get rid of it. If so, the real issue remains: Why should the begging display, which threatens no harm and stimulates no C-fibers, be aversive? It is unlikely that "socialization" has made it so.

What then of the human case? Animal research will not permit direct conclusions about it, true. On the other hand, if we could understand the underlying mechanisms in animal altruism, we might find ourselves asking new and better focused questions about human altruism, its mechanisms, and the sources of these mechanisms.

My own guess, for what it is worth, is that the underlying question about human nature will best be illuminated by the analysis of mechanism in simpler cases: in young children and even in animals. To tackle it head on in the adult, socialized human being, as Batson and Shaw have done, is to take on the most complex case imaginable. Their experimental expedition is admirable in its courage and ingenuity, but I cannot be optimistic about its prospects for bringing home convincing answers.

Note

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Is Altruism Innate?

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The answer to the question posed in my title is yes. Altruism is found in many animal species, and the origin lies deep in evolutionary history (Wilson, 1978).

In nonhuman animals, altruism includes parental care, warning calls, cooperative defense, rescue behavior, and food sharing; it may also involve self-sacrifice. The poisonous sting of a honeybee is an adaptation against hive robbers. The recurved barbs facing backward from the sharp tip cause the whole sting to be wrenched out of the bee's body, along with some of the bee's vital internal organs. These barbs have been described as instruments of altruistic self-sacrifice. Although the individual dies, the bee's genes, shared in the colony of relatives, survive.

Human altruism also originates in, and helps serve, genetic purpose. Empathy is a disposition most likely evolving from parental care. Even babies empathize; during ontogeny, when allied cognitive abilities come into play, the capacity for intellectual identification appears, even with individuals who lived thousands of years ago, or with those who are yet to be born.

The genetic roots of empathy were, in fact, detected by Batson in a study of twins with fully 71% of the variance in amount of empathy estimated as due to genetic influence (Matthews, Batson, Horn, & Rosenman, 1981). Curiously, this interesting observation has been cited only six times in the journals covered by the *Social Science Citation Index* (1981–1989) and only once by Batson himself as first author, and it is not mentioned in the target article. Can Batson not quite bring himself to believe his own results? Social psychologists have not always been known for highlighting the genetic basis of the regularities that lie beyond their deconstructions (Rushton, Brainerd, & Pressley, 1983).

Genetic Studies

The finding by Matthews et al. (1981) was one of several others. Loehlin and Nichols (1976) carried out cluster analyses on self-ratings of various traits from 850 twin pairs. Clusters labeled *kind, argumentative,* and *family quarrel* demonstrated heritabilities of .40. Twin studies of antisocial behavior and delinquency similarly have found that about 50% of the variance is due to genetic influence (Rowe, 1986). In a study of both altruism and aggression in 573 pairs of adult twins, 50% of the variance on each scale was found to be associated with genetic effects (Rushton, Fulker, Neale, Nias, & Eysenck, 1986). These results are shown in Table 1.

Some have argued that the twin method is invalid for estimating heritability because an equal-environment assumption is not valid. A review by Scarr and Carter-Saltzman (1979) suggested that the criticism is of limited importance: In cases in which parents and twins incorrectly classify zygosity, the degree of twin similarity on many traits is better predicted by true zygosity (defined by blood and fingerprint analysis) than by social definition. Moreover, Loehlin and Nichols (1976) showed that, when measures of the differences that do exist in the treatment of twins were correlated with personality and other scores, there was no evidence that differences in treatment had any effect.

Perhaps the least appreciated aspect of twin studies is the information they also provide about environmental effects. The important environmental factors influencing development turn out not to be shared by siblings but to be unique to each. Such factors as social class, parental values, and childrearing styles are not found to have a major effect on siblings. The important environmental variance is within a fam-

Table 1. *Variance Components From an Analysis of Altruism and Aggressiveness Questionnaires From 573 Adult Twin Pairs*

	Additive Genetic Variance		Common Environmental Variance		Specific Environmental Variance	
Trait	**%E**	**%EC**	**%E**	**%EC**	**%E**	**%EC**
Altruism	51	60	2	2	47	38
Empathy	51	65	0	0	49	35
Nurturance	43	60	1	1	56	39
Aggressiveness	39	54	0	0	61	46
Assertiveness	53	69	0	0	47	31

Notes: %E, variance component; %EC, estimates corrected for unreliability. Data has been adapted from Rushton, Fulker, Neale, Nias, and Eysenck (1986).

ily, not between families (Plomin & Daniels, 1987). This is true even of traits such as altruism and aggression that parents are expected to socialize heavily. As shown in Table 1, although 50% of the variance on each scale is associated with genetic effects, virtually 0% is associated with the twin's common environment and the remaining 50% is with each twin's specific environment.

Convergent with this twin work, adoption studies have found that children who were adopted in infancy were at greater risk for criminal convictions if their biological parents had been convicted than if their adoptive parents had been (Mednick, Brennan, & Kandel, 1988). In one study of all 14,427 nonfamilial adoptions in Denmark from 1924 to 1947, it was found that siblings and half-siblings adopted separately into different homes were concordant for convictions. A unique study comparing sets of identical and fraternal twins, some raised apart and others raised together, has confirmed the typical heritability of .50 across diverse traits, including aggression and traditional morality (Tellegen et al., 1988).

