Looking Smart and Looking Good: Facial Cues to Intelligence and Their Origins

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The authors investigated accuracy of judging intelligence from facial photos of strangers across the lifespan, facial qualities contributing to accuracy, and developmental paths producing correlations between facial qualities and IQ scores. Judgments were more accurate than chance in childhood and puberty, marginally more accurate in middle adulthood, but not more accurate than chance in adolescence or late adulthood. Reliance on the valid cue of facial attractiveness could explain judges' accuracy. Multiple developmental paths contributed to relationships between facial attractiveness and IQ: biological, environmental, influences of intelligence on attractiveness, influences of attractiveness on intelligence. The findings provide a caveat to evolutionary psychologists' assumption that relationships between attractiveness and intelligence or other traits reflect an influence of "good genes" on both, as well as to social and developmental psychologists' assumption that such relationships reflect self-fulfilling prophecy effects. Each of these mechanisms failed to explain some observed correlations.

"Teachers who look pretty are smart and they look smart." This pronouncement and others like it came from first-grade children who were asked why they preferred one of two teachers in a television news magazine program demonstrating the attractiveness halo effect, whereby more attractive individuals are perceived and treated more positively ("20/20," November 4, 1994). Shall we take this as wisdom from the mouths of babes? Can people actually judge intelligence from appearance and, if so, does attractiveness enable them to do so? If the answer to these questions is yes, then how can we explain a correlation between attractiveness and intelligence?

An interest in the relationship between actual intelligence and perceived intelligence has a long history within psychology. Most studies have followed a uniform format in which judges' ratings of the intelligence of people depicted in photographs were correlated with those people's intelligence scores based on measures such as the Thorndike Intelligence Test for High School Graduates, the Thurstone Intelligence Test IV, or the Stanford Binet. Although several studies found no correlation between perceived intelligence and actual intelligence, some have found a surprisingly strong relationship. To determine whether the mixed results reflected any consistent trend, we performed a meta-analysis on the published studies that assessed accuracy of group judgments of intelligence from facial photographs of strangers using IQ test scores as a criterion (Anderson, 1921; Brunswik, 1945; Cook, 1939; Gaskill, Fenton, & Porter, 1927; Laird & Remmers, 1924; Moriwaki, 1929; Pinter, 1918; Uhrbrock, 1929; Uhrbrock & Games, 1963). These studies included both male and female judges and male and female targets ranging in age from childhood to adulthood. The number of judges ranged from 10 to 1,530, and the number of targets ranged from

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10 to 150. Accuracy was defined as the correlation between measured intelligence and the average of all judges' intelligence ratings. The mean group accuracy for the seven studies that reported quantitative data was .30 (minimum = .07, maximum = .70). A homogeneity test applied to these seven effect sizes was not significant, $\chi^2(7) = 7.59$, $p > .30$, indicating that they did not differ from one another more than would be expected by chance (i.e., sampling error). The combined p value for these seven studies in addition to two more with unknown but positive effect sizes (conservatively estimated as zero) was $p < .01$ ($Z = 2.92$).[1] Three additional studies were described in other works. When Hollingworth (1922, cited in Gaskill et al., 1927) and Cogan (1919, cited in Cook, 1939) were added, the average accuracy was .37, yet another study had a positive but unknown correlation (Knight, 1921, cited in Cook, 1939). Taking this study into account as well, all 12 of the studies showed accuracy that was positive in direction. If the three unknown effects are added in with an estimated correlation of zero (a conservative approach considering that all three were positive), the average accuracy correlation was .28, combined $p < .02$ ($Z = 2.53$).

Videotapes were used for judging intelligence in two other studies (Borkenau & Liebler, 1993; Reynolds & Gifford, 2001). When the tapes were viewed by judges without soundtrack, the mean accuracy for these two studies was .27 (combined $p < .01$, $Z = 2.64$). When sound was added, mean accuracy was .36 for these two studies (combined $p < .001$, $Z = 3.94$), and when audio alone was judged (in Reynolds & Gifford, 2001), accuracy was .30, $p < .11$. Studies using photographs also have used variables other than intelligence per se; for example, the ratings or the criteria might be achievement tests (Cook, 1939; Moriwaki, 1929; Murphy, Nelson, & Cheap, 1981). For these studies, mean accuracy was .26 (combined $p < .05$, $Z = 2.49$).

Altogether, the evidence is quite consistent in showing that strangers can judge intelligence at levels significantly better than chance from brief exposures to a target's face, voice, and other nonverbal cues. Although research examining the accuracy of intelligence judgments has been largely atheoretical, the results are consistent with an ecological approach to social perception (McArthur & Baron, 1983; Zebrowitz, 1990; Zebrowitz & Collins, 1997). According to ecological theory (e.g., Gibson, 1966, 1979), "perceiving is for doing" with the result that perceptions of adaptively relevant attributes will be accurate provided that they are grounded in sufficient stimulus information. Certainly the detection of intelligence is adaptive both for reproductive success (e.g., to avoid mating with the mentally infirm) and for individual goal attainment (e.g., to solicit information and advice from those who are most capable). Given that accuracy is shown in response to the minimal information available in still photographs, ecological theory would predict even larger accuracy effects in response to the dynamic, multimodal stimulus information available in social interactions.

The finding that intelligence can be detected raises the question of what specific qualities convey it. One possible mediator of accuracy in judging intelligence is suggested by the well-documented attractiveness halo effect, whereby positive traits, including intelligence, are attributed to more attractive individuals. Indeed, three meta-analyses have shown a positive correlation between attractiveness and perceived intelligence, although some of these collapsed ratings of intelligence with other measures of competence: (a) Eagly, Ashmore, Makhijani, and Longo's (1991) mean weighted $d = .46$ for ratings of adults on the dimensions intelligent, skillful, rational, scientific, ambitious, hardworking, good grades, and career success; (b) Feingold's (1992, Study 1) median $d = .32$ for ratings of adults' academic ability, IQ, and brightness; and (c) Langlois et al.'s (2000) median $d = .43$ for ratings of children's intelligence, skills, academic performance, alertness, and maturity and median $d = 1.05$ for ratings of adults' job performance, competence, motivation, and suitability as an employee.

Not only is attractiveness associated with perceived intelligence but also, as discussed below, both evolutionary and social expectancy theories predict that it will be associated with actual intelligence. Two meta-analyses have examined the relationship between attractiveness and actual intelligence (Feingold, 1992, Study 2; Langlois et al., 2000) and another used proxies for measured intelligence (e.g., competence, status, and occupational success) (Jackson, Hunter, & Hodge, 1995). The two that included children (Jackson and Langlois) found a small to moderate positive effect in children (both rs = .20). The evidence regarding adults was less clear; Feingold and Langlois found no evidence that more attractive adults were more intelligent, whereas Jackson found a weak ($r = .12$) relation between attractiveness and the proxy criteria with outliers included and no relation ($r = .01$) with outliers removed.

