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Socialization in the Context of the Family: A Sociobiological Perspective

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Because of its status as the primeval form of human social organization, the human family must play a central role in evolutionary theorizing about development. The purpose of this chapter is to provide a sociobiological framework within which substantial areas of the literature on the family deriving from developmental psychology can be integrated.

From an evolutionary perspective the family must be viewed as in a delicate balance between centripetal forces which tend to make the family unit a cohesive social structure and centrifugal forces which tend to pull it apart. If indeed natural selection has occurred at the individual level, the existence of advanced social structures such as the family presents a major theoretical problem. On the one hand, the centrality of self-interest in sociobiological theorizing leads to viewing the family as a battleground where conflict of interest predominates, while on the other hand it is expected that the family will develop mechanisms of social cohesion which will function to raise well-adapted offspring. As indicated in Chapter 1, Trivers was the first to notice this. In his discussion of parent-offspring conflict he emphasizes that individuals within a family have the same interest only up to a point. It is in the interest of both the offspring and the parents, perhaps including the father, for the parents to invest in the offspring. But this symmetry of interest disappears when further investment in an individual offspring is disadvantageous to the parents.

The organization of this chapter reflects the tension between centripetal and centrifugal tendencies within the human family. Regarding the centripetal tendencies, the focus is on the proximal affective mechanisms which hold families together and the historical and cross-cultural context of their expression, especially with regard to how they influence development. Centrifugal tendencies within the family occur for a variety of reasons, and in the present case the effects of variation in parental investment resulting from male-female differences in reproductive strategy are emphasized.

The point of view adopted here is explicitly nonreductionist. In previous papers (MacDonald, 1983, 1986d, 1987a; see also this vol., Chap. 1) I have argued for the existence of several independent, nonreducible factors as being relevant to understanding fitness in human societies, and in this chapter the role of economic production and social controls are discussed. The perspective adopted here considers the family to be embedded in a broad cultural and biological matrix (Bronfenbrenner, 1986; Lerner & Kauffman, 1986), ranging from biologically influenced proximal mechanisms, such as the affective systems underlying family functioning and social learning, to social controls on behavior originating both within and beyond the family. The family is embedded also in a cultural and historical context, and these varying contexts profoundly affect development in ways that can be understood within the framework of sociobiological theory.

Centripetal Tendencies Within Families and the Context of Development

From a sociobiological perspective the idea that the nuclear family is the basic form of human social organization implies a high level of paternal investment in offspring. Proximal mechanisms fostering male-female as well as parent-child social bonding are expected. Several proximal mechanisms which facilitate cohesion of the family grouping have been proposed by sociobiologists, including continuous sexual receptivity of females and concealed ovulation (Alexander, 1979). Both of these mechanisms would provide an incentive for a male to maintain continuous ties with a female in order to ensure his paternity. However, the centripetal mechanism that is most relevant for thinking about child development involves the proximate, epigenetic mechanisms underlying parent-parent and parent-child affective bonds. Knowledge of these mechanisms is essential to understanding the flexibility and control of human behavior, and in the following I will concentrate on developing a biological theory of these affective bonds, describing its adaptive history in human societies and discussing its role in the individual development of children.

AN ETHOLOGICAL THEORY OF AFFECTIVE BONDS

Bowlby's (1969, 1973) ethological theory of attachment has had a wide influence on the research and conceptualization of early parent-child interaction. Bowlby postulates that secure attachment is based on "natural clues" provided by certain stimuli, particularly the presence or absence of the caretaker. These natural clues or epigenetic rules in the

sense of Lumsden and Wilson (1981) form the basis for an ethological theory of familial affective relationships. In particular it is proposed that the epigenetic rules underlying familial interactions program for the subjective, affective valence of social stimulation, so that, for example, the stimulation provided by a sensitive, responsive caretaker is perceived as subjectively pleasurable by a child, while hostile, rejecting environments are perceived as aversive. This type of analysis is formally similar to analyses by Wilson (1975), Pulliam and Dunford (1980), and Barash (1977), who emphasize the evolution of the rewarding properties of certain behaviors as due to selection for reward responses in the limbic system. This type of analysis also provides an evolutionary basis for highly flexible behavioral systems, since it is the affective consequences of environmental stimulation which guide behavior rather than highly stereotyped, internally generated behavioral patterns which were the concern of the classical ethologists. As Sroufe (1979) states, "Affect is the link between the instinctive behavior of animals and the flexible behavior of man" (p. 501).

