UNIVERSITÉ DU QUÉBEC À MONTRÉAL

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PRÉSENTÉE

COMME EXIGENCE PARTIELLE

DU DOCTORAT EN PSYCHOLOGIE

par

ANTÓNIO JOSÉ FREITAS DOS SANTOS

PRESCHOOL AFFILIATIVE NETWORKS : A SOCIO-STRUCTURAL ANALYSIS OF THE BEHAVIORAL ECOLOGY OF NATURAL PEER GROUPS

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RÉSEAUX AFFILIATIFS À L'AGE PRÉSCOLAIRE: UNE ANALYSE SOCIOSTRUCTURELLE DE L'ÉCOLOGIE COMPORTEMENTALE DE GROUPES DE PAIRS EN MILIEU NATUREL

JUILLET 1993

RÉSUMÉ

Durant les trois dernières décennies, les chercheurs ont accordé une importance croissante au rôle des pairs dans le processus de socialisation de l'enfant. Toutefois, la majorité des recherches sur le développement de l'enfant traitent principalement des différences individuelles du statut social et négligent, de façon tacite, l'examen des contraintes relationnelles inhérentes à l'écologie des groupes de pairs. En contraste, les approches socio-éthologiques ont souligné comment les groupes naturels fournissent une variété de rôles sociaux distincts susceptibles d'influencer la croissance et le développement individuel. Malgré tout, les analyses éthologiques se sont longtemps limitées à documenter uniquement les relations agressives et la structure de dominance dans les groupes. Parallèlement, des recherches similaires sur l'organisation affiliative furent entravées par l'absence de modèles propres à l'étude des structures sociales cohésives.

Les analyses contemporaines des réseaux affiliatifs entre pairs, selon les profils d'association, offrent une base descriptive heuristique pour l'étude de l'organisation cohésive du groupe à l'âge préscolaire. Toutefois, l'usage exclusif du comportement affiliatif, à titre d'indice socio-structurel, réduit d'autant l'examen de la qualité de l'insertion individuel dans la structure affiliative et de son influence sur les activités sociales des enfants. De plus, les analyses portant sur la discrimination sociale se doivent de dépasser les considérations sur l'association à un sous-groupe particulier afin de mieux définir l'impact des entourages locaux sur le développement individuel. Une attention particulière doit être accordée à la stratification des réseaux affiliatifs et à l'influence probable des différences de statut sur l'organisation des relations cohésives.

Dans cette recherche, l'évaluation des réseaux est réalisée à partir d'indices de proximité inter-personnelle et de mesures sociométriques pour déterminer la préférence sociale envers les partenaires de jeux. Ces procédures complémentaires permettent l'analyse empirique de la stratification des sous-groupes et l'examen de la variabilité du phénomène de discrimination sociale. Dans la première étude, des patrons collectifs de proximité interpersonnelle et d'investissement prosocial pendant les activités de jeu libre servent à identifier les choix associatifs des enfants. L'échantillon comprend trois groupes d'enfants Portugais d'âge préscolaire. L'échantillonnage par balayage instantané est utilisé pour identifier les sous-groupes naturels sur une période de trois mois. A la fin des observations, les nominations sociométriques positives et négatives des partenaires de jeux sont obtenues par entrevues individuelles.

L'application d'algorithmes matriciels et de techniques multivariées développées par Strayer et al. (1988) génèrent des résultats descriptifs des réseaux mettant en évidence certaines similarités dans l'organisation affiliative des trois groupes préscolaires et indiquant qu'une vaste majorité d'enfants sont intégrés dans des cliques sociales cohésives. Les résultats d'analyse des nominations positives et négatives révèlent que l'appartenance des enfants à des cliques cohésives est associée à une préférence marquée vers l'endogroupe sans rejet face à l'exogroupe. Inversement, les membres des agrégats sociaux ne démontrent pas de préférence envers l'endogroupe. L'analyse de la stratification sociale indiquent que les sous-groupes affiliatifs se distinguent entre eux sur la dimension de la désirabilité des pairs et aussi que les membres de chaque sous-groupe ont, de façon significative, tendance à obtenir des scores similaires de désirabilité. Enfin, l'introduction des statuts différentiels dans les analyses du biais endogroupe permet de souligner que les membres de cliques de haut et moyen statut sont fortement discriminants

en faveur de leurs co-membres tandis que les enfants de cliques de bas statut ne démontrent pas de préférence significative similaire.

Dans la seconde étude empirique, l'analyse des réseaux s'élargie par l'utilisation de données sur "le voisin le plus près" recueillies durant trois sessions consécutives d'une année scolaire auprès d'un groupe d'enfants Américains d'âge préscolaire. L'évaluation du biais social et de la stratification sociale est dérivée d'une méthode sociométrique de comparaison par paires qui fournit une meilleure information en terme de stabilité et d'ampleur. De plus, l'attention sociale est utilisée à titre d'index comportemental pour valider les procédures d'analyse de réseaux et de stratification et afin d'évaluer les fonctions de socialisation potentielles des sous-groupes particuliers dans le contexte plus large du groupe de pairs. Le choix de l'attention sociale offre également l'opportunité de contribuer au débat actuel en éthologie de l'enfant sur les modèles d'organisation sociale des groupes de pairs. L'information extensive fournie par la méthode sociométrique de comparaisons-pairées révèle une plus forte similarité des sous-groupes au niveau de la désirabilité des pairs. De plus, les enfants de cliques de haut statut démontrent une plus grande préférence vers l'endogroupe que les enfants de cliques de moyen ou bas statuts. Enfin, les enfants de cliques de bas statut manifeste une préférence endogroupe significative ce qui fournit une validation additionnelle à la conception de réseaux de cliques sociales cohésives. Les analyses sur le biais dans l'attention sociale indiquent que les membres des cliques sont fortement biaisés envers leurs co-membres. D'autre part, les membres des agrégats sociaux ne démontrent pas un tel biais dans l'allocation de leur attention sociale. Ces résultats confirment la vision initiale quant aux différences dans la nature cohésive des deux types de sous-groupes affiliatifs et fournissent une importante validation externe pour la présente approche socio-structurelle. Le degré de magnitude de

l'attention sociale des enfants envers leur co-membres augmente en fonction du statut de leur clique et demeure significatif même pour les enfants de bas statut.

La réalisation d'analyses additionnelles sur la distribution de l'attention non dirigée vers des co-membres indiquent que l'attention sociale reçue des pairs provient principalement des membres de la clique sociale immédiate de l'enfant et dans une proportion beaucoup moindre par les pairs situées en dehors de l'entouragé affiliatif immédiat. Cependant, les membres de sous-groupes de plus haut statut démontrent une plus grande capacité pour attirer l'attention résiduelle des enfants d'autres groupes de pairs. Un tel résultat supporte la notion que le degré de stratification social, aussi bien que l'association cohésive influencent la distribution de l'attention sociale à l'intérieur d'un groupe stable de pairs. La discussion des résultats de la présente recherche aborde la question de l'étude des activités cohésives et dispersives chez les groupes de pairs d'âge préscolaire dans une perspective éthologique renouvelé. Une intégration interdisciplinaire des recherches sur les bases biologiques et psychologiques du développement comportemental est proposée afin de mieux démontrer l'influence des rôles sociaux structurés au sein des groupes de pairs sur l'adaptation et le développement social à long terme de l'enfant.

SUMMARY

During the last three decades, developmental research has increasingly emphasized the relevance of peer relations in children's socialization. However, most studies of child development still focus upon individual differences in social status, tacitly neglecting relational constraints inherent in the ecology of the peer group. In contrast, socio-ethological approaches have stressed that natural groups provide a variety of distinct social roles that differentially impact upon individual growth and development. However, ethological analyses have often been limited to aggressive relations and group dominance structures. Comparable studies of affiliative organization have been hampered by the paucity of models for the study of cohesive social structure.

Current network analyses of patterns of peer association offer an heuristic basis for investigating the cohesive organization of preschool stable groups. However, the exclusive use of affiliative behavior as a socio-structural index imposes limits on analyses of how insertion into the peer group affiliative structure influences the patterning of children's social activity. Moreover, analyses of social discrimination must extend beyond consideration of subgroup association in order to better characterize the impact of cohesive local contexts on individual development. Attention must be to given to the stratification of children's affiliative networks and to the potential influence of status differentials on the organization of cohesive relationships.

In the present research, network assessments based on indices of interpersonal proximity are integrated with sociometric methods for determining "likability" of play partners. Together, these procedures permit an empirical analysis of subgroup stratification and variation in subgroup discrimination. In the first empirical study,

collective patterns of interpersonal proximity and prosocial involvement during free play were examined as indices of associative patterns in three Portuguese preschool groups. The observational assessment was based on repeated scan sampling of naturally occurring subgroups during a three month period. Children's sociometric nominations of most and least liked play partners were obtained from individual interviews following the observation period.

