



Marital status and reproduction: Associations with childhood intelligence and adult social class in the Aberdeen children of the 1950s study

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ABSTRACT

Childhood intelligence (age 11) and occupational social status at midlife (age 46 to 51) was associated with marital status and reproduction in a sample from the Aberdeen Children of the 1950s cohort study ($N = 9614$).

Male and female divorcees had lower childhood intelligence test scores than their married counterparts, but no meaningful difference was found between ever- and never-married individuals. Lower occupational social status increased the odds of being never-married, divorced, separated or widowed compared to being married by 53% to 26% in men ($N = 2716$) but not in women ($N = 2920$). Higher intelligence scores were associated with being married rather than divorced at midlife with odds ratios (OR) of 0.86 (Confidence Interval of 95% of 0.76 to 0.99) in men, and 0.87 (0.77 to 0.98) in women.

In men, lower intelligence predicted having offspring (0.69; 0.59 to 0.81), while in women, higher occupational status was associated with lower odds of having children (0.66; 0.55 to 0.76). An interaction term showed that high intelligence women remained childless in the top occupational classes but, in the lower social groups, mothers were more intelligent than their childless peers. Intelligence or occupational status were not associated with the number of offspring in both sexes.

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In Western society, the institution of marriage has traditionally been the basis of sexual reproduction and raising children. Being married has previously been associated with higher intelligence and higher social status compared to staying single, but these associations differ for men and women (e.g. Marmot et al., 1991; Taylor et al., 2005). It has been suggested that married men are of higher social status and ability than their unmarried counterparts, whereas, for women, the opposite is more likely to be the case (Marmot et al., 1991; Taylor et al., 2005). For reproductive success, intelligence has been shown to reveal null or inverse associations with the number of biological children (e.g. Hopcroft, 2006; Lynn & van Court, 2004; Kanazawa, 2004).

Similarly, there seems to be an inverse relationship between social status and number of offspring (Kaplan, Lancaster, Tucker, & Anderson, 2002; Vining, 1986). If high ability and status increase the likelihood of being married (at least in men), which in turn facilitates having offspring, it seems somewhat paradoxical that those with the characteristics most conducive for sexual reproduction present with the smallest number of children.

To date, ability and social position have been mostly studied with regard to two categories of marital status: married versus unmarried. Much less is known about the association of IQ and social status with other important marital categories, particularly widowhood and divorce. Reproductive success has typically been conceptualized as number of biological children. However, research rarely addressed the principal question of having offspring versus not, which gained relevance in recent times of increased

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availability of contraceptives. Here, we aim to replicate and extend previous findings on associations of ability and social position with marital status (e.g. Taylor et al., 2005), and to explore their relationship with sexual reproduction in a large, representative birth cohort from Scotland.

1. Intelligence, status and marriage

Taylor et al. (2005) examined the effects of childhood intelligence assessed at age 11 on 'ever' versus 'never' marrying at midlife in a relatively small sample of 547 men and 336 women from the Scottish Mental Survey 1932. They reported that women who never married had higher childhood intelligence than their married counterparts; this association remained significant after adjusting for social status. The reversed pattern was observed for unmarried men, who had lower average intelligence than their married peers, but this difference was non-significant and became negligible after adjustment for social status. Taylor et al. (2005) hypothesized that more intelligent women were likely to spend more time in education and therefore, might delay getting married, with some never marrying. In contrast, less intelligent men may be disadvantaged in competing for marriage partners because their lower cognitive ability would lead to lower occupational status, failing to provide resources for a spouse and offspring (Miller, 2000; Taylor et al., 2005). Marmot et al. (1991) showed in the Whitehall Study II of civil servants that men with higher occupational status were more likely to be married than men of less prestigious profession. Conversely, the proportion of women in the highest occupational grade who married was much smaller than the number of women from lower occupational classes (Marmot et al., 1991). These and related observations have led to suggestions that for men, high occupational status and intelligence are indicators of evolutionary fitness, which define men's chances of marriage and mating (Buss, 1994; Miller, 2000). In women, status and intelligence may also indicate fitness but only seemingly lower probabilities of marriage, which is possibly due to the societal and occupational structures in 20th century Britain.