The question of whether attractiveness mediates accuracy in judging intelligence has been addressed in two recent studies (Borkenau & Liebler, 1995; Reynolds & Gifford, 2001). Both of these studies found that auditory cues were more strongly related to measured and judged intelligence than visual ones and that accuracy was higher when auditory cues were provided. Although these studies did not find significant mediation by attractiveness, neither one used a pure measure of facial attractiveness. Not only were attractiveness judgments made from videotapes that included nonverbal cues but Reynolds and Gifford (2001) created a composite mea-

sure of attractiveness that included "showy clothing" and "well-proportioned." Thus, it remains to be determined whether variations in facial attractiveness per se can mediate accuracy in judging intelligence.

If attractiveness does mediate accuracy in judging intelligence, a theoretical explanation for the diagnosticity of attractiveness is needed. Both evolutionary and social explanations for relationships between attractiveness and adaptive traits have been proposed (for pertinent reviews, see Berry, 2000; Buss & Schmitt, 1993; Langlois et al., 2000; Thornhill & Gangestad, 1993; Zebrowitz, 1997). These and other explanations are captured in Figure 1, which shows four developmental paths to a relationship between appearance and psychological traits identified by Zebrowitz and her colleagues (Zebrowitz, 1997; Zebrowitz & Collins, 1997; Zebrowitz, Collins, & Dutta, 1998). It should be emphasized that these paths are not mutually exclusive. Moreover, although Figure 1 does not explicitly label all possible paths between the elements, the circular paths are intended to recognize the possibility of multiple bidirectional influences. For example, biological and environmental variables can influence each other via an influence on adaptive traits and/or attractiveness (cf. Gottlieb, 2000).

Path A in Figure 1 shows an influence of biological factors on both attractiveness and intelligence. This possibility is consistent with evolutionary theorists' argument that attractiveness signals "good genes" and that perceptions of certain facial qualities as attractive have evolved as an adaptation to the problem of choosing a high-quality mate (e.g., Buss, 1989; Thornhill & Gangestad, 1993, 1999). Although previous research investigating whether attractive faces do in fact signal good genes has focused on the relationship between attractiveness and health (e.g., Kalick, Zebrowitz, Langlois, & Johnson, 1998; Shackelford & Larsen, 1997, 1999), one might also argue that the preference for certain facial qualities evolved because they signal high intelligence. Indeed, Miller and his colleagues (Miller, 2000; Miller & Todd, 1998) argued that humans have evolved to prefer intelligence in a potential mate. Such a preference could have enhanced reproductive success in either of two ways. More intelligent mates might confer survival benefits on their offspring through the heritability of intelligence or through their ability to provide better parental care and more resources (see Mackintosh, 1998, for a review of research on the heritability of intelligence, and see Gangestad & Simpson, 2000, for a discussion of possible trade-offs in mating between the acquisition of good genes and good providers). Moreover, one might argue that preferential selection of intelligent mates would be more likely to evolve if intelligence were advertised by readily apparent cues, such as facial appearance.

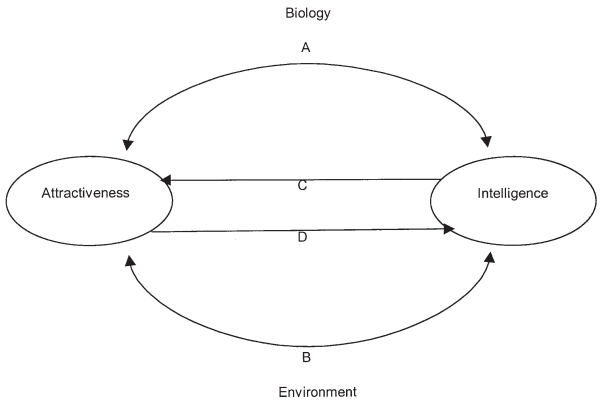

Figure 1 A developmental model of attractiveness-intelligence relations.

NOTE: Path A represents an influence of the same biological factors on both attractiveness and intelligence. Path B represents an influence of the same environmental factors on both attractiveness and intelligence. Path C represents an influence of intelligence on attractiveness. Path D represents an environmentally mediated influence of attractiveness on intelligence.

Environmental factors provide another possible path to a relationship between attractiveness and intelligence, as shown by Path B in Figure 1. Although psychological theories have tended to ignore such factors, variables such as the quality of nutrition and the health care that a person receives may have an impact on the development of both attractiveness and intelligence.

A third possible path to a relationship between attractiveness and intelligence is that intelligence influences attractiveness, as shown in Path C. Although this mechanism seems unlikely in childhood, it is possible that more intelligent individuals from puberty onward increase their attractiveness through flattering makeup, better grooming, more stylish haircuts, wiser use of social display rules that enhance attractiveness, or better health maintenance that can enhance attractiveness. Consistent with such an influence of psychological qualities on appearance is the finding that higher levels of sociability during adolescence and young adulthood predicted positive changes in women's attractiveness in later adulthood (Zebrowitz, Collins, & Dutta, 1998).

A fourth possible explanation for a relationship between attractiveness and intelligence is a self-fulfilling prophecy effect, shown by Path D. Applying self-fulfilling prophecy theory in this case suggests that attractiveness may influence people's social and intellectual environments, which in turn may influence their intelligence (see Harris & Rosenthal, 1985; Langlois et al., 2000; Zebrowitz, 1997, for theory and literature reviews pertinent to self-fulfilling prophecy effects of attractiveness). Indeed, there is considerable evidence to indicate that

teachers, parents, and strangers all expect better performance from attractive children and adults. There is also considerable evidence to indicate that, from an early age, attractive individuals are treated more warmly than unattractive individuals in a variety of social settings and even by their own parents, as well as evidence that such treatment can enhance academic performance. Although there is little evidence directly bearing on the treatment of attractive children in classroom settings, there is considerable evidence to show more favorable treatment of individuals from whom high performance is expected for other reasons, with such treatment augmenting performance. Finally, evidence that an individual's job can produce changes in personality over time (Kohn & Schooler, 1982) suggests that the more favorable occupational outcomes of attractive adults also may be able to produce positive changes in intellectual functioning.

