

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

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Studies connecting childhood intelligence with later life health and mortality have used measurement at a single time point to characterize cognitive reserve accumulated during growth. Using a sample from outside the traditionally investigated high income countries, the primary aim of this study is to examine within subject variance in longitudinal childhood cognitive test scores. The secondary aim is to compare the relationship of the childhood scores to later life cognitive ability.

Physical and cognitive growth data were used to study 42 high socioeconomic status Guatemalans born between 1943 and 1953. All individuals had normal physical development as measured by height and weight. Using Z-scores and regression analysis, childhood ability test scores were compared with the results of three different tests administered to the participants, now 64-74 years-old. A Kruskal-Wallis test was used to explore within subject score distribution.

Results show high within subject variance in childhood cognitive ability, 62% of participants had fluctuations of $>+1SD$ in their scores. The within subject distribution of scores was not similar between individuals ($H(43)=79.055$, $p<0.001$). Average childhood cognitive test Z-scores were positively related to older age cognitive test Z-scores ($R=0.347$, $p<0.05$) with 62% of the sample maintaining their cognitive test Z-score category.

Test type and motivation could in part explain the high within subject variance in scores highlighting that researchers should be careful when using a single test score from childhood. Further, only a modest proportion of total variation in the old age Z-scores (17.4%) was explained by the childhood Z-scores in this sample.

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