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Replication of the Jensen effect on dysgenic fertility: An analysis using a large sample of American youth

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ABSTRACT

The purpose of this study is to replicate recent findings demonstrating that the dysgenic fertility trend is a Jensen effect. Data were drawn from Project TALENT. Present analyses included data from a total sample of 79,734 participants with complete data regarding number of biological children at the 11 year follow up, and analyses were further split by sex and race to examine possible differential trends among subgroups. Correlated vectors analyses revealed strong Jensen effects such that subtests with higher *g*-saturation were associated with larger dysgenic fertility gradients. This effect was evident in the total sample, and within all race/gender subgroups except for Asian males. Such findings yield further confirmation that *g* is in fact the principal factor by which the dysgenic fertility gradient operates.

1. Introduction

1.1. Dysgenic fertility trend

Underlying much social science research is the universal phenomena that inter-individual differences emerge within human psychology, physiology, and behavior to produce variations in health, occupational, and social outcomes (Reeve, 2005). Evolutionary theory provides a parsimonious, empirically established framework for understanding natural variation in human traits that aid "surviving and thriving" (e.g., Woodley & Figueredo, 2013). In particular, evolutionary theory posits that a general cognitive ability factor (i.e., *g*) would evolve as a domain-specific adaptation for solving evolutionary novel problems, which by definition require learning, reasoning, and the eduction of relations and correlates (Kanazawa, 2004, 2010). As cultural evolution among humans began to outpace biological evolution over the last 10,000 years, most of our environment and daily tasks effectively became evolutionarily novel. Consistent with this, the science of differential psychology has empirically demonstrated that *g* is a crucial determinant of a very wide range of human behavior in the modern world (Gordon, 1997; Gottfredson, 1997; Jensen, 1998). And in fact, *g* has been empirically demonstrated to be one of the strongest single trait predictors of many academic, occupational, health and social outcomes (Gottfredson, 1997; Kuncel, Hezlett, & Ones, 2004; Reeve, 2009; Reeve, Lyerly, & Peach, 2013; Retherford & Sewell, 1988; von Strumm, Batty, & Deary, 2011; Woodley & Meisenberg, 2013; Wrulich et al., 2014).

Consistent with evolutionary and sociobiological theories, *g* also predicts social and mating behaviors among modern humans. In particular, research demonstrates an inverse relationship between *g* and reproductive behavior among modern humans (e.g., Lynn & Van Court, 2004; Meisenberg, 2010; Reeve et al., 2013; Retherford & Sewell, 1988; Shatz, 2008; von Strumm et al., 2011; Woodley & Meisenberg, 2013). While sexual behaviors are clearly evolutionarily familiar behaviors, advancements in birth control and modern social structures have reframed the control of reproduction and other aspects of mating as evolutionarily novel events (Kanazawa, 2004; Lynn, 2011; Nyborg, 2012; Woodley & Figueredo, 2013). This, in turn, has generated a dysgenic trend for intelligence, such that individuals higher in *g* can acquire greater material resources (e.g., birth control) and psychological resources (e.g., declarative and procedural knowledge of birth control) and more successfully "navigate the evolutionarily novel modern society" of mating behaviors (Reeve et al., 2013).

While the dysgenic fertility trend has acquired increasing empirical support and scientific publicity, there remains some skepticism of whether these effects are truly due to differences in general cognitive ability (i.e., '*g*'). Further, specific estimates of the dysgenic fertility gradient appear to vary somewhat depending on the specific ability measure used. However, many of these

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concerns can be addressed through demonstration of the Jensen effect. To date, only one study (Woodley & Meisenberg, 2013) has directly demonstrated a Jensen effect with respect to the dysgenic fertility trend. The purpose of the current study is to conceptually replicate Woodley and Meisenberg's (2013) recent findings and add to the empirical base of the *g*-nexus.

1.2. The Jensen effect

The Spearman–Jensen effect (e.g., Jensen, 1998; Rushton, 1998), or more commonly referred to as just the Jensen effect, refers to the empirical finding that effect sizes of many variables (e.g., heritability, group differences in average phenotypic intelligence, etc.) typically correlate significantly with subtest *g*-loadings. Said differently, the Jensen effect refers to the finding that measures with higher *g*-saturation are better at differentiating between individual, group and national variations in outcomes that are influence by *g*. Consistent with the hypothesis, a number of studies have found large and significant Jensen effects for black–white differences (e.g., Rushton & Jensen, 2010), inbreeding depression scores, evoked potentials, brain pH, reaction times, test heritabilities (Jensen, 1998; van Bloois, Geutjes, te Nijenhuis, & de Pater, 2009), brain size (Rushton & Ankney, 2009), and sex differences (Nyborg, 2005) amongst others. Jensen effects have also been found to explain variability on non-biological variables such as differences in retest effects (e.g., Reeve & Lam, 2007) and race differences in work criteria (Reeve & Bonaccio, 2009).