Our assessment of whether biological factors influence both attractiveness and intelligence (Path A in Figure 1) draws on the evolutionary argument that facial symmetry and facial averageness signal genetic fitness because they reveal developmental stability, the ability to maintain normal development despite various stressors. Each of these facial qualities has been positively related to attractiveness (Langlois & Roggman, 1990; Rhodes, Proffitt, Grady, & Sumich, 1998; Rhodes, Sumich, & Byatt, 1999; Zebrowitz, Voinescu, & Collins, 1996) and negatively related to a variety of syndromes characterized by intellectual deficits (e.g., Clarren et al., 1987; Cummings, Flynn, & Preus, 1982; Krouse & Kauffman, 1982; Streissguth, Herman, & Smith, 1978; Thornhill & Møller, 1997). Fluctuating asymmetry of the body,[2] which may be correlated with facial asymmetry, also has been found to be negatively related to intelligence test scores in a population of college undergraduates (Furlow, Armijo-Prewitt, Gangestad, & Thornhill, 1997).

In light of the foregoing evidence, the viability of Path A, the biological path, was assessed by determining whether partialing out facial symmetry and/or averageness reduced a correlation between attractiveness and intelligence. Path B, the environmental path, was assessed by determining whether partialing out one possible environmental influence on attractiveness and intelligence, socioeconomic status (SES), reduced a correlation between attractiveness and intelligence. Path C was assessed by determining whether a person's intelligence at one point in time predicted changes in attractiveness at a later time. Finally, Path D was assessed by determining whether a person's attractiveness at one point in time predicted changes in intelligence at a later time.

In summary, whereas theory and research provides reason to predict that facial attractiveness will be related to both perceived and actual intelligence, studies have not adequately examined the relationship of attractiveness to both of these variables for the same group of targets. Such an investigation is necessary to directly test the hypothesis that it is attractiveness that enables perceivers to accurately judge intelligence from facial photographs. The present study fills this gap in the literature. We examined the accuracy of perceiving intelligence from facial photographs across the lifespan. We predicted that judges would show accurate estimates of intelligence, that attractiveness would be correlated with both perceived and measured intelligence, and that accuracy in judging intelligence would be significantly reduced with attractiveness controlled. We also examined four possible paths to correlations between attractiveness and IQ that are not mutually exclusive: biological influences on both, environmental influences on both, an influence of IQ on attractiveness, and an influence of attractiveness on IQ.

METHOD

Participants

Participants were drawn from the Intergenerational Studies of Development and Aging (IGS), a combination of three longitudinal studies begun between 1928 and 1933 and archived at the University of California, Berkeley, Institute of Human Development (IHD). Participants in the Guidance and Berkeley samples were a representative sample of people born between 1928 and 1929 in Berkeley, California. Most were from White, middle-class, Protestant families, and family educational status was above the average for the general U.S. population. Oakland participants, born between 1920 and 1922, were a reasonable representation of the population attending Oakland schools where they were enrolled at the time they were initially studied between the ages of 10 and 12. Similar to the Guidance and Berkeley samples, most Oakland participants came from White, middle-class families, although children of blue-collar workers constituted a higher percentage of the Oakland sample (Block, 1971). (For further details about the three studies, see Eichorn, Clausen, Haan, Honzik, & Muzzin, 1981; Jones, Bayley, Macfarlane, & Honzik, 1971.)

To be included in the analyses, participants needed appearance data, IQ data, and SES data at one or more age levels. The number of participants who met this criterion at each age were as follows: late childhood (10 years; n for girls = 100, n for boys = 86), puberty (13 years for girls, n = 92; 15 years for boys, n = 84), adolescence (17 to 18 years; n for girls = 90, n for boys = 80), middle adulthood (30 to 40; n for women = 67, n for men = 56), and later adulthood (52 to 60; N for women = 112, n for

men = 97). These samples were not selected for their particular appearance or intellectual qualities, thus minimizing possible selection bias.

Participants selected for inclusion in the present investigation composed a subset of those included in a study investigating the stability of appearance across the lifespan (Zebrowitz, Olson, & Hoffman, 1993) and overlapped with those included in studies investigating the contribution of appearance to military service outcomes, to perceived and real health, to personality, to academic achievement, and to perceived and real honesty across the lifespan (Collins & Zebrowitz, 1995; Kalick et al., 1998; Rhodes et al., 2001; Zebrowitz, Andreoletti, Collins, Lee, & Blumenthal, 1998; Zebrowitz, Collins, & Dutta, 1998; Zebrowitz et al., 1996). Identical participants are not included in all of these studies because different data are missing for different participants; for example, some have IQ scores but not health scores, and vice versa.

Photographs

Slides of targets' faces were cropped from black-and-white, whole-body photographs contained in the IGS archives. The photographs in childhood, puberty, and adolescence were taken under standardized conditions with the participants unclothed so that their somatotypes could be assessed by IGS investigators. The photographs in middle and later adulthood also were taken by IGS investigators. Although participants were clothed at these ages, the photos were cropped so that little clothing could be seen.

Two or three slides depicted each participant across a 1-year span in childhood, puberty, and adolescence and one slide depicted each in middle and later adulthood. When multiple ratings were available at a particular age, the average was used because it was presumed to be a more reliable indicator of the participants' appearance at that age.

Intelligence Variables

Perceived intelligence. Judges were 12 male and 12 female Australian university students who received course credit. The perceived intelligence of each face was rated on a 7-point scale with endpoints labeled *not at all intelligent* to *very intelligent.* Faces were blocked by age group and by sex, which was blocked within each age group. Eight sample faces were shown at the beginning of each block. Each judge rated all the age groups, and order of sex and age (youngest to oldest, or vice versa) was counterbalanced across judges. Judges were encouraged to use the full range of the scale. Correlations between male and female judges averaged .79 for male faces and .77 for female faces, and we averaged across male and female judges to obtain a single mean rating for each face. Alpha reliabilities, calculated separately for each target sex and age group, ranged from .76 to .91 and averaged .84 for male faces and .83 for female faces.

IQ. IQ scores were taken from the IHD archives. Stanford-Binet scores were available for participants in childhood, puberty, and adolescence; Wechsler Adult Intelligence full scale scores (WAIS-R) were available in middle adulthood and later adulthood.[3]

Appearance Variables

Facial attractiveness. Attractiveness ratings on 7-point scales with endpoints labeled *unattractive* to *attractive* were obtained from a previous study by Zebrowitz, Olson, and Hoffman (1993, Study 1). The average alpha reliability was .87 for male faces and .90 for female faces. Research supporting the validity of these ratings by U.S. college undergraduates in the 1990s includes significant agreement between ratings of the attractiveness of adolescent girls and ratings of their prettiness by IGS staff in the 1960s, indicating that the present ratings may be generalized to another historical time, where standards of beauty may have been somewhat different, and to another sample of judges (Zebrowitz et al., 1993). Previous research also has established predictive validity of the adolescent appearance ratings: attractiveness ratings predicted likelihood of marriage and, for those who did marry, age of marriage (Kalick et al., 1998).

