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Adolescents but not older women misjudge intelligence from faces and do not consider intelligent-looking men attractive

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During human evolution, finding an intelligent mate could have resulted in more high-quality offspring via better access to resources or via "good genes". Considering that the choice of a mate is an important issue, one would expect that intelligence could be accurately judged by human observers at the beginning of sexual maturity when women of primitive tribes generally establish pair bonds. Male facial photographs and IQs were used to study how well adolescent *versus* older women can judge intelligence from a picture. There was no correlation between men's IQ and the perceived intelligence rankings given by female adolescent judges, nor did these judges perceive men of higher IQ as more attractive. Interestingly, however, there was a significant correlation between the measured IQ and the intelligence ranking by older female respondents. The ability to readily judge intelligence seems to be learned, or it matures later. As surprising as the inability of adolescent women to correctly evaluate intelligence is, it in any case may partly explain why they did not find intelligent men attractive: they could not estimate whether they were intelligent or not. Evaluation of human intelligence could, indeed, represent a case where it can be worthwhile for young or inexperienced individuals to copy more experienced ones, at least in cases where only limited information exist.

Introduction

The fast evolution of human intelligence suggests that it has been under strong selection pressures and intelligence should have been also one of the primary mate choice criteria of our ancestors (Roth & Dicke 2005, Miller & Penke 2007). It is still associated with success in a wide variety of circumstances (Kuncel *et al*. 2004), and it predicts very well the future socioeconomic success of an individual (Buss 2003). Choosing an intelligent mate can be expected to result in producing more high-quality offspring via better access to resources and/or via "good genes" (Prokosch *et al*. 2009 and references therein). Intelligence belongs to the most desirable traits of mates (e.g. Shackelford *et al*. 2005, Furnham 2009), and it has even been argued that humans have evolved to prefer intelligence in a potential mate (Miller & Todd 1998, Miller 2000). In a primi-

tive society of hunter-gatherers, women value intelligence more than men (Marlowe 2004). In long-term relationships, women continuously rate intelligence highly (Li *et al*. 2002), and in some studies it has also been shown to be a preferred short-term mate trait (Buunk *et al*. 2002, Li & Kenrick 2006, Prokosch *et al*. 2009, but *see* Gangestad *et al*. 2007, 2010).

As intelligence is an important mate choice criterion, one would expect humans to be accurate at judging the intelligence of their potential mating candidates. Indeed, many studies have shown that respondents can judge strangers' intelligence rather well from many kinds of verbal and nonverbal cues (Zebrowitz *et al*. 2002, Prokosch *et al*. 2009). Even a brief exposure to photographs of men's faces has been enough for women to arrange potential mating candidates in an actual intelligence order (based on intelligence tests, *see* meta-analysis in Zebrowitz *et al*. 2002). A ready detection of intelligence from minor cues may have been important in short-term relationships where ancestral women have sought "good genes" for their offspring outside their regular partnership or at the early stage of relationship, when they have had to decide which candidate they would choose/reject without sufficient information on the candidates. Although many studies have shown that attractiveness is correlated with perceived intelligence (Langlois *et al*. 2000, Zebrowitz *et al*. 2002), perceived intelligence has often correlated only weakly with actual intelligence (e.g. Prokosch *et al*. 2009) and some studies have failed to find a linkage between rated and measured intelligence (*see* Zebrowitz *et al*. 2002, Zebrowitz & Rhodes 2004 for different results in upper and lower half of attractiveness distribution). This may not be a surprise, because speedy evaluation of intelligence as such is probably a difficult task and, in addition, men can often manage an impression of intelligence (Murphy 2007).

In previous studies, female respondents who assessed the intelligence of target men were approximately 20 years old or older, mainly college or university students (Langlois *et al*. 2000, Zebrowitz *et al*. 2002, Zebrowits & Rhodes 2004, Prokosch *et al*. 2009). Our female ancestors, however, probably implemented mate choice at a younger age (Buss 2003, Quinlan & Quinlan 2007). Because accurate assessing of intelligence is difficult, it may require practice and experience. Recently, it was also discovered that general face-learning ability improves until just after the age of 30 (Germine *et al*. 2010). In this study, we examine for the first time whether young women who have just reached their sexual maturity can judge the intelligence of men correctly by looking at their facial photos. We also compare their skills to identify intelligence to the skills of older women. Furthermore, to examine if young women are more talented assessors than men, we conducted the same test for men of a similar age. We also determined whether adolescent female respondents consider men who appear intelligent and men who are measured to be intelligent attractive.

