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What do Children Want? A Conceptualisation of Evolutionary Influences on Children's Motivation in the Peer Group

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This paper presents an evolutionary perspective on children's resource-directed behaviour in peer groups. It is argued that reciprocity is theoretically expected to be the fundamental rule of resource exchange in peer relationships of friendship. Children are therefore expected to be attracted to peers who are similar to themselves on a wide variety of traits. These traits are viewed as resources in peer relationships, and individual differences in these traits represent a resource environment for children. In this paper, the resource environment represented by individual differences in several evolved motivational systems will be emphasised. The discussion focuses on such three evolved systems, the sensation seeking/impulsivity system, the human affectional system, and the behavioural inhibition system. It is concluded that individual differences in these systems are important for understanding friendship and sociometric status in children's peer relationships.

Charlesworth (1988) has emphasised the idea that an evolutionary perspective must be based fundamentally on a concern with resources and resource transactions. The goal of this set of papers is to provide an evolutionary framework for conceptualising children's resource-directed behaviour in peer relationships. In the present contribution, the following points will be made: (1) Reciprocity and similarity are theoretically expected to be fundamental rules of resource exchange in peer relationships of friendship; (2) Peer groups can be viewed as exhibiting a wealth of individual differences among children which can be understood as resulting from genetic and environmental variation in evolved motivational systems;

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(3) This landscape of individual differences in evolved motivational systems constitutes a resource environment for children.

An Evolutionary Perspective on Reciprocity and Similarity

> Every animal loves its like, and every man his neighbour. All creatures flock together with their kind, and men from attachments with their own sort. What has a wolf in common with a lamb, or a sinner with a man of piety? (*Ecclesiasticus*, 13: 15–17)

The basic theorem of modern evolutionary biology might be phrased as "Thou shalt not construct a theory which implies that organisms are truly altruistic". A fundamental result of modern evolutionary logic is that true altruism can evolve only under very stringent conditions, and that even if it were to evolve it would tend to lose out in competition with non-altruistic individuals within any group where it occurs (e.g. Alexander, 1987). [This is not to imply that human groups cannot impose altruism on their members, by, for example, penalising non-altruists in the interests of establishing cohesive groups (MacDonald, 1994; Wilson & Sober, 1994), however, this type of social regulation is not likely to be an aspect of children's evolved psychological adaptations.] The result is that an evolutionary perspective predicts that children's behaviour will be self-interested rather than self-sacrificing, and that their relationships with their peers will reflect this generalisation (MacDonald, 1988; chs. 7 and 8).

Within this perspective, peer relationships may be viewed as a continuum ranging from high levels of commonality of interest to high levels of conflict of interest (see Table 1). Empirical research has focused on three points of this continuum. At one extreme is exploitation, defined as asymmetrical relationships in which one individual receives no benefit. Because the interests of the exploited child are compromised, such relationships are not voluntarily entered into, and the relationship is maximally prone to defection. Examples would be the bullying relationships studied by Smith (1991), and, in the following section, the relationship between aggression and peer rejection is considered in this framework.

At a second level are structured group settings in which there are limited resources. The empirical findings indicate that there is a tendency toward uneven access to resources among groups of children, a result highly compatible with the evolutionary expectation of conflict of interest among individuals regarding access to valued resources (Charlesworth, this issue). Paradigmatic of such group phenomena are relationships of dominance and subordination in naturally occurring groups of children. Unlike relationships of exploitation, relationships of dominance/subordination are

TABLE 1
Characteristics of Focal Types of Peer Relationships

	Type of Relationship		
	Friendship	*Structured Group Relationships of Dominance and Subordination*	*Exploitation*
Commonality of interest	High	Common interests can occur, but wide variation	Low
Degree of ability to choose other	High	Varies	High for exploiter None for exploited
Degree of control within relationship	High	Varies by dominance status	High for exploiter None for exploited
Symmetry of resource access	High	Low	Completely asymmetrical
Reciprocity	High	Some, but unbalanced in favour of dominant	None
Phenotypic similarity	High	Not important	Not important
Likelihood of defection	Low	Relatively low for dominant Relative high for subordinate	High for exploited

voluntarily entered into and, indeed, dominance/subordination is a basic principle of social organisation among many species of animals. Dominance relationships are asymmetrical, with dominant children having priority of access to resources (Charlesworth & LaFreniere, 1983; Savin-Williams, 1987). The evolutionary expectation that dominance/subordination, as a voluntary relationship, contains benefits for subordinate individuals is borne out in the animal literature (McGuire, 1974; Wilson, 1975), and Savin-Williams (1987) has noted that subordinate adolescent boys highly value membership in hierarchical peer groups.