Facial averageness and symmetry. Symmetry ratings in later adulthood were taken from previous research by Zebrowitz et al. (1996). Ratings made by Australian college students of symmetry at other ages and averageness at all ages were taken from Rhodes et al. (2001). Symmetry was assessed on 7-point scales with endpoints labeled *very asymmetrical* to *very symmetrical.* Averageness was assessed on 7-point scales by asking judges to rate its converse, "distinctiveness," which was defined for judges as the ease with which the face could be picked out of a crowd of faces of that age group. "Distinctiveness" was rated rather than "averageness" because the latter can be misinterpreted to mean "average looking" (i.e., not particularly "good looking") instead of spatially average, as intended. Rated distinctiveness and symmetry change systematically with experimental manipulations of averageness and symmetry, respectively, indicating that they are valid measures of these physical traits (Rhodes et al., 1998; Rhodes & Tremewan, 1996). Alpha reliabilities for all ratings, calculated separately for each sex and age group, averaged .84 for male faces and .86 for female faces.

SES

In childhood, SES was measured by the Hollingshead Index (Hollingshead & Redlich, 1958) for participants

TABLE 1: Correlations Among Perceived Intelligence, IQ Scores, and Appearance Variables Across the Life Span

Variable	*Childhood* (N = *186*)	*Puberty* (N = *176*)	*Adolescence* (N = *170*)	*Middle Adulthood* (N = *123*)	*Later Adulthood* (N = *209*)
Perceived intelligence with IQ scores	.14**	.18**	.03	.15*	.07
Controlling attractiveness	–.03	.11	–.09	.03	.00
Attractiveness with:					
IQ scores	.26****	.16**	.21***	.22***	.11
Perceived intelligence	.64****	.57****	.51****	.59****	.55****
Averageness with:					
IQ scores	.12*	.21***	–.09	.11	–.03
Attractiveness	.44****	.34****	.36****	.53****	.36****
Perceived intelligence	.50****	.21***	.31****	.49****	–.09
Symmetry with:					
IQ scores	.27****	.02	–.02	.09	.04
Attractiveness	.31****	.22***	.30****	.29***	.40****
Perceived intelligence	.41****	.35****	.27****	.38****	.25****
SES with:					
IQ scores	.39****	.43****	.27****	.47****	.49****
Attractiveness	.20***	.17**	.03	.16*	.13*
Perceived intelligence	.10	.26****	–.08	.19**	.10

NOTE: All correlations control for participant sex. *SES = socioeconomic status.*
*$p \leq .10$. **$p \leq .05$. ***$p \leq .01$. ****$p < .001$.

at the time of their entry to the study. The mean of scores at entry and adolescence was used as the index in puberty and adolescence; the mean of scores at entry, adolescence, and middle adulthood was used as the index in middle adulthood; and the mean of scores at entry, adolescence, middle adulthood, and later adulthood was used as the index in later adulthood. If the score at one age was missing, those at the available ages were used to calculate the SES scores.

Analyses

Correlation and regression analyses were performed to test the experimental hypotheses. Unless otherwise indicated, all analyses controlled for sex of participant. We also performed all analyses within sex of participant. Although we had no a priori predictions about differences between men and women, we have reported the within-sex effects when a result that was not significant in the overall analysis was significant for one sex alone. Because these within-sex findings were unpredicted, they should be interpreted with caution. To examine whether a given relationship could be accounted for by a third variable (e.g., whether the correlation between perceived and actual intelligence could be accounted for by physical attractiveness), we used partial correlations. The appendix shows intercorrelations among variables in these partial correlation analyses that are not reported in the text.

RESULTS

Was Intelligence Judged Accurately?

To determine the accuracy of intelligence judgments, correlations between participants' IQ scores and judges' mean intelligence ratings based on the photographs were examined at each of the five ages. As shown in Table 1 (top line), the correlation was significant in childhood and puberty and marginally significant in middle adulthood, largely due to a smaller sample size at the latter age. The correlation was not significant in adolescence or in later adulthood, although within-sex analyses revealed significant accuracy in judging the intelligence of men in later adulthood, $r(95) = .20$, $p < .05$.[4] It should be noted that because either photographs or IQ scores were missing for different participants at different ages, the samples are not identical across the life span. Consequently, lower correlations at one age than another could either reflect an influence of target age on the accuracy with which intelligence can be judged or it could reflect differences in sample composition. The size of the longitudinal sample that spanned the entire age range under investigation was too small for meaningful analysis ($N = 39$).

Can Attractiveness Account for the Accuracy of Judged Intelligence?

Consistent with previous research, attractiveness was significantly correlated with perceived intelligence at all

ages. Attractiveness also was significantly correlated with IQ scores at all ages except later adulthood (Table 1). Moreover, the correlations between perceived intelligence and IQ scores lost significance in childhood, puberty, and middle adulthood when attractiveness was partialed out, suggesting that attractiveness contributed to the accuracy in judging intelligence at these ages (Table 1). The nonsignificant correlations in adolescence and later adulthood were not improved when attractiveness was partialed out, indicating that lack of accuracy at these ages was not due to judges' being blinded by beauty, as had previously been found for judgments of health (cf. Kalick et al., 1998).[5]

What Are the Paths to a Relationship Between Attractiveness and IQ?

Biological influences on attractiveness and intelligence. The evolutionary hypothesis that attractiveness has evolved as an honest indicator of intelligence was tested by examining the relationship between attractiveness and IQ, controlling for the aspects of attractiveness that have been theorized to indicate genetic fitness—averageness and symmetry. In childhood, averageness and symmetry were both correlated with attractiveness and with IQ scores, making them potential explanations for the relationship between the two (Table 1). However, the relationship between attractiveness and IQ in childhood remained significant when controlling averageness or symmetry or both, respective rs = .23, .19, and .17, ps < .02. In puberty, only averageness provided a potential explanation for the relationship between attractiveness and IQ scores. That relationship lost significance with averageness controlled, $r(172) = .09$, $p = .21$. In adolescence and middle adulthood, neither symmetry nor averageness provided potential explanations for the significant relationships between attractiveness and IQ scores.[6] In sum, the evolutionary hypothesis that the correlation between attractiveness and intelligence derives from an influence of biological factors on both received support in puberty.