Using matrix algorithms and multivariate techniques developed by Strayer et al (1988), the network descriptive results show similarity in the affiliative organization for the three groups, with the vaste majority of children integrated within cohesive social cliques. Analyses of positive and negative nominations revealed that children's membership in cohesive cliques was associated with strong ingroup preference but not with outgroup rejection. In contrast, members of social aggregates showed no ingroup preference. Social stratification analyses revealed that affiliative subgroups differed on a peer likability dimension and that there was a significant tendency for subgroup members to have similar likability scores. Finally, the introduction of status differentials in the analysis of ingroup bias revealed that members of high and medium status cliques were highly discriminative in favor of co-members, while in contrast, children in low status cliques showed no significant ingroup preference.

In the second empirical study, network analysis were extended using nearest neighbor data collected during three sessions of the school year in an American preschool group Assessments of social bias and social stratification were derived from a paired comparison sociometric method which yields more stable and extensive information. In addition, social attention was used as a behavioral index for validating the network and stratification procedures and for assessing potential socializing functions of particular

subgroups in the larger context of the peer group. The choice of social attention also offer the possibility to contribute to an ongoing debate in the child ethology literature concerning models of peer group social organization. The more extensive information provided by the paired-comparisons sociometric method showed stronger subgroup similarity in peer likability. Moreover, children in high status cliques reveal more ingroup preference than children in medium or low status cliques. Most important, children in low status cliques showed significant ingroup preference, a result that provide additional validation for the network conception of cohesive social cliques. Analyses of bias in social attention revealed that clique members were highly biased towards co-members. Members of social aggregates showed no such bias in the allocation of their social attention. These findings confirm the earlier view of differences in the cohesive nature of the two types of affiliative subgroups, and offer an important external validation of the present socio-structural approach. The magnitude of children's ingroup attraction of social attention increased as a function of the status of their clique but was significant even for low status subgroups.

Supplementary analyses of the distribution of attention not directed to co-members indicated that social attention received from peers came predominantly from members of a child's immediate social clique and to a considerable lesser degree from peers outside the immediate affiliative entourage. However, members of higher status subgroups appeared to have slightly more capacity to attract the residual attention of other peer group members. Such a result supports the notion that social standing as well as cohesive bonding influences the distribution of social attention within the stable peer group. Results of the present research are discussed in terms of future ethological approaches to cohesive and dispersive activities in preschool peer groups. An interdisciplinary integration of biological and psychological research on behavioral development is proposed in order to

furthering the understanding of how social roles within early peer groups impact on children's social adaptation and shape their long term social development.

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CHAPTER I

ETHOLOGICAL STUDIES OF CHILDREN'S SOCIAL DEVELOPMENT

Theories of child development often portrayed parents as major socialization agents shaping the emergence of individual differences is social abilities (Maccoby & Masters, 1970). However, in a seminal review of peer research, Hartup (1969) underscored that social experience with peers was fundamental for the development of children's social competence. During the subsequent two decades, empirical studies of early social skills have increasingly focused upon the role of peer relations as a basic determinant of social and personality development (Asher, 1981; Asher & Dodge,.1986; Asher & Renshaw,.1981; Coie & Dodge, 1983, 1988; Dodge, 1987). From a sociological perspective, Hallinan (1981) argued that membership in stable social cliques was probably the most important force directing child social adaptation. Integrating cognitive and relational perspectives in developmental research, Youniss (1980) elaborated a more balanced theory of early socialization extending earlier views about the role of parents while stressing the role of friendships with peers as a necessary component for psychosocial growth.

Although at a conceptual level there has been an important shift toward recognizing the developmental influence of the peer context, most researchers continue to focus upon individual differences in social skills, thus ignoring differential constraints imposed by the peer group social organization. In contrast, ethological studies of child behavior have stressed that natural peer groups provide a variety of social settings that differentially shape individual adaptation. Studies of ecological constraints imposed by the structure of the stable peer group have been primarily limited to accounts of aggressive relations and

group dominance structures (Omark, Strayer & Freedman, 1980). Strayer (1980a) argued that comparable studies of affiliative constraints on individual development were at best preliminary because of a lack of appropriate models for representing the cohesive organization of early peer groups.

In an attempt to overcome this difficulty, Strayer (1980b) adapted sociometric procedures from small group sociology, to examine the differential allocation of prosocial investment among members of stable groups. The analysis of children's differential participation with available peers provided an empirical index for determining the organization of affiliative bonds within preschool peer groups. This effort to isolate a specific set of behavioral procedures for the derivation of cohesive social structures presaged what Cairns (1983) later identified as a much needed shift from an individually based psychometric focus in research on social development to a more socio-structural analysis of diversity in contexts and styles of social adaptation.

Although the potential contribution of socio-structural analyses to the understanding of child development appears promising, the application of such techniques to the study of peer group social organization raises a number of questions about the kinds of information (verbal reports, direct observation, expert opinion) that best reflect the social context of early peer groups. These debates have been especially problematic for attempts to integrate ethological and psychological research on children's social development. Rather than endorsing one or another of these perspectives, the present research adopts a multi-method approach, where a progressively detailed consideration of specific research questions provides a more comprehensive account of how socio-structural factors may serve as ecological constraints on social adaptation during early childhood.

Comparative Studies of Social Organization

The beginning of biological interest in social behavior can be traced to Charles Darwin's *The Expression of Emotion in Man and Animals* (1872). Darwin was one of the first biologists to seriously consider the adaptive value of social communication. The progressive development of behavioral biology during the past decades revealed two major currents of research -- classical and social ethology. Both approaches are derivatives of the conceptual framework for behavioral biology formulated by Konrad Lorenz and Niko Tinbergen in the 1950's. Hinde (1966), in what has become a classic review synthesizing ethology and comparative psychology, underscored that theoretical preoccupations in classical ethology centered upon questions of proximal causality and behavioral development. In contrast, the emergence of social ethology as a second branch of behavioral biology involved a shift of interest to questions about the structure and adaptive function of social behavior.

Although both approaches to behavior require an analysis of naturally occurring activity, classical ethology has been more directly associated with modern psychology because of its preoccupation with explaining individual differences. On the other hand, because of its focus on the organization and functioning of groups, social ethology appears more directly related to the fields of social psychology and sociology (Crook, 1970). Research in classical ethology began with the study of fixed action patterns. Such behavioral structures were usually considered as innately determined, as a direct reflection of phylogenetic selection. In social ethology, group social structure was also initially seen as a species specific mode of functioning, but considerable more emphasis was given to the notion that social organization involves a dynamic system reflecting continuing interaction of both ecological and behavioral processes within a limited adaptive range

tolerable for a given species. During the 1960's and 1970's, the increasing amount of information from primate field studies about the diversity and complexity of primate societies had a direct impact upon conceptions of individual adaptation and social development. Such findings provided a catalysing force for the consolidation of collective adaptation as a central research problem within behavioral biology (Crook, 1970; Kummer, 1971). Most importantly, diversity in individual social adaptation was seen as providing a major source of variability between individuals that became the potential object of future natural selection. Integration and adjustment within a prevailing social system were prerequisite for immediate survival, and in the long term, such adaptations determined individual reproductive success. The traditional organism-environment dichotomy in behavioral biology was reformulated in terms of three continually interacting systems: the physical habitat, the structured social group and the developing organism. This reformulation has important implications for conceptual models of social development in neighboring disciplines of child ethology and developmental psychology.

The ethological study of social behavior among nonhuman primates did not emphasize classical notions about species specific action patterns, but rather paid greater attention to graded signaling systems. From this perspective, communicative activity was conceptualized as subject to strategic modulation across different physical and social contexts. Generally, particular forms of social behavior were associated with precise roles within prevailing group structures. The adaptive value of behavior was dependent upon both the social system and the prevailing social relations between individuals. Crook (1970), argued that such a shift in interest within behavioral biology reflected an underlying conviction about the interaction between ecology, population dynamics and social behavior. He defined three interdependent perspectives within this new field of social ethology:

1) Socio-ecology: the comparative study of social structure and communicative behavior in relation to dynamics of the physical habitat.
2) Socio-demography: the analysis of relations between social organization in stable groups and more general features of population dynamics.
3) Social systems: the study of behavioral processes that maintain group structure, regulate social change and determine differential reproductive success of particular individuals.

Adaptive significance of social organization:

The socio-ecological interests in social ethology led to a more explicit effort to define and operationalize the concept of social adaptation. Kummer (1971) was among the first to clearly distinguish between levels of behavioral analysis necessary for the investigation of interpersonal communication and social adaptation. He identified five interrelated questions central to the study of social behavior. The first concerns the nature of the behavioral phenomena:

1) Structural Analysis: a description of the organizational conditions of a living system, such as the anatomical underpinnings of a particular behavior pattern or the spatial arrangement of group members.

Kummer stressed that in living systems, conditions change constantly. Thus elements identified in a structural analysis must be seen as subject to dynamic transformation and not as static states. Such processes can be distinguished from two contrasting viewpoints:

2) Causal Analysis: the necessary and sufficient conditions, or the underlying processes that lead to the appearance of the behavioral structures under study.

3) Functional Analysis: the immediate outcome, or emerging processes associated with the observed activity that increase the survival value or reproductive success of the living system.

Finally, two questions require situating observed activity within the larger time scale of historical processes:

4) Ontogeny: the study of organic, social and ecological processes that shape changes during the course of individual development.
5) Phylogeny: the long-term processes that determine survivorship and directly shape the genetic heritage on which ontogeny depends.