On the other extreme of the continuum of commonality of interest are relationships of friendship. As is the case with relationships of dominance/subordination in naturally occurring groups of children, friendship is characterised by repeated interactions which are voluntarily entered into and from which neither party defects. However, unlike dominance/subordination, there is the implicit assumption that the individual can choose friends from a set of individuals who vary along a variety of dimensions. The choice of a friend is thus essentially a choice of a resource which, from the present perspective, is theoretically constrained by the requirement that the friendship satisfies the interests of both partners. As a result, it is expected that such relationships are more nearly symmetrical and based on reciprocity than are relationships based on dominance or exploitation.

The empirical research indicates that symmetry and reciprocity are central to friendship. Youniss (1986), taking an evolutionary perspective, summarises evidence that indeed children's positive social interactions tend to involve reciprocity. Infants exhibit toy sharing, turn-taking, and mutual imitation, and older children regard acts of symmetrical reciprocity as the hallmark of friendship. Friends share a variety of resources, help each other in times of emotional stress, and develop mutual dependence. Resources need not be exchanged immediately, but only over the long term. Friendship implies reciprocity, because, as Parker and Gottman (1989, p. 112) note: "If play is to be coordinated, it is simply not always possible to get one's own way. In service of the overall adventure, children must inhibit some actions [and] accept influence at times." Because reciprocity is lacking, children who always try to get their way are thus not likely candidates for friends. This is presumably the reason why theorists since Piaget have emphasised the importance of peer interactions as influences on social cognition and perspective-taking: Becoming a successful social actor entails understanding others' interests.

Being a friend also implies that one answers the interests of the other. Asher (1990, p. 3) sums up the research as indicating that: "Friends are important sources of companionship and recreation, share advice and valued possessions, serve as trusted confidants and critics, act as loyal allies, and provide stability in times of stress or transition." Asher and Williams (1987) note that friendship is more likely if one child finds the other to be fun to be with, is trustworthy, is similar to self, is someone who facilitates the child's goals, makes the child feel good about himself or herself, or influences the child in a way the child likes.

Interestingly, Morgan and Sawyer (1967) found that friends prefer equality in division of rewards but would sometimes consent to unequal division. However, children who disliked each other insisted on absolute equality. LaFreniere (this issue) and Hartup (1989) show that friends are more likely to engage in equitable exchanges and are more likely to co-operate rather than compete even in situations with limited resources (see also Rabbie, 1991 for similar data on adults). Nevertheless, Hartup makes the point that although reciprocity and equality are the hallmarks of friendship, one of the friends may be less favoured in the relationship and therefore be more willing to accept some imbalance in distributing rewards.

These findings are consistent with Charlesworth's findings reported in this series of papers: In a limited resource situation, there is a strong tendency for nonequal division of resources even among children who are friends, and this is the case cross-culturally. In such a situation one can conceptualise reciprocity as being achieved despite the lack of equal division of resources: The less favoured partner in the relationship must give up more in some tangible resource in order to maintain the relationship. For example, in the

following section, sociometric popularity is conceptualised in terms of possessing a set of traits which are valued by peers. Thus, if a very popular child were friends with a somewhat less popular child, it is expected that the less popular child would have to allow the more popular child to obtain more tangible resources in a resource-competitive situation in order to maintain an overall reciprocity in the relationship.

A perhaps not so obvious result of this is that similarity is expected to be a basic feature of peer relations of friendship. From an evolutionary perspective, a child may be considered to be a concatenation of resource potentials for other children. Indeed, if reciprocity is the fundamental rule of peer relations, then a very likely outcome is simply a phenotypic matching process in which children aggregate on the basis of phenotypic similarity. Similarity ensures reciprocity because the resource value of a wide range of phenotypic attributes is matched within the dyad. Thus, if physical attractiveness is a resource, children of similar physical attractiveness are expected to be more likely to become friends because reciprocity in this resource attribute has been achieved. In addition, children's interests and abilities would be expected to be resources for other children who have similar interests and abilities: Sharing an interest in, for example, baseball, provides both children with psychological rewards, so that reciprocity is maintained.

There is overwhelming evidence for the importance of similarity as a principle of assortment in children's friendships. In terms of the present theoretical perspective, the set of similar attributes constitutes a set of resources which are relevant to particular friendships. Humphreys and Smith (1987) found that children who engaged in rough and tumble (R&T) play tended to have similar rank in the dominance hierarchy, and Pellegrini (1991) found that this was the case not only for R&T, but also for engaging in games-with-rules and other types of social interactions (e.g. talking with a peer, comfort contact). Similarly among primates, co-operation and other types of association are much more likely among animals who are near to each other in the dominance hierarchy (Harcourt, 1991).

