

PhD proposal: The relationship between income and physical and mental health in families with young children

This project will examine why income negatively relates to physical and mental health in families with young children. Existing explanations focus either on money's power to buy goods and services conducive to health, or money acting as a proxy for social position, with being of low position acting as a stressor. This project will provide the first clean and direct test between these competing explanations. This research will further provide indication of the mechanism underlying the effect, which is vital to inform effective policy interventions. The escalating problem of income inequality makes identifying how and why income relates to health an increasingly pressing policy question.

Positioning of the research

Having a low income undermines the physical and mental health of adults and children. Two explanations have been proposed: the *Material deprivation hypothesis* states that low spending power undermines health as income decreases. This is supposed by the UK poverty line, deprivation indices (Adams et al., 2011, McLennan et al., 2011) and in poverty reduction strategies of wealth redistribution, benefits and the minimum wage. Alternatively, the *Psychosocial hypothesis* argues that income acts solely as a proxy for social status (Powdthavee, 2009), so an individual's income position, not their actual level of income determines their health. Having an income lower than that of a comparison group carries a psychological burden, compromising health (Marmot, 1998).

Despite a lively debate between the proponents of each viewpoint, the evidence remains inconclusive as the competing hypotheses have not been directly tested (because income is correlated with income position, evidence supporting one without controlling for the other can be used to support either explanation). Further, it is not clear why being of low social position would have such an impact on health. I will therefore directly test the competing hypotheses, controlling for the primary expectations of each, aiming to support a novel social rank explanation of the psychosocial hypothesis.

The traditional version of the psychosocial hypothesis states that an individual's income determines their social position (Marmot and Wilkinson, 2001, Adamson et al., 2006), and occupying a low position induces stress, insecurity and anxiety that damage health (Wilkinson and Pickett, 2010). However, it remains unclear how this comparison occurs: some previous work assumed that people compare to the typical person (eg: Kondo et al., 2008), whereas others suppose that comparisons are made to rank position (eg: Undurraga et al., 2010).

Demonstrating whether people use rank or average-based comparisons is important because this implicates different underlying mechanisms to explain the health impact of low social position. The novel social rank explanation suggests that occupying a low social rank triggers 'involuntary defeat syndrome' (IDS), a hard-wired and ordinarily adaptive response to low social position in

animal hierarchies. This response modifies hormonal activity, prompting defensive behaviour that signals a 'no threat' status to dominants (Gilbert, 2006).

If the rank of an individual's income within a comparison group, rather than income itself was related to health, this may suggest that being of low income triggered an IDS response. Similarities are evident between adaptive IDS behaviours in non-human animals and symptoms of human affective behaviours (including social withdrawal, hypervigilance and reduced appetite), particularly in depression and anxiety disorders. Despite being widely used in animal studies and to examine income and happiness in humans, social rank explanations have only recently been applied to health.

This project will directly test whether the relationship between income and health is due to (a) income itself, (b) how income differs from the mean of a comparison group, or (c) how the income ranks within the group. Only two existing studies, both by the potential supervisor and his colleagues (Wood et al., 2012, Boyce et al., 2010) have attempted this comparison. These examined a general population sample, focusing exclusively on life satisfaction and general psychopathology. I will extend this initial work to provide the first clear tests examining why parental income impacts on parent and child health, extending Wood's previous work by examining specific outcomes and identifying the underlying mediating mechanisms.

Research design and methodology

All studies use data from the Millennium Cohort Study (MCS). Each comprises cross-sectional and longitudinal analyses using multilevel modelling to consider individual and family effects and change over time. Further details are included in section 11.

Study 1

This directly extends previous research by explicitly testing the social rank hypothesis with respect to anxiety and depression in adults. Mental health is assessed by measures of depression or serious anxiety. Income is used to predict health in preference to consumption because it captures spending power more clearly. Comparing three measures of income provides a clean test of income rank to predict health from income. Each income variable is specified as time-varying to empirically test the interaction between income and time.