Environmental influences on attractiveness and intelligence. The hypothesis that environmental factors such as nutrition and health care may produce a correlation between attractiveness and IQ scores by influencing both was tested by examining the relationship between attractiveness and IQ, controlling for SES. As shown in Table 1, SES provided a potential explanation for the significant correlations between attractiveness and IQ in childhood and puberty and the marginally significant correlation in middle adulthood because it was correlated with both attractiveness and IQ at these ages, albeit only marginally with attractiveness in middle adulthood. In childhood, the correlation between attractiveness and IQ remained significant with SES controlled, $r(182) = .20$, $p < .01$. In puberty, the correlation lost significance with SES controlled, $r(172) = .10$, $p = .42$, and in middle adulthood it was reduced to marginal significance, $r(119) = .17$, $p = .06$. Thus, the hypothesis that the correlation between attractiveness and intelligence derives from an influence of environmental factors on both was supported in puberty and weakly supported in middle adulthood.

Combined biological and environmental influences on attractiveness and intelligence. Given the evidence for both biological and environmental contributions to the relationship between attractiveness and intelligence in childhood and puberty, we also examined those relationships controlling for averageness and/or symmetry as well as SES to see if the combination of these variables would better account for the correlation. Whereas the correlation between attractiveness and intelligence in childhood remained highly significant whether controlling for SES alone or for averageness and symmetry alone or together, it was reduced to marginal significance when all three potential mediators were controlled, $r(180) = .14$, $p = .06$. Although the correlation between attractiveness and IQ in puberty lost significance when controlling either for averageness or for SES, there was an even larger drop when controlling for both, $r(171) = .04$, $p = .56$. It thus appears that biological factors and environmental factors make an additive contribution to the relationship between attractiveness and IQ.

Path from intelligence to attractiveness. Regression analyses predicting changes in attractiveness from earlier intelligence were conducted to test the hypothesis that concurrent correlations between attractiveness and IQ may reflect differential efforts to improve attractiveness by those who vary in intelligence. With attractiveness at the preceding age controlled, IQ scores did not significantly predict attractiveness at puberty, adolescence, or middle adulthood. Although the concurrent correlation between attractiveness and IQ was not significant in later adulthood, higher IQ scores at middle adulthood did predict a positive change in later adult attractiveness with middle adult attractiveness controlled, $\beta = .20$, $t = 2.31$, $p = .02$.[7] In all regressions, attractiveness was highly stable from the earlier to the later age.

Path from attractiveness to intelligence. Regression analyses predicting changes in IQ from early attractiveness were conducted to test the hypothesis that concurrent correlations between attractiveness and IQ scores may reflect self-fulfilling prophecy effects. With IQ scores at the preceding age controlled, earlier attractiveness did not predict IQ scores at puberty, adolescence, middle adulthood, or later adulthood. Because the failure to find evidence of self-fulfilling prophecy effects at

younger ages may reflect the shorter time spans involved, analyses also were performed predicting adolescent IQ scores from childhood attractiveness, controlling childhood IQ. Although childhood attractiveness did not predict positive changes in IQ at adolescence for all participants combined, it was a marginally significant predictor for boys, $\beta = .13$, $t = 1.70$, $p = .09$. Regressions performed within sex at other ages yielded one significant result: Higher adolescent attractiveness predicted positive changes in women's IQ scores in middle adulthood with adolescent IQ scores controlled, $\beta = .13$, $t = 2.24$, $p = .03$.[8] In all regressions, IQ was highly stable from the earlier to the later age.

DISCUSSION

Consistent with the ecological theory of social perception (McArthur & Baron, 1983; Zebrowitz, 1990; Zebrowitz & Collins, 1997) and with the meta-analytic findings reported in the introduction, people were able to judge intelligence from facial photographs of strangers with above-chance accuracy. Moreover, consistent with the anecdotal observations of young children, facial attractiveness contributed to perceivers' accuracy. Attractiveness was correlated with perceived intelligence at all ages. Attractiveness also was correlated with IQ scores at the ages where judged intelligence was accurate, and controlling attractiveness at these ages eliminated that accuracy. The finding that attractiveness was correlated with IQ scores from childhood through middle adulthood contrasts with the meta-analyses reported in the introduction, in which that relationship was confined to childhood. Although we do not know for certain how to account for this difference, it should be noted that our faces were a representative sample of the population in two cities, which is not true for previous research. The magnitude of the accuracy in judged intelligence that we obtained, similar to that in the earlier literature, was modest. This may reflect the impoverished stimulus information available in still photographs of strangers' faces. Larger accuracy effects are predicted by ecological theory when perceivers are provided with dynamic, multimodal information. Considering the limited amount of information available to perceivers in the present study, this may indeed be a situation in which "small effects are impressive" (Prentice & Miller, 1992).

Of interest, judgments of the intelligence of adolescents were not accurate despite the fact that attractiveness was correlated with both perceived intelligence and IQ scores just as it was at the other ages where judgments were accurate. One possible explanation is that the components of attractiveness that were associated with perceived intelligence in adolescence did not overlap sufficiently with the components associated with actual IQ scores. Consistent with this possibility, symmetry and averageness were correlated with perceived intelligence but not with IQ scores in adolescence, whereas one or both of these attractive facial qualities predicted both perceived intelligence and IQ scores in childhood and puberty (see Table 1). Thus, perceivers' failure to accurately judge adolescents' intelligence may reflect an overreliance on averageness and symmetry cues, which were not valid indicators of intelligence at that age. It also may reflect a paucity of SES cues, which could have provided valid indicators of intelligence. Whereas SES was associated both with IQ scores and with perceptions of attractiveness and intelligence in puberty and middle adulthood, it was unrelated to perceptions in adolescence. This may reflect a tendency for adolescents to do more to alter their attractiveness than do individuals at other ages such that influences of SES on appearance were masked, although still showing up in IQ scores.[9]

The present study provided some evidence consistent with the "good genes" explanation for a relationship between attractiveness and IQ (Path A in Figure 1). Facial averageness and facial symmetry were correlated with attractiveness at every age, and these markers of developmental stability provided a potential explanation for the relationship between attractiveness and IQ in childhood and puberty when one or both also was correlated with IQ scores. Moreover, the correlation between attractiveness and IQ in puberty lost significance with averageness controlled. Thus, "good genes" may contribute to the relationship between attractiveness and IQ in puberty. Although this path does not account for the relationship between attractiveness and IQ in childhood, the correlation between facial symmetry and IQ at that age is itself noteworthy because it extends evidence that body symmetry correlates with IQ in adulthood (Furlow et al., 1997).

As noted earlier, ratings of averageness and symmetry, such as those employed in the present research, change systematically with experimental manipulations of averageness and symmetry, respectively, indicating that the ratings provide valid measures of these physical traits (Rhodes et al., 1998; Rhodes & Tremewan, 1996). Nevertheless, actual measurements of averageness and symmetry may yield finer distinctions among faces and more valid indicators of "good genes," as reflected in IQ scores. It therefore would be worthwhile for future research to correlate more objective measures of these facial qualities with IQ scores and attractiveness.