Recently, Woodley and Meisenberg (2013) found a Jensen effect with respect to dysgenic fertility for White males and females, Black females, and Hispanic males. That is, they found that the more a given ability test measured *g*, the stronger the negative relation between test scores and dysgenic fertility. Replicating and extending these important findings could generate further confirmation that *g* is in fact the principal factor by which the dysgenic fertility gradient operates, as well as extend the nomological net describing biological and behavioral constructs for which Jensen effects are evident. Considering such, the present study tests the hypothesis that the dysgenic fertility trend will be evident and will show a Jensen effect within a large, nationally representative sample of American youth.

2. Methods

2.1. Sample

Data were extracted from the Project TALENT (PT) database. PT initially included a nationally representative, stratified random sample of 5% of all US high school students in 1960 (see Tiedeman, 1972, for details). Participants were followed longitudinally for 11 years. The baseline sample size from 1960 consists of 325,252 cases with useable data. From this the initial pool of potential participants, 79,734 responded to the 11 year follow up survey regarding number of biological children. To allow for examination of differences in Jensen effects across demographic groups, we split the analyses by sex and race. Thus, the specific sample size for each analysis varies (Table 1).

2.2. Baseline measures (during high school)

2.2.1. Ability measures

A primary objective of the PT ability battery was to survey a wide variety of human abilities (Flanagan et al., 1962, p. 57). A general cognitive ability factor has been shown to underlie the variance among the tests of the PT battery (Carroll, 1993; Reeve, 2004). The PT ability battery is comprised of 11 tests that assess narrow abilities, including fluid intelligence (Abstract Reasoning, Arithmetic Reasoning, Mechanical Reasoning, Reading Comprehension, 2D Rotation, 3D Rotation, and Table Reading) and crystallized intelligence (Vocabulary, Biological Sciences Knowledge, Social Sciences Knowledge, and Literature Knowledge). We followed recommendations of Jensen and Weng (1994), Reeve and Blacksmith (2009) to obtain a proper and reliable *g*-score. The first unrotated principal component based on the 11 tests was extracted. This component accounted for 51.4% of the observed score variance and is reported in a *z*-score metric with a mean of 0 and standard deviation of 1. To check the accuracy of this method, we also computed *g*-loadings using Principal Axis factoring. In the current data, the vector of *g*-loadings derived using PCA correlated r = .996 with *g*-loadings derived using PAF. This is consistent with the research showing *g*-estimates from different methods tend to converge with large samples (Reeve & Blacksmith, 2009).

2.3. Follow up measure (11 years post baseline)

2.3.1. Dysgenic fertility gradient

At the 11 year follow up, participants reported their total number of biological offspring. Each subtest of the PT ability battery was then correlated with the total number of biological children to obtain the dysgenic fertility gradient for each subtest.

3. Results

Table 1 shows the descriptive statistics for each sub-scale and the number of offspring for each sub-sample analyzed. Consistent with the extant literature, the mean scores on the ability tests tend to be higher for Asians and Whites than Blacks. Similarly, fertility rates differ slightly across races, and tend to be slightly higher for females than males.

A correlated vectors analysis was conducted by correlating the vector of *g*-loadings of the PT ability subtests with the vector of computed dysgenic fertility gradients (i.e., the correlations between each subtest and the number of biological children). To fully examine the Jensen effect on dysgenic fertility, the sample was also split by race and sex. These results are reported in Table 2 for the whole sample, and for each sex by race classification. The dysgenic fertility gradients are negative for all sub-tests in all groups except for the table reading test, which has the lowest *g*-loading of all the subtests. We acknowledge that the method of correlated vectors has its detractors (e.g., Ashton & Lee, 2005).

The vector correlations are shown at the bottom of Table 2. Note, because dysgenic fertility gradients are computed with a negative sign (i.e., higher *g*-scores are associated with fewer offspring); the observed vector correlations are negative in sign as well. The strength of the Jensen effect was $r = -.89$ among the full sample, ranging from $r = -.94$ among Asian females to $r = -.66$ among Black males. In all instances, the vector correlations were in the expected direction (i.e., the higher the *g*-saturation, the stronger the dysgenic fertility gradient), and were very strong in all subgroups (cf., Cohen's traditional cut for a large effect is $r = .37$). These findings indicate that the dysgenic fertility gradient is directly proportional to the *g*-loading of the test, thus confirming the hypothesis that *g* is the primary factor through which the dysgenic fertility gradient operates. On average, the Jensen effect appears to be slightly stronger among females than among males. A finding consistent with research showing dysgenic fertility is more prominent among women than men (e.g., Hopcroft & Reeve, 2014; Reeve et al., 2013). Our estimate of the size of the Jensen effect is generally consistent with other recent estimates (e.g., Woodley & Meisenberg, 2013).