Cairns, Cairns, Neckerman, Gest and Gariépy (1988) found that aggressive children formed groups with other aggressive children and were often nominated as best friends by other aggressive children. Panduit, the talking robot, used by Parker and Gottman (1985) to explore children's friendship formation, was rated much more likeable when it attempted to establish common ground with the child. Epstein (1989) found that similarity among friends occurs on a wide range of attitudes, behaviours, and interests, as well as personality and academic success. Moreover, the similarity of friends increases linearly with age, and closer friends tended to be more similar than casual friends (see also Brown, 1989). Cohen (1977)

found that similarity was a prerequisite for friendship, not the consequence of friendship.

Interestingly, the subjective feeling of similarity is important to the friends themselves even when the similarities themselves seem trivial: Parker and Gottman (1989, p. 110) state that "it is not so much the nature of their similarities, as the presence of commonalities that interests these children. Indeed, children destined to become friends sometimes give the appearance of going to almost any length to find commonality, regardless of how frivolous (A: 'We both have chalk on our hands'; B: 'Right!')."

It is of considerable interest to attempt to state precisely the extent to which the foregoing constitutes a falsifiable theory of children's peer relationships. My view is that the previously mentioned theory is falsifiable. Regarding friendship, it would be an important challenge to the theory if a significant number of instances were found in which, for example, an intelligent, socially dominant, physically attractive, athletic child was best friends with a mentally retarded, physically handicapped child who had very different interests in a situation where the former could choose to be friends with peers who were more similar to self. Such an example suggests altruism because the former child is not maximising his/her interests in choosing peer alliances. Similarly, if LaFreniere (this issue) had instead found that friends were less co-operative, more competitive, and engaged in more acrimonious, exploitative relationships, there would be a major difficulty for the evolutionary approach. The nondefection of the less favoured partner would demand a theoretical explanation, as such nondefection would suggest altruism.

The evolutionary approach also predicts that friendship will obey the principles of reciprocity and similarity in other cultures as well, and that these findings will not be subject to powerful secular trends or tied to particular socialisation contingencies. This does not mean that the specific content of friendships is not subject to socialisation contingencies (see later), but only that the principles of reciprocity and similarity underlying friendship are pan-human universals.

Regarding exploitative relationships, the theory would be falsified if children failed to attempt to defect from such relationships. It goes without saying that relationships, such as bullying, are viewed negatively by the victims. Regarding structured group settings with limited resources, the theory would be disconfirmed if in fact individuals within peer groups failed to attempt to maximise their access to resources, so that, for example, children voluntarily gave up valued resources.

However, it should be noted that in situations of conflicts of interest among humans, there is no a-priori evolutionary reason to predict whether egalitarian or despotic social systems must occur (MacDonald, 1988, 1990, 1995a). Egalitarianism can occur as the result of conflicts of interest in

human societies, but historical and contemporary examples of egalitarian social structures appear to depend on high levels of social control of individual behaviour which enforce adherence to group norms. As predicted by models in which human behaviour is importantly shaped by natural selection at the individual or genic level, highly egalitarian group organisation and high levels of altruism are fairly uncommon among humans generally; and, in the absence of external controls emanating from interested adults, as has occurred in some human societies, for example, the Soviet Union (Bronfenbrenner, 1970; see discussion in MacDonald, 1988, Ch. 9), altruistic groups do not appear to occur among naturally occurring groups of children.

Evolved Systems Influencing the Resource Value of Children in the Peer Group

The foregoing account has emphasised perceived interests in peer interactions but has not provided an evolutionary account of the specific resources sought in peer relationships. The following attempt to develop an evolutionary account of children's perceived interests in peer relationships will focus on the findings of research on peer sociometric status.

As conceptualised by Coie, Dodge and Coppotelli (1982), sociometric status is established by a child's standing on two fairly independent dimensions of liking and disliking. Within this conceptualisation, the characteristics of popular children can be viewed as assets from the perspective of the social group, whereas the characteristics of rejected children constitute a set of liabilities. The assets are thus a set of resources for the child who possesses them as well as for the other children who value them. Similarly, the liabilities are attributes which not only fail to conform to the interests of other children, but are characteristics which children actively dislike. Individual differences in children can be viewed as a resource environment from the standpoint of other children, with popular children possessing a high net positive value of assets.