At the level of structural analysis, Kummer (1971) noted that there were two accepted parameters for describing the grouping tendencies for a given species or population: the distribution of individuals in space and time, or the frequency and quality of inter-individual communication. Social groups are usually identified as collections of individuals who remain together and interact with each other. Frequently, the temporal stability of a social structure is assessed by measuring the persistence of one or the other of these parameters across time. However, since demonstrations of temporal stability serve primarily to validate descriptions of group organization, Kummer (1971) stressed that such descriptions must be complemented by causal or functional analysis of the derived social structures.

Social cohesion and social dispersion

Early primatologists theorized that group social organization involved a continuing dialectic between cohesive and dispersive forces operative within the social unit. The necessity to optimize the balance between these two forces explained both the structure

and the stability of primate groups. Theoretically, social cohesion was seen as depending upon common interest in specific ecological or social resources; while social dispersion derived from the inevitable competitive situations that arose because some individuals attempted to maximize their exclusive access to resources that were essential for survival and reproductive fitness (Carpenter, 1942; Yerkes, 1928; Zuckerman, 1932). Scientific discussions of the concept of social dominance have persisted throughout the past two centuries. Predictable dominance orders were explicitly recognized by Huber as early as 1802 in his pioneering study of the behavior of bumblebees (Wilson, 1975). However, such findings were not appreciated and had no impact in the mainstream of the behavioral literature at the time.

Social hierarchy and social structure

Perhaps because of the prevailing neo-Darwinian bias, social dominance received the majority of attention from both human and non-human early primate social ethology during the past fifty years (Omark, Strayer & Freedman, 1980). In 1922, Schjelderup-Ebbe introduced the concept of status hierarchy in a behavioral study of domestic fowls (Wilson, 1975). He showed that members of a flock establish a "pecking order" in the course of aggressive encounters and that the resulting hierarchy rigidly determined individual access to roosts and food. In subsequent years, dominance hierarchies, or elementary "pecking orders", were documented throughout the animal kingdom and viewed as a basic mechanism in the social structure of animal groups (Bernstein, 1970, 1980; Chase, 1979, 1985). From an adaptive point of view, high status individuals were assumed to enhance their individual fitness by assuring priority of access to critical resources (food, shelter, mating partners). Because sex, size and aggressiveness were all related to status in the dominance hierarchy, biologically given characteristics were regarded as factors that determine the social rank of individuals in a group. However,

psychosocial variables such as prior experience, socialization history and quality of current relationships were also reported to relate to dominance status (Omark, Strayer & Freedman, 1980).

At a descriptive level, dominance relations summarize the relative balance of social power between members of a social group, while status hierarchies reflect the organization of such power relations among all group members. Inspection of the early primate literature reveals considerable confusion in the use of social dominance as a descriptive term and in the choice of specific criteria for its evaluation. Dominance has been used to refer to forms of social behavior, classes of social interaction, differences between individuals, qualities of social relations, and structural properties of social groups (Strayer, 1981). Faced with such conceptual ambiguity, several authors questioned the utility of dominance as the fundamental principle of primate social organization (Bernstein, 1970, 1980, 1981; Chance, 1967; Rowell, 1974)

Multidimensional analyses of social organization

During the 1970's, a renewed interest in the descriptive analysis of basic dimensions of social organization for stable groups led to the clarification of some of the earlier confusion about the nature and function of social dominance. A major feature of this more systematic approach to group functioning was recognition of the need to consider a greater diversity of social behaviors at progressively more complex levels of structural organization (Hinde & Stevenson-Hinde, 1976). Four basic levels of social analysis were explicit in studies of primate dominance published after 1970 (Pitcairn, 1976; Sade, 1972; Strayer, 1976):

1. The first level entailed the description of social action patterns. There is no essential difference between this type of behavioral description and that in earlier ethological studies.
2. The second level involved an examination of social transactions during communicative episodes. Such analyses permit the isolation of recurrent forms of dyadic exchange among members of the stable group.
3 - The third level required observation of regularity and diversity in forms of interaction for specific partners through time. Such analyses focused upon the identification of larger categories of social exchange that served as converging indices of specific dimensions of social relationships .
4 - In the final socio-structural analysis, general principles that summarized the organization of observed relationships provided an empirical basis for the derivation of the hierarchical structure that constituted the organization of social power in the stable group.

At an empirical level, the description of individual actions, social exchanges and dyadic relationships enables a systematic study of social relations within a group. The analysis of group structure, which depends upon a clear understanding of recurrent patters in social relations, permits identification of particular social roles within the stable group that shape or influence the social activity of other group members. The integration of these different levels of social description provides a better method for understanding both individual adaptation and social coordination with familiar social partners (Strayer, 1980b).

Ethological Studies of Child Behavior

The introduction of ethological methods for the study of child development was consolidated in the beginning of the 1970's, after the first effort to integrate certain theoretical perspectives on early social relations (Ainsworth, 1967; Bowlby, 1951; Hinde, 1966, 1974). The fragility of observation techniques and behavioral measures in child psychology during this period was often contrasted with the methodological and conceptual rigor in animal ethology. This comparison led some child ethologists to conclude that behavioral biology might provide solutions to many of the contemporary problems in the study of child development (Blurton Jones, 1972a, 1972b; Blurton Jones & Leach, 1972; Brannigan & Humphries, 1972; Leach, 1972; McGrew, 1970, 1972; Smith & Connolly, 1972).

Two decades later, it seems appropriate to note that, although child ethology provided a better understanding of the complexity and the specificity of children's early social behavior, this sub-discipline fell short of its original promise to revolutionize research on human development. The majority of ethological studies centered on classical morphological and causal descriptions of human behavior. Such an emphasis reflected a preoccupation with individual differences in behavioral adaptation, an interest that was seldom contextualized in terms of the immediate social surround. The description of stable behavioral styles was the logical extension of this preoccupation and led to a de-contextualization of social behavior and to the neglect of fundamental questions about how social dynamics influence behavioral development of the individual child (Strayer, 1989).

Early studies in child ethology seldom provided a systematic account of contextual constraints on the development of social behavior or modes of social reaction (Blurton

Jones, 1972, McGrew, 1972). Instead, they sought to document individual differences in the quality of action patterns used during the course of social communication (Smith & Connolly, 1972, McGrew, 1972, Montagner, 1978). In a sense, these studies provided a necessary first level for a more complete socio-ecological analysis of peer group social functioning. However, it is only in the past fifteen years, that researchers have begun to focus more directly on specifying how organizational features of the stable group differentially influence communication patterns in different social contexts.

Historically, child social ethology emerged as a field concerned with the extension of theoretical and methodological notions from primatology to the study of human behavior. The initial focus on dominance relations as an analytic concept suggests that the majority of researchers accepted dominance hierarchy as a primary dimension of peer group social organization (Abramovitch, 1976; Hold, 1977; Missakian, 1976; Sluckin & Smith, 1977; Strayer, Chapeskie & Strayer, 1978; Strayer & Strayer, 1976; Vaughn & Waters, 1978). Following the direction of research with nonhuman primates, a comparable interest in the nature and function of cohesive behaviors emerged only during the last decade, when attention was redirected to questions about how positive forms of social exchange might be related to roles within the group dominance hierarchy.

For children, preliminary descriptive findings suggested that social dominance was directly related to the differential receipt of social attention (Abramovitch & Strayer, 1978), as well as to the probability of being imitated and assuming leadership roles (Savin-Williams, 1979; Strayer, 1980b, 1981). Strayer and his colleagues (Strayer 1980a, 1980b; Strayer & Nöel, 1986; Strayer & Trudel, 1984) also reported that children's position in the dominance hierarchy was related to issues of friendship choice and general popularity. However, Vaughn & Waters (1980, 1981) questioned the

importance of social dominance as the central organizing dimension for the early peer group and proposed instead that social competence was the central feature of children's social organization. Although modern ethological researchers appear to agree on the importance of analyzing diverse forms of prosocial activity, there has been no attempt to provide a socio-structural analysis of cohesive behaviors. Instead, they analyzed positive social activity in relation to roles within the group dominance hierarchy. Implicitly, the focus on social roles invited an analysis of dominance status which accentuated measures of individual differences in social functioning rather than interactional or relational processes.

The preliminary descriptive findings concerning relations between social conflict and social attraction served as an impetus for further research on the nature and the development of affiliative structures (Strayer, 1980a, 1989). Information about the socio-structural organization of affiliative relations seemed a prerequisite for clarification of processes underlying the coordination of dispersive and cohesive activities in children's play groups. In this context, it is pertinent to compare and contrast the socio-structural analyses of dominance hierarchies with network structures derived from sociometric representations of the positive social relations.

Empirical Studies of Dominance and Affiliation

In spite of the continuing debate about the relative importance of dominance and affiliation, modern researchers in child social ethology generally accepted that both constructs are primary dimensions of peer group social organization. The more fundamental problem, that of understanding the relation between social dominance and affiliative behavior, had been obscured by a lack of adequate structural models for representing cohesive organization. Strayer's (1980b) introduction of behavioral

sociometry provided a potential solution for identifying affiliative structures in children's groups and offered a heuristic link with the more classic techniques from small group sociology (Moreno, 1934).