If a relationship between social rank and health is identified, its strength across the income spectrum will be examined further to test whether the relationship holds among wealthier individuals. Changes in income and health over time will be examined to determine the responsiveness of IDS behaviours to income changes, specifically among benefit-dependent families.

Study 2

The second study considers whether lower incomes undermine physical and mental health in children, using parental ratings of child health, long-standing illness and the Strengths and Difficulties Questionnaire. To supplement the self-report measures, diagnoses of Autism or Asperger's Syndrome, Attention Deficit

and Hyperactivity Disorder and developmentally appropriate behavioural measures (bedwetting, sleeping problems) will be included.

Study 2 will also examine behavioural correlates of IDS. Hormonal activity and behaviour are modified by IDS but hormonal measures are not available in the MCS. Observing these behaviours will instead lend strength to the social rank explanation.

The study will also examine whether the influence of income rank is fixed or dynamic in young children. The results will be replicated and extended among older children (13 upwards) using data from the Longitudinal Survey of Young People in England.

Study 3

The final study links the findings of the earlier studies by examining the extent to which the role of income on child health is influenced by other factors. This first test of whether parental rank influences child health will further explore these mechanisms, controlling for unmeasured family characteristics. Two types of mediating factors will be considered: financial capital (material goods and the physical environment), and family process factors (non-material parental resources). This distinction mirrors the differing explanations of the material and psychosocial hypotheses. Interaction terms will determine whether these factors vary over time.

Methodological critique

Its data and analysis techniques offer this project great analytical power. The MCS confers high reliability and great statistical power without the costs of data collection, and being nationally representative makes project findings generalizable beyond the sample, increasing their impact.

Psychological research typically employs experiments and small-scale surveys, presenting problems in generalizing results. Despite their numerous benefits, the potential of readily available large datasets has remained untapped in Psychology. This project will apply research techniques from Social Statistics to consider a question relevant to both disciplines, while overcoming the key limitations of psychological methods and increasing the profile of large datasets in Psychology.

The longitudinal approach also confers advantages. Repeated observations of individuals removes the confounding influence of fixed effects, enabling relationships to be more clearly observed. Longitudinal analysis provides more efficient estimators than equivalent cross-sectional designs (Hussein, 2011), while lagged models enable the direction of relationships to be established, which is vital for formulating effective interventions.

The project's relevance to policy and society

The crucial influence of the early years was recognized in the government's 2010 review of health inequalities, whose first recommendation was to 'Give every child the best start in life' (Marmot, 2010). The consequences of child health

extend well beyond childhood: data from the National Child Development Study indicated that health at age 7 was significantly correlated with health and employment throughout middle adulthood (Case et al., 2005). The lasting implications of poor child health make understanding exactly how income relates to health relevant to both children and adults.

The current financial climate increases the importance of these considerations. Record levels of unemployment, reduced eligibility for Income Support and Child and Working Tax Credits, frozen rates of Child Benefit and the possibility of an annual benefits cap put more families at risk from low incomes and impaired health. Because income may become more salient during economic hardship, answering these research questions is currently particularly relevant.

This project's impact is therefore significant: by examining the mechanisms that translate income into health outcomes, it can inform evidence-based policies to address the health consequences of income disparity. The implications of this study will be extremely timely to policy makers.

The project's relevance to ESRC priorities

This project is relevant to several ESRC priorities. Collaboration between Psychology and Social Statistics directly supports the aim to build capacity in interdisciplinary research and will maximise the impact of results.

It also supports the priority to utilise existing large quantitative datasets. Ensuring the UK data infrastructure is exploited to its full potential protects the ESRC's investment in these datasets and increases the returns made by these investments.

Finally, the project is highly relevant to the ESRC Strategic Priority for a vibrant and fair society. During recent years, health inequalities have increased while social mobility has decreased. Understanding exactly how income relates to health outcomes has never been more important or more relevant.

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