Regarding the characteristics of popular children, Coie, Dodge, and Kupersmidt (1990) find that positive social status at all ages of childhood is related to helpfulness, rule conformity, friendliness, and prosocial interaction. Popular children become leaders and set norms for the group, and, especially as children get older, popular children tend to have high academic and athletic achievement. Popular children are also physically attractive (see Coie, Dodge, & Coppotelli, 1981). Rejected social status, especially among boys, is related to aggression, hyperactivity, being off task in the classroom (inattention), and disruptiveness. However, Cairns et al. (1988) have shown that aggressive children, despite being disliked by some children, form social networks with each other. In addition, Asher (1990)

notes specific subgroups of rejected children, including mildly retarded and learning-disabled children. Finally, Coie et al. (1990) describe evidence that neglected social status is associated with very low aggression as well as shyness and active social withdrawal.

These lists of attributes may be viewed as an empirically derived set of resources relevant to peer status. Several of the attributes of popular children can easily be seen as suggesting reciprocity and commonality of interest with peers. Thus, helpfulness, friendliness, and prosocial interaction are clearly attributes which suggest that popular children's peer relations are characterised not by attempts at exploitation but rather by reciprocity of positive social interactions. There is even the suggestion that the social status of popular children is achieved in part by maintaining a net resource outflow: Other children become indebted to them as a result of acts of friendliness, support, and helpfulness. Popular children are also characterised by highly heritable attributes, such as athletic ability and physical attractiveness, which appear to be valued in all cultures, suggesting natural selection for high valuation of these traits (Weisfeld & Billings, 1988). Intelligence and academic success are also resources which are related to achieving status within our own society. For rejected children it is easy to see that their behaviour has a negative resource valuation by peers. Offensive aggression is an attempt to exploit others, while disruptiveness and inattention conflict with group goals.

The results of Cairns et al. (1988) are particularly interesting because they suggest individual differences in what constitutes a resource of peers. Aggression is not viewed as a resource by most children, it appears to be a resource for some. This point will be returned to later.

Evolved Systems and the Peer Group: The Question of Function. This section provides an overview of the possible contributions of individual differences in evolved systems as assets or liabilities in children's appraisals of liking and disliking in sociometric classification. The premise is that at least some of the assets and liabilities important for sociometric status involve individual differences in evolved systems. The general point is that human genetic and phenotypic diversity constitutes a resource environment for individuals (Buss, 1991). An evolutionary perspective suggests that children will be highly sensitive to the resource environment represented by individual diversity, and mechanisms will evolve in order to take advantage of this diversity (Lusk, MacDonald, & Newman, 1993; MacDonald, 1991).

In thinking about the role of evolved systems it is important to keep in mind that sociometric success in the peer group is probably not an important arena of adaptation during human evolution. Peer groups were probably virtually nonexistent during evolutionary history, because anthropological evidence indicates that humans evolved in small groupings (e.g. Lee, 1979; Lovejoy, 1981). In such small groups, it is unlikely that important resources would be obtained through interaction with peers.

Indeed, Draper and Harpending (1987) have emphasised that children in foraging societies depend on parents rather than peers for valued resources. In intermediate level societies where there are larger peer groupings, children may well learn resource manipulation and negotiation skills within the peer group. Analogous to research in industrial societies, it would not be surprising to find that dominant peers in such societies would obtain more resources (e.g. Charlesworth & LaFreniere, 1983; Savin-Williams, 1987) so that there would be natural selection for traits associated with dominance among children. Nevertheless, children in these societies still must obtain resources from adults whose interests are to maximise co-operation and even altruism in their children's relationships (Trivers, 1986). Thus, parents and other adult relatives would be expected to counteract large, life-threatening disparities in resource acquisition among children. As a result, selection pressure on children's resource acquisition abilities within the peer group are likely to be weak.

However, it does not follow that assets and liabilities in peer relations do not reflect variation in evolved systems. From an evolutionary engineering standpoint, if a particular set of systems (e.g. those related to aggression) are important in adulthood then they must emerge full blown at some point during development. They need not, of course, develop at birth or during early childhood (e.g. the reproductive organs are not competent until adolescence). Nevertheless, there are at least three reasons to suppose that systems important in adulthood will often emerge much earlier at least in truncated form.

1. Advanced animals are characterised by a prolonged period of plasticity in which learning takes place, typically during play (Fagen, 1981; MacDonald, 1988, 1993; Smith, 1982). Important behavioural systems are not genetically "hard-wired" units which suddenly emerge full blown in adulthood. There is a prolonged training period during which skills are honed and lessons learned. Thus, the fact that boys are more aggressive than girls during nursery school quite possibly has nothing whatever to do with their obtaining more resources at this age which in turns leads to greater success as an adult. Nevertheless, the presence of this system allows the child to develop skills related to being effectively aggressive when it really counts. Consistent with this Pellegrini (1992) notes a shift in R&T play from a co-operative, playful style in younger children to a rougher style associated with dominance interactions and aggression in early adolescence.