Drawing on Kummer's (1968) and McGrew's (1972) basic distinctions between cohesive and dispersive activities, Strayer (1980b) classified social behaviors in terms of their social functions. Measures of dispersive and cohesive behaviors were derived using a limited number of specific agonistic and affiliative action patterns. Dispersive behaviors contained various forms of attack, threat and competition, while social cohesion included dyadic orientation, social approach, gentle contact, and sharing of objects. Analyses of the differential distribution of affiliative behavior to different social partners were conducted comparing expected and observed frequencies. Observed frequencies that significantly surpassed expected values were used as the operational definition of social preferences within the group. The sociographic representation of these behavioral preferences provided a visual representation of cohesive chains of individuals that seemed to be organized in distinct affiliative subgroups.

A major contribution of Strayer's (1980b) sociographic analysis was the demonstration that hierarchical models used to represent social dominance structures were inappropriate for representing cohesive organization. He noted that the high levels of symmetry in the exchange of affiliative behavior indicated that cohesive social structures should be conceptualized as networks of mutuality and connectedness, rather than as hierarchies with asymmetry and transitivity of social roles. The network organization evident in the affiliative sociogram led to distinctions among three cohesive roles: 1) Nuclear children who participated in social cliques where reciprocal preferences were evident between co-members and absent with other peers: 2) Peripheral children who had

unilateral connections with affiliative subgroups, but were not integrated within social cliques; and 3) Isolated children who were disconnected from central affiliative structures. These latter children showed no significant discrimination in the allocation of affiliative behavior to peers, and were never chosen by peers as significant playmates.

Social Discrimination in Peer Associations

In behavioral biology, the notion of discrimination is most often associated with the study of perceptual, learning and cognitive processes (Hinde,1966). Technically, discrimination refers to the organism's capacity to react differently to different stimuli or patterns of stimulation. Such response bias is usually discussed in terms of two closely related principles: behavioral selectivity and response differentiation. Behavioral selectivity refers to the differential suppression of particular responses in specific contexts or settings. For example, although smiles of an infant can be elicited by a large number of face-like configurations, with age, smiling to unfamiliar individuals becomes increasingly unlikely. Response differentiation is more directly associated with a modulation in the intensity or form of a reaction in different contexts. Taking the previous example, an infant smiles more frequently and for longer periods of time to his primary caregiver than to another familiar figure (Bowlby, 1969). Clearly, behavioral selectivity and response differentiation are intertwined in most real life situations; depending of the research question either or both aspects of social discrimination may be highlighted.

From a ethological point of view, social discrimination is usually operationalized in terms of the differential allocation of individual behavior towards other group members (Strayer, 1980b). Although theoretically children might attack, embrace or watch different social partners in a completely random fashion, casual observation of spontaneous activity indicates that such behaviors are seldom allocated in a haphazard manner. Children avoid

agonistic episodes with many of their peers, while they often selectively seek out more subordinate individual as targets for their aggressive outbursts. Similar discrimination occurs in the allocation of positive, or cohesive behaviors. Although children usually direct some affiliative acts to almost all peers, they tend to reserve a large proportion of prosocial behavior for a relatively few preferred playmates. In both of these examples, social discrimination refers to the differential deployment of activity to available social partners. Such discrimination may involve either agonistic or affiliative behaviors, and involve active or passive reactions.

This notion of social discrimination in social ethology corresponds well with the use of the term in more traditional psychological research on social processes. In fact, Moreno's (1934) "sociometric interview" was primarily conceived as a tool to understand group structure through the measurement of differential relations between individuals and subgroups (e.g. interpersonal choice, attraction, repulsion, friendship). In modern sociometric studies of child development, social assessments are based directly upon the principle of differential allocation of positive or negative choices to members of the peer group (Coie & Dodge, 1983;. Newcomb & Bukowski, 1983).

The strong concordance in the meaning of social discrimination in ethological and developmental research contrasts with the more common sense meaning of social discrimination in the fields of sociology and social psychology. In the latter two fields, social discrimination is usually defined "... as the differential treatment of individuals considered to belong to a particular social group." (Williams, 1947). In the context of research on intergroup relations the concept refers not merely a selective and differential bias in the allocation of behavior, but to action that "...*violates important institutional standards* which usually are obligatory in certain areas of conduct " (Williams, 1947, pg.

39, original italics). The ethologist's use of social discrimination has little direct relation with the latter definition. For social ethologists, discrimination and bias refer to a differential deployment of behavioral activity among available social partners. It implies no pre-conception about underlying values or social norms, nor does it involve theoretical inferences about the underlying motivational bases for the discriminative allocation of behavior activity.

Social Stratification of Affiliative Structures

A second common aspect of an ethological analysis of social structure involves assessing the degree of social stratification. Any discussion of social roles within the group requires specifying operational measures for distinguishing the relative position of individuals within the social structure. For example, in the context of agonistic exchange and social dominance, two major approaches have been used to index social stratification: the first involves establishing a rank ordering of group members by examining behavioral profiles, the second focuses upon patterns of dyadic exchange underlying status differences within the hierarchy.

Since the 1960's, field researchers have sought to measure social dominance by determining functionally equivalent classes of social activity that provide a reliable basis for ranking group members in terms of relative social influence or relative success in agonistic encounters (e.g. Altmann, 1962; Jay, 1965; Hinde, 1966; Richards, 1974). Similar indices have been proposed to assess the degree of social stratification for social power relations in children's peer groups (Barner-Berry, 1980; Omark, 1980; Savin-Williams, 1979). Such rank measures of social dominance usually focus on individual profiles and tend to neglect the more subtle aspects of dyadic interchange. In contrast, structural measures of dominance status involve determining each individual's position in

the group dominance hierarchy (Omark et al, 1980). Such status assessments place greater emphasis upon dyadic relationships and position each individual in terms of the larger context of the group. This approach to social stratification does not automatically assign higher rank to the most aggressive or influential group member, but rather places individuals in terms of their relative dominance with each and every other group member. Ethologists are in general agreement that assessments of dominance status provide a better representation of socio-structural organization of social power than rank ordering based upon individual behavioral profiles (Bernstein, 1980).

A second use of social stratification in child ethology is found in studies of individual differences in affiliative activity. Affiliative ranks can be assigned according to rates of participation in cohesive activity; however, such indices do not necessarily reflect underlying social preferences (Strayer, 1980b). By examining mutual and asymmetrical affiliative relations, children have been distinguished in terms of relative degree of connectedness to other group members. Strayer (1989) employed this type of index to classify children as central, peripheral or isolated within their peer group. Although this approach to assessing social stratification does not provide a quantitative index of status, it draws attention to qualitative differences in nature of social insertion within the affiliative structure of the peer group.

Studies of social stratification along dimensions of prosocial activity have predominantly used ranking indices based upon individual profiles. These analyses are directly analogous to those that are commonly reported in traditional sociometric studies with young children (Coie & Dodge, 1983;. Newcomb & Bukowski, 1983). Both social attention and social control have been explored using individual ranking procedures (Abramovitch,1976; Hold, 1976). Unfortunately, in the context of a socio-structural

analysis these measures do not account for dyadic fluctuation in observed social activity, and thus cannot be used to provide a structural analysis of social organization (Strayer, 1981).

The operational approach to social stratification in child ethology differs from the more traditional perspective in sociological and social psychological research. In the social sciences, social power and social status are often treated as conceptually distinct terms. From an intergroup relations perspective, the central argument is that power and status may be discrepant, as for example with English aristocracy who still have a position of high-status in British society without relevant exercise of power on a political plane (Sachdev and Bourhis, 1991). Sachdev and Bourhis (1991) have also argued that social power is related to the extent of control by one group over its own destiny and the destiny of outgroups; while group status implies the relative positioning of groups on valued dimensions of social comparison. For ethologists, social power refers to the ability to immediately influence conspecifics, while social affinity refers to patterns of inter-individual attraction. Either or both of these behavioral systems might be organized as a stratified social structure. To better understand affiliative organization of stable peer groups, greater attention should be given to an analysis of stratification in children's affiliative networks and the potential influence of subgroup status on the organization of cohesive friendships within the group.

Analytic Approaches to Socio-Structural Analyses

Social Hierarchies

The assessment of social dominance is essentially based upon measuring asymmetric interactive roles evident during bouts of social conflict. The concept of linear dominance hierarchy involves identifying a specific network of asymmetric relations that

optimally integrates observed dyadic relations within a single social structure. On an operational plane, the evaluation of a dominance hierarchy begins with the description of dominance acts and dominance exchanges. Such observations are essential for determining the interactive role asymmetry for specific relationships. Inspection of dyadic asymmetries permits construction of larger networks of transitive relationships that constitute the hierarchical structure of the social group. In this sense, social hierarchy is a higher order structural principle that depends upon, but cannot be reduced to, the rate of specific acts, frequency of social exchange or regularity of prevailing social relations (Strayer, 1980b). A simple seriation of individuals to produce an ordinal "ranking" for any of these latter measures provides at best a limited and potentially flawed assessment of dominance status. The examination of transitivity in observed dyadic relations within a group is a necessary step in the socio-structural analysis of the social hierarchy.

