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Correlational and factor analytic support for Rushton's differential *K* life history theory

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ABSTRACT

The present study examines predictions from Rushton's differential *K* theory that diverse traits covary with intelligence, reproductive strategies, speed of maturation, parental care, and longevity. The predictions are tested by inter-correlating 129 cross-national differences in IQ, birth rate, infant mortality, HIV/AIDS, and life expectancy. A *K* super-factor accounted for 75% of the variance. Moreover, the correlations were significantly higher with skin color, a biological variable, than they were with gross domestic product (GDP), a culturally influenced variable. The median of the 21 inter-correlations among the seven variables was 0.68.

1. Introduction

This paper provides a test of Rushton's (1985, 1990) "Differential *K* Theory," which posits that individuals and groups differ on a suite of correlated life history and reproductive strategy variables. Rushton (1985) conjectured that "one basic dimension—*K*—underlies much of the field of personality" (p. 445). His application of *r*–*K* theory to human differences built on MacArthur and Wilson's (1967) and Wilson's (1975) description of how species colonize islands and become equilibrated. Species genetically inclined to *r*-reproductive strategies produce more offspring but provide less parental care; those with *K*-reproductive strategies produce fewer offspring but provide greater parental care. Pianka (1970) and Wilson (1975) described how *r*- and *K*-strategists differ in family, individual, population, and social system characteristics. *K*-strategists have a slower rate of growth, delayed sexual reproduction, higher encephalization, fewer offspring, lower infant mortality, more parental care, and higher altruism. Rushton (1985) cited several animal studies which show that the *r*–*K* continuum also applies to individual differences within species.

Research has confirmed many predictions from differential *K* theory (Rushton,1990, 1995, 2004; Rushton, Bons, & Hur, in press). For example, among university students, Bogaert and Rushton (1989) found correlations between self-reported delinquency, sex guilt, mating effort (sexual permissiveness), general intelligence, and an aggregate *r*–*K* battery of items assessing family size, maturational speed, longevity, altruism, and reproductive effort. The results held when three separate measures of family background were statistically controlled. Although the average correlation between single indices of *K* was low, aggregate measures were predictive of a general factor on which single items loaded an average of +0.31.

Other research has confirmed Rushton's predictions. For example, Ellis (1988) found criminals had an earlier onset of sexual behavior, frequent sexual partners, more siblings and half-siblings, and a shorter life span than non-criminals. Rowe, Rodgers, Meseck-Bushey, and St. John (1989) found that among adolescents, 36% to 49% of the variance in the level of sexual intimacy engaged in by one sibling was predicted by the amount of delinquency engaged in by the other. Rowe and Flannery (1994) found that high scores on measures of sexuality and delinquency loaded positively on measures of impulsivity, deceitfulness, and rebelliousness and negatively on parental affection and encouragement of achievement. Rowe, Vazsonyi, and Figueredo (1997) found that differences in delinquency correlated with measures of mating effort (e.g., number of sexual partners) both within individuals and across siblings.

Figueredo, Vásquez, Brumbach, and Schneider (2004) extended the evidence still further. They found in a nationally representative sample that included 309 MZ and 333 DZ twin pairs aged 25- to 74-years, that a substantially heritable "Super-*K*" dimension comprised three lower-order factors (a lower-order *K* factor, a

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"co-vitality" health factor, and a general personality factor). These findings were replicated by Figueredo, Vásquez, Brumbach, and Schneider (2007) using a sub-sample who by middle-age had chosen their life niches to marry (or not), to bear and raise offspring (or not), and to create social networks. In both of the latter two studies, controlling for "social privilege" (by regressing out level of education, race, and family income) accounted for less than 10% of the variance and did not change the pattern of factor loadings.

Controversially, the theory has also been applied to population group differences. Rushton (1995) reviewed data which showed that East Asians tended to fall toward the *K* end of the continuum, Europeans intermediate, and Africans at the *r* end. For example, East Asians averaged largest in brain size, highest in IQ score, slowest in rate of maturation, oldest at age of first intercourse, oldest at age of first pregnancy, greatest in marital stability, longest in life span, lowest in level of aggression, greatest in law abidingness, lowest in sexual permissiveness, and lowest in rate of sexually transmitted diseases. (For population group differences in HIV/AIDS, also see Rushton & Bogaert, 1989.)

Rushton (2004) proposed that brain size (and its concomitant, intelligence) was the most important of the myriad variables constituting the *r*–*K* continuum. He suggested (see also Lynn, 1991, 2006) that population group differences in intelligence evolved in part as an adaptation to the demands of surviving in colder climates where gathering and storing food and keeping warm were a major challenge. However, brain size is not the only variable related to geographic latitude that correlates with IQ. Templer and Arikawa (2006) found skin color, conceptualized as a multigenerational adaptation to differences in climate, was highly related to IQ across 129 countries of the world ($r = -0.92$). IQ also correlated −0.76 with mean high winter temperature, and −0.66 for mean low winter temperature. The correlation of IQ with skin color was significantly higher than the correlation of IQ with several other variables, for example gross domestic product per capita (GDP), where the correlation was $r = 0.63$. Moreover, when the correlations between IQ and skin color were computed separately within the three continents, the correlation still held: −0.86 for Africa; −0.55 for Asia; and −0.63 for Europe. Although Templer and Arikawa's results have been criticized on both theoretical and methodological grounds (Hunt & Sternberg, 2006), they have also been defended (Jensen, 2006) as well as corroborated and extended (Kanazawa, 2008).