2. Intelligence, status and reproduction

Intelligence is frequently hypothesized to be directly related to sexual reproduction (e.g. Kanazawa, 2004; Miller, 2000). In line with this, many researchers have focused on correlating intelligence test scores with the number of offspring (e.g. Lynn & van Court, 2004) but not on the odds of having children versus not. However in times of continuously declining frequencies of births across generations in Western societies, partly due to the wide-spread use of contraceptives and strategic family planning, it seems more appropriate to conceptualize having children as categorical variable rather than as continuous measure. Treating the count of offspring as categorical may also help clarifying the presently inconsistent associations of intelligence and status with the number of children (e.g. Hopcroft, 2006; Meisenberg, 2010). Therefore, it is important to firstly understand the predictors of having offspring, and subsequently to explore factors that affect the number of children.

More intelligent men tend to have a greater number of mating partners and a higher frequency of copulation (Kanazawa, 2003; Pérusse, 1993); that is, they have greater *potential fertility* than men with lower cognitive ability. However, intelligence is unrelated or even negatively associated with *achieved fertility*, referring to the number of biological children, in both men and women (e.g. Hopcroft, 2006; Kanazawa, 2003; 2004; Meisenberg, 2010). In fact, the suggestion that people with lower cognitive ability have more children than individuals of higher intelligence formed the principal rationale for the Scottish Mental Survey 1947 to examine possible dysgenic trends in the Scottish population (Deary, Whalley, & Starr, 2009). Furthermore, high social status individuals have been reported to have fewer children than less privileged people (e.g. Deary et al., 2009; Kaplan et al., 2002; Vining, 1986). This is somewhat paradoxical: on the one hand, high intelligence and status are inter-related factors that are positively associated with marriage and wealth, forming excellent basis for having children (e.g. Marmot et al., 1991; Taylor et al., 2005). On the other hand, individual differences in intelligence have been proposed to correspond to variances in general fitness, which is thought to enhance fertility (Houle, 2000; Miller, 2000). This intelligence–fitness link is supported by studies reporting positive associations between cognitive ability with sperm quality (Arden, Gottfredson, Miller, & Pierce, 2009), with an organism's stability of bilateral symmetry (i.e. fluctuating asymmetry; Bates 2007), and markers of system integrity (e.g. Gale, Batty, Cooper, & Deary, 2009). In summary, high ability and social status individuals have sufficient chances to mate, as well as the biological fitness, to reproduce; nonetheless they fail to achieve their fertility potential. Vining (1986) dubbed this paradox the 'central theoretical problem in human sociobiology' (p. 167).

3. The current study

In the present analyses, we first aim to replicate and extend Taylor et al.'s (2005) findings on intelligence and marital status. Our sample, the Aberdeen children of 1950s study, which recorded data for 12,500 children born between 1946 and 1951 in Scotland, is larger and more representative than the Taylor et al.'s (2005) sub-sample of the Scottish Mental Survey 1932. The data also allow investigating several categories of marital status, including never-married, currently married, divorced, widowed and separated, in contrast to earlier studies including Taylor et al. (2005), which mostly focused on married versus unmarried. Here, we hypothesized that married men were more intelligent and of higher status than their unmarried peers; conversely, never-married women were expected to be on average more intelligent and of higher status than the married ones, in accordance with previous studies (Marmot et al., 1991; Taylor et al., 2005).

Second, we aimed to examine associations of general intelligence and reproductive success, here operationalized by having offspring versus not, as well as the number of children. With hormonal contraception introduced nationwide in the early 1960s in Britain, women in the current cohort matured sexually in an era of unheralded emancipation, gaining more control over family planning than had

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