1. Accept the struggle as a normal part of doing math, just as you accept the struggle to become better in sports. Help uncover difficulties, and offer suggestions for overcoming them.
2. Encourage Mastery. Just as it is important to repeat fundamentals again and again in sports until performed automatically, it is important to see practice in mathematics as developing mastery, not a chore or form of punishment.
3. Look Beyond the Grade. Math grades are often calculated on percentages of correct answers on tests and assignments accumulated during a grading period, so they may not reflect understanding that has developed over the course of a grading period. Help focus on understanding and being able to identify

specific difficulties.

4. Discover the Textbook. "Reading" math can be difficult, and math textbooks are often used as collections of assignments and homework problems. Help your child learn how to "read" the math textbook, see the underlying structure, and learn from the examples provided. (pp. 2-3)

In *Preschool Education Monthly*, an early childhood publication of the Hsin-yi Foundation in Taiwan, Teng (1998) recounted many real life mathematics experiences provided by parents about their interaction with their children. Parents reported that they wanted their children to be curious and knowledgeable about numbers. Many believed that the earlier that their children learned mathematics, the more success they would achieve. Several parents shared their experiences: (a) one mother reported that she had seen other young children be successful in learning mathematics, so she decided her child should be introduced to it as early as possible; (b) another parent wanted her son to be skilled in problem solving; and (c) a third parent wanted his son to acquire good study habits and understand the methods involved to prevent frustration when the mathematics became more difficult. According to Teng's interviews, parents in Taiwan believe that it is a necessity that their children acquire mathematics ability and learn mathematical concepts.

## **Conclusion**

Haury and Milbourne (1998) quoted Einstein (n.d.) in regard to his relationship with mathematics. Einstein stated "Do not worry about your difficulties in mathematics. I can assure you that mine are still greater" (p. 1).

According to Haury and Milbourne (1998), "Everyone struggles with mathematics, whether learning the multiplication tables or trying to figure out how to stretch the monthly income to pay bills. Some find mathematics easier than others do, just as some find spelling easier. Some use mathematics extensively in their work, just as some make more use of hammers. However, everyone uses mathematics daily, and limited proficiency in mathematics leads to limited success with the daily challenges of our society" (p. 1).

Sutton (1998; as quoted in Haury & Milbourne, 1998) expressed a similar view, "One of the most significant things parents can do is to help their children understand the normalcy and the value of struggle in mathematics" (p. 1). To encourage children's success in mathematics, one must help children recognize the use of mathematics present in daily life and engage them in games and activities that foster familiarity with numbers and mathematical thinking.

It is the aspiration of most parents that their children learn to like and enjoy mathematics. Based on the research (Anderson, 1991, 1993b; Lawler, 1990; Winter, 1987; Zeman, 1989), even preschool children can acquire mathematical concepts. In the ideas presented here, there are numerous sources that parents can use to help their child become proficient, from reading books to playing games. In this way, parents of primary and elementary school children can take an active role in their children's mathematical education.

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