Material and methods

Nine men (aged 20–28 years, mean = 21.6, strangers to the respondents) were originally photographed sitting behind a table with two attractive women next to them (*see* Milonoff *et al*. 2007). The men were recruited for research purposes from the friends of the author's children and represented the same ethnicity as respondents of the study (Finns). A test series of photos (35×45 mm) was produced from these original photos by using an image processing program (Adobe Photoshop CS2). The background was removed and only the man's face was shown in the photos (Fig 1).

The same test series of photos was presented to three different, randomly selected groups of students from Valkeakoski Senior Secondary School (all male students and female students randomly divided into two groups), aged 16–18 years. A group of male respondents (n = 84, mean = 17.3 years) and a group of female respondents (n = 58, mean = 17.4 years) were requested to rank the men in the photos according to their intelligence (1 = the most intelligent, 9 = the least intelligent). Another group of female respondents (n = 56, mean = 17.6 years) was requested to rank the men in the photos according to their attractiveness (1 = the most attractive, 9 = the least attractive). The photos were also presented to a group of older women

Fig. 1. A part of the test series of photos.

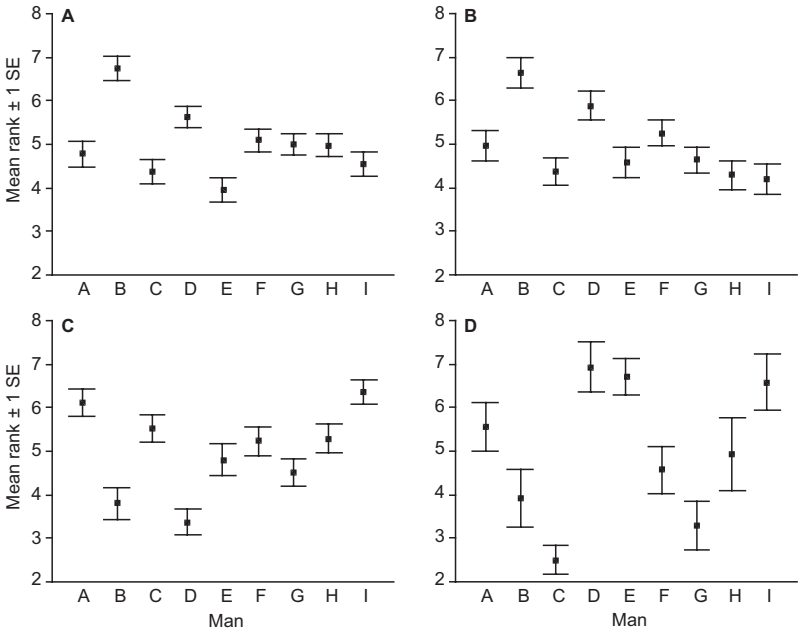

Fig. 2. Intelligence and attractiveness ranks of the men in the photos. (**A**) Intelligence ranks by adolescent male respondents (n = 84). (**B**) Intelligence ranks by adolescent female respondents (n = 58). (**C**) Attractiveness ranks by adolescent female respondents (n = 56). (**D**) Intelligence ranks by older female respondents (n = 14).

(n = 14, mean = 37.3 years, personnel of the school and their friends) and they were requested to rank the men according to their intelligence.

Culture Fair Intelligence Test Scale 3 (IPAT 1973) was used to measure the intelligence quotient (IQ) of the males in the photos (mean = 108). The test was performed according to the test manual (IPAT 1973). We were unable to arrange the test for one of the men.

Kendall's W-test (coefficient of concordance) was used to test the concordance of respondent opinions within groups as well as between groups. Spearman's rank correlation was used to test correlations between the means of different respondent groups.

All participants knew that they were engaging in a research study and they gave their approval. They were not compensated and the test was carried out during a school's theme day.