Another idea that comes out of this theoretical perspective is the general principle that adaptive interactions with the environment are accompanied by subjective, affective pleasure. For example, Barash (1977) asks why sugar tastes sweet. The adaptationist answer is that the food derived from sugar is beneficial so that there has been natural selection for a subjectively pleasurable response to eating sugar. Sexual activity can be analyzed in a similar manner. In the case of familial affective interactions, the collapse of secondary drive theory and the fact that the class of parental behaviors which are subjectively pleasurable to children are nonrandom and cross-culturally universal strongly suggests that the behaviors of parents classed as warm are primary reinforcers to children (see MacDonald, 1984, 1987b for a detailed discussion). Similarly, a wide variety of social games, including physical play between parents and children and the games of early infancy as described by Stern (1977) and Brazelton, Koslowski, and Main (1974), involve the provision of stimuli which are affectively arousing and pleasurable to children. As Berlyne (1960) has pointed out, many aspects of stimulation, such as surprisingness, incongruity, and novelty are intrinsically arousing and pleasurable if they are within an optimal range of intensity.

Human social behavior is thus viewed as driven in large part by evolutionarily derived reward systems specific to particular aspects of social behavior. Such a view is consistent with findings indicating a variety of neuroanatomical sites and neurotransmitter systems which are associated with reward systems in rats (Stein, 1983; see also Panksepp, 1986). Clearly the reward systems underlying human social behavior are likely to be far more complex than those found in the rat. (Rats do not play peek-a-boo with their offspring, nor, I suppose, do they fall in

love.) Such a view is also consistent with theories of personality as involving individual differences in sensitivity in the reward systems of the brain (see, for example, Gray, Owen, Davis, & Tsaltas, 1983; MacDonald, 1987b; Zuckerman, 1983).

The evolutionary logic outlined here is the implicit logic behind the belief by many attachment theorists that secure attachment was adaptive in the "environment of evolutionary adaptedness" (Bowlby, 1969), since sensitive, responsive care giving is associated with secure attachment (Ainsworth, Blehar, Waters, & Wall, 1978). This does not imply that secure attachment or warm parent-child interactions are always adaptive, but does imply that these types of interactions are primitive in humans. As indicated below, there is good reason to believe that under certain conditions, such interactions would be maladaptive.

Familial affective interactions thus emerge as a highly flexible epigenetic system which is able to respond quickly to varying ecological and social conditions. Such systems are environment-expectant in the sense that they bias the individual to respond affectively to certain classes of environmental events. These affective responses in turn have important effects on adaptive behaviors.

FAMILIAL AFFECTIVE RELATIONSHIPS IN CROSS-CULTURAL CONTEXT

Philosophers of science have noted that one aspect of a theory which makes it attractive to scientists is that it is able to incorporate previously unrelated phenomena into a coherent explanatory scheme (e.g., Aronson, 1984). The great bulk of the research focused on cross-cultural variation in development has occurred in the absence of an explanatory theory. For example, several reviews of cross-cultural variation in socialization and family interaction patterns in middle-level horticultural and simple agricultural societies (e.g., Blain & Barkow, this vol., Chap. 13; Draper & Harpending, this vol., Chap. 12; MacDonald, 1984; Weisner, 1984) have noted that these kinship-based societies are characterized by extended families, affectively distant husband-wife and parent-child relationships, polygyny, and lack of father involvement in child rearing. In the absence of a theory as to why these correlations might be expected one is left with little more than the idea that there is a great deal of cultural variation and, if one is an adaptationist, one could propose that these patterns make adaptive sense in the particular ecologic niche these cultures find themselves in. It is the contention of this chapter that sociobiology is the only available theory that can even attempt an explanatory framework for these data and that the sociobiological framework which emerges sheds light on contemporary developmental mechanisms.

The approach developed here utilizes two general types of constructs. The first of these constructs involves the idea of central tendencies in human behavior which are expected on the basis of sociobiological theory, while the second involves contextual variables which affect the expression of these central tendencies. The idea of central tendencies in behavior is a familiar one to developmentalists. McCall (1981) has pointed to the two realms of developmental theory and research, one involving a concern with individual differences and one concerned with developmental functions which can be characterized as a population average of behavior as it develops over time (Wohlwill, 1973). The central tendencies predicted by sociobiological theory constitute average expected levels of certain types of behavior and are consistent with the idea of variation around that average. Sociobiologically predicted central tendencies include the idea that on the whole individuals will be more self-interested than truly altruistic, that males and females will have vastly different reproductive strategies, and that individuals will attempt to advance the interests of genetic relatives (see MacDonald, 1986d, for a discussion).

