1303 Darwinian approaches to explaining demographic transition

Title: The influence of perceived mortality risk on fertility preferences: how life history theory and demographic transition theory can collaborate to improve our understanding of fertility decline

Abstract: Both Life History Theory and Demographic Transition Theory predict that fertility responds to changes in mortality. However there has been limited research on the links between mortality perceptions and fertility preferences at the individual level. My previous work found that males, though not females, react to priming about their own mortality by increasing their desired number of children. This research expands on in three ways: i) looking at a more diverse participant population, ii) expanding fertility preferences to consider the desired timing and prerequisites for children iii) investigating the nature of different types of mortality threat, specifically the relative effects of mortality priming for adult or child mortality and the relative effects of priming for random or non-random mortality (i.e. the extent to which mortality risk can be mitigated by parental investment). This research demonstrates how an understanding of individual behaviour informed by evolutionary theory can help explain population-level phenomena.

Extended abstract

Background

This research attempts to bring together to two theoretical frameworks: Demographic Transition Theory and Life History Theory.

Numerous empirical studies have highlighted the association between mortality and fertility rates between countries (e.g. Chowdhury 1988). The trend is also seen within communities as well as across them as demonstrated by Wilson and Daly's (Wilson and Daly 1997) study between wards within Chicago. The role of mortality was seen as the central causal agent in the classic version of the Demographic Transition Theory (Notestein 1945, Davis 1963). However, subsequent fertility decline theories such as (Caldwell 1982, Becker 1991, Easterlin and Crimmins 1985, Cleland and Wilson 1987, McDonald 2000, Newsom, Postmes et al 2005) have detached mortality arguing it is coincidental or confounding and have moved away from attributing to it causal status. Recently some demographers (Cleland 2001, Casterline 2003, Ni Bhrolchain and Dyson 2007) have re-advocated its utility, though they argue that the causal process works through intermediate socio-demographic, economic or cultural factors, such as urbanisation. Unsurprisingly demographers set such theories at the macro population level.

At the individual level Life History Theory predicts a similar reaction to mortality (Chisholm 1993, Roff 1992, Stearns 1992). Biologists broadly classify reproduction into r or K strategies (Livi Bacci 2001). Organisms that follow r reproductive strategies are characterised by limited parental investment per offspring and a high quantity of offspring. Such a strategy is evolutionarily adaptive under conditions of high extrinsic mortality, as the risk of reproductive failure is spread across a large number of offspring. Examples of such a strategy would be rodents or fish species. K strategy conversely is characterised by higher parental investment in a smaller number of offspring. Such a strategy is adaptive under conditions of low extrinsic mortality, as in these conditions parents can be reasonably sure that their high levels of parental investment will not be wasted before their

offspring can successfully reproduce. The application of such strategies can also be seen within species and is consistent with the plasticity stressed in Human Behavioural Ecology (Borgerhoff Mulder 1991). Some research has shown that a within-species response to mortality conditions may apply to perceived, rather than actual, mortality in non-human species (Eggers, Griesser et al. 2006). Research conducted into fertility outcomes following mortality enhancing events in our own species supports this proposition. Specifically, (Cohan and Cole 2002) looked at fertility in South Carolina following Hurricane Hugo of 1989; and (Rodgers, Craig et al. 2005) investigated fertility after the 1995 Oklahoma City bombing. In both cases there was an increase in fertility in the areas following the incidents. The effects were heavily reported and highly visible though neither event had a substantial long-lasting effect on the overall mortality of the population in the areas concerned.

Given the importance of mortality in setting the correct reproductive strategy, we have previously suggested that changes in the perception of mortality are likely to influence reproductive decision making in humans (Mathews and Sear 2008). The aggregate effect of individual decisions may then lead to changes at the population level consistent with the demographic transition. In our previous paper, we supported this claim with evidence from an experimentally manipulated population. The results showed that mortality salience increased ideal family size in male, though not female, participants.

Methods

In this study, we extend our previous research using a similar experimental methodology. A 'treatment' population with an artificial and short term high perception of mortality is created (by using 11 closed questions such as "How old do you expect to be when you die?") and then compared to a control population. A web-based questionnaire is used to collect data, which allows for random allocation of participants between treatment and control questionnaires. Our previous research was conducted on a socio-economically homogeneous population: students at the London School of Economics.

This research expands on the previous research by:

1) Increasing the sample size and the diversity of respondents by collecting data from students at other London colleges
2) Improving on the measurement of fertility preferences
3) And, most importantly, investigating in more detail the nature of the mortality threat, in two ways:
    a. Testing the relative effects of priming for adult or child mortality
    b. Testing the relative effects of priming for random or non-random mortality (i.e. the extent to which mortality risk can be mitigated by parental investment)

Our hypothesis is that individuals will respond differently to priming that induces conditions of high child and infant mortality. In normal circumstances, an increase in perceived mortality risk should result in an increase in the desired number of children, in order to dilute the risk of child mortality and thus minimise the risk of lineage extinction. However, the nature of the mortality risk is also important: if child mortality can be mitigated by parental investment we hypothesise that it will induce higher concentrations of investment in a small number of high quality offspring, and thus decrease the number of desired children.

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