Behavioral sociograms

This application of classic sociometry (Moreno, 1934), based on the dyadic direction of cohesive activities, was independently introduced in research on affiliative organization of non-human primate groups (Soczka, 1974; Strayer & Harris, 1978). Strayer (1980b) used similar techniques to identify social structures in preschool peer groups. The majority of earlier studies with children examined individual differences in directed or received behavior. These analytic procedures lead to a loss of information about dynamics of dyadic exchange, and thus from a social ethology perspective, do not provide an adequate representation of group affiliative structure. Behavioral sociograms of significant affiliative choices provide a visual resume of social preferences (Strayer, Tessier & Gariépy, 1985), however, they do not provide a true structural representation of affiliative organization. Such limits in the analysis of affiliative structures restrict ongoing

research and preclude the evaluation of hypotheses about the coordination of cohesive and agonistic structures in stable social groups (Strayer, 1989).

Networks Analyses

During the past four years, Strayer and his collaborators have been exploring a series of new descriptive methods for identifying association networks based upon observation of naturally occurring affiliative behavior (Leclerc, 1991; Leclerc & LaFerté, 1990; LaFerté, Leclerc & Gariépy, 1989; Santos, 1990; Strayer, Leclerc & LaFerté, 1988). Based upon an adaptation of a subgroup nomination procedure (Cairns et al. 1985), these same network methods have also been extended for the identification of the affiliative structure in groups of primary school children (Gagnon, Legault, & Lapointe, 1991; LaFerté, 1989, 1990, 1992; La Ferté & Legault, 1991; Veríssimo & Santos,1991, Veríssimo, 1992). In general, these descriptive findings extend previous analyses of adolescent networks (Cairns et al., 1985, 1988, 1989) to school-aged and preschool children. Results reveal consistent structural information across qualitatively different data sets (socially directed actions, spatial proximities and verbal nominations) for a variety of different socio-cultural contexts (France, Holland, Portugal and Québec). A growing consensus emerging from these research findings is that multivariate network procedures focusing upon similarity of dyadic association profiles provide a robust technique for the socio-structural analysis of affiliative organization in stable social groups (Santos, 1993; Strayer, 1992).

The first analyses of affiliative networks in preschool peer groups ranging from 12 to 60 months, revealed a significant increase with age in the number of children that participate in affiliative subgroups, as well as a stronger affiliative investment between the members of a same subgroup (Strayer et al, 1988). Subsequent measures of clique

cohesion showed age-graded consolidation of the identified affiliative structures and that similarities in affiliative associations within the peer group were developmentally associated with a greater probability of mutual friendships (LaFerté et al, 1989). In an independent study of affiliative organization in toddler play groups, Leclerc (1991) distinguished three affiliative roles: 1) the first involved being a member of a social clique, 2) the second was being identified as a member of a social aggregate or 3) the third involved adopting a peripheral role in the group's affiliative structure. Reporting that the proportion of children included in social cliques increased progressively between one and three years to nearly 80%, Leclerc concluded that similarity of affiliative associations in early peer groups occurs with or without the existence of strong interpersonal relations. She argued that in social aggregates, loose association with other subgroup members constituted a socializing context for the elaboration of joint activities and offered potential occasions for young children to develop more stable affiliative relationships.

In an extension of affiliative network procedures, Santos (1990) considered observational measures of social proximity in a five-year-old preschool group. Referring to past primate research (Altmann, 1968, Carpenter, 1952), he argued that the expected association between affiliative communication and spatial proximity should permit an independent assessment of affiliative structures from a more general spatio-temporal mappings of the social group. In his field work on baboon societies, Kummer (1968) emphasized that the structure of animal society is directly reflected in the spatial arrangement of its members. Employing similar measures, Santos (1990) assessed the temporal stability of affiliative networks during three months of observation. His findings provided a more nuanced view of variation in social subgroups and indicated that although nearly 80% of children were clique members, the majority of non-clique members changed their subgroup membership from one month to the next. Similarly, only half of

the social cliques remained stable for two consecutive sampling periods (Santos, 1990; Santos et al., 1991). These initial results indicate that future studies of cohesive networks in children's peer groups might attempt to distinguish more clearly between temporary associative groupings and more permanent affiliative cliques by tracking temporal stability of selective participation with particular peer group members.

Conceptual Bases for an Analysis of Group Affiliative Structures

In the past ten years, ethological researchers have extended the sociometric analysis of affiliative behavior to include network analyses of cohesive relations within children's peer groups. The majority of these studies employed hierarchical cluster analyses to assess similarity in patterns of dyadic association as indices of the group affiliative structure. Findings indicate that the vast majority of children were members of cohesive subgroups. These initial results suggested that a more fine-grain description of social dynamics within different subgroups might help to clarify how integration in the peer group affiliative structure influences the subsequent development of the child. Drawing from the previous sociometric analyses, density based measures of selective association were employed to provide complementary information on subgroup cohesion (Strayer et al, 1988). Subsequent studies examined the relative density of association within subgroups to distinguish social cliques and social aggregates. Cliques were characterized as having significantly higher levels of selective affiliation among co-members, while children who were members of social aggregates failed to show mutual preference.

Analyses of behavioral discrimination in social participation suggest that cohesive social cliques provide important settings that may facilitate the development of affective relations and assure communalities of social experience for certain children. However,

given the relative preponderance of social cliques, it seems necessary to extend the socio-structural analysis beyond consideration of selective association among subgroups of children in order to better characterize the impact of these cohesive local contexts on individual development. At a conceptual level, similar attention must be to given to the analysis of the nature of stratification of children's affiliative networks and to the potential influence of status differentials on the organization of cohesive relationships within and between subgroups. Thus, before asking specific questions about the coordination of social dominance, social affinity and social attention, efforts should be directed to providing a more adequate description of the affiliative structure of stable peer groups.

The following empirical investigations were designed to extend the descriptive analysis of cohesive structure in five-year-old preschool groups. It was assumed that children's level of integration within the group affiliative network provides important complementary information about their modes of social functioning with peers. A socio-structural model of cohesive organization that integrates sociometric nominations with network assessments of the affiliative relations was elaborated to examine this issue. Network analyses were based upon measures of physical proximity among group members through time. The supplementary use of sociometric nominations provides means of producing a stratified representation of the affiliative structure that permits distinguishing among identified social subgroups. Two empirical studies were conducted to verify the utility of this approach.

The first study had two major interrelated objectives. The first was to extend the socio-structural analysis of affiliative networks to observational measures of spontaneously occurring subgroups within three five-year-olds peer groups. Following an identification of social subgroups having similar association profiles, sociometric data

on personal preferences were used to stratify the obtained networks and to assess variation in subgroup discrimination.

In the second study, the scope of the first empirical work was extended to consider short term changes in the stratified affiliative network during the course of the school year. Network analyses in this second study were based upon more refined measures of proximity and social preference. In addition, this investigation included assessments of individual differences in allocation of social attention, and related these behavioral measures to children's positions within the stratified affiliative structure. By integrating proxemics, sociometric preferences and behavioral indices of social influence, this investigation provided an external validation of the utility of network procedures for the derivation of cohesive organization of stable groups.

Underlying these studies was an attempt to integrate ethological and psychological research on child development. The major advantage of the present approach lies in the simplicity of the basic measures: proxemics, verbal nominations and attention patterns. Empirically the studies draw on three straightforward analytic procedures: cluster analysis for network identification; proportion tests for verifying subgroup discrimination; and descriptive statistics to identify subgroup status. The interrelations between the proposed measures and procedures enhanced the understanding of the cohesive underpinnings of social organization among five-year-old preschoolers. The coherence of the findings could shape future questions about the developmental impact of particular affiliative roles during the preschool years.

CHAPTER II

A SOCIO-STRUCTURAL ANALYSIS OF PRESCHOOL AFFILIATIVE NETWORKS

During the past decade there has been a resurgence of interest in the analysis of how affiliative structures in natural peer groups differentially influence early social development (Cairns, 1983). New sociometric procedures, based either upon structured socio-cognitive interviews (Cairns, Perrin & Cairns, 1985) or upon direct observation of naturally occurring activity (Strayer, Leclerc & LaFerté, 1988), have been elaborated for identifying social networks within stable peer groups. The present study examines the relationship between an observation-based procedure for identifying social subgroups and classical sociometric nominations of best-liked peers. An underlying assumption of the approach is that complementary methods of inquiry are necessary for an understanding of the matrix of relationships that constitute a social group. Thus, the goal of the research is not to endorse a particular approach, but rather, to evaluate the respective contribution of each to the characterization of affiliative organization in children's play groups. Three objectives provide the analytic focus of the research. The first involves elaborating appropriate means for describing the cohesive units in preschool groups. A second issue concerns specifying means for differentiating among various subgroups within the affiliative network. A third goal involves assessing the extent of social stratification within the affiliative structure and examining the nature of social bias among and between members of stratified social subgroups.