For the purposes of this chapter sociobiologically expected differences in reproductive strategy are particularly important (see Trivers, 1972, and Wilson, 1975 for a general discussion). Males and females of many different species invest quite different amounts in offspring, with the female typically investing much more in time and energy to reproduction. This leads to the expectation that males will compete for the relatively scarce resource of females with the result that there is a general trend for a higher variance in reproductive success among males than among females. Sexual competition among the males results in some males siring a disproportionate share of the offspring compared to other males. However, natural selection can modify this apparent primitive tendency for a disparity between males and females in the amount of parental investment. For example, many bird species are monogamous, with the male contributing very high investment in the offspring, and in humans the finding that the most primitive forms of human social organization, hunter-gatherer groups, are characterized by monogamy supports the idea that there has been natural selection for greater equality between the sexes for parental investment in humans.

The second ultimate biological source of sex differences is that males have vastly different reproductive capacity than females. A male can sire children by a large number of females, but the reverse is not the case. In human history it has not been uncommon for males to sire large numbers of children by many women, and polygyny is far more common as an accepted practice than exclusive monogamy among preindustrial societies. Moreover, the occurrence of polyandry is vanishingly rare, and apparently confined to cases where the husbands are brothers. It is this biological sex difference which is, in an ultimate sense, responsible for

the differences in reproductive strategy described here; i.e., given this sex difference, it is expected that there will be a central tendency for males to engage in polygyny in the appropriate economic and political circumstances (see below). Described differently, males have more to gain than females by controlling resources because they are able to invest these resources by having several wives and large numbers of children. Viewed in terms of the previous discussion of parental investment, the sex difference in reproductive capacity allows for the possibility of enormous variation between males in their ability to sire offspring depending on their ability to control resources and females. Theoretically this situation sets the stage for relatively intense sexual competition among males compared to females.

Sociobiologically predicted central tendencies in behavior are a fairly weak explanatory device when confronting the variation in behavior seen cross-culturally. In attempting to explain this variation, contextual variables must be introduced. Contextual variables refer to the features of the situation in which the behavior occurs, and for the purposes of this discussion will include the variables of economic production and social controls (see MacDonald, 1983; 1986d, for a detailed discussion). Regarding economic production, anthropologists (e.g., Goody, 1976; Sahlins, 1974) have found it useful to grade human societies in terms of the amount of production per individual. At the low end of this scale are hunter-gatherer societies, followed by relatively primitive (hoe) agriculture and culminating in advanced (plow) agriculture. In terms of evolutionary theory, this increasing production results in an increased potential for sexual competition among males. Due to the asymmetry in reproductive capacity described above, the sexual strategies of males and females are expected to strongly diverge as societies become more productive. Males increasingly compete with each other as more intensive polygyny becomes possible because one individual male is able to control enough resources to support several wives and children. Supporting this general trend, van den Berghe (1979) found an association between increasing economic production and polygyny in a cross-cultural sample. The pinnacle of this trend can be seen in the classical civilizations of Eurasia, where wealthy males were able to control very large numbers of females, and massive differences in Darwinian fitness between males occurred (Dickemann, 1979).

Corresponding to an increasing resource base are more extensive forms of human social organization. At relatively low levels of economic production societies are relatively decentralized and are centered around economically independent nuclear families. As Sahlins (1974) points out, with increasing production families are immersed to a greater extent in extended kinship relations and the conflict between the household and the wider kinship relationships is the central dilemma of these societies. From a sociobiological perspective these

cleavages result from increasing genetic distance as one moves beyond the nuclear family to immersion in extensive kinship relations.

These relationships can be better appreciated by examining the literature on reproductive rituals which are characteristic of many adolescents in preindustrial societies (see MacDonald, 1987a, for a complete discussion). Paige and Paige (1981) note that societies with relatively low levels of production are characterized by extensive reproductive rituals for girls. A man who wants to arrange an attractive marriage for his daughter is unable to rely on an extensive kinship group to enforce his interests but must instead form temporary political alliances to gain support against possible seducers and to assure a proper marriage by advertising the economic success of the girl's family.

In more economically advanced societies, the family is embedded in a large kinship network which can be counted on to safeguard the father's interest in his daughter's marriage, with the result that reproductive rituals are absent. Since sexual competition is increased in these relatively productive societies, the value of the daughter to the father increases, and the practice of bridewealth (which involves economic payments to the family of the bride) becomes common. Indeed, the main function for the protection bestowed by the large kinship group is to make sure that the girl will command the best possible bridewealth and be attractive to the highest-status males (Dickemann, 1981). Economically successful males can ensure high levels of polygyny for themselves and their sons by being able to purchase wives.

