

Even if one accepts Buss's general premise and regards mate preferences as partly an evolutionary heritage, several issues remain unresolved. One is clearly the nature of the proximate mechanism involved. Have brain areas evolved to promote a preference for the physically attractive? Such an idea is not so farfetched as it might appear. A brain area does exist that is specialized for facial recognition – and damage to it results in an inability to recognize faces. Moreover, Francis Galton's original suggestion that average facial features may be perceived as attractive – based on creating composite images of faces – could provide a basis for an attractiveness recognition mechanism (Plomin et al. 1980, p. 28). Similarly, although the trappings of wealth and power certainly vary among cultures, the idea of ranking is widespread in humans and animals; it is certainly possible for a mechanism to evolve that favors preference for high rank, where the system of ranking is *learned*. But these mechanisms are speculative. Unless evidence can be provided about the process linking DNA and behavior, Buss's thesis will be unconvincing to some scholars, and certainly incomplete.

The presence of individual differences remains a puzzle. Directional, evolutionary selection should eventually eliminate individual differences (e.g., humans, with rare exceptions, are two-legged). Yet, the target article notes that the "male and female preference distributions overlap considerably, in spite of mean differences." What is the origin of these individual differences, and why do they persist? Behavioral genetic studies of mate preference might be of interest here. Such studies could reveal *no* genetic influence on such preferences, indicating that the individual-level variation is merely the result of measurement error and idiosyncratic experiences. On the other hand, they might indicate that these preferences contain a component of additive genetic variation. Often, the latter type of variation suggests selective neutrality for a trait over evolutionary periods – genetically, it may not matter much whether one prefers a highly attractive or unattractive mate. However, under some circumstances – for instance, frequency-dependent selection – strong selective pressures may exist and yet additive genetic variation will remain. Other complex selective schemes may also produce this result (Price et al. 1988). The presence of genetic dominance variation accords with the thesis of directional selection of mate preference. Finally, an absence of *shared*-environmental influences (by definition, environmental influences operating to make family members alike) supports the position that such preferences are not acquired from family environments or from other, local environmental influences.

Similarly, the genetic architecture of preference-determining traits is important. Little work exists on the heritability of physical attractiveness. Rowe et al.'s (1987) study of the facial attractiveness of monozygotic twins indicates a high broad-sense (i.e., all genetic components) heritability. However, the lack of other kinships (and a small sample size) prevents further partitioning of genetic variation in facial attractiveness. Traits related to "earning potential," such as I.Q. and a variety of personality traits, have strong, additive genetic components. If heredity plays a role in the determination of such traits, then the choice of mates possessing them should benefit one's offspring genetically – a mechanism that might promote the evolution of such mate preferences.

The target article also neglects the importance of rethinking mate preferences as biologically based dispositions. A large body of literature in social psychology and allied fields is devoted to the topic of choosing mates. In general, the theories describing the mate selection processes explicitly assume that mate preferences are consequences of other, social processes. For example, in the attribution literature, it is noted that many positive traits (e.g., friendliness) are attributed to the physically attractive. From this observation, it is argued that early socialization prepares people to make such trait attributions and then that such attributions determine mate preferences (e.g., for young and attractive mates). However, if these preferences

were actually woven into the nervous system, and if they were emotions directly felt and determined by this biological substrate, then may not other, social correlates of mate preference be consequences rather than causes? Indeed, the entire attribution literature could be read as demonstrating the *rationalizations* people make for their inborn emotional responses. Thus, Buss's thesis has broad implications for many fields outside of evolutionary biology, including the psychology and sociology of mate selection.

Epigenesis and social preference

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Evolution appears to have endowed humans with a discriminating desire for some as marriage partners rather than others. In addition, there seem to be mean differences between women and men in terms of which traits are considered attractive. Buss's data thus join those assembled in the domains of incest avoidance (see van den Berghe 1983) and sexual behavior (see Symons 1980) to support the view that human life histories are guided by epigenetic rules (see Lumsden & Wilson 1982) acting in the service of fitness optimization. In this commentary, I extend this data base, suggesting that nature may have endowed individuals with a particularly fine-tuned set of social preferences.