2. The traits which are assessed as assets or liabilities by peers may have important functions during childhood independent of their importance as

resources to peers. In the following, I will discuss three biological systems which appear to be assets or liabilities in peer relationships. Two of these systems can be reasonably viewed as having an adaptive function during childhood (MacDonald, 1988; 1995b). Thus, the sensation seeking/impulsivity (SS/IMP) system is linked not only to traits such as sociability (Eysenck, 1981) which are of resource value to peers, but also to curiosity, exploratory behaviour, and creativity (see MacDonald, 1988, 1993), and holistic, synthetic thought processes (Tucker & Williamson, 1984). This trait is thus associated with interest in and responsiveness to the environment (whether social or non-social), and is thus presumably an important aspect of play (and certainly R&T play, see later). Evolutionary analyses of play emphasise the function of play as involving intrinsic motivators which facilitate interaction with the environment (e.g. Fagen, 1981; MacDonald, 1988, 1993; Smith, 1982). Similarly, a second temperament system, the behavioural inhibition system, is functional throughout life as a system which responds to external threats with behavioural inhibition and emotions such as fear and anxiety (Gray, 1982; Kagan, Reznick, & Snidman, 1987, 1989).

3. Another reason for discussing evolved systems which are important to peer relations during childhood is that if a biological system is important in adulthood, then a nonfunctional version of the system may be present during earlier development. In this case, despite the lack of a biological function during childhood, the system nevertheless is present during childhood and may be an important aspect of peer relations. In the following section, I will discuss the human affectional system—a system which is proposed to result in tendencies to form close affectional relationships later in life (Bowlby, 1969; Sroufe, 1991). Given that the evolutionary function of attachment is to produce close affectional relationships during adulthood and facilitate high investment parenting (MacDonald, 1992a), there would be no evolutionary necessity for the tendency for pair bonding to develop out of relationships which occur during infancy. It is quite conceivable that intimate relationships, like reproductive competence, would develop *de novo* at puberty so that early affectional relationships would be irrelevant. However, natural selection appears to have taken advantage of a pre-existing system involving maternal nurturance of the young, with the result that the tendency for affectional relationships in humans (including close friendships) occurs at a very early age. Natural selection must work with what is available, and it is often much easier to modify existing systems rather than create a system *de novo*. In the absence of natural selection against such a trait occurring in childhood, the most efficient path for developing an adult trait may be to develop the trait (or a rudimentary version of it) during childhood even if it has no adaptive function during childhood.

Evolved Systems and the Peer Group: Relationship to Sociometric Status. In any case, it is clear that the temperament precursors of adult personality exist in children, and, moreover, these temperament systems can be related to evolutionary functions in childhood and/or adults. The purpose of the following is to comment on the possible resource value which variation in these traits has within the peer group.

The following is a discussion of three systems which have been identified as temperament/personality traits. Digman (1990) provides evidence that these traits have been found in a large number of factor analytic studies of personality performed over the last 50 years. Individual differences in these systems are then viewed as contributing to the resource value which peers have for each other and thereby as contributing to individual differences in friendship relationships and sociometric status. There is no implication that these systems are the only important evolutionary influences on peer relations, or that peer relations are not influenced by factors which cannot be related to evolved systems.

1. *Sensation Seeking/Impulsivity among Attention Deficit Hyperactivity Disorder [ADHD] Children.* Zuckerman (1983) and Gray, Owen, Davis, and Tsaltas (1983) propose that two basic, correlated traits of personality-labelled sensation seeking and impulsivity fundamentally involve sensitivity to rewards. Sensation seeking involves attraction to novelty, danger, excitement, sexual variety, and disinhibition, and is phenotypically and genetically correlated with sociability, impulsivity, extraversion, dominance, and aggression (see Eysenck, 1981; Fulker, 1981; Zuckerman, 1991). In the developmental literature, Rothbart (1989) has described positive approach as a self-regulatory aspect of temperament; Buss and Plomin (1984) have emphasised the related trait of sociability; Bates (1989) has noted the traits of sociability, attention, and positive emotionality; and Sigvardsson, Bohman, and Cloninger (1987) find novelty seeking to be a fundamental dimension of temperament in children. These traits have been observed cross-culturally and the heritability of these traits (as well as the others discussed later) is approximately 0.5 (Digman, 1990).

