Commentary: Influence of early life intelligence test performance on later health: do lower scoring children become less healthy adults?

Merete Osler and G David Batty

Since the introduction of intelligence testing in the early 20th century, this characteristic (also known as cognition, cognitive function, and mental ability) has consistently been shown to be related to indices of socioeconomic position, such as education and occupational social class, with the least favourable levels seen in individuals from the poorer backgrounds. Childhood cognitive function has also been suggested as one of the mechanisms mediating the association between socioeconomic position in early life and adult mortality. Cognition measured in early life has been related to final qualifications and adult behaviour, such as smoking, supporting the notion that this psychometric characteristic may be associated with health. However, given the ubiquitous social patterning of cognition scores, a potential alternative explanation for this effect is confounding by social circumstances. Further indirect support for this view point can be found in the patterns of association between childhood cognition and adult cause-specific mortality which tend to reflect those reported for paternal social class, a widely used indicator of pre-adult socioeconomic position.

Although pre-adult cognition seems to relate to adult disease aetiology—as mediator and/or a predictor in it own right—it is only in within the last decade that intelligence has been examined in relation to health outcomes. The reticence of investigators to fully grasp this area of enquiry may be ascribed to its contentious nature, as exemplified in the vigorous debates that followed the release of Herrnstein and Murray's *The Bell Curve: Intelligence and Class Structure in American Life*, one of the most provocative social science publications of recent years. In this text, analyses of data from the US National Longitudinal Survey of Youth were used by the authors to illustrate ethnic differences in general intelligence, leading to their assertion that eugenic-like reforms should be made to the modern US welfare system. Notably, their findings were never subjected to the scrutiny of peer review. Another explanation for the reticence may be due to the questions that have been raised as to what IQ tests actually measure.

Until recently, the literature on childhood cognition and health has been dominated by non-representative samples of army recruits and nuns, not all of which provided direct measures of cognition—in the latter cohort, for instance, mental ability measurements were based on the density of information in selected passages from convent members’ hand-written autobiographies. The paucity of data from populations which represent the full range of intelligence scores has recently been addressed in a follow-up of a sub-group of Aberdonians from the 1932 Scottish Mental Survey (SMS) of 11 year olds. In this study childhood cognition was related to all-cause mortality in adulthood, with the lowest risk seen in adults who, as children, had higher test scores.

The 1946 birth cohort, one of four on-going nationally representative British birth cohort studies, which holds a range of serially collected data from birth until middle age, has now accumulated sufficient mortality cases to examine these issues. In their analysis, Kuh and co-workers found an elevated rate of total mortality which was confined to the low cognition group; an incremental association was not seen. This observation was only made in men; there was no association in women. Although various adjustments were made, comparison is complicated by differing sample size across sub-group owing to missing data. Nonetheless, when controlled for differences in childhood socioeconomic position, childhood illness and adult smoking patterns had little impact on the effect estimates in men. However, statistical significance at conventional levels was lost when social factors in adulthood (education and occupational social class) were added to the model. In so doing, the authors may have identified a pathway through which cognition protects against mortality, whereby elevated scores on pre-adult tests of cognition lead to high educational attainment and entry into well-paid employment.

The lack of association in women and absence of an incremental cognition–mortality gradient in men is notable. Both may be attributable to the low number of deaths in this study, a problem acknowledged by Kuh et al. and one which was most acute in women. It is plausible that mortality risk was only elevated in the lowest cognition group because it may have held a large proportion of children with mental disabilities whose mortality experience will inevitably be less favourable in later life. On adjusting for people with disability in childhood in preliminary analyses of data from another Scottish study and, excluding such people in a Danish investigation (schools for children with learning difficulties were not surveyed), the incremental cognition–mortality association remained.

A challenge for future research in this area is to explore the role of other potential covariates in early and later life (birth characteristics, risk behaviour, psychosocial traits, and health services use) represented in the proposed four mechanisms behind the association and the relation between cognition and other
more specific health outcomes such as cardiovascular diseases and violent causes of death. In this context pooling of data from the available cohorts should be considered in order to maximize power, since most cohorts at present are hampered by a small number of deaths. Studies should also consider using more complex models to quantify the direct and indirect causal pathways postulated in life course models. It could also be of value to explore effect modification by socioeconomic position on the cognition–mortality relation by comparing this relation in groups of individuals living in poor and affluent households, respectively.

Thus, it is still an intriguing question that deserves investigation—why should a school child’s performance on a brief, usually group-administered, written test be associated with health outcomes many years—in some cases up to 65 years—later?

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References


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