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Thesis Committee: Susan Sonnenschein (Chair), Linda Baker, Mary Rivkin, Anne Spence

Ethnicity, Socioeconomic, and Gender Differences in Second Graders' Math Fact Fluency and Confidence

Automatic or fluent retrieval of basic arithmetic facts is related to later math difficulties or even disabilities. Although there are clear individual differences in children's math fluency, less is known about possible ethnicity, family income, or gender differences. This study considers such group-based differences in children's fluent fact retrieval and their confidence in their math knowledge. Confidence was explored because some researchers have shown that students who are more confident in their knowledge of math are more likely to automatically retrieve facts from memory.

Ethnicity and family income-related differences are evident in preschoolers' informal math skills with European American and middle-income children performing at higher levels than African American and low-income children. Small but consistent gender differences favoring boys appear by kindergarten. These ethnicity, income, and gender differences increase throughout elementary, middle, and high school.

Gender differences are evident in students' confidence as early as first grade with boys showing higher levels of confidence than girls. The small amount of research that has been conducted about ethnicity-related differences in students' confidence has shown that African American students' confidence tends to be unrelated tp their performance. No research has investigated income-related differences in confidence or the relation between confidence and fluency. .

The present study investigated the number of addition and subtraction problems 156 second graders (½ African American, ½ European American, ½ low-income, ½ middle-income) could correctly answer in one minute and how confident those students were in math. Each student first completed a 12-question *Confidence in Learning Math* measure, followed by an *Addition Fact Fluency* measure, then a *Subtraction Fact Fluency* measure.

Low-income European American students were able to correctly solve more addition and subtraction problems in one minute than low-income African American students. No such differences were found for middle-income students nor were there any gender-based differences in students' math knowledge.

Low-income boys displayed a higher level of confidence in their math knowledge than did low-income girls. Again, no such differences were found for middle-income students nor were there any ethnicity differences in students' confidence.

The number of addition or subtraction math facts a student could correctly answer in one minute was found to be moderately related to the student's confidence in math. That is, students who correctly solved more problems had higher levels of confidence.

Ethnicity differences in low-income children's performance may be due to the multiple disadvantages faced by low-income African American children.

These students often encounter low teacher expectations, negative stereotypes, and schools that may not have adequate resources. At home, low-income African American children seem less likely to engage in math activities than their middle-income European American counterparts.

Gender differences in low-income students' confidence may result from low-income parents' desire for children to conform to societal expectations, possibly exposing females to negative math stereotypes. Results affirm the relation between confidence and fluency, as well as the importance of ensuring that all children learn their math facts.