Broadly speaking, these systems make the child seek contact with the environment and, at moderate levels, can be viewed as part of a Piagetian optimal learning device (MacDonald, 1988). These systems provide psychological rewards for interacting playfully with novel stimuli and approaching sources of reward. As Tucker and Williamson (1984) note, there is a tendency toward diffuse, relatively shallow attention, and holistic thought processes as individuals actively explore the environment. Developmentally, there is a decline in these systems during childhood and particularly during adulthood: Risk-taking and sensation seeking decline,

and attention becomes more focused as the individuals must be able to cope with possible sources of threat.

Moreover, these traits show an evolutionarily predicted sex difference, that is, females are expected to be the high investment, low-risk sex compared to males, to be relatively less interested in sexual variety, and gain less by dominance and aggression. Briefly, the evolutionary theory of sex emphasises the idea that the high investment sex (females) will be competed for by the low investment sex (males) (e.g. see Daly & Wilson, 1983). As a result, all females tend to mate, whereas for the great majority of mammalian species mating for males is problematic. Males are thus expected to be relatively impulsive and risk-takers; they are expected to be highly attracted to reward, more aggressive, and more concerned about their dominance status *vis-à-vis* other males.

As predicted, there is a very large sex difference for ADHD as well as all of the other externalising disorders of childhood (e.g. Rutter & Garmezy, 1983). This finding is conceptualised as influenced by the greater likelihood that boys will be found at the extreme ends of the externalising temperament dimension described earlier. Theoretically, although the foregoing discussion indicates that it is reasonable to suppose that this system constitutes a set of basic biological adaptations which bring the child into contact with the environment, the extremes on these distributions may well be maladaptive (MacDonald, 1988). As a result, the social rejection of ADHD children may be conceptualised as resulting from the fact that extreme values of a biological adaptation are not viewed as resources by other children.

ADHD and sensation seeking impulsivity. Diagnostic criteria for ADHD include impulsivity and inattention (Shaywitz & Shaywitz, 1988). In addition, there is considerable evidence that ADHD children seek highly stimulating environments (see Zentall & Zentall, 1983, for a review). ADHD children are also very sensitive to anticipated rewards but not sensitive to anticipated punishments. Douglas (1985) notes that ADHD children respond impulsively in learning experiments and tend to seek immediate gratification and stimulation. However, as ADHD children are very sensitive to rewards, there is no difference between ADHD and control children on continuous reinforcement schedules. Performance during partial reinforcement, however, is deficient as many responses are unrewarded. Loss of reward often provokes very strong emotional response, and during extinction the performance of ADHD children returns to baseline much more quickly than that of normal children.

Rejected children (Coie et al. 1982; MacDonald, 1987; Pellegrini, 1988) and ADHD children (MacDonald, 1988) also engage in high levels of stimulus-seeking behaviour typical of R&T play. ADHD children engaged in very high levels of R&T play and these play sessions were characterised by

high levels of both positive and negative affect and aggressive behaviour. Moreover, interview material indicates that these children seek out this style of play from their environment, often asking parents or older siblings to engage in physical play. The interviews also indicate that parents characterise their children as tending to engage in dangerous activities, such as riding bicycles in a reckless manner or climbing up on roofs, and that they often worry that they will act in a reckless and impulsive manner which could endanger them. These data are highly congruent with the idea that ADHD children are high in the temperamental characteristic of SS/IMP described earlier.

ADHD, SS/IMP, and peer rejection. ADHD children are well known to be highly likely to be rejected by their peers (Henker & Whalen, 1989; Milich & Landau, 1982; Pelham & Bender, 1982). From the standpoint of the framework developed above, being extreme on the trait of SS/IMP is not likely to be viewed as a positive asset by other children. Buhrmester, MacDonald, and Heller (1989) found that ADHD children in a peer group behave as if they have their own private agenda. Their extreme curiosity and sensation seeking, as well as their tendency to switch activities rapidly results in a poor ability to co-ordinate activities with the peer group. Their behaviour, far from being a resource to other peers, is disruptive and incompatible with shared positive experiences. In addition, the strong overlap of ADHD and aggressive behaviour as well as other externalising disorders, such as conduct disorder and oppositional/defiant disorder (Hinshaw, 1987), suggests that their behaviour would appear to others as exploitative.

