

# An exploratory analysis of missing data





physical activity (MVPA) in the past 7 days, and their daily screen time habits on weekdays and weekend days [5].

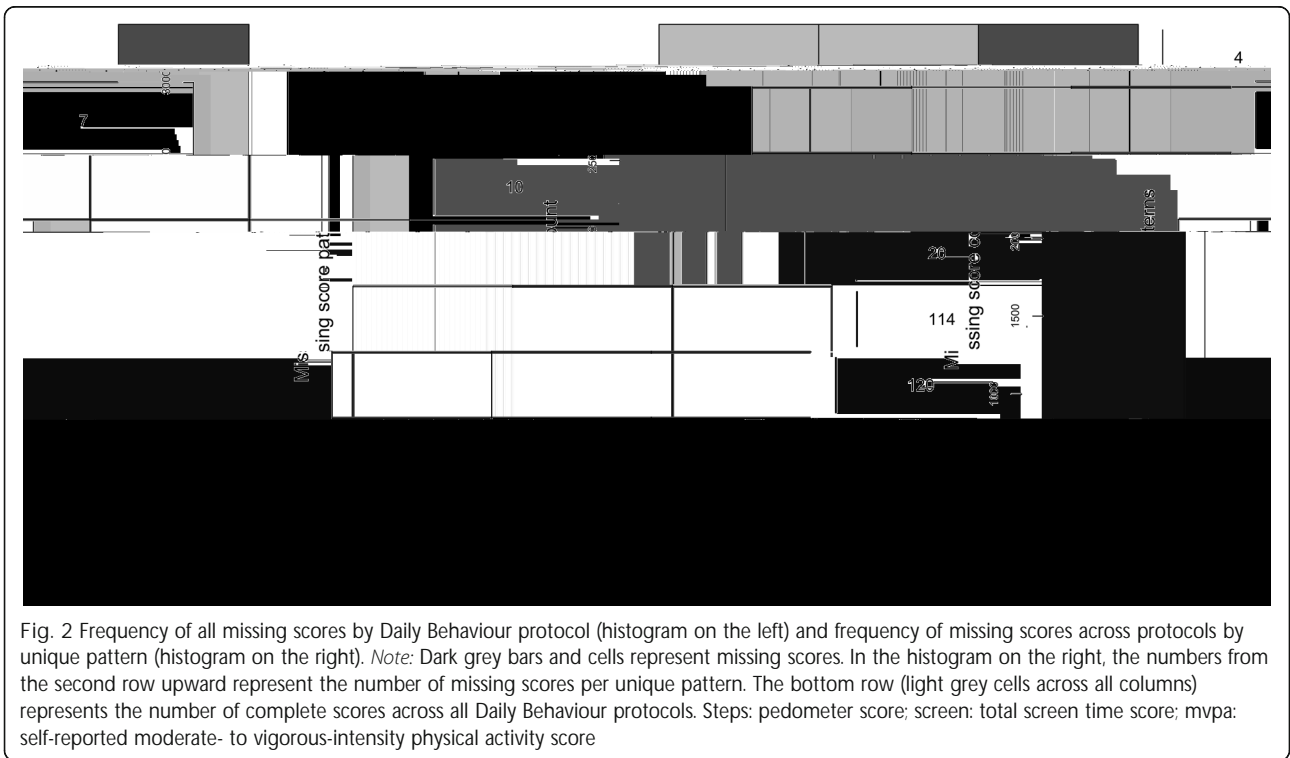
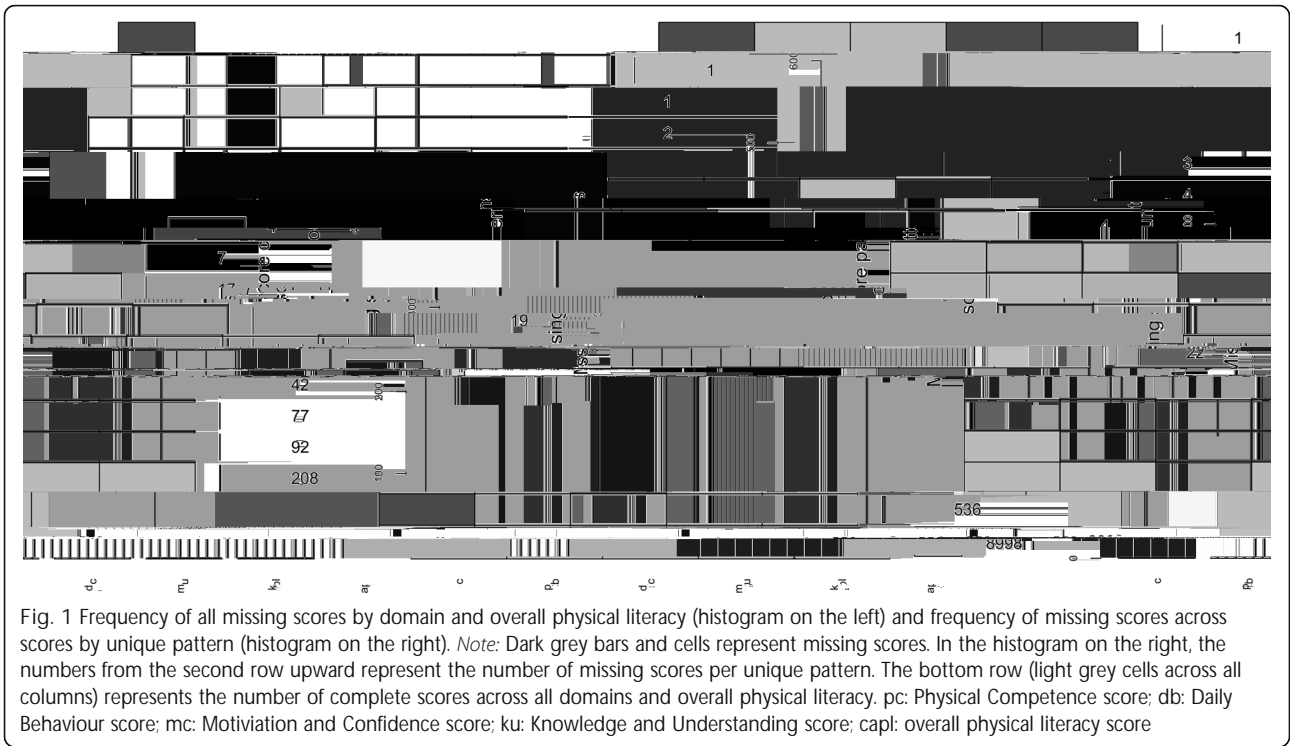
#### *M t a t a C*