Results

The different age of target men could have affected the results, but none of the ranks correlated with the age of the men ($p > 0.56$). There were clear differences between average ranks of men in the photos (Fig. 2). The intelligence rankings of male respondents and female respondents in both age groups were notably unanimous (Table 1). Adolescent women were also highly unanimous in judging the attractiveness of the men in the photos. The intelligence ranking of adolescent men and adolescent women was concordant but there was no concordance between the rankings of adolescent women and older women (Table 2). The ranking of intelligence and attractiveness made by adolescent women was concordant but inverse; on average, men who were considered intelligent were not con-

sidered attractive (*see* also the correlations in Table 3).

There was a positive correlation between the mean intelligence ranking of adolescent men and women respondents (Table 3). The correlations between the intelligence ranking and attractiveness ranking of adolescent respondents were negative (men who were considered intelligent were not considered attractive), and the correlations between intelligence and attractiveness ranking made by adolescent women were statistically significant. There was no correlation between the rankings of adolescent respondents and the intelligence ranking of older women.

Moreover, there was no correlation between measured IQ and the intelligence ranking of adolescent respondents (Table 3 and Fig. 3). Target men with a higher IQ were not assessed as intelligent, although the correlation of women respondents clearly pointed in that direction. A higher IQ did not mean judged attractiveness. Interestingly, the measured IQ and the intelligence ranking of older female respondents were significantly correlated.

Table 1. Kendall's *W*-test of the unanimity of respondents.

	Men	Adolescent women		Older women
	Intelligence	Intelligence	Attractiveness	Intelligence
W	0.087	0.089	0.131	0.333
χ^2_r	58.557	41.181	58.776	37.295
df	8	8	8	8
p	< 0.001	< 0.001	< 0.001	< 0.001
n	84	58	56	14

Table 2. Kendall's *W*-test of the unanimity of respondent groups.

	Intelligence-adolescent men *vs.* intelligence-adolescent women	Intelligence-adolescent women *vs.* attractiveness-adolescent women	Intelligence-adolescent women *vs.* intelligence-older women
W_g	0.071	–0.091	–0.012
Z	14.093	–14.724	–0.938
df	8	8	8
p	< 0.001	< 0.001	ns
n	84, 58	58, 56	58, 14

Table 3. Spearman's correlation coefficient (r_S) for pairwise comparisons of intelligence ranks, attractiveness ranks and IQ (Cattell & Cattell Culture fair intelligence test scale 3). Negative relation between actual and perceived intelligence indicates more accuracy in perception of actual IQ.

	Intelligence rank: adolescent men			Intelligence rank: adolescent women			Attractiveness rank: adolescent women			Intelligence rank: older women			IQ
	r_S	*p*	*n*	r_S	*p*	*n*	r_S	*p*	*n*	r_S	*p*	*n*	r_S
Intelligence rank													
adolescent men	1												
adolescent women	0.717	0.030	9	1									
Attractiveness rank													
adolescent women	–0.600	0.088	9	–0.717	0.030	9	1						
Intelligence rank													
older women	–0.050	0.898	9	0	1.000	9	–0.067	0.865	9	1			
IQ	–0.048	0.910	8	–0.311	0.453	8	0.084	0.844	8	–0.731	0.040	8	1