Finally, although being extreme on SS/IMP is linked to peer rejection (and may well be characteristic of many non-ADHD rejected children (see MacDonald, 1988), it is likely that a moderate level of this trait is actually a positive asset. Sociability and extroversion are genetically and phenotypically linked to SS/IMP (Eysenck, 1981; Fulker, 1981), and presumably are linked with peer leadership and being at ease socially—traits linked to popularity. Controversial children would appear to be even higher on these externalising traits: Coie et al. (1990, p. 52) state that:

> Controversial children are the most socially active of all children. They are often engaged in active interaction with peers and are rarely observed in solitary activity. They talk frequently with peers and adults and make the peer group laugh with their humor. They are among the most aggressive of all children, and because of their disruptive activities, they are often reprimanded by adult supervisors. They appear to be easily aroused to anger and yet are also seen as much more facilitative in groups than rejected children and are group leaders.

In terms of the present discussion, controversial children appear to be highly extroverted to the point where their behavior, while attractive to

some, is aversive to others. This fits well with the findings of Cairns et al. (1988) that aggressive children form social networks of friends but are also disliked by many children. Controversial children would thus appear to be intermediate on this dimension to popular children and the rejected/hyperactive children.

2. *Peer Relations and the Human Affectional System.* Another personality dimension proposed as a resource for peer relations derives from the human affectional system. This system appears to function to keep the infant close to the mother, according to Bowlby (1969), or to cement family ties and increase paternal investment in children (MacDonald, 1988, 1992a). It is a system which by all accounts results in securely attached children developing propensities to engage in intimate relationships, such as close friendship, later in life.

The child who is securely attached finds intimate, affectionate relationships to be highly rewarding and eagerly seeks out relationships, including peer relationships, in which this stimulation is available. Because the other person in such a relationship also finds this stimulation rewarding, the relationship is characterised by reciprocal positive affective exchanges. (See also LaFreniere's discussion of attachment and reciprocity, this issue.) Friends are "intimate associates" and their relationship is characterised by reciprocity, commitment, co-operation, and engaging in reciprocated prosocial support, intimacy, and affection (Hartup, 1989). Because of the motivating rule of affection for nurturance, the securely attached child is expected to be relatively empathic and altruistic, especially within friendships where these actions and feelings are reciprocated.

In conformity with these expectations, Sroufe (1991; see also Sroufe and Fleeson, 1986) has found that securely attached children are more likely to have close friendships during early adolescence. Park and Waters (1989) found that pairs of securely attached children were more harmonious, less controlling, more responsive, and happier than secure-insecure pairs.

Rejected and ADHD children, on the other hand, engage in more negative interactions with peers, especially aggression (Coie, 1990; Ladd, 1983; Putallaz & Gottman, 1981). Interestingly, there is evidence that cold, distant family relationships are associated with aggression for hyperactive children (Hinshaw, 1987). Moreover, Turner (1991) found sex-differentiated patterns for the sequelae of insecure attachment consistent with the present emphasis on sex differences in the SS/IMP system. Insecure boys were more likely to have aggressive, externalising relationships with peers, whereas insecure girls were more dependent and submissive toward peers. Thus, although individual differences in aggression are clearly genetically linked to variation in the SS/IMP system (see earlier), close family relationships appear to make the child more prone to establishing

relationships based on intimacy rather than aggression (see MacDonald, 1988, 1992a).

I would suggest that although assortment among peers may be based on a variety of traits (resources) which children value, deep friendship based on shared intimacy, by definition, involves the affectional system. There is evidence that marriage and friendship serve some of the same affective functions. Mueller (1980) emphasised that if an individual has a set of alternative relationships, he or she is less likely to be devastated by a single loss, whereas an individual without such an alternative relationship is particularly likely to be devastated by a loss. Such a proposal is consistent with the finding that men tend to be much more devastated by the loss of a spouse than are women, because women more often have intimate, confiding relationships outside the marriage, whereas men rely on their spouse as a confidant (Booth & Hess, 1947; Fischer & Phillips, 1979, as cited in Ginsberg, Gottman, & Parker, 1986). Finally, the loss of a close friend, like the loss of a spouse, is associated with depression and grief (Ginsberg et al. 1986). Close friendship and marital intimacy appear to involve the same biological system.

In addition to being a *sine qua non* of close friendship, warmth is undoubtedly an important positive asset in measures of liking in sociometric assessment. As described by Coie et al. (1990) popular children are friendly, helpful, supportive of peers, and engage in prosocial behaviour. Empathy, nurturance, and prosocial behaviour also appear to be traits linked to the human affectional system (see Digman, 1990; John, 1990; MacDonald, 1988).

Moreover, because of the relatively greater evolutionary importance of affectional relationships for females than for males, an evolutionary perspective predicts that intimacy will be more characteristic of girls' relationships than those of boys (Hinde, 1984; MacDonald, 1988; 1992a). Males score lower than females on the dimension of warmth or intimacy, the difference being 0.5 standard deviations. [See Sigvardsson et al. (1987) and Cloninger (1987) for data on the Reward dimension and Eysenck and Eysenck (1976) for data on the psychoticism dimension, both of which clearly tap a desire for social intimacy and affection.]

