



# Childhood intelligence and personality traits neuroticism and openness contributes to social mobility: A study in the Aberdeen 1936 Birth Cohort<sup>☆</sup>



R.T. Staff<sup>a,\*</sup>, M.J. Hogan<sup>b</sup>, L.J. Whalley<sup>c</sup>

<sup>a</sup> NHS Grampian, Aberdeen, United Kingdom

<sup>b</sup> Department of Psychology, NUI, Galway, Ireland

<sup>c</sup> Institute of Applied Health Sciences, University of Aberdeen, United Kingdom

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## ABSTRACT

**Background:** Social mobility has been linked to intelligence, education, personality traits and childhood socioeconomic status (SES). We explore these influences to evaluate their relative importance as sources of individual differences in social mobility.

**Methods:** Data are from the Aberdeen Birth Cohort of 1936 (ABC36) for whom childhood intelligence scores are available. Social mobility of participants was estimated from comparisons between their childhood and adult circumstances age 64. Personality traits were assessed using the Five Factor model. Structural Equation Modelling was used to investigate the influence on social mobility of socioeconomic variables, childhood and adult intelligence, education and personality traits.

**Results:** Controlling for childhood socioeconomic status and childhood intelligence, upward social mobility is predicted by personality traits of Openness (positive) and Neuroticism (negative). Neuroticism had a significant direct influence on mobility after. Openness had an indirect effect via Education and adult cognitive ability. Education, childhood and adult cognitive ability are significant influences on mobility.

**Conclusions:** Socioeconomic destination is determined in this sample by childhood intelligence and socioeconomic status and the adult personality traits of Openness and Neuroticism. Educational exposure and gains in cognitive ability over the life course mediate these influences.

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## 1. Introduction

A complete understanding of the interaction between potential drivers of social mobility and their prospects for modification is yet to be realized. At the population level, two broad and inter-related trajectories of life course development reveal the many possibilities for a sustained intergeneration reproduction and accentuation of social, economic and health inequalities. Notably, within cohorts, as people develop from childhood through to old age, there is a tendency for increased diversity across a range of social, economic, and health outcomes coupled with a systemic pattern of cumulative advantage/disadvantage (Dannefer, 2003). In other words, as cohorts develop throughout the life course patterns of increased diversity within any single group are not purely random. Cumulative advantage/disadvantage (CAD) highlights a systemic pattern of divergence of developmental outcomes whereby,

‘initial comparative advantage of trained capacity, structural location, and available resources make for successive increments of advantage such that the gaps between the haves and the have-nots increase’ (Merton, 1968). Support for CAD theory comes from studies of both income and health inequalities, with systemic patterns of inter-individual divergence repeatedly observed for different cohorts across decades of international research, even in the context of dramatic changes in the absolute amount of age-specific inequality or poverty (Dannefer, 2003).

Although lifespan developmental theories focused specifically on social mobility are lacking, the individual and environmental variables that influence social mobility are likely to be multi factorial and multi-level. Indeed, Bronfenbrenner previously proposed a model (Bronfenbrenner, 1979) that describes an ecological multilevel system within which humans interact and develop over time. Bronfenbrenner proposed that development is influenced by interactions across different system levels, that is, between individuals and proximal institutions and groups including family, peers, school, religious groups, the interactions between multiple micro-systems, and broader socio-cultural factors that change over time. While the limited availability of longitudinal data makes it difficult to account for all factors at all levels

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\* Corresponding author at: Aberdeen Royal Infirmary, NHS Grampian, Foresterhill, Aberdeen AB25 2ZD, United Kingdom.

E-mail address: [r.staff@nhs.net](mailto:r.staff@nhs.net) (R.T. Staff).

across the life course, evidence suggests that social structural factors such as socioeconomic status of one's parents and educational opportunities and individual factors such as intelligence, personality and motivation can influence both the intergenerational reproduction and accentuation inequalities, while influencing patterns of social mobility within cohorts (Forrest, Hodgson, Parker, & Pearce, 2011, Crystal & Shea, 1990). As such, within the broader cumulative advantage/disadvantage profile, research suggests that there are also unique and varied trajectories of both upward and downward social mobility.

Social mobility is defined as “the movement of an individual between social classes over his or her life course” (Forrest et al., 2011). Mobility and social inequalities in health are among the most important topics in social epidemiology. Lower economic and social status at the individual level and high economic and social inequalities at the population level have a negative effect on health (Lynch et al., 2004; Lorgelly & Lindley, 2008). Although it is unclear if upward social mobility can improve health and reduce mortality, there is some optimism that it might (Hart, Smith, & Blane, 1998). If so, identification of the nature and strength of factors that facilitate social mobility as well as those that obstruct it would be relevant to public policies that aim to ameliorate social inequalities in health.

Controversy remains about the nature of major influences on social inequalities. It was not unusual in the last century to encounter forceful arguments that the lower classes carried personal responsibilities for their poor position. Over time, interest shifted towards the study of individual differences in personal attributes and social circumstances that might promote social mobility (Mackenbach, 2010). These include differences in general cognitive ability (intelligence), personality, and indicators of the origins of the diseases in foetal development and during a disadvantaged childhood (Whalley, 2006). The wide range of social structural influences on social mobility includes geographical variation in school education, economic opportunities and temporal trends in funding of education and occupational opportunity (de Vries & Rentfrow, 2016). Personal attributes such as intelligence and personality may also be important, but we currently have limited insight into their relative influence on social mobility.

