Large within subject variance in childhood cognitive ability scores of Guatemalan high SES individuals born 1943-1953

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Large within subject variance in childhood IQ scores of Guatemalan high SES individuals born 1941-1953

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Background

- Previous studies have connected childhood cognitive reserve, often measured as Intelligence Quotient (IQ) scores, with various later life health outcomes, including risk of dementia and mortality5,7.
- These studies assume relative stability in IQ test scores over the developmental period, as often only a single, un-replicated IQ measurement is available or selected to represent early life cognitive reserve.
- Other literature has questioned the relative stability of IQ scores during development and highlighted that adverse life events, an individual’s developmental level and the instruments chosen can affect results significantly8-11.
- Therefore it is important to explore the variation seen within and between individuals’ IQ test scores to understand test precision and whether this is related to the type of test used, the administration process, or other less easily identified sources of variability.

Aims: 1) Examine within subject variance in longitudinal childhood IQ test scores 2) compare the relationship of childhood IQ scores to later life fluid intelligence test scores.

Methods

- Longitudinal childhood IQ scores were used from 42 high socioeconomic status Guatemalans born 1941-1953, now 64-76 years old.
- Attended Colegio Americano de Guatemala (American School) and took part in Universidad del Valle de Guatemala’s (UVG) Longitudinal Study of Child and Adolescent Development12-14 during youth.
- The sample represents 14% of original study participants who met the selection criteria (Figure 1).
- Novel cognitive data collected using the UK Biobank two minute fluid intelligence test15, the Spanish word accentuation test Chicago version16 (Table 1).
- Using Z-scores and regression analysis, childhood IQ scores were compared with the results of the recent IQ tests administered to the participants.

Results

- Participants showed high within subject variance in childhood IQ: 62% had fluctuations of >15D in their scores (Figure 2).
- Average childhood IQ test Z-scores were related to older age fluid intelligence test Z-scores with 61.9% of the sample maintaining their test Z-score category (Figure 3).
- The within subject distribution of scores was not similar between individuals (p<0.001).
- Only 12% of total variation in the older age scores was explained by childhood scores (p<0.05)

Conclusions

- Test type, motivation, and disturbing life experiences could in part explain the within subject variance in scores.
- These sources of variability, plus modest association between childhood and older age IQ scores suggest that single point measurements of intelligence at a young age and stability of test scores over lifespan should be regarded with some caution.

REFERENCES