

# MISSING DATA'S IMPACT ON PROBLEM-SOLVING MEASURES

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## PROBLEM AND PURPOSE

During assessment completion, students elect to answer items or not. A student may leave an item unanswered due to lack of content mastery, time, interest, or other reasons. Missing data presents a challenge to data analysis due to a significant number of factors contributing to the meaning of a student's choice and the nature of the assessment (Cheema, 2014). Ways in which missing data have been addressed during analysis are manifold (Cheema, 2014), and a one-size-fits-all approach to solving the issue is not possible. While DeMars (2002) reported the Rasch model was quite "robust" in the estimation of parameters where missing data were observed, issues raised during analysis surrounding the extent of missing data make the solution to the problem vexing. Most missing data studies reflect multiple-choice assessments (Rose et al., 2014). There is a gap in understanding missing data's impact in higher-level thinking constructed response assessments like problem-solving measures. Such tests require students to use different skills of producing rather than selecting answers and thereby require more time in item completion and fewer items tested. Thus, the impact of any single missing data point may be critical. The current study explored whether differential outcomes exist when missing data are analyzed as "incorrect" versus "missing" within the *Problem-Solving Measure* for Grade 5 (*PSM5* for age 10-11-year-olds). Research questions guiding this study were: (1) Was there a significant relationship between student *PSM5* measures from each scoring method? (2) Was there a significant difference in student *PSM5* measures depending on the scoring method?

## BRIEF FINDINGS AND CONCLUSIONS

Student test scores from both scoring methods shared a strong and statistically significant relationship ( $r=.983$ ,  $p<.001$ ). This result suggests the Rasch model was a robust predictor of rank regardless of scoring method with low item tests ( $N=18$ ). A paired samples *t*-test revealed a significant difference in student measures when unanswered items were considered incorrect versus missing;  $t(366)=1.65$ ,  $p<.001$ . Student measures were slightly lower when missing data were considered incorrect.

## References

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