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Physical attractiveness and reproductive success in humans: evidence from the late 20th century United States☆

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Abstract

Physical attractiveness has been associated with mating behavior, but its role in reproductive success of contemporary humans has received surprisingly little attention. In the Wisconsin Longitudinal Study (1244 women, 997 men born between 1937 and 1940), we examined whether attractiveness assessed from photographs taken at age ~18 years predicted the number of biological children at age 53–56 years. In women, attractiveness predicted higher reproductive success in a nonlinear fashion, so that attractive (second highest quartile) women had 16% and very attractive (highest quartile) women 6% more children than their less attractive counterparts. In men, there was a threshold effect so that men in the lowest attractiveness quartile had 13% fewer children than others who did not differ from each other in the average number of children. These associations were partly but not completely accounted for by attractive participants' increased marriage probability. A linear regression analysis indicated relatively weak directional selection gradient for attractiveness (β=0.06 in women, β=0.07 in men). These findings indicate that physical attractiveness may be associated with reproductive success in humans living in industrialized settings.

Keywords: Fertility; Interbirth interval; Physical attractiveness; Reproductive success; Offspring sex ratio; Sociobiology

1. Introduction

According to an evolutionary perspective, physical attractiveness functions as a cue of mate quality and reproductive value (Gangestad & Scheyd, 2005; Hume & Montgomerie, 2001; Rhodes, 2006; Rhodes, Simmons, & Peters, 2005; Thornhill & Gangestad, 1999). People have therefore evolved to pay attention to physically attractive individuals and seek them as partners. Aided by this advantage in the mating market, attractive people are expected to enjoy higher reproductive success. Despite this rather straightforward prediction, surprisingly few studies have directly examined whether physical attractiveness is related to fertility, i.e., the number of children, in humans. Pawlowski, Boothroyd, Perrett, and Kluska (2008) found no association between facial attractiveness and fertility in a sample of contemporary Polish women, but due to the small number of participants (N=47) this null finding may reflect insufficient statistical power rather than absence of association. Physical attractiveness has been shown to correlate with higher age-controlled fertility in Ache women (Hill & Hurtando, 1996; see also Apicella, Feinberg, & Marlowe, 2007), indicating that attractiveness may be related to reproductive success at least in hunter-gatherer populations.

Indirect evidence does suggest that physical attractiveness might contribute to fertility differences even in humans living in industrialized settings. Attractiveness predicts more active sexual behavior and higher mating success (e.g.,

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Rhodes et al., 2005; Weeden & Sabini, 2007), and measures of physical attractiveness have also been associated with healthier reproductive physiology, e.g., women's fecundity, i.e., the capability of having children (e.g., Jasienska, Lipson, Ellison, Thune, & Ziomkiewicz, 2006), and men's semen quality (Soler et al., 2003; but see Peters, Rhodes, & Simmons, 2008). Kanazawa (2007), in turn, has argued that parents' attractiveness should bias the sex distribution of their offspring, as daughters are expected to benefit more than sons from their genetically inherited attractiveness.

Studies of attractiveness and mating success have often considered only linear effects (the more attractive the better), but it is possible that very high attractiveness does not increase fertility even if it increases mating success. People searching for a partner to have children with may not be interested in extremely attractive partners, because such partners may be more likely to leave them for another partner or to have extra-pair relationships (see Boothroyd, Jones, Burt, DeBruine & Perrett, 2008; Chu, Hardaker, & Lycett, 2007; Durante & Li, in press; Smith, 1995; Waynforth, 2001). Hence, moderately attractive parent candidates might be favored over very attractive ones. Further complicating the issue is the fact that the reproductive advantage of attractiveness may be suppressed by the influences of modernized lifestyle. In particular, attractiveness is related to higher socioeconomic achievement (Dickey-Bryant, Lautenschlager, Mendoza, & Abrahams, 1986; Harper, 2000) and possibly to parental socioeconomic status (Harper, 2000), which may confound the attractiveness–fertility association.

The ongoing Wisconsin Longitudinal Study (WLS; Wollmering, 2007) has followed a large sample of high school graduates from 1957 onwards, and data on photograph-based attractiveness ratings are available for a subsample of them. These data allowed us to assess whether physical attractiveness in young adulthood predicted adult reproductive success in humans living in the late 20th century United States. We also examined whether adjusting for parental socioeconomic status, educational achievement and life-course marital status modified the association between attractiveness and reproductive success, and whether attractiveness predicted average interbirth interval, i.e., the time between births of two subsequent children, and offspring sex ratio in addition to the number of children.

2. Method

2.1. Participants

The participants were from the ongoing WLS (Wollmering, 2007; http://www.ssc.wisc.edu/wlsresearch/) which has followed a random sample of 10,317 participants (5326 women, 4991 men) who were born between 1937 and 1940 and who graduated from Wisconsin high schools in 1957. After baseline data collection in 1957, survey data were collected from the participants or their parents in 1964, 1975, 1992 and 2004. The WLS sample is broadly representative of white, non-Hispanic American men and women who have completed at least a high school education (among Americans aged 50 to 54 in 1990 and 1991, approximately 66% were non-Hispanic white persons who completed at least 12 years of schooling). It is estimated that about 75% of Wisconsin youth graduated from high school in the late 1950s — everyone in the primary WLS sample graduated from high school (Wollmering, 2007). The present sample included participants who had data on attractiveness assessed from high school yearbooks and on fertility and marital history reported in follow-up phase in 1992 when the participants were 53–56 years of age (N=2241; 1244 women, 997 men).

2.2. Measures

2.2.1. Attractiveness

Data on physical attractiveness have been collected for a subsample of participants based on the graduates' yearbook photos, the participant then being 18.1 years of age, on average. A random sample of schools (n=93; selection probability being proportional to the schools' size, so that all WLS respondents had an equal probability of being selected) was selected, and all participants from these schools were included in the subsample. Yearbooks were scanned and then the participants' senior photographs were extracted. The majority of the yearbook photos were face portraits, so the rated physical attractiveness was based mostly on facial attractiveness.

The attractiveness coding was conducted during the summer of 2004. Participants of the Madison Senior Scholars program were recruited to look at and code a randomly selected sample of three thousand seven 1957 WLS respondent yearbook photos and a subsample of two hundred fifty-eight 1956 WLS respondent yearbook photos. Thirty-three different judges whose ages ranged from 63 to 91 years (average of 78.5) rated the photos. Each yearbook photo was rated by six men and six women using a photo-labeled 11-point rating scale, with end points labeled as *not at all attractive* (=1) and *extremely attractive* (=11). Photos were divided into 10 groups of roughly 300 photos per group and a final group of the 1956 photos. Judges rated one set of 300 per session and were required to have a break of at least 12 h between coding sessions. Several judges coded multiple sets of photos; a few coded all 11 sets of photos. In order to assess possible nonlinear associations between attractiveness and fertility, attractiveness was categorized in quartiles separately by sex, denoted as follows: 1=not attractive, 2=moderately attractive, 3=attractive, 4=very attractive.

2.2.2. Fertility

Reproductive success was assessed on the basis of number of biological children. For up to 10 children, the participants reported the birth year and sex of the child and whether the child was the participant's biological children. We included only biological children in the analyses and