Cohesive Structures within Early Peer Groups

The *Subgroup Nomination Procedure* introduced by Cairns et al (1985) for the study of adolescent cliques offered a novel approach for the sociometric study of affiliative

organization. These procedures redirect attention from assessing individual differences in popularity or social isolation to the problem of how to evaluate communalities in peer association as indices of social subgroups with mutual affiliative ties. With only slight modifications, these socio-structural procedures have been used to identify social networks in groups of elementary school children (LaFerté & Legault, 1991; Strayer 1991; Veríssimo & Santos, 1991). However, cognitive demands of this sociometric interview limit its use with younger children (Leclerc,1991). Sociometric assessments indicated that even simple nominations do not always provide reliable information about personal preferences among preschoolers (Boivin, Tessier & Strayer, 1985). To mentally represent and to verbally report specific friendships among playmates may in fact require a level of social and cognitive integration that surpasses the capacities of most five-year-olds. Faced with such obstacles in the sociometric interview with very young children, researchers tended to rely upon direct observation of social activities. Naturally occurring affiliative behavior seemed to offer a more satisfactory basis for identifying the developmental origins of cohesive structures in preschool play groups (Strayer, 1980b).

Behavioral network procedures analogous to those proposed by Cairns, et al (1985) have been developed and successfully applied in behavioral research on preschool affiliative relations (Leclerc, 1991; LaFerté, Leclerc & Gariépy, 1989; Strayer, Leclerc & LaFerté, 1988). Although initial findings showed a relatively complex cohesive structure even in groups of very young children, subsequent efforts to extend these descriptive results raised a number technical questions about the measurement and analysis of network structures in stable groups. Strayer (1989) argued that the exclusive use of affiliative activity as an index of social networks imposed logical limits on analyses of how insertion into the peer group affiliative structure influences the patterning of children's social activity. Theories of peer socialization claim that membership in

particular social cliques shapes or constrains the individual's future social behavior (Cairns et al, 1985,1988; Strayer et al, 88, Strayer, 1989). However, if social networks are defined in terms of observed social activity, it becomes circular to ask how the network influences social behavior. The structure of cohesive peer relations is clearly an important component for research on peer socialization, but to avoid circularity in the use of descriptive information, it is important to develop and test alternative indices of affiliative structures.

These considerations focus attention on the choice of appropriate measures for socio-structural analyses of affiliative networks. Rather than indexing affiliative structure in terms of directed social acts, Santos (1990) used behavioral maps of spatially proximal subgroups as primary data in a network study of five-year olds. His initial results suggested that most children were integrated in cohesive social cliques at the end of the preschool year. The extension of this approach to network analysis with preschool groups would permit verification of the generalizability of the proximity procedures for the assessment of affiliative social structures with young children.

Social bias in the Evaluation of Peer Playmates

The notion that members of a social unit maintain close proximity and develop a semi-closed system of positive communication has a long history in the study of primate social organization (Kummer, 1971). In an extension of socio-structural network analyses, Laferté & Legault (1991) investigated the influence of clique membership on positive and negative sociometric choices among primary school children ranging from 7 to 9 years of age. Results indicated that children in social cliques were characterized by strong ingroup preference for positive nominations and strong outgroup rejection regarding negative attributions. Given that traditional positive and negative nominations

translate children's most and least valued associative contacts, the network representation of cohesive structure confirmed that close association and positive communication were basic aspects of affiliative subgroups. How differential bias relates to subgroup membership constitutes an important empirical avenue for investigations of developmental changes in the socializing influence of affiliative networks.

In this context, it is important to know whether five-year-old children's positive and negative sociometric nominations are related to their affiliative subgroup membership. Ingroup preference and outgroup rejection can be assessed by examining the extent to which the two types of sociometric nominations are coherently related to children's subgroup membership. Given the selective association among clique members, integrated children should show ingroup preference with their positive nominations and outgroup rejection for negative choices. On the other hand, members of social aggregates should not reveal ingroup preference given their lack of selective association with other peers in their subgroup. The absence of selective association between members of social aggregates might even be associated with a greater probability of negative choices towards co-members.

Social Stratification and Subgroup Status

Since Moreno's (1934) early concept of sociometric "star", researchers in social sciences have been concerned with the centrality of particular individuals or specific subgroups within social networks (Scott, 1990). Measures of status differentials -- conceptualized in terms of popularity (Hartup, 1969), general likability (Asher, et al., 1979), social impact (Peery, 1979) or sociometric classification (Coie & Dodge, 1983) -- have been cornerstones in developmental research on social adaptation in the peer group. Measures of centrality of individuals and social subgroups were used to index stability of

affiliative structures in adolescent groups (Cairns et al., 1985; Cairns et al., 1988). LaFerté (1992) employed a measure of peer preference (sympathy - antipathy) to distinguish the relative position of social cliques in grade school classrooms. He speculated that higher-status cliques served as reference groups for other children.

The influence of ingroup and outgroup preference on homogeneity of likability within specific subgroups could provide evidence for structural constraints on peer impact. Thus, it is important to verify whether there is a tendency for members of the same subgroup to have similar likability scores. Finally, examining the relation between status differentials and social bias may provide a means for more accurately characterizing differences in affiliative subgroups and documenting the potential influence of the affiliative structure on social activity in the larger context of the peer group.

METHODS

Subjects

The sample for the study consisted of 64 (25 girls and 39 boys) five-year old Portuguese children attending two preschool centers at the Santa Casa da Misericórdia de Cascais, Cascais, Lisbon. The children ranged in age from 54 to 65 months (mean = 60 mo). They came from middle-class districts in the greater metropolitan area of Lisbon and were predominantly white. Participation was on a voluntary basis and required the agreement of preschool directors, educators, parents and children (all of the concerned parties agreed to participate at each of the two centers).

Children were organized three different groups: Group A (13 girls and 10 boys); Group B (5 girls and 16 boys) and Group C (7 girls and 13 boys). All groups were observed during the Spring session of their school year. Groups A and C were observed at the same preschool center.

Procedures

Observation of social proximity: The research examined patterns of interpersonal proximity and collective involvement as indices of children's peer associations. Naturally occurring subgroups of children were defined as being in close proximity (within the reach of one arm's length) and sharing interest in common activity (e.g. manipulation of toys or materials, collective play). Information about social subgroupings was collected by two observers who conducted direct observations in the classrooms and manually coded the spatial localization of identified subgroups on to prepared maps. The maps portrayed the plan of each group's classroom including furniture and particular zones of children's activities (e.g: mats, painting, drawing tables, dolls house, groceries shop). Observations were conducted during free play periods. Systematic observation was initiated after a training period which coincided with the children's familiarization with the observers.

A scan sampling procedures was used. At one minute intervals, during each hour of observation, two types of information were recorded: the location of each child in the group and the current subset of playmates. The initials of each children were indicated at the appropriate place on spatial maps and a circle was drawn to enclose members of an observed subgroup. In completing the spatial maps, efforts were made to account for both spatial proximity and ongoing social activity. For example, if in a given scan, children A, B and C were playing cards, and another child D approached and began talking with C, then (A, B, C) would be enclosed in one circle and (C, D) in another. The situation could be even more complex, if for example the child (D) was involved in a "building blocks game" with children (E) and (F) while briefly interacting with (C). In this case, a third circle enclosing children (D, E, F) would also be drawn. Each minute of observation

provided one map. Each observation session lasted 50 minutes. A total of 12 observational session were scheduled during the three month period of the Spring Session. These procedures provided 600 spatial maps for each of the three groups.

Sociometric assessment: Information about positive and negative sociometric nominations for each group was collected at the end of the observation period. Individual interviews were conducted outside the classrooms by one of the observers. Children were asked to nominate three classmates whom they liked most and three classmates whom they liked the least. Care was taken to make sure that the child understood the task. Whenever a child did not provide a complete set of three choices, the observer would ask if there was anybody else to be nominated. A negative response or hesitation by the child would end the inquiry.

RESULTS

Socio-structural analysis

The transformation of the initial proximity data into a dyadic co-occurrence matrix constituted the key step for a structural description of the affiliative organization. This matrix summarized for each child the frequency of being in social proximity of other peer group member. Taking for example a subgroup composed of three children (A, B,C), the following tallies would be entered in the co-occurrence matrix: one for the dyad (AB) another for (BC) and a last one for (AC). Frequencies of association between peers for the total period of observation were tabulated into a triangular matrix for each group. The original matrix was then reflected on its majors diagonal to produce a symmetric co-occurrence matrix for the total observational period. An example of such a matrix for A is shown in Table 1.

The second step in the socio-structural analysis involved examining similarities between associative profiles evident in the co-occurrence matrices. An important analytic issue concerns the question of whether to use euclidian distances or similarity indices to reflect patters of connectedness of individuals within a social network (Scott, 1990). In numeric classification, the decision of grouping observations according to distances on underlying dimensions or in terms of shared variance across descriptors must be based on a consideration of the theoretical relevance of the metric under study (Legendre & Legendre, 1983). In the present case, Pearson correlations coefficients were used to index the shared variance of the patterns of association evident in the dyadic co-occurrence matrices. These coefficients provided frequency independent measures of similarity of association profiles for subjects within each group. The resulting similarity matrix for Group A is shown in Table 2.