Variation in production is also associated with variation in the characteristics of male initiation rites. Societies with extensive kinship relationships are characterized by the presence of large solidary groups of related males which function to control important resources. Despite the genetic ties among the members of the group, the relatively large size of these groups results in large conflicts of interest within the society, and individual males must integrate themselves into this wider community, a need that is not present in the less productive societies characterized by the independent nuclear family. The male reproductive rituals thus appear to be "rites of submission" which function to show allegiance to the tribal elders (Paige & Paige, 1981) in circumstances in which the centrifugal tendencies arising from individual genetic self-interest are particularly likely to occur (MacDonald, 1987a). At lower levels of economic production rituals involving males are relatively uncommon, and if they occur at all they are confined to the immediate family.

The second contextual variable considered here, that of social controls, arises because the behavior of individuals can be controlled by others. Social controls consist of a wide variety of cultural practices which attempt to channel the behavior of individuals and can range from military force to various types of social disapproval. At relatively low levels

of economic production social structure is relatively egalitarian and based on the independent nuclear family. As we have seen, at higher levels of production the extensive kinship group is able to exert greater control over individual behavior, while at the highest levels of production kinship ties weaken as political control by the state becomes increasingly important (Alexander, 1979; Stone, 1977).

Social controls are theoretically important because they can operate independently of the genotypes of the individuals they affect, i.e., they are often insensitive to the genotypic and even many of the phenotypic characteristics of the individuals to whom they apply (MacDonald, 1983, 1986d, 1987a). For example, individuals may be drafted into the military or obliged to pay taxes to support individuals on welfare whether or not they want to do these things. Entire classes of individuals or even whole populations may be subject to the social controls, so that they may be quite insensitive to genetic variation. Social controls are thus not reducible to the genetic characteristics of individuals.

Social controls may be egalitarian or antiegalitarian. Egalitarian social controls function to limit the extent by which individuals can differ from each other, such as socialist controls on the individual accumulation of wealth. Antiegalitarian social controls function in the opposite manner, to accentuate individual variation in resource control or other biologically relevant phenotypes. The important theoretical point is that there are no means derived from sociobiological theory to predict whether in a particular case social controls will be egalitarian or antiegalitarian. The direction and extent of social controls is a chronic political issue in all societies, and, for example, in our society there is no theoretically derived way of predicting changes in social controls brought about by the electoral process. Sociobiology emerges as an explanatory framework for human behavior that is nonpredictive and is based on descriptions of actually existing human societies. There is no basis for the claim that sociobiological theory predicts that oppression, sexism, etc., are inevitable aspects of human social organization.

Particularly important here are social controls regulating family life. Perhaps one of the best examples is that of modern China which, in contrast to its dynastic past, has severe controls on reproduction. Of greater importance are social controls which have effectively institutionalized monogamy in Western European society since the Middle Ages and increasingly in all modern industrial societies (MacDonald, 1983, 1986a). Stone (1977) describes social controls on marriage and sex that occurred in the Puritan era in England, controls that functioned to strictly regulate family life. Laws against bigamy have been present in the United States since colonial times, and resulted in repression of polygamy as practiced by the Mormon church. From a theoretical perspective these social controls function as an egalitarian leveling institution which effectively dampens sexual competition among males.

We have now provided a framework derived from sociobiological theory within which the correlational data on family structure and reproductive ritual can be illuminated. This theoretical perspective can be expanded to also include affective relationships within the family. As described above, the correlational data indicate that societies characterized by the economically independent nuclear family have been found to have affectively warm parent-child and husband-wife relations. They are also characterized by relatively low economic production and, for the reasons described above, low levels of sexual competition. As indicated in the previous section, there are theoretical reasons for supposing that this situation is primitive in humans. With increasing levels of production the independent family unit becomes more enmeshed in extensive kinship networks, and the resulting tension between the individual and the group is reflected by increasingly hostile intrafamilial affective relationships. This negative affective climate is reflected in the male initiation rites characteristic of these societies (Paige & Paige, 1981). Paige and Paige (1981) also point out that violence and feuding among kin groups are common and that large conflicts of interest occur even in groups of closely related kin. In these intermediate-level societies affective relationships within the family become severely strained as each male strives to integrate himself into the wider network of kin, often in competition with his own family members. Paige and Paige (1981) state that "every man is a potential head and, therefore, also a potential traitor to his lineage. In the words of an Arab proverb, 'I against my brother; I and my brother against my cousin; I, my brother and my cousin against the next village; all of us against the foreigner'" (p. 128). This passage indicates the affective strains associated with such a social system, and also shows quite clearly that the principle of inclusive fitness did not originate with twentieth-century evolutionary theorists.

