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# EARLY LIFE PREDICTORS OF CHILDHOOD INTELLIGENCE: EVIDENCE FROM THE ABERDEEN CHILDREN OF THE 1950S STUDY

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## ABSTRACT

**Objective:** To identify the early life predictors of childhood intelligence. **Design:** Cohort study of 10 424 children who were born in Aberdeen (Scotland) between 1950 and 1956. There are few facts about the role of obedience when committing acts against one's personal conscience (1961). Most theories suggest that only very disturbed people are capable of administering pain to an ordinary citizen if they are ordered to do so. Our experiment tested people's obedience to authority. **Results:** The results showed that most obey all orders given by the authority-figure, despite their unwillingness. **Conclusion**: The conclusion is that, contrary to common belief, personal ethics mean little when pitted against authority.

**KEYWORDS:**

## INTRODUCTION

Childhood intelligence is associated with a number of important health outcomes in adulthood, including cardiovascular disease, some cancers, and premature mortality. For the most examined end point, total mortality, the relation with early life IQ seems to be strong, incremental, consistent across a number of study populations, and independent of childhood social circumstances. With intelligence reflecting a person's ability to learn, reason, and solve problems, plausible mechanisms underlying the lower risk of mortality in groups who score more highly on intelligence test in childhood may include the optimal interpretation of health prevention messages, such as those related to smoking, and better disease management in persons with existing chronic illness. Other mechanisms include the possibility that intelligence test scores serve as records of prenatal and childhood environmental insults, and/or that they act as an indicator of information processing efficacy. Having a clear picture of the early life determinants of childhood intelligence is potentially important in developing our understanding of what mechanisms might explain the associations between childhood intelligence and mortality.

## METHODS

Of the 12 150 participants, 11 679 (96%) had intelligence scores at age 7, 11 386 (94%) had intelligence scores at age 9, and 11 324 (93%) had scores at age 11, and 10 873 (90%) had intelligence scores at all three ages (fig 1). In the analyses presented in this paper for each intelligence score all those with data at the age being considered are included (that is, for results concerned with intelligence scores at age 7, 11 679 participants are included in the analyses). When we repeated the analyses only including those with results on all three intelligence scores (that is, 10 873) the results were essentially unchanged from those presented.

Linear regression was used to estimate mean differences and 95% confidence intervals of each measure of intelligence across exposure categories. A series of multivariable linear regression models was undertaken to assess the independent effects of each predictor. Among those with intelligence test data, for most of the predictors that we considered (excluding maternal education as discussed above) between 96% and 100% of the participants had complete data. There were two exceptions to this. For sex and gestational age adjusted birth weight z score data were available on 90% and for maternal physical characteristics data were available on 75%. We therefore used multiple imputation using all other variables in the analysis dataset (that is, all predictor variables and the outcomes) to impute values for the missing data for birth weight z score and maternal physical condition. We used switching regression as described by Royston, and carried out 20 cycles of regression switching and generated five imputation datasets. With these imputations 92%–93% of the participants with intelligence test scores at each of the three ages had complete data on all potential predictors. The multivariable results presented in this paper are based on analyses using imputed values for the birth weight z score and maternal physical condition. In addition to these analyses we undertook sensitivity analyses in which we conducted all of the multivariable analyses solely on those people with complete data on all predictor variables and intelligence measured at each age (58%). The results using multiple imputed data did not differ substantively from those on the complete data subset, although the former were more precisely estimated than the latter.

In the regression models, birth weight and childhood height, weight and body mass index z scores were entered as continuous variables. All other variables were either binary or were entered as indicator variables in the categories presented in table 1. We examined stratified results and computed likelihood ratio tests to assess interactions. We used robust standard errors when computing p values and 95% confidence intervals, to take account of any non-independence between siblings in the cohort. All analyses were conducted using Stata version 8.0.

## RESULTS

Social class of father around the time of birth, gravidity, maternal age, maternal physical condition, whether the child was born outside of marriage, prematurity, intrauterine growth, and childhood height were all independently associated with childhood intelligence at ages 7, 9, and 11. The effect of social class at birth was particularly pronounced, with a graded linear association across the distribution even with adjustment for all other covariates ($p<0.001$ for linear trend). Those from the lowest social class (V) had intelligence scores that were on average 0.9–1.0 of a standard deviation lower than those from the higher groups (I and II) at each of the three ages of intelligence testing. Collectively, the early life predictors that were examined explained 16% of the variation in intelligence at each age.

## CONCLUSION

Father's social class around the time of birth was an important predictor of childhood intelligence, even after adjustment for maternal characteristics and perinatal and childhood factors. Studies of the association of childhood intelligence with future adult disease need to ensure that the association is not fully explained by socioeconomic position.

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