In the present study, several *r*–*K* related variables were compiled from 129 countries. These were: mean IQ, birth rate, infant mortality, life expectancy, and rate of HIV/AIDS infection. In addition, these variables were correlated with skin color and gross domestic product per capita (GDP).

2. Method

The 129 countries employed by the present study are those assembled by Templer and Arikawa (2006) as representing primarily indigenous people, who were defined as having existed prior to 1492, a criterion previously used by Cavalli-Sforza, Menzoni, and Piazza (1994). Data on life expectancy (in years), birth rate (per 1000 population), infant mortality (deaths per 1000 births), and HIV/AIDS (percentage of afflicted adults) were provided by the CIA World Factbook (2006, details from the author). IQ and real gross domestic product per capita were obtained from Lynn and Vanhanen (2002) and Lynn and Vanhanen (2006) who calculated the mean IQ for 113 of 192 countries and estimated the IQ for 79 neighboring countries. For the 129 countries analyzed by Templer and Arikawa (2006), 55 had calculated and 74 estimated IQs. Although the estimating of IQs on the basis of neighboring countries has been criticized (Hunt & Sternberg, 2006), Templer and Arikawa's analyses showed that the correlations with skin color were very similar for both sets of IQ scores. Furthermore, Lynn (2006) found that with 25 countries the correlation between estimated and later-measured IQ was 0.91. Skin color was measured on a scale from 1 (very light) to 8 (very dark) (Biasutti, 1967). Because the map provided by Biasutti did not delineate national boundaries, Templer and Arikawa had three graduate students unaware of the purpose of the study specify the dominant color for each of the 129 countries. The correlations between pairs of raters were 0.95, 0.95, and 0.93.

3. Results

The means and standard deviations for the seven variables across the 129 countries are: IQ (85, 13), birth rate (24, 13), life expectancy (63, 12), infant mortality (47, 42), HIV/AIDS rate (3, 7), skin color (4, 2), and GDP per capita (7083, 7291). Table 1 presents the values for the seven variables for each of the 129 countries. Table 2 contains the correlation matrix for the variables, all of which were significant and in the expected direction. All correlations with skin color were higher than the corresponding correlations with GDP. The contrasts were significant for intelligence ($P < 0.001$), birth rate ($P < 0.001$), life expectancy ($P < 0.01$), and HIV/AIDS ($P < 0.001$) but not for infant mortality. A principal components analysis was performed on these seven variables along with a varimax rotation. Only one factor had an eigenvalue greater than 1 (3.1) and it accounted for 73.4% of the variance. It can be regarded as representing Rushton's *r*–*K* dimension, with loadings: IQ, −0.93; birth rate, 0.91; life expectancy, −0.96; infant mortality, 0.92; HIV/AIDS, 0.54; skin color, 0.93; and GDP, −0.75.

4. Discussion

The results support the existence of a single common factor, the *K* factor, which underlies a variety of life history traits such as birth rate, infant mortality, HIV/AIDS, general intelligence, and life expectancy. It accounted for 73% of the variance. These results thereby confirm a theoretical suggestion made by Rushton (1985, 1990, 2004) that a broad heritable dimension underlies a number of individual differences. It also confirms the predictions made by Rushton and Bogaert (1989) about the greater susceptibility of some populations to infection by HIV/AIDS. It extends the recent evidence for that heritable dimension provided by Figueredo et al. (2004, 2007) and Rushton et al. (in press).

One methodological limitation in this study is the use of archival data assembled at the national aggregate level, which many have criticized for a lack of control over correlated factors (Hunt & Sternberg, 2006). Many of the limitations and strengths of such data have been discussed by Lynn and Vanhanen (2006). Evolutionary theories rest on a multitude of evidence and so cannot be "proven" by a single study based on a single methodology. Here support comes from several lines of converging evidence. For example, maternal IQ predicts child mortality in 222 Serbian Roma (Gypsy) women, as well as age at first reproduction and total number of offspring (Čvorović, Rushton, & Tenjevic, 2008). Additional data should be collected to rule out alternative interpretations. In the current study, five major variables were found to correlate more highly with a biological variable (skin color) than with an economic variable (GDP). This supports the view that a biological substrate underlies the inter-correlations. In Figueredo's et al., 2004, 2007 studies, controlling for "social privilege" (by regressing out level of education, race, and family income) accounted for less than 10% of the variance and did not change the pattern of factor loadings.