We conclude, then, that in societies based on extensive kinship relations the source of military and economic power is also the potential or actual opposition: Without a higher level of centralized political control feuds are endemic. A brief review of some of the correlational literature brings these points into sharper focus (see also Draper & Harpending, this vol., Chap. 12, and Blain & Barkow, this vol., Chap. 13). Katz and Konner (1981) found that fathers tended to be closer to their children in cultures "where combinations of polygyny, patrilocal residence, the extended family, or patridominant division of labor are absent" (p. 203). Violent and hypermasculine behavior are associated with father distance, and Bacon, Child, and Berry (1963) found father distance associated with violent crime and extremely punitive disciplinary measures with children. Aloof husband-wife relationships are also associated with polygyny and military activity on the part of the husband.

The historical trends in the past 500 years in Western Europe have been toward a decreasing importance of extensive kinship relations

associated with the resurrection of the economically independent nuclear family (Stone, 1977). Stone (1977) notes the tendency for the state to view kinship relations as a threat to its own power, as well as the tendency for individuals to cease relying for the protection of their interests on kin when the state could perform this function. The state thus destroyed the power of large kinship groups and reinforced the patriarchal nuclear family.

These changes in family structure, resulting in part from social controls on marriage and kinship relations, were accompanied by trends toward an emphasis on affective ties as being the basis of marriage and a trend toward warmer parent-offspring relationships in the period following 1640 (Stone, 1977; see discussion in MacDonald, 1987a). The history of familial affective relations is thus far from linear, and recent and contemporary familial interactions represent a return to the affective environment more characteristic of the earliest stages of human evolution. Whereas the evolutionary basis of monogamy and affectively warm family interactions occurring at the hunter-gatherer level appear to have resulted from natural selection for increased paternal investment, the return to this style of interaction may well be the result of the social controls on reproduction described above. The institutionalization of monogamy as the result of social controls on male reproduction resulted eventually in a more egalitarian family structure and increased emphasis on affective relationships as the basis of marriage.

It is interesting to note the parallels between the evolutionary considerations described here and those emphasized by Draper and Harpending in their work (see this vol., Chap. 12). Both chapters view the explanation of the cross-cultural correlational data on family interactions and reproductive strategy as central and both view economic resources as essential to an understanding of the phenomenon. In addition, both approaches stress the sensitivity of human behavior to contextual variation, particularly variation in resource base. However, the two theories provide different evolutionary explanations for this variation. They propose that the variation is a learned response to variation in resource availability (see Chap. 12 for details). The approach of this chapter, however, sees the resource base as affecting behavior primarily through its effects on sexual competition and by forcing males to participate in much wider social groups than the nuclear family. Increased production is seen as putting strain on nuclear family social structure and pulling males into the wider network of more distantly related kin. On the one hand, this results in socialization for more distant affective relationships within the family as intragroup aggression and hostility increase (see below), and on the other hand it leads to polygyny and less psychological availability of fathers for their children. This approach need not characterize this psychological distance as indicating a general lack of paternal investment. Indeed, fathers in many of these

mid-level societies are forced to make heavy economic investments in their offspring because they must in effect purchase their wives as well as maintain their economic and political status in the community. Moreover, the stress on social controls as influencing family structure and relationships in industrial societies (see above) is consistent with warm affective familial relationships and high paternal investment, whereas relying solely on resource availability to explain reproductive strategies results in predicting that industrial societies should be characterized by extreme lack of paternal investment. The opposite, however, is the case. The resource availability theory also has difficulty with the fact that within industrialized societies there is a direct correlation between socioeconomic status and paternal investment (see Draper & Harpending, this vol., Chap. 12). In general, however, these considerations illustrate well the fact that human sociobiology is a theoretically and empirically diverse area. As in any science, such diversity is a sign of vitality.