Identification of Affiliative Networks

Similarity matrices were analyzed using complete linkage hierarchical clustering procedures. Figures 1, 2 and 3 provide a visual representation of the results of these analyses. Individual children were identified as members of the same social subgroup when pair-wise indices of similarity among cluster members significantly exceeded chance expectations ($p < .05$). The cutting point of the dendrograms at these similarity levels separated unclustered children from those included in social subgroups.

Table 1
Dyadic co-occurrence matrix for a five-year-old group

Ss	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	21	22	23	24	25
1	--	26	147	13	125	79	120	37	117	147	39	174	31	99	141	240	10	70	87	94	60
2	26	--	109	34	9	303	12	36	68	74	102	40	32	6	10	3	0	9	25	98	17
3	147	109	--	58	59	125	29	59	104	68	61	121	130	42	48	108	8	65	41	71	82
4	13	34	58	--	1	47	42	74	133	26	10	75	61	41	106	44	2	11	17	22	131
5	125	9	59	1	--	30	10	98	61	85	15	67	117	328	46	507	0	21	45	46	37
6	79	303	125	47	30	--	13	12	78	104	152	83	137	64	36	29	2	26	45	82	34
7	120	12	29	42	101	13	--	137	21	132	21	178	66	96	59	30	1	51	37	107	88
8	37	36	59	74	98	12	137	--	126	112	52	175	98	145	130	8	16	18	45	91	11
9	117	68	104	133	61	78	21	126	--	32	56	46	91	41	77	103	0	6	7	38	26
10	147	74	68	26	85	104	132	112	32	--	157	183	75	125	41	51	1	115	63	202	103
11	39	102	61	10	15	152	21	52	56	157	--	33	14	52	41	46	6	88	44	111	82
12	174	40	121	75	67	83	178	175	46	183	33	--	182	157	127	73	10	14	18	88	18
13	31	32	130	61	117	137	66	98	91	75	14	182	--	112	13	47	12	16	9	48	10
14	99	6	42	41	328	64	96	145	41	125	52	157	112	--	151	278	4	9	22	48	64
15	141	10	48	106	46	36	59	130	77	41	41	127	13	151	--	137	2	17	55	26	33
16	240	3	108	44	507	29	30	8	103	51	46	73	47	278	137	--	0	52	99	37	67
21	10	0	8	2	0	2	1	16	0	1	6	10	12	4	2	0	--	19	19	1	39
22	70	9	65	11	21	26	51	18	6	115	88	14	16	9	17	52	19	--	215	351	237
23	87	25	41	17	45	45	37	45	7	63	44	18	9	22	55	99	19	215	--	240	150
24	94	98	71	22	46	82	107	91	38	202	111	88	48	48	26	37	1	351	240	--	220
25	60	17	82	131	37	34	88	11	26	103	82	18	10	64	33	67	39	237	150	220	--

Table 2
Similarity matrix of a five-year-old group

Ss	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	21	22	23	24	25
1	1.00	-.03	.27	.21	.60	-.20	.29	.34	.05	.16	.10	.30	.39	.60	.46	.46	-.30	.01	.08	-.05	-.01
2		1.00	.39	.00	-.24	.91	-.20	-.18	.16	.18	.68	-.00	.38	-.19	-.19	-.22	-.18	.08	-.01	-.03	-.02
3			1.00	.22	.16	.49	.20	-.10	.51	.24	.24	.19	.38	.16	.19	.00	-.00	-.11	.01	-.05	-.30
4				1.00	.03	-.07	.08	.27	.39	-.14	.05	.05	.16	.00	.24	-.17	.31	-.04	-.11	-.11	-.28
5					1.00	-.17	.11	.04	.22	-.00	-.09	.30	.15	.85	.61	.90	-.16	-.12	-.00	-.22	-.12
6						1.00	-.14	.02	.16	.12	.46	-.02	.08	-.28	-.26	-.16	-.20	-.05	-.19	-.04	-.18
7							1.00	.62	.09	.66	.06	.68	.39	.42	.45	.28	.22	.16	.17	.13	-.02
8								1.00	.04	.26	-.21	.64	.51	.30	.38	.28	-.40	-.17	-.34	-.28	-.14
9									1.00	-.08	-.16	.43	.28	.31	.49	.08	-.17	-.33	-.23	-.49	-.34
10										1.00	.43	.37	.23	.05	.18	.05	.16	.42	.42	.42	.27
11											1.00	.00	.11	-.23	-.27	-.28	-.01	.37	.40	.45	.26
12												1.00	.53	.35	.44	.11	-.27	-.18	-.20	-.25	-.21
13													1.00	.35	.41	.25	-.31	-.34	-.33	-.30	-.31
14														1.00	.46	.77	-.22	-.19	-.07	-.29	-.34
15															1.00	.32	-.06	-.24	-.21	-.25	-.19
16																1.00	-.12	-.14	-.08	-.16	-.13
21																	1.00	.34	.30	.63	.05
22																		1.00	.92	.93	.88
23																			1.00	.82	.84
24																				1.00	.78
25																					1.00

In order to verify if children included in the same cluster also selectively associated with co-members of their social unit, chi-square analyses were used to examine the relative density of association among subgroup members. These tests were conducted in order to determine if the likelihood of mutual association surpassed the expected value. Results permitted distinguishing children in social aggregates from members of cohesive social cliques in terms of selective association between co-members.

The joint use of these two statistical criteria distinguished three qualitatively different social elements within the group's affiliative network (see Figure 1 to 3):

Social Cliques: subgroups of children whose association profiles were similar and whose level of mutual association were significantly higher than expected by chance (Chi Square (1) > 10.51, p <.001)

Social Aggregates: individuals who had similar association profiles, but did not show a significantly high rate of mutual association (Chi2 (1) < 10.51, p > .001)

Social Outliers: Subjects whose association profiles did not resemble that of any other peer group member.

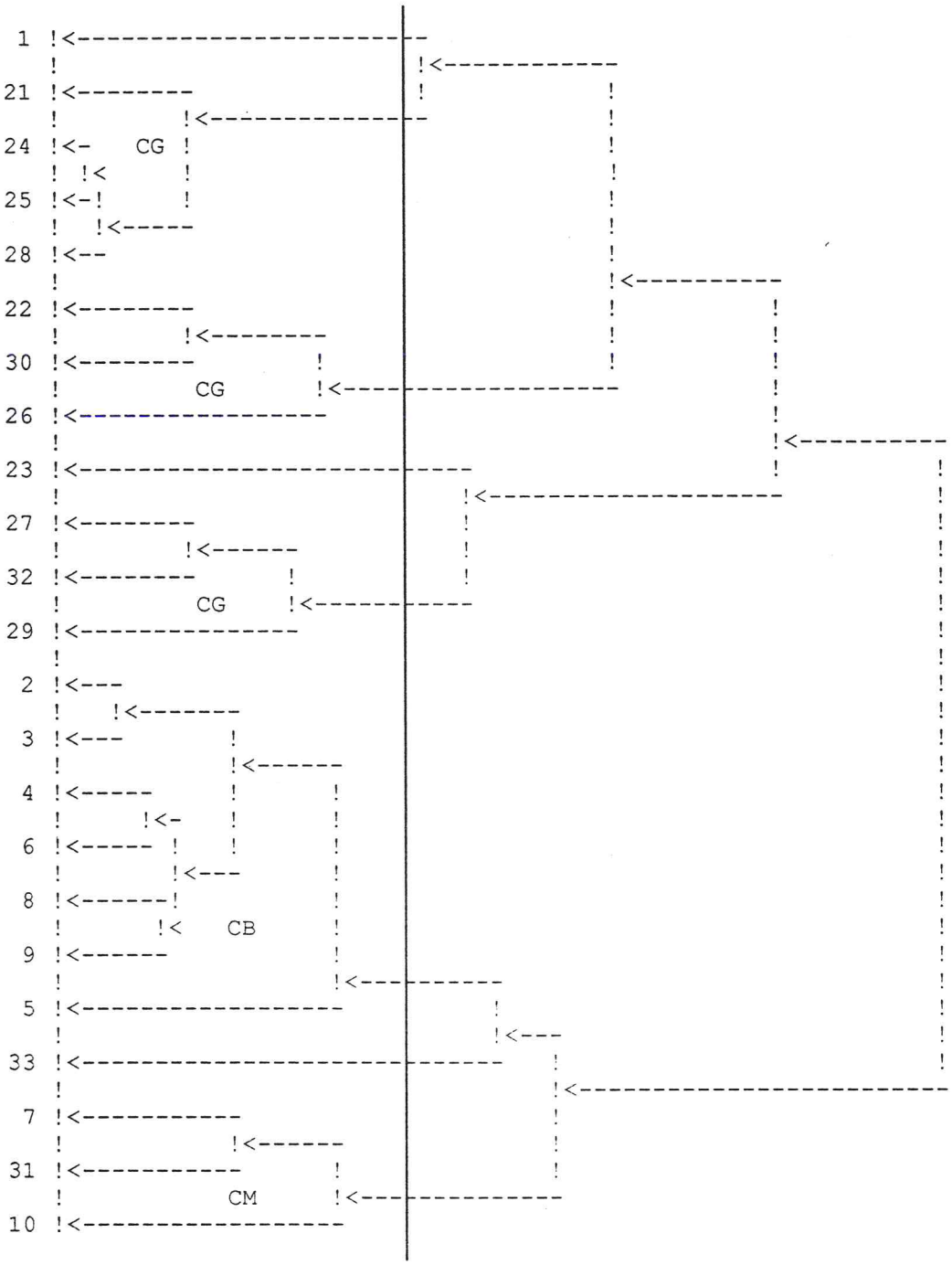
These different affiliative roles are identical to those already identified in previous research on children social networks (Strayer, et al., 1988).