Buss notes that other variables such as similarity might affect mate preference; elsewhere he has reviewed data showing that partners tend to resemble each other in such characteristics as age, ethnic background, socioeconomic status, physical attractiveness, religion, social attitudes, level of education, family size, intelligence, and personality (Buss 1985). Correlations tend to be higher for opinions, attitudes, and values (0.40 to 0.70), and lower for personality traits and personal habits (0.02 to 0.30). Less well known is the fact that partners also tend to resemble each other in terms of socially undesirable traits, including criminality, alcoholism, and psychiatric disorders. Alternative reasons can be proposed for this finding (Burley 1983), but it raises the possibility that the tendency to seek a similar partner may sometimes override considerations such as mate quality and individual fitness.

Genetic similarity theory (Rushton et al. 1984), an extension of the kin-selection theory of altruism, postulates that people detect genetic similarity in others (nonkin as well as kin) in order to proffer preferential treatment to those most similar. This suggests a new theory of attraction and friendship. Preliminary data make it likely that social assortment in humans is genetically mediated. It is known that the dimensions on which spouses and friends resemble each other are partly inherited (e.g., Tellegen et al. 1988); hence, unless one adopts the implausible idea that humans detecting similarity are responding purely to the environmentally influenced component of a trait, it follows that genetic similarity between partners must occur.

More direct evidence is also available. Using blood antigen analyses from nearly 1,000 cases of disputed paternity, Rushton (1988) found that degree of genetic similarity predicted (1) whether a pair was sexually interacting or randomly generated, and (2) whether a pair produced a child together or not. Seven polymorphic marker systems (ABO, Rhesus [Rh], P, MNSS, Duffy [Fy], Kidd [Jk], and HLA) at 10 loci across six chromosomes were examined. Sexually interacting couples were found to share about 50% of measured genetic markers, partway between mothers and their offspring, who shared 73%, and randomly paired individuals from the same sample, who shared 43% (all comparisons significantly different, $p < .001$). In the cases of disputed paternity, genetic similarity predicted male

inclusion: Males not excluded from paternity were 52% similar to their partners, whereas those excluded were only 44% similar ($p < .001$).

Close friends are also found to be genetically similar using the same blood analyses. Rushton and Chan (in press) recruited 76 nonrelated close friends, ranging in age from 18 to 57, from the general community. Subjects completed several life history, personality, and social attitude questionnaires, had numerous anthropometric measurements taken, and gave a blood sample. The percentage similarity of the friendship pairs, as well as that of an equal number of randomly paired individuals from the same sample, were calculated over the 10 loci. Whereas friends were found to be 54% similar on these genetic markers, the random pairs were found to be only 48% similar ($p < .05$).

Although the blood antigens undoubtedly arise from assortment on related variables (there is no such thing as "genetic ESP"), the results are not due to obvious factors such as ethnicity and social stratification. Our samples were homogeneously North European in appearance (in the paternity study as judged from photographs), and with the friends, within-pair differences on variables such as education and occupation did not correlate with the blood tests. The critical point about these data is their demonstration that, *in effect*, social assortment often follows lines of genetic similarity.

Other data suggest that genetic influence on mate choice is particularly fine-tuned because within sets of homogeneous attributes, similarity between spouses is most pronounced on traits of high rather than low heritability. Several studies have found positive correlations between spouse similarity scores and estimates of genetic influence across a wide variety of anthropometric, cognitive, and personality characteristics (Rushton & Nicholson 1988; Rushton & Russell 1985; Russell et al. 1985). Rushton and Nicholson (1988) found these observations to be robust in that estimates of genetic influence calculated in one population (e.g., Japanese-Americans in Hawaii) predicted assortative mating coefficients in others (e.g., European-Americans living in California).