One of the consistent findings in the peer literature is that girls are more strongly attracted to a relatively low number of relationships based on intimacy and affection, whereas boys are more likely to have extensive social relationships that are not as intimate (e.g. Berndt, 1986; Buhrmester & Furman, 1987). In terms of the resource model described earlier, the point is that girls value close, intimate relationships more highly than boys. As a result, warmth and intimacy emerge as more important components of friendship for girls than for boys.

As described earlier, in the present context, peer relationships based on intimacy are viewed as nonfunctional consequences of the fact that the

propensity for intimacy develops out of relationships originating during infancy. Although the evolutionary function is to ensure appropriate mate choice, increase paternal investment in children and cement family ties, securely attached children place a high value on such relationships and actively seek them out with the result that their peer relations are characterised by close, intimate friendships. One might say that intimacy is high on their list of resource priorities in their relationships with their peers.

3. *The Behavioural Inhibition System and Peer Relations.* The psychological manifestation of the need to protect oneself in the face of threat is the behavioural inhibition system (BIS) [Panksepp's (1989) fear-anxiety system], proposed by Gray (1982) as a biological system which responds to perceived threat with behavioural inhibition and the initiation of fight or flight behaviours. The affects associated with the BIS are fear, tension, and anxiety. This system is much studied by developmentalists (e.g. Kagan et al., 1989). As predicted by evolutionary theory (MacDonald, 1988) there is developmental evidence that girls are higher on behavioural inhibition than boys (Buss, 1989; Rothbart, 1989).

Children whose personalities are dominated by behavioural inhibition are clearly withdrawn and shy (Kagan et al., 1989)—exactly the characteristics of neglected children (Coie et al. 1990; Dodge, Murphy, & Buchsbaum, 1984). In terms of the present perspective, these traits are not resources for other children, either negatively or positively, but being behaviourally inhibited results in a lack of engagement with the wider peer group. Thus, whatever other resources such children may have are not available for other children, and the result is social neglect.

There is also evidence that extremely withdrawn children can become rejected by the peer group (Rubin, LeMare, & Lollis, 1990; see also Asher, Parkhurst, Hymel, & Williams, 1990). Rubin and his associates (see Rubin et al. 1990) have elaborated a developmental model in which these children begin life high on temperamental behavioural inhibition and continue to exhibit this trait as a function of the interaction between this trait and the developmental context. Observations of such children indicate that they tend to become (p. 241): "less mature, less assertive, and more compliant or deferential than their more sociable age-mates". Asher et al. (1990) review data indicating that some extremely withdrawn children become victimised by the peer group, and that there is a subgroup of rejected children who are described as very shy and as likely to play alone.

These data indicate that the characteristics of extremely socially withdrawn children are viewed not as neutral but as liabilities. Such victimised children are at the low end of the social status hierarchy and are thus viewed negatively by peers as children with whom they do not want to

engage in positive relationships. Such children are thus not only low on resources valued in peer interaction, but become actively rejected.

Discussion

Overall, the results indicate that evolutionary theory is able to provide a powerful perspective on peer relations. Basic evolutionary theory predicts the importance of reciprocity and similarity in peer friendships. Moreover, the evolutionary theory of sex is a powerful predictor of sex differences in the evolved systems of sensation seeking/impulsivity, attraction to intimacy, and behavioural inhibition which are assets or liabilities in peer interaction. No other theoretical perspective provides this type of a-priori predictive power. Other theoretical perspectives are consistent with the descriptive data of peer relationships and with theories on the proximal mechanisms involved. Only evolutionary theory is capable of providing an a-priori predictive basis for the study of peer relations.

Finally, from the perspective developed here the resource value of many of the characteristics relevant to friendship and sociometric status are capable of being fit into a powerful evolutionary framework. Variation in evolved systems appears to have important repercussions in peer interactions despite the reasonable assumption that sociometric status and peer friendships have not been important arenas for natural selection. Thus, warmth as a resource in peer relations is seen not merely as an interesting empirical finding but as a comprehensible outcome of selective pressures occurring during human evolution.

Similarly, the enjoyment children take in highly rousing play styles with their peers is seen as congruent with the view that humans have been under selection pressures for developing systems which propel the child into interaction with his/her environment. Moderately extroverted children are expected to enjoy mutually rewarding, high energy styles of play, whereas the overinhibited child offers little to others, and, at the extreme, may even be seen as a social liability.

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