The influence of intelligence and education level on social mobility has been examined in a handful of studies. For example, Cassidy and Lynn (Cassidy & Lynn, 1991), in a longitudinal study tracking young people from ages 16 to 23 years, found that higher levels of educational attainment and achievement motivation, but not parental socioeconomic status, predicted upward social mobility. Although higher intelligence did not directly influence social mobility in the study by Cassidy and Lynn, it had a positive effect on educational attainment. Another study tracking social mobility between ages five and 49–51 years (Forrest et al., 2011) found that both achieved education level and childhood IQ were significantly and independently associated with upward social mobility.

In relation to personality, Elder (1969) examined longitudinal trajectories of social mobility in a sample of 69 men from high school through to adulthood (ages 33–38 year) and found that, during adolescence, the upwardly mobile were more ambitious and scored higher on personality measures of ego integration and competence. Evidence from cross-sectional studies also suggests that personality may influence patterns of social mobility. For example, Turner and Martinez (1977) found that women scoring higher on a Machiavellian personality scale (i.e., a disposition to focus on power; being cool, distant, and manipulative) achieved higher levels of occupational prestige and higher income levels. However, for men, a similar positive relationship was only found for those with above-average educational attainment. Conversely, a negative relationship between Machiavellian personality and occupational prestige and higher income levels was observed for men with below-average educational attainment.

Other cross-sectional studies have found that higher scores on personality traits of Neuroticism and Agreeableness and lower scores on Conscientiousness, Extraversion and Openness are more frequent in lower status occupations (Chapman, Fiscella, Kawachi, & Duberstein,

2010). Alessandri and Vecchione (2012) also found that stability (i.e., a personality factor characterised by higher conscientiousness, lower neuroticism, and higher agreeableness), but not plasticity (i.e., higher openness and extraversion) predicted better job performance. At the same time, the role of personality in longitudinal trajectories of socioeconomic status remains uncertain. The mechanism by which factors combine and are mediated by life course exposures such as education is also unclear. Authors such as Von Stumm, Gale, Batty, and Deary (2009) and Cheng and Furnham (2012) have used structural equation models to determine the direct and indirect influences of similar factors, finding significant results for Extraversion and Conscientiousness and ‘locus of control’ which has been linked to Neuroticism. A longitudinal study by Cassidy and Lynn (1991) found that an aggregate measure of personality (including extraversion and neuroticism) was associated with upward social mobility. However, the study by Cassidy and Lynn focused on a narrow age range (ages 16 to 23 years) and included a limited range of predictors of social mobility and thus it remains unclear how childhood intelligence, educational attainment and personality influence patterns of social mobility over the life course.

In a UK birth cohort study, we seek a better understanding of how social mobility is related to childhood socioeconomic status (SES), childhood intelligence, early education, and adult personality. Absolute occupational intergenerational social mobility is difficult to capture in the context of structural changes in the labour market in the UK. The UK in general has reduced its manufacturing base in favour of more service industries, although the exact nature of this shift varies from location to location. Aberdeen, the city on which this study is centred, shifted from a provincial city with a population reliant on light engineering, farming, shipbuilding and fishing, in the mid twentieth century, to one predominantly centred on the oil industry with an increase in service industries and with many highly paid administrative jobs (Tiesdell & Allmendinger, 2004). Our data are contemporaneous with the transformation of the labour market in the post-war period and afford a unique opportunity to examine the predictors of social mobility during a time of unprecedented socioeconomic improvement enjoyed in a single Scottish city. We are in the fortunate position to hold data on Aberdeen residents who had taken part in the Scottish Mental Survey of 1947 when aged about 11 years (Whalley et al., 2011), thus allowing this life course analysis. In order to examine factors that influence the movement of individuals between social classes from early childhood to late life, we considered the direct effect of childhood socioeconomic status, childhood intelligence, and personality on adult socioeconomic status, and also the indirect effect of these predictors as mediated by education and adult cognitive ability.

## 2. Methods

### 2.1. The sample

All data were provided by the Aberdeen Birth Cohort of 1936. This is a subsample of the Whalley et al. (2011) which was a national survey of childhood intelligence. Children who sat the Scottish Mental Survey of 1947 in an Aberdeen City School were traced by gender, date of birth and unmarried name using the Community Health Index, General Registrar Office public records and National Health Centre Records (Scotland and England). The local Family Doctors' Research Committee requested that invitations to take part in the current study should be made by letter, each signed by the prospective participant's family doctor to exclude those who were recently bereaved or suffering a life-threatening illness. An extended description of recruitment and data acquisition is available (Whalley et al., 2011). Following guidance by the Local Ethics of Research Committee who approved study procedures, volunteers gave written informed consent to a longitudinal observational study of brain ageing and health. We invited individuals who could be matched exactly by birth name and date of birth with the Scottish Mental Survey (1947) archive; 506 of 676 (75%) agreed to participate. Of these, 443 participants provided personality data (213

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