In addition to providing some support for biological factors as an explanation for the relationship between attractiveness and IQ scores, the present findings also provided some support for environmental factors, as indexed by SES (Path B in Figure 1). SES was correlated with IQ scores at every age, and it provided a potential explanation for the relationship between attractiveness

and IQ in childhood, puberty, and middle adulthood when it also was correlated with attractiveness. The correlation of SES with attractiveness indicates that the tendency for people to use attractiveness when judging SES (Kalick, 1988) will often yield accurate judgments. With SES controlled, the correlation between attractiveness and IQ lost significance in puberty and was reduced to a marginal level of significance in middle adulthood. Thus, environmental factors contributed to the relationship between attractiveness and IQ at these ages.

Environmental and biological factors combined provided a better explanation for the relationship between attractiveness and IQ scores in childhood and puberty than either one alone. Whereas the correlation between attractiveness and intelligence in childhood remained highly significant whether controlling for SES alone or for averageness and symmetry alone or together, it was reduced to marginal significance when all three potential mediators were controlled. Similarly, there was an even larger drop in the correlation between attractiveness and IQ in puberty when controlling for averageness and SES than when controlling for one or the other. It thus appears that biological factors and environmental factors make an additive contribution to the relationship between attractiveness and IQ before adolescence. It should be noted that a joint contribution of biology and the environment is consistent with the evolutionary theory argument that genetic fitness reflects the ability to maintain normal development despite various environmental stressors.

Social and developmental psychologists have postulated that the attractiveness halo effect sets into motion self-fulfilling prophecy effects, as represented by Path D in Figure 1 (e.g., Adams, 1977; Langlois et al., 2000; Snyder, Tanke, & Berscheid, 1977; Sorrell & Nowak, 1981). The present results do show that attractiveness was strongly correlated with perceived intelligence at every age, which is consistent with the argument that people have higher expectations for the intellectual capabilities of more attractive individuals. We found significant support for a self-fulfilling effect of these expectations for women in middle adulthood, when IQ scores were predicted from earlier attractiveness with earlier intelligence controlled. A similar, albeit marginally significant, trend also was observed for adolescent boys whose IQ scores were predicted from childhood attractiveness with childhood intelligence controlled. Langlois et al. (2000) concluded that social expectancies provide a plausible but largely unproven explanation of correlations between attractiveness and behavior because evidence of causal relations was lacking. Our time-lagged effects take a step in the direction of establishing causality (see also Zebrowitz, Collins, & Dutta, 1998). However, additional research is needed to determine what social outcomes of early attractiveness are responsible for these effects on intellectual development, as well as to understand why self-fulfilling effects of attractiveness were not constant across age and sex.

Path C in the model shown in Figure 1 shows another possible explanation for the correlation between attractiveness and IQ, namely that more intelligent people pay more attention to their appearance or may be more successful in projecting an attractive demeanor through control of the facial muscles (e.g., avoiding a "slack-jawed" or drooping-lids appearance) and thus become more attractive. This hypothesis received significant support in later adulthood when attractiveness was predicted from IQ scores in middle adulthood with middle adult attractiveness controlled. Although this result shows that higher IQ scores can positively influence the development of attractiveness, the fact is that the effect was inadequate to produce a significant positive correlation between IQ and attractiveness in later adulthood in the present study.

In conclusion, we have shown that people can judge intelligence from facial appearance and that when they do so, it is apparently by using the valid cue of attractiveness. Our results also reveal that biology (Path A), the socioeconomic environment (Path B), behavioral choices (Path C), and social expectations (Path D) may each make a contribution to the relationship between attractiveness and intelligence. Future research is needed to elucidate why facial averageness and symmetry cease to serve as valid cues to intelligence after puberty, what facial manipulations by adolescents mask the components of attractiveness that could be used to accurately judge their intelligence, what aspects of SES make a dual contribution to attractiveness and intelligence, what behaviors of more intelligent people lead to the development of greater attractiveness over time, and what aspects of an attractive person's social environment lead to the development of greater intelligence over time. Research also is needed to determine how it is that people come to associate attractiveness with intelligence, particularly because it appears that such associations can be self-fulfilling. A consideration of various possible origins of the preference for certain facial qualities should be instructive in this regard (cf. Zebrowitz, 1997; Zebrowitz & Rhodes, 2001).

Our findings provide an important caveat to social and developmental psychologists, who have often assumed that relationships between attractiveness and intelligence or other traits reflect self-fulfilling prophecy effects. A self-fulfilling prophecy mechanism, as shown by an influence of earlier attractiveness on changes in intelligence, provided a viable explanation for the correlation between attractiveness and intelligence only for adult women and adolescent boys. Our results also pro-

vide a caveat to evolutionary psychologists, who have argued that attractiveness signals "good genes" (e.g., Buss, 1989; Miller & Todd, 1998; Thornhill & Gangestad, 1993, 1999). Although attractiveness was positively correlated with the high quality trait of intelligence, the evidence supported a "good genes" contribution to this correlation only in childhood and puberty, whereas correlations between attractiveness and intelligence in adolescence and adulthood reflected contributions of SES or self-fulfilling prophecy effects. The finding that multiple mechanisms can produce correlations between attractiveness and intelligence makes it clear that an adequate account of the relationship between attractiveness and any adaptive trait, such as intelligence, must consider contributions not only from "good genes" but also environmental factors, behavioral choices, and social expectations.

APPENDIX
Correlations Among Variables Used in Partial Correlation Analyses at Each Age Level

Variable	*Facial Symmetry*	*SES*
1. Childhood (N = 186)		
Facial averageness	.30***	.13*
Facial symmetry		.07
2. Puberty (N = 176)		
Facial averageness	.12	.14*
Facial symmetry		.05
3. Adolescence (N = 170)		
Facial averageness	.12	–.04
Facial symmetry		.00
4. Middle adulthood (N = 123)		
Facial averageness	.22**	.15*
Facial symmetry		.17*
5. Later adulthood (N = 209)		
Facial averageness	.09	.02
Facial symmetry		–.02

NOTE: Entries are partial correlations controlling for sex. SES = socioeconomic status.
*$p \leq .10$. **$p \leq .05$. ***$p \leq .01$.

NOTES

1. Six studies calculated accuracy for each judge rather than for the whole group of judges by correlating each judge's intelligence ratings with the criterion across targets. The mean accuracy computed in this way can be expected to be lower than the group-based accuracy because averaging across judges' ratings reduces measurement error. Indeed, this was the case (the mean accuracy correlation = .19; minimum = .05, maximum = .45).

2. Fluctuating asymmetry is a random deviation from perfect bilateral symmetry in traits that are, on average, bilaterally symmetric.

