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A Poverty of aspirations? Exploring the roots of the aspirations-careers paradox

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Background

There has been substantial concern in many countries about students' engagement with school science and the low numbers choosing to pursue the study of science (European Commission, 2004; HM Treasury, 2006; National Academy of Sciences, 2005), and a considerable body of evidence now exists highlighting how science is failing to engage young people (Jenkins & Nelson, 2005; Lyons, 2006; Osborne & Collins, 2001; Sjøbeg & Schreiner, 2005). Research has demonstrated that despite the majority of children having positive attitudes to science at age 10 (Murphy & Beggs, 2005), interest declines sharply in the following years (Osborne, Simon, & Collins, 2003) and ever-diminishing numbers choose to study science subjects at higher levels. Moreover, evidence suggests that life-world experiences prior to 14 are the major determinant of any decision to pursue the study of science (Lindahl, 2007; Royal Society, 2006).

Research evidence also indicates that there may be an important link between the early formation of aspirations for science-based careers and later propensity to study science at higher levels and/or enter a science career. For instance, Tai et al. (2006) point to how early science aspirations are a better predictor of studying science at university than levels of achievement in school. However, in what can be termed the 'attitude-achievement paradox' (Mickelson, 1990), this close link between attitudes/ aspirations and progression to study science at higher levels does not necessarily translate in a straightforward manner for all ethnic groups, particularly in the case of students of Black Caribbean, Pakistani and Bangladeshi heritage in the UK (Elias et al., 2006).

Research Questions

Despite the importance of early experiences in the formation of aspirations, relatively little work has been conducted on what views young students (that is children under the age of 11) hold about science - particularly not from a perspective that understands learning as tied to processes of identity construction (Holmes, 2000) nor from an exploration of how these vary with ethnicity.

In this paper, we draw on survey data from the ASPIRES project - a five year study on the factors shaping the educational and science choices and aspirations of children between ages 10-14 - to map out issues pertaining to the development of children's science aspirations over time. The study aims to explore how educational and occupational aspirations are formed, how aspirations are influenced by peers, parents and experiences of school science and how they are shaped by gender, class and ethnicity. These questions will be investigated both qualitatively (repeat interviews over 4 years with 60 students and parents) and quantitatively (via a national online questionnaire survey of students age 10, who are then tracked and surveyed again at ages 12 and 14). While both the wider project and the survey data reported in this paper are broadly concerned with investigating the ways in which children's aspirations and engagement with science are shaped by identities and inequalities of 'race'/ethnicity, social class and gender, there is not a specific focus on students of particular ethnic backgrounds. Nevertheless, in order to ensure that factors such as ethnicity (specifically minority ethnic backgrounds) are considered, the project has deliberately sought to ensure that substantial proportions of minority ethnic students participate in the various forms of data collection.

Methods

This paper focuses on the first set of quantitative data collected in the project, which forms a baseline with which children's later aspirations can be compared. In that phase (autumn 2009) nearly 9900 Year 6 pupils from 278 schools took part in an online survey. All schools were located in England and were recruited to be broadly representative of the population of primary schools in terms of

geographic location (Government Office Region), school type (private, state, religious) and attainment (based on Key Stage 2 science performance in 2008). The recruitment also took socioeconomic class (as reflected in the proportion of pupils eligible for free school meals) and the proportion of pupils having English as an additional language into consideration, as well as ethnic background, given the interest of the project in how class and ethnic identities may influence the development of aspirations.

Frame

The questionnaire itself was administered online and drew on existing instruments, qualitative literature (particularly concerning cultural capital and identity) and discussion groups with Year 6 students, and it was pilot tested with Year 5 and 6 students in summer 2009. The final version contained items concerning cultural capital, interest in science outside of school, occupational values, parental aspirations or expectations, parental attitudes towards science, peer attitudes to school and to school science, images of scientists, perceptions of school science, self-concept in science, self-efficacy in science, and future aspirations in science. All of these have a well-established empirical or theoretical base.

The analysis of the survey data proceeded in two phases. First, reliability and validity analyses were carried out, using principal components analysis and Cronbach's alpha to determine unidimensionality and internal consistency of our scales. Second, multivariate analyses utilised the latent variables (components) that emerged from the first set of analyses to explore patterns in children's responses, particularly with regard to gender, ethnicity and social class, and to investigate what components may be contributing to students' aspirations in science.

Research findings

The findings provide an overview of students' aspirations in Year 6, particularly related to science, and identify factors - such as parental attitudes to science, experience of school science, and self-concept in science - that contribute to these aspirations. They also highlight the complex way in which ethnicity and social class interact with aspirations. Because this data is quantitative, it can only provide an overall picture of students' aspirations in Year 6. Thus, we rely on qualitative interview data with students (and their parents) to illuminate how and why these factors influence aspirations. Policy implications, particularly with relation to the aspirations-achievement paradox, will also be discussed.