Epigenetic Rules

No one believes that genes code for social behaviors directly. Rather, genes code for enzymes which, under the influence of the environment, lay down tracts in the brains and neurohormonal systems of individuals, thus affecting people's minds and the choices they make about behavioral alternatives. In regard to empathy, for example, people may inherit nervous systems that differentially predispose them to kindliness or to being conditionable. There are many plausible routes from genes to behavior, and collectively these routes may be referred to as epigenetic rules.

Within the same rearing environment, genetically different siblings are biased to learn different items of information because they have different sets of epigenetic rules channeling their common environments in individual ways. In an illustrative study on television effects, Rowe and Herstand (1986) found that, although same-sex siblings resemble one another in their exposure to violent programs, it is the more aggressive sibling who (a) identifies more with aggressive characters and (b) views the consequences of the aggression as positive. Within-family studies of delinquents find that both intelligence (Hirschi & Hindelang, 1977) and temperament (Rowe, 1986) distinguish delinquent siblings from those who are not delinquent.

Genes not only influence general tendencies of kindliness, they also provide direction for behavior. For example, a territory-holding male stickleback fish will attack a very crude fish model that has a red belly. There is evidence that humans, too, selectively respond; for example, people typically react nurturantly to babies. Many Disney cartoon animals have features that appear to be caricatures of baby characteristics—high bulging foreheads, small noses, and large cheeks. The changes that have occurred in the faces of teddy bears show a trend toward rounded features. The early ones, manufactured at the beginning of the century, were modeled on a real bear with a long snout. Over the years their snout has become relatively shorter and their foreheads relatively larger. The change is presumably due to those types more successful in leaving the shop shelves being more numerous there in the next year; they were better at eliciting nurturant responses in consumers (Hinde & Barden, 1985).

Genetic Similarity Theory

Selective responding may be highly individualized. By being most altruistic to those who resemble us, and with whom we share genes, we help copies of our own genes to replicate. This makes "altruism" ultimately "selfish" in purpose. Promulgated in the context of animal behavior, this idea became known as kin selection and provided a conceptual breakthrough by redefining the unit of analysis away from the individual organism to his or her genes, for it is these which survive and are passed on. This idea has been extended to the human case and, as such, provides a new theory of attraction and friendship (Rushton, 1989).

Marriage partners resemble each other in such characteristics as age, socioeconomic status, physical attractiveness, religion, social attitudes, level of education, family size and structure, IQ, and personality. The median assortative mating coefficient for IQ, for example, averaged over 16 studies involving 3,817 pairings is .37 (Bouchard & McGue, 1981). Correlations tend to be higher for opinions, attitudes, and values (.40 to .70) and lower for personality traits and personal habits (.02 to .30). Less well known is that partners tend to resemble each other on socially undesirable attributes, including criminality, alcoholism, and psychiatric disorders, as well as on a variety of physical features.

Social assortment in humans follows lines of genetic similarity. Using blood tests to estimate genetic distance between people across 10 blood loci using seven polymorphic marker systems over six chromosomes, both male friendship dyads and sexually interacting couples are found to share more genetic markers than do randomly generated pairs from the same samples. Moreover, genetic similarity is closest among those sexually interacting couples who produce a child together (Rushton, 1989).

Choosing partners must engage particularly fine-tuned mechanisms because partner similarity is most marked on the genetically rather than on the environmentally influenced components of a variety of anthropometric, cognitive, personality, and attitudinal attributes (Rushton, 1989). This is a differential prediction: Environmental theories of partner choice would predict that similarity between partners occurs most on the more environmentally influenced components of traits. However, several studies have shown that genetically

similar people are inclined to seek each other out (Daniels & Plomin, 1985; Rowe & Osgood, 1984).

Family favoritism also reflects genetic similarity. Because of assortative mating, some children will be genetically more similar to one parent than to the other. Family members are expected to favor those who are most similar. A test of this prediction was made 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 perceived as resembling their side of the family (Littlefield & Rushton, 1986). Among siblings, perceived similarity is correlated with genetic similarity measured by blood tests.

Ethnic Nepotism

The implications of the finding that people moderate their altruism as a function of genetic similarity may be far-reaching. They may suggest a biological basis for ethnocentrism, for example (Rushton, 1989). Despite enormous variance within populations, it can be expected that two individuals within an ethnic group will, on average, be more similar to each other genetically than two individuals from different ethnic groups. According to genetic similarity theory, people can be expected to favor their own group over others. Ethnic conflict and rivalry is one of the great themes of historical and contemporary society. Local ethnic favoritism is also displayed by group members who prefer to congregate in the same area and to associate with each other in clubs and organizations. Many studies have found that people are more likely to help members of their own race or country than they are to help members of other races or foreigners, and that antagonism between classes and nations may be greater when a racial element is involved. Xenophobia may represent a dark side of innate human altruism.

Note

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