3. It should be noted that in middle adulthood, the appearance ratings and the IQ assessments are not exactly concurrent. For Guidance participants, middle adulthood photos were available at 30 years and IQ scores at 40 years. For Oakland participants, middle adulthood photos were available at 40 years and IQ scores at 50 years. (For Berkeley participants, there were no middle adulthood photos.) Because IQ was highly stable across time, it seems reasonable to assume that the correlation between appearance and IQ scores 10 years later would be similar to concurrent correlations. Indeed, the correlation between IQ scores at ages 40 and 52 was .84 for the Guidance sample, the correlation between ages 50 and 60 was .84 for the Oakland sample, and the correlation between ages 36 and 52 was .76 for the Berkeley sample.

4. Zero-order correlations (i.e., not controlling for sex) also were calculated between perceived and actual intelligence. These correlations were as follows: for childhood, $r(184) = .14$, $p < .06$; for puberty, $r(174) = .18$, $p < .02$; for adolescence, $r(168) = .05$, *ns*; for middle adulthood, $r(121) = .17$, $p < .06$; and for later adulthood, $r(207) = .09$, *ns*.

5. We also conducted exploratory analyses to determine whether babyfaceness, overweight, or ectomorphy (assessed by the body mass index and the ponderal index, respectively) might account for accuracy in judging intelligence. Controlling for these facial qualities did not reduce accuracy at any age.

6. Because facial averageness and asymmetry are theorized to reflect a biologically based inability to maintain normal development despite environmental or genetic stressors, cumulative measures of this inability were created by averaging z scores of averageness ratings or symmetry ratings at all ages through the one under consideration. Z scores were employed to create these composites because averaging raw scores from two age levels could distort participants' standing relative to their peers. The cumulative measures were no better at predicting attractiveness or IQ scores than the single assessments.

7. Because the failure to find predictive effects of intelligence at younger ages may reflect the shorter time span involved, additional analyses were performed predicting adolescent attractiveness from childhood intelligence, controlling childhood attractiveness. Childhood intelligence did not predict changes in attractiveness at adolescence for all participants combined. However, higher intelligence in childhood predicted a marginally significant negative change in attractiveness for adolescent girls, $\beta = -.16$, $t = 1.74$, $p = .09$. This result should be interpreted with caution because it was both marginally significant and opposite to prediction.

8. The correlations between attractiveness and IQ for adolescent boys, $r(78) = .24$, $p = .03$, and for women in middle adulthood, $r(74) = .20$, $p = .08$, were comparable to the correlations reported in Table 1 for all participants combined.

9. A similar explanation may account for perceivers' failure to accurately judge the intelligence of women at late adulthood. Although socioeconomic status (SES) was positively correlated with women's IQ scores at this age, it was not correlated with their attractiveness or perceived intelligence, perhaps because older women engage in grooming practices that mask their SES.

REFERENCES

Adams, G. R. (1977). Physical attractiveness research: Toward a developmental social psychology of beauty. *Human Development, 20*, 217-239.

Anderson, L. D. (1921). Estimating intelligence by means of printed photographs. *Journal of Applied Psychology, 5*, 152-155.

Berry, D. S., (2000). Attractiveness, attraction, and sexual selection: Evolutionary perspectives on the form and function of physical attractiveness. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 273-342). San Diego, CA: Academic Press.

Block, J. (1971). *Lives through time*. Berkeley, CA: Bancroft.

Borkenau, P., & Liebler, A. (1993). Convergence of stranger ratings of personality and intelligence with self-ratings, partner ratings, and measured intelligence. *Journal of Personality and Social Psychology, 65*, 546-553.

Borkenau, P., & Liebler, A. (1995). Observable attributes as manifestations and cues of personality and intelligence. *Journal of Personality, 63*, 1-25.

Brunswik, E. (1945). Social perception of traits from photographs. *Psychological Bulletin, 42*, 535-536.

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences, 12*, 1-49.

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review, 100*, 204-232.

Clarren, S. K., Sampson, P. D., Larsen, J., Donnell, D. J., Barr, H. M., Bookstein, F. L., Martin, D. C., & Streissguth, A. P. (1987). Facial effects of fetal alcohol exposure: Assessment by photographs and morphometric analysis. *American Journal of Medical Genetics*, *26*, 651-666.

Collins, M., & Zebrowitz, L. A. (1995). The contributions of appearance to occupational outcomes in civilian and military settings. *Journal of Applied Social Psychology, 25*, 129-163.

Cook, S. W. (1939). The judgment of intelligence from photographs. *Journal of Abnormal and Social Psychology, 34*, 384-389.

Cummings, C. D., Flynn, D., & Preus, M. (1982). Increased morphological variants in children with learning disabilities. *Journal of Autism and Developmental Disorders, 12*, 373-383.

Eagly, A. H., Ashmore, R. D., Makhijani, M. G., & Longo, L. C. (1991). What is beautiful is good, but . . . : A meta-analytic review of research on the physical attractiveness stereotype. *Psychological Bulletin*, *110*, 109-128.

Eichorn, D. H., Clausen, J. A., Haan, N., Honzik, M. P., & Muzzin P. H. (Eds.). (1981). *Present and past in middle life.* New York: Academic Press.

Feingold, A. (1992). Good looking people are not what we think. *Psychological Bulletin, 111*, 304-341.

Furlow, B., Armijo-Prewitt, T., Gangestad, S. W., & Thornhill, R. (1997). Fluctuating asymmetry and psychometric intelligence. *Proceedings of the Royal Society* (Series B), *264*, 823-829.

Gangestad, S. W., & Simpson, J. A., (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences, 23*, 573-644.

Gaskill, P. C., Fenton, N., & Porter, J. P. (1927). Judging the intelligence of boys from their photographs. *Journal of Applied Psychology, 11*, 394-401.

Gibson, J. J. (1966). *The senses considered as perceptual systems.* Boston: Houghton Mifflin.

Gibson, J. J. (1979). *The ecological approach to visual perception.* Boston: Houghton Mifflin.

Gottlieb, G. (2000). Environmental and behavioral influences on gene activity. *Current Directions in Psychological Science, 9*, 93-97.

Harris, M. J., & Rosenthal, R. (1985). Mediation of interpersonal expectancy effects: 31 meta-analyses. *Psychological Bulletin, 97*, 363-386.

Hollingshead, A. B., & Redlich, F. C. (1958). *Social class and mental illness.* New York: John Wiley.

Jackson, L. A., Hunter, J. E., & Hodge, C. N. (1995). Physical attractiveness and intellectual competence: A meta-analytic review. *Social Psychology Quarterly, 58*, 108-122.

Jones, M. C., Bayley, N., Macfarlane, J. W., & Honzik, M. P. (Eds.). (1971). *The course of human development.* New York: John Wiley.