IMPLICATIONS FOR DEVELOPMENTAL MECHANISMS

There are three theoretical reasons to suppose that the environment is crucial in producing cross-cultural variation in behavior. First, as argued above, many of the mechanisms involved in human social behavior are environment-expectant. These systems program for the response to expected environmental variation, so that it is reasonable to suppose that environmental variation can affect variation in adaptive phenotypes. As indicated above, environment-expectant genetic systems have the potential of providing a very quick adaptive response to environmental variation, but also allow for the possibility of pathological environmental effects—the double-edged sword of plasticity (Lerner, 1984; MacDonald, 1985).

Second, given that the epigenetic system is sensitive to environmental variation, variation in the intensity of environmental stimulation is expected to facilitate the production of extreme phenotypes (MacDonald, 1986c). The early experience literature indicates quite clearly that environments that depart radically from cultural norms are relatively likely to have long-term effects on children. From a cross-cultural perspective, this suggests that cultures facing particular ecological contingencies would be able to establish relatively extreme modal environments which would have major effects on adaptive behaviors. Indeed, anthropologists (e.g., Weisner, 1984) have often pointed out that the range of environmental variation is likely to be much wider in cross-cultural samples than within one culture. For example, in an American sample late weaning may be 18 months of age, while in a cross-cultural sample this may represent the low end of the variation. This implies that conclusions about the role of family environments should not be

based solely on the results of studies within one culture. Within a particular culture, family environments may be fairly homogeneous so that family studies fail to find significant between-family sources of environmental variation. Indeed, the result of a great many behavioral genetic studies on families indicates that between-family sources of environmental variation are not a significant source of phenotypic variation (e.g., Rushton, Littlefield, & Lumsden, 1986). These findings do not preclude a major average effect of family environment due to the modal type of parent-child relations prevailing in a particular society. These considerations are directly analogous to the principle that there can be a large average effect on IQ resulting from adoption into a middle-class environment that is not reflected in the correlational patterns between biological and adoptive relatives in an adoption study: The average effects of parenting may not be reflected in individual differences in a large, relatively homogeneous sample, but will be an important source of variation between populations (MacDonald, 1986b). Nor do the behavioral genetic findings preclude important effects of relatively extreme parent-child interactions found either cross-culturally or within a culture.

Finally, Lumsden and Wilson (1981) have shown that genetic change which influences cultural variation can occur in as little time as 1000 years. This suggests that if significant change can be shown in a shorter time period there is presumptive evidence that the source of change is environmental in origin. The fact that considerable historic evidence indicates a major shift in familial affective relationships within a period of 200 to 300 years associated with the rise of the economically independent nuclear family suggests that the shift was due to a shift in the modal environment characteristic of the population (MacDonald, 1984, 1987a). These considerations do not imply that all or even most of the cross-cultural variation in, e.g., prosocial behavior or aggression is environmentally determined but strongly suggest this possibility. Since prosocial behavior and aggression are such important human phenotypes, it is reasonable to suppose that cultures would seize the opportunity provided by human plasticity to shape this behavior in an adaptive manner.

Correlational studies done within Western societies have suggested an association between familial affective interactions and childrens' prosocial behavior and aggression. Briefly, these studies have shown that warm familial interactions are positively associated with measures of prosocial behavior and negatively associated with aggression, while cold, hostile, and rejecting familial interactions have the opposite associations. (For reviews, see Maccoby & Martin, 1983; Mussen & Eisenberg-Berg, 1977; Parke & Slaby, 1983; Radke-Yarrow, Zahn-Waxler, & Chapman, 1983; Staub, 1978, 1979, 1986). In addition, warm parent-child interactions appear to facilitate children's conformity to

adult attitudes and behavior as indicated by the literature on adolescent identity formation (MacDonald, 1987a) as well as altruistic behavior (Clary & Miller, 1986; MacDonald, 1984; Rosenhan, 1970). These results indicate a strong interactions between affectively warm parent-child interactions and social learning: Warm parent-child interactions appear to facilitate the adoption of parental attitudes and behaviors. The emphasis placed on affective interactions here does not imply that other types of environmental variations are unimportant, but merely focuses on one source of variation which appears important in the cross-cultural literature.

The discussion of the cross-cultural data on familial affective interactions presented above leads one to suppose that economically intermediate societies characterized by extensive kinship relations and high levels of sexual competition are typified by cold, hostile interpersonal relations and socialization for aggression and lack of prosocial behavior. At the lowest level of economic organization social structure is characterized by independent nuclear families, affectively warm intrafamilial interactions, and socialization for high levels of prosocial behavior and low levels of aggression. Socialization for prosocial behavior within these relatively independent nuclear family units would be adaptive because of the high degree of relatedness and common interests among the members. As the family becomes more enmeshed in extensive kinship groups characterized by high levels of sexual competition, a relatively low degree of genetic relatedness and common interest, and the concomitant violence and feuding mentioned above, socialization for aggression and lack of prosocial behavior become more adaptive (see MacDonald, 1984, 1986d, 1987a for extended discussions).