With friends, too, evidence exists that the tendency to choose similar others is itself genetically influenced. In Rushton and Chan's (in press) study, positive correlations were found between the differential heritability estimates and the degree of similarity between the friends (measured by correlation coefficients) on the attitudinal and personality assessments – that is, the friends' similarity was most marked on the more genetically influenced items, thus paralleling those from the studies of marriage partners. Other investigators independent of ourselves have also found evidence for genetic assortment. Rowe and Osgood (1984) used a behavior genetic design to examine delinquency in 530 teenaged twins and found that not only was antisocial behavior itself about 50% heritable, but that the correlation of 0.56 between the delinquency of self and the delinquency of friends was genetically mediated – that is, genetically disposed delinquent students were also genetically inclined to seek each other out.

Finally, parental preferences between full siblings have been examined. Because kin selection theory emphasizes relatives "identical by descent" where all siblings have a .5 coefficient of relationship, differences between full siblings has been overlooked. Because of assortative mating and the vagaries of meiosis, however, some children will be more similar to one parent than to the other. If a father provides a child with 50% of his genes, 10% of which overlap with the mother's contribution, and a mother provides the child with 50% of hers, 20% of which overlap with the father's, the child would be 60% similar to the mother and 70% similar to the father, and family members can be expected to favor those most similar. Support for this prediction was found in a study of bereavement following the death of a child: Both mothers and fathers, irrespective of the sex of the child, grieved most for children they perceived as resembling their side of the family (Littlefield & Rushton 1986). Among

siblings, perceived similarity is correlated with genetic similarity measured by blood tests (Scarr & Grajeck 1982). [See also Plomin & Daniels: "Why Are Children From the Same Family So Different?" *BBS* 10(2) 1987.]

It would appear that people do moderate their behavior in accordance with the genetic similarity of others. Thus human social preferences may be considerably more Darwinized than has been considered to date. As Buss notes at the conclusion of the target article, there is a need to understand the proximate mechanisms responsible for such effects. Like food preferences, sexual predilections can be highly individualized. Innate feature detectors, canalized learning, and idiosyncratic experiences may all have a role to play in ontogeny.

Homo sociobiologicus not found

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There have been several theoretical approaches to the study of mate choice and marriage. Some are based on inadequate conjectures, some on the experience of clinicians, and some are derived from more broadly based theories of human functioning. The sociobiological approach is a relative newcomer, with several attributes that make it worthy of serious consideration. It draws its hypotheses about human beings from principles that have been found most useful in accounting for the behavior of animals engaged in a variety of reproductive strategies. It is unique in that the form of explanation is functional. Instead of searching for immediate causes, sociobiological theorists view behavior as playing a part in optimizing reproductive success. As the human marriage system is of such importance in human reproduction, this is an area to which sociobiological insights may be considered particularly applicable.

We accordingly welcome Buss's contribution. The derivation of hypotheses from basic theory is clear and convincing. The scale of the data gathering is impressive. By and large, the findings support the theory. However, the theory and the findings should both be taken with a pinch of salt. By its nature, the theory applies to an optimizing, ideal organism. It must be recognized that selection operates on a particular species with a particular set of behavioral possibilities. In contrast to Lumsden and Wilson (1981), who saw cognition as the link between natural selection and behavior, we contend that alterations in behavior are primarily selected through the proximal mechanism of emotional makeup. Sociobiological theorizing about human mate choice and bonding ignores the detailed study of the relevant emotions as its peril. Buss has paid little attention to the actual nature of the human in favor of purist, "species-free" theory. [See also multiple book review of Lumsden & Wilson, *BBS* 5(1) 1982.]

Why should the findings be partly suspect? Because they rely on asking young people what they think they will want, rather than studying what people do. These reservations should not be taken to imply that we think Buss is wrong, but rather that what he describes is a facet of human mate choice. We feel that the term "mate choice," with respect to humans, is ambiguous. We assume mate choice to mean long-term mate choice, or marriage. With this in mind, we looked for corroborative evidence. We used some relevant questions from a comprehensive nationwide study of over 1,000 British married couples of all ages and socioeconomic levels. The data were gathered by Russell and Wells in 1986.

According to the target article, men tend to desire women who are young, chaste, and physically attractive, whereas women tend to want men who are wealthy and industrious. To obtain