

Can Item Format (Multiple-Choice vs. Open-Ended) Account for Gender Differences in Mathematics Achievement?

Michal Beller

The Open University of Israel

Naomi Gafni

The National Institute for Testing and Evaluation (NITE)

Abstract

The purpose of this study was to investigate differential performance of boys and girls on open-ended (OE) and multiple-choice (MC) items on the 1988 and 1991 International Assessment of Educational Progress (IAEP) mathematics test. In the 1988 mathematics assessment a representative sample of approximately 1,000 thirteen-year-olds in each of the six participating countries was assessed. In the 1991 mathematics assessment a representative sample of nine- and thirteen-year-olds (approximately 1,650 from each age group) in some twenty participating countries was assessed. Analyses of both assessments yielded results which indicated that boys generally, performed better than girls in mathematics. In the 1988 assessment, gender effects were larger on MC items than on OE items, corresponding to results of earlier studies. However, the 1991 IAEP assessment produced contrary results: gender effects tended to be larger for OE items than for MC items. These inconsistent results challenge the assertion that girls perform relatively better on OE test items, and suggest that item format alone cannot account for gender differences in mathematics performance. Further investigation of the data revealed that the inconsistent patterns of gender effects with regard to item format were related to the difficulty level of the items, regardless of item format. Correlations between item difficulty and item gender effect size were computed for age 13 in the 1988 assessment and for age 9 and age 13 in the 1991 assessment. The correlations obtained were 0.26, 0.47, and 0.53, respectively, suggesting that the more difficult the items, the better boys perform relative to girls.