There is good reason to suppose that affectively warm familial interactions represent an optimal developmental environment in industrial societies in the sense that such environments are associated with upward mobility (see below for a discussion of the importance of social mobility as a dependent variable in sociobiological analysis). Stone (1977) points out that warm familial relationships were characteristic of the upwardly mobile middle classes in England in the period from 1600 to 1800, and Kagan (1979) suggests that more child-oriented patterns of child rearing arose as a result of the importance of instrumental competence in achieving upward mobility. In addition, phenotypes such as juvenile delinquency and teenage pregnancy which predispose to downward mobility are characterized by negative affective environments (see MacDonald, 1987a, for a review). Finally, the general tenor of much of the attachment literature suggests that socially desirable behaviors such as social popularity and ego-resilience are associated with responsive, sensitive care giving (see, e.g., Sroufe, 1979).

II. Centrifugal Tendencies Within Families and Their Effects on Children

In the previous section, although the emphasis was on the mechanisms holding the family together, there was also mention of forces, such as the possibility of polygyny and the need for males to integrate themselves with an extensive kinship group, which pulled the nuclear family into larger forms of social organization. Fundamentally, this centrifugal force results from differences in reproductive strategy between males and females, and in the present section these differences are explored with respect to their implications for families within modern industrial societies, especially as regards the social mobility and socialization of children.

The sociobiological analysis of modern industrial societies presents a number of difficulties. Although there is undoubtedly continuing natural selection within these societies against a variety of behaviors such as those typical of schizophrenia (MacDonald, 1986d), unlike traditional societies there is no evidence for an association between control of resources and reproductive success (Barkow & Burley, 1980; MacDonald, 1983; Vining, 1986). This situation may be due to a variety of factors, including especially social controls on marriage and family structure (MacDonald, 1983; 1986d) and the need for increased parental investment in a relatively low number of highly competent children in a highly competitive society (Alexander, 1979). An attractive alternative to the use of Darwinian fitness as the major dependent variable in sociobiological analysis is the use of socioeconomic status and social mobility as dependent variables. The assumption is that high social class status and optimal cognitive and social functioning are inherently desirable from a sociobiological viewpoint because of their association with wealth and political power which in traditional societies are strongly associated with Darwinian fitness (Dickemann, 1979; Hartung, 1976; Hill, 1984; Irons, 1979; MacDonald, 1983). In the jargon of the philosophy of science, these relationships in traditional societies as well as basic evolutionary theory provide empirical and theoretical support for the contrary-to-fact conditional that if there were no social and ideological controls on marriage and sex in modern industrial societies, there would in fact be a strong association between social status and reproduction. The support of theoretically derived contrary-to-fact conditionals is an aspect of all scientific theories (e.g., Aronson, 1984) and in the present case justifies an interest in socioeconomic status and social mobility as dependent variables in a sociobiological analysis. In the same manner, psychological data and theory generate contrary-to-fact conditionals such as "If this child were adopted into a middle-class family, his IQ would be above average" which are theoretically

and empirically justified whether or not adoption in fact becomes a social policy.

A second reason for using socioeconomic status as a dependent variable here is that high socioeconomic status facilitates sociobiologically predicted behavior even within industrial societies. As we shall describe below, wealthy males are able to mitigate the decrements in their children's adaptive behavior which are expected as a result of divorce.

Modern industrial societies are characterized by a variety of social and ideological controls which reinforce monogamy. However, in recent years there has been a secular trend toward decreasing social controls on divorce, with the result that the incidence of divorce has increased dramatically. From a sociobiological point of view divorce and remarriage constitute serial polygamy, and the consequences of this serial polygamy are expected to be quite different for the two sexes. Since males remain reproductively competent longer than females, they are expected to benefit from divorce by being able to marry younger women, a situation that is facilitated if the male is of high socioeconomic status. Females, however, are expected to be less likely to benefit from divorce because of lessened reproductive value and because they must generally increase their relative share of parental investment after divorce. This situation is exacerbated if the woman is of low socioeconomic status. Moreover, it is expected that divorce will generally result in a decrease in parental investment in children with concomitant decreases in culturally adaptive behavior. From a sociobiological perspective, these decrements are secondary results of males' engaging in sociobiologically predicted behavior.