Kalick, S. M., (1988). Physical attractiveness as a status cue. *Journal of Experimental Social Psychology, 24*, 469-489.

Kalick, S. M., Zebrowitz, L. A., Langlois, J. H., & Johnson, R. M. (1998). Does human facial attractiveness honestly advertise health? Longitudinal data on an evolutionary question. *Psychological Science, 9*, 8-13.

Kohn, M. L., & Schooler, C. (1982). Job conditions and personality: A longitudinal assessment of their reciprocal effects. *American Journal of Sociology, 87*, 1257-1286.

Krouse, J. P., & Kauffman, J. M. (1982). Minor physical anomalies in exceptional children: A review and critique of research. *Journal of Abnormal Child Psychology, 10*, 247-264.

Laird, D. A., & Remmers, H. (1924). A study of estimates of intelligence from photographs. *Journal of Experimental Psychology, 7*, 429-445.

Langlois, J. H., Kalakanis, L., Rubenstein, A. J., Larson, A., Hallam, M., & Smoot, M. (2000). Maxims or myths of beauty? A meta-analytic and theoretical review. *Psychological Bulletin*, *126*, 390-423.

Langlois, J. H., & Roggman, L. A. (1990). Attractive faces are only average. *Psychological Science, 1*, 115-121.

Mackintosh, N. J. (1998). *IQ and human intelligence.* Oxford, UK: Oxford University Press.

McArthur, L. Z., & Baron, R. M. (1983). Toward an ecological theory of social perception. *Psychological Review, 90*, 215-238.

Miller, G. (2000). *The mating mind.* New York: Doubleday.

Miller, G. F., & Todd, P. M. (1998). Mate choice turns cognitive. *Trends in Cognitive Sciences, 2*, 190-198.

Moriwaki, E. (1929). Note on the comparative validities of judgments of intelligence based on photographs and on interviews. *Journal of Applied Psychology, 13*, 630-631.

Murphy, M. J., Nelson, D. A., & Cheap, T. L. (1981). Rated and actual performance of high school students as a function of sex and attractiveness. *Psychological Reports*, *48*, 103-106.

Pinter, R. (1918). Intelligence as estimated from photographs. *Psychological Review, 25*, 286-296.

Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin*, *112*, 160-164.

Reynolds, D. J., & Gifford, R. (2001). The sounds and sights of intelligence: A lens model channel analysis. *Personality and Social Psychology Bulletin*, *27*, 187-200.

Rhodes, G., Proffitt, F., Grady, J., & Sumich, A. (1998). Facial symmetry and the perception of beauty. *Psychonomic Bulletin & Review, 5*, 659-669.

Rhodes, G., Sumich, A., & Byatt, G. (1999). Are average facial configurations only attractive because of their symmetry? *Psychological Science*, *10*, 52-58.

Rhodes, G., & Tremewan, T. (1996). Averageness, exaggeration and facial attractiveness. *Psychological Science*, *7*, 105-110.

Rhodes, G., Zebrowitz, L. A., Clark, A., Kalick, S. M., Hightower, A., & McKay, R. (2001). Do facial averageness and symmetry signal health? *Evolution and Human Behavior, 22*, 31-46.

Shackelford, T. K., & Larsen, R. J. (1997). Facial asymmetry as an indicator of psychological, emotional, and physiological distress. *Journal of Personality and Social Psychology, 72*, 456-466.

Shackelford, T. K., & Larsen, R. J. (1999). Facial attractiveness and physical health. *Evolution & Human Behavior, 20*, 71-76.

Snyder, M., Tanke, E., & Berscheid, E. (1977). Social perception and interpersonal behavior: On the self-fulfilling nature of social stereotypes. *Journal of Personality and Social Psychology, 35*, 656-666.

Sorrell, G. T., & Nowak, C. A. (1981). The role of physical attractiveness as a contributor to individual development. In R. Lerner & N. A. Busch-Rossnagel (Eds.), *Individuals as producers of their development: A life span perspective* (pp. 389-446). London: Academic Press.

Streissguth, A. P., Herman, C. S., & Smith, D. W. (1978). Intelligence, behavior, and dysmorphogenesis in the fetal alcohol syndrome: A report on 20 patients. *Journal of Pediatrics, 92*, 363-367.

Thornhill, R., & Gangestad, S. W. (1993). Human facial beauty: Averageness, symmetry, and parasite resistance. *Human Nature, 4*, 237-269.

Thornhill, R., & Gangestad, S. W. (1999). Facial attractiveness. *Trends in Cognitive Sciences, 3*, 452-460.

Thornhill, T., & Møller, A. P. (1997). Developmental stability, disease and medicine. *Biological Reviews, 72*, 497-548.

Uhrbrock, R. S. (1929). Estimating intelligence from photographs. *Proceedings of the Ninth International Congress on Psychology, 9*, 451-452.

Uhrbrock, R. S., & Games, P. A. (1963). Estimating intelligence from photographs. *Indian Journal of Psychology, 38*, 49-63.

Zebrowitz, L. A. (1990). *Social perception.* Buckingham, UK: Open University Press.

Zebrowitz, L. A. (1997). *Reading faces: Window to the soul?* Boulder, CO: Westview.

Zebrowitz, L. A., Andreoletti, C., Collins, M. A., Lee, S. Y., & Blumenthal, J. (1998). Bright, bad, babyfaced boys: Appearance stereotypes do not always yield self-fulfilling prophecy effects. *Journal of Personality and Social Psychology, 75*, 1300-1320.

Zebrowitz, L. A., & Collins, M. A. (1997). Accurate social perception at zero acquaintance: The affordances of a Gibsonian approach. *Personality and Social Psychology Review, 1*, 203-222.

Zebrowitz, L. A., Collins, M. A., & Dutta, R. (1998). Appearance and personality across the lifespan. *Personality and Social Psychology Bulletin*, *24*, 736-749.

Zebrowitz, L. A., Olson, K., & Hoffman, K. (1993). Stability of babyfacedness and attractiveness across the life span. *Journal of Personality and Social Psychology*, *64*, 453-466.

Zebrowitz, L. A., & Rhodes, G. (2001). Nature let a hundred flowers bloom: The multiple ways and wherefores of attractiveness. In G. Rhodes & L. A. Zebrowitz (Eds.), *Facial attractiveness: Evolutionary, cognitive, and social perspectives* (pp. 261-293). Westport, CT: Ablex.

Zebrowitz, L. A., Voinescu, L., & Collins, M. A. (1996). "Wide eyed" and "crooked-faced": Determinants of perceived and real honesty across the life span. *Personality and Social Psychology Bulletin*, *22*, 1258-1269.

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