The Motivation and Confidence domain was evaluated with a questionnaire that included items taken from published instruments in order to assess the participant's

total of 6502 participants had complete data for all three components (pedometer, self-reported MVPA, and self-reported screen time). The most common pattern for missing data was for children missing step counts ( $n = 3257$ ), with the next largest patterns for missing data being the children missing all three components for the Daily Behaviour domain ( $n = 120$ ) or missing the two self-report questions ( $n = 114$ ). The recursive partitioning analysis (missing step scores  $\sim$  age + gender + height + weight + school grade + site) suggested that site was the best predictor of missing data for step counts. Three of the 11 sites included in the RBC Learn to Play-CAPL project were missing step counts for 69.2% of their participants on average. Two four-site groupings had 38.2 and 21.4% of missing step counts for their participants on average, respectively.

Table 2 compares the scores in the project data by those missing versus not missing the pedometer scores (measure with the greatest missing data). Effect sizes for differences for all of the variables were considered negligible to small (range for Cohen's  $d$ : 0.00 to 0.39).

When the Daily Behaviour score was regressed on a grouping variable (nominal variable from 0 to 5, where 1 to 5 represented the five imputed datasets and zero represented the original dataset, which served as the reference), the scores were 1.6–1.7 units lower on average ( $p < 0.001$ ) compared to the Daily



pedometers was 66.2%. However, even though our compliance rates are in line with previous research, there is



participants. Another solution is to suspend the missing protocol rule for this domain so that if pedometer step counts are missing, no Daily Behaviour score is calculated. Even though missing data are inevitable, especially with objectively measured physical activity, a level of 34% is much too high.

To the best of our knowledge, this is the only study that has investigated the patterns of missing data in a large test battery for physical literacy consisting of a





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#### References

1. Tremblay MS, Costas-Bradstreet C, Barnes JD, Bartlett B, Dampier D, Lalonde C, et al. Canada's Physical Literacy Consensus Statement: process and outcome. *BMC Public Health*. 2018;18(Suppl 2)