The data on divorce generally uphold these expectations. First, women have a longer average duration of divorce before remarriage than men, and this is particularly true for older women (Mackey, 1980). Seventy-six percent of divorced women up to age 29 remarry, while only 32.4% remarry between ages 40 and 49, and only 11.5% between 50 and 75 (Mackey, 1980). Divorced males more often remarry and they tend to marry women who are increasingly younger than themselves (Mackey, 1980). Moreover, divorce tends to result in economic decrements for women, part of the recent "feminization of poverty." This increasing poverty results in downward social mobility for women and the children of the first marriage following divorce (Hetherington, 1979; Wallerstein & Kelly, 1980). Downward social mobility is often accompanied by movement to less desirable neighborhoods and is much more severe and permanent than that experienced by men (Wallerstein & Kelly, 1980).

The developmental literature on divorce indicates moderate impairments associated with divorce due either to father absence or to the negative home environment prior to divorce. Boys tend to show continuing problems with teachers and peers and are characterized as aggressive and noncompliant (Hetherington, 1979; Hodges, Buchsbaum, &

Tierney, 1983; Hodges & Bloom, 1984). Guidubaldi, Cleminshaw, Perry, and McLoughlin (1983) found significant performance decrements in social and intellectual performance in a random sample of elementary school children from divorced homes when compared to intact families (see also Hetherington, Camara, & Featherman, 1983; Wallerstein & Kelly, 1980). Wallerstein and Kelly (1980) also document emotional difficulties in postdivorce children, and several studies suggest difficulties in sex-typing for both sexes (Hetherington, 1966, 1972; Huston, 1983), as well as antisocial, delinquent behavior in boys (Guidubaldi et al., 1983; Hetherington, Cox, & Cox, 1982). Finally, data indicate that a much higher percentage of stepfathers engage in child abuse than natural fathers (Burgess, Garbarino, & Gilstrap, 1983; Daly & Wilson, 1981) and that there are often long-term psychiatric impairments for the children involved. From a sociobiological perspective sexual abuse by a stepfather is expected to occur at relatively high rates because of the lack of biological relationship between stepfather and daughter, but in the present context it is also an example of the decrease in parental investment and concomitant decrements in adaptive behavior that are associated with divorced and reconstituted families. As predicted by sociobiological theory, stepparents as a group invest less in stepchildren than biological fathers invest in their children (Hetherington, 1987).

It should be noted that a divorcing male can mitigate the effects of divorce by providing for his children economically. Wallerstein and Kelly (1980) found less downward mobility in divorced women of the upper and upper-middle classes and also found that poor psychological outcome in children was associated with economic distress (see also Hodges et al., 1979). Thus, high social class status facilitates sociobiologically predicted male reproductive behavior by lessening its consequences on children. Moreover, in addition to economic support, fathers can lessen the effects of divorce by maintaining a good relationship with their children after divorce (Guidubaldi et al., 1983), i.e., by maintaining a fairly high level of parental investment.

Finally, as indicated above, there have been important secular trends and cultural variation in the social controls affecting divorce. Divorce has increased greatly in the United States in recent years, an increase that is associated with decreasing legal and social restrictions on divorce, such as no-fault divorce laws. Divorce is still not legal in Ireland and was virtually impossible in England from 1603 to 1837 (MacFarlane, 1986). Recently women's groups have attempted to improve the status of women in divorce settlements by enforcing child-support laws and by making the ex-husband's professional degree and future earnings part of the divorce settlement. Thus contextual variation on social controls can have a very profound effect on sociobiologically predicted sexual behavior and secondarily on the socialization of children.

III. Conclusion

The central message of this essay is in many ways a familiar one to developmentalists. The science of human development must adopt a multivariate, contextual perspective, what Lerner and Kauffman (1986) term the *embeddedness* of behavior. One must invoke different levels of analysis (social controls, proximate mechanisms), various biological systems (affective bonding versus biological self-interest), and the interfaces of these biological systems with environmental contingencies such as the interface between the affective systems and social learning (MacDonald, 1984, 1987a). As illustrated by this essay, a sociobiologically influenced developmental psychology will be vitally concerned with historical shifts in the contextual variables affecting behavior as well as with how these variables function as part of a cross-cultural theory of variation in development. Indeed, at the present time sociobiological theory is the only theory that is powerful enough to provide an explanatory framework for the descriptive data generated by cross-cultural and historical studies of human development.

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