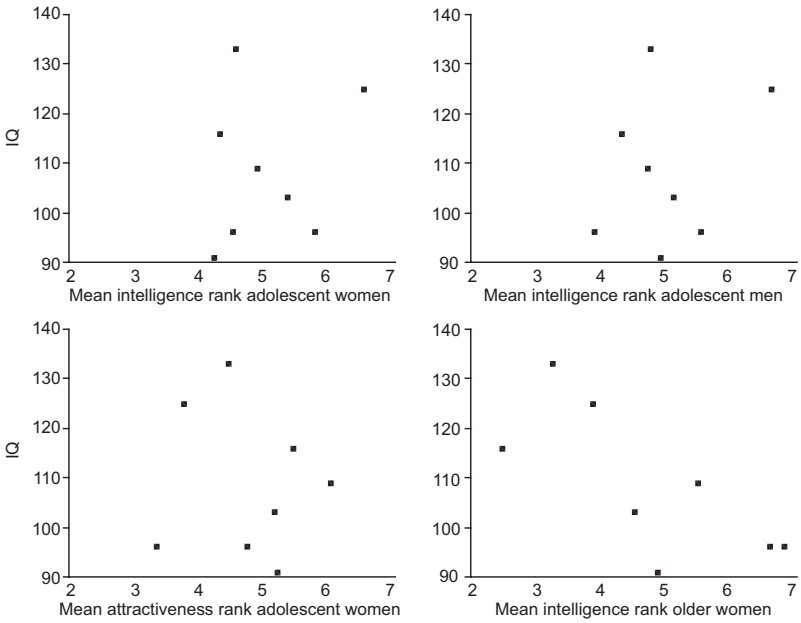

Fig. 3. Relationships between mean intelligence ranks, attractiveness ranks and IQ of the men in the photo (n = 8). Negative relation between actual and perceived intelligence indicates more accuracy in perception of actual IQ.

Discussion

Many studies have shown that women can judge intelligence from the photographs of men's face (Zebrowitz *et al*. 2002). Concordantly, in our study older women judge intelligence correctly, but adolescent women were not able to do this accurately. Our main respondent group, 16–18-year-old women, were younger than the respondents of the earlier studies. As accurate assessing of intelligence may require practice and experience, the negative result can be explained by age difference. Adolescent men respondents were as good, i.e. as poor, evaluators as women of their age, which means that women do not have sex-linked innate abilities for assessing intelligence from men's face. Similarly, Germine *et al*. (2011) discovered that face-learning ability improves beyond the age of adolescence equally in both women and men. As older women can evaluate intelligence from men's face, the ability seems to be learned, or it matures later.

It has been shown that in non-human species young females copy the mate choice of older conspecifics (e.g. Dugatkin 1993), and dynamic models suggest that mate choice copying may evolve when young females are poor at discriminating what high-quality males look like and they have to learn to do it (Stöhr 1998). Evaluation of human intelligence could, indeed, represent a case where it can be worthwhile for young or inexperienced individuals to copy more experienced ones, at least in cases where only limited information exists. Even small age differences may have an effect. In mate choice copying, the choices of females under the age of 20 were not valued as much as the ratings of females who were a few years older (Vakirtzis & Roberts 2010).

Although our respondents were young, women from primitive tribes perform mate choice and establish pair bonds at that age (Quinlan & Quinlan 2007). In that sense the ability of adolescent women to assess men's intelligence is an evolutionary issue of importance. In fact, many or even most of our female ancestors have established their permanent pair bonds at that age. Furthermore, intelligence is thought to be a preferred trait for women, especially in long-term relationships, where both a mate's ability as a provider and his heritable quality are important (Buss & Schmitt 1993, Gangestad & Simpson 2000, Scheib 2001, Li *et al*. 2002). As surprising as the inability of adolescent women to correctly evaluate intelligence is, it may explain why they did not find intelligent men attractive: they could not consciously or probably even uncon-

sciously estimate whether they were intelligent or not. This may be one reason why brain size (which correlates substantially with intelligence) has a low additive genetic coefficient of variation (Miller & Penke 2007) although traits under strong sexual selection tend to have high coefficients (Houle 1992, Pomiankowski & Möller 1995, *see* Gangestad *et al*. 2010 for other possible reasons).

However, our test arrangement is somewhat unrealistic since our female ancestors have often had more information about their potential mates, which has probably improved their ability to assess intelligence. Humans may be better in detecting intelligence when more information is presented (Borkenau & Liebler 1993, Reynolds & Glifford 2001). They may also have relied on the knowledge of more experienced persons, e.g. in arranged pair bonds or by copying the mate choice of older women. Nevertheless, in choices between mate candidates made at the early stage of a relationship or in brief short-term relationships, this limitation has been significant. If intelligence cannot be evaluated properly, mate choice must be based on other more readily identifiable characteristics (e.g. fluctuating asymmetry, masculinity and body characters). As these characteristics may not covary with intelligence or even have a negative association (*see* Gangestad *et al*. 2010 and references therein), the dismissal of intelligent or intelligent-looking men is understandable. Because mate choice of adolescent women has been common (Quinlan & Quinlan 2007), this inability to recognize highly advantageous traits may have affected the selection pressures and development of humans. If our adolescent female ancestors had been able to recognize bright mate candidates at a glance, the evolution of intelligence could have been even faster and the importance of other characteristics lesser.

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