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Measurement skills in low-income elementary school students: Exploring the nature of gender differences.

Cogn. Instr. 27, No. 4, 401-428 (2009).

Summary: In this research, we examined overall performance and gender differences in measurement skills in elementary-school students from low-income families. In Study 1, accuracy and error patterns were analyzed in a large sample of fourth-graders; in Study 2 error patterns and strategy usage were examined with a smaller sample of fourth-graders. Study 1 showed no main effect of gender on students' performance. Instead, as predicted, the direction of gender difference varied as a function of problem type: boys outperformed girls on spatial/conceptual measurement, whereas girls outperformed boys on formula-based measurement, as well as on a test of computation skills. Study 2 revealed both similarities and differences in the way boys and girls approached measurement problems. Girls appeared to have specific difficulty with spatial/conceptual problems where objects and measurement units were not pictorially presented. When recording their solutions, girls generally wrote down calculations while boys made drawings. Overall, the students performed poorly in measurement; strategy analysis allowed for examination of common weaknesses, indicating possible ways of improving performance of underserved groups.

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Keywords: elementary school students; grade 4; spatial ability; cognitive processes; females; error patterns; measurement; gender differences; males; low income groups; mathematics skills; mathematical concepts; problem solving; mathematical formulas; urban schools; research; educational diagnosis; primary education; socioeconomic differences

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