Composition of Social Units

The vast majority of children (76%) were integrated within cohesive social cliques. Social aggregates were evident in only one of the three groups; and thus this type of social grouping emerged a relatively rare social role (8% of the total sample). Finally, a small percentage of children (16%) were identified as social outliers. There was no evidence for

Figure 1

Dendrogram of Group A



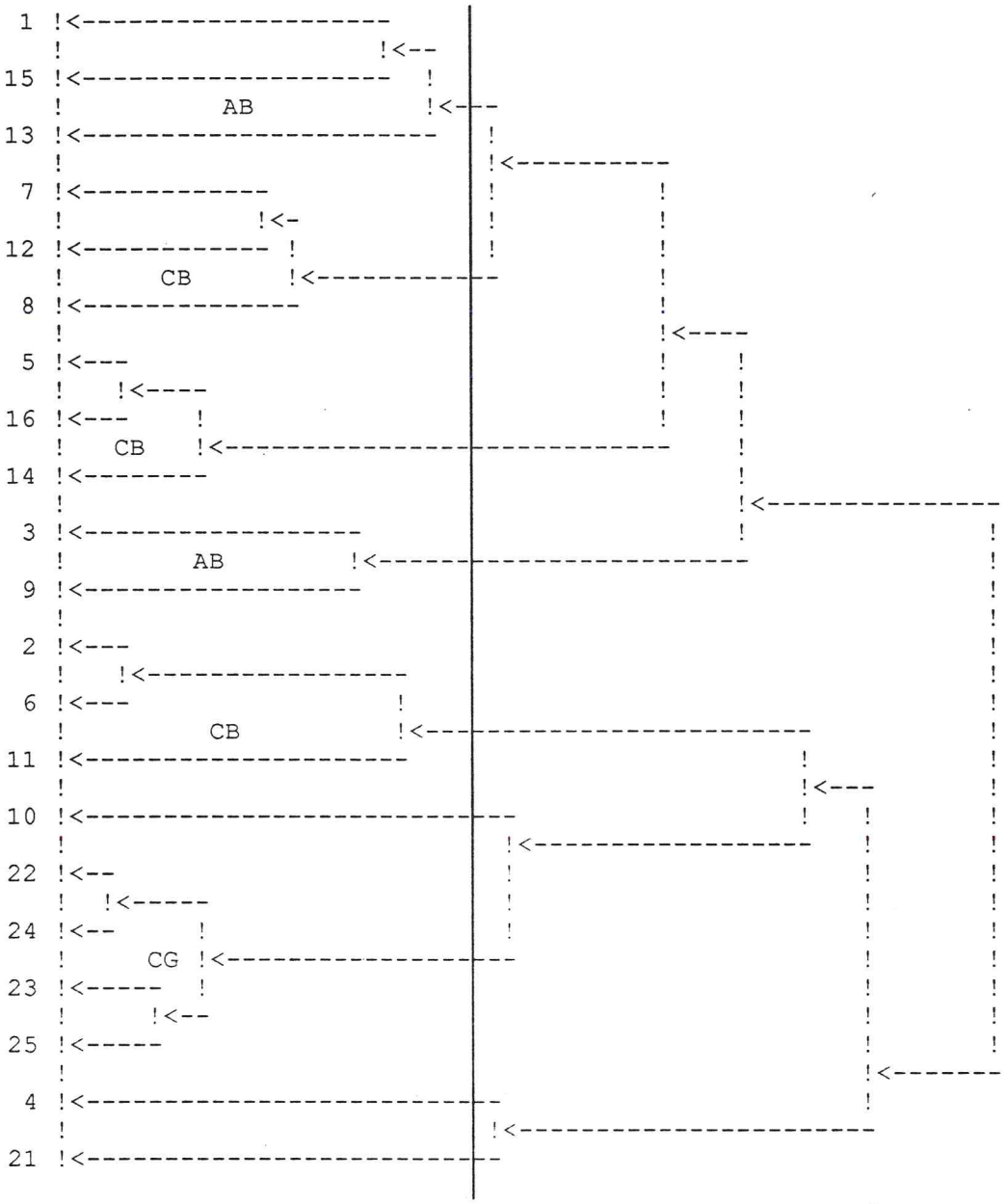
Cutting point ($p < .05$)

Boys: 1 to 10; Girls: 21 to 33. N=23

C: social clique; G: girls; B: boys; M: mixed.

Figure 2

Dendrogram of Group B



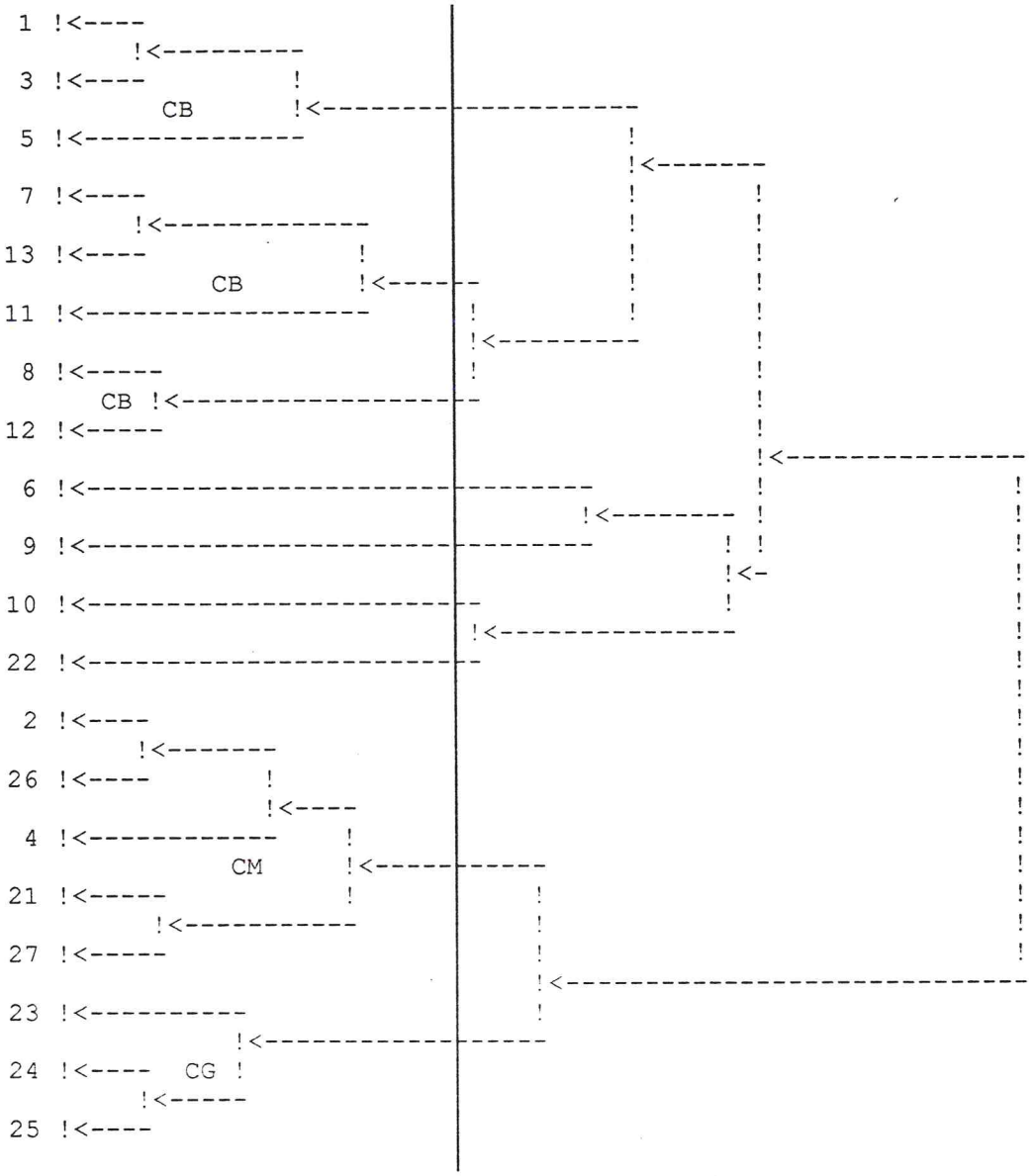
Cutting point ($p < .05$)

Boys: 1 to 16; Girls: 21 to 25; N=21

C: social clique; A: social aggregate: G: girls; B: boys; M: mixed.

Figure 3

Dendrogram of Group C



Cutting point ($p < .05$)

Boys: 1 to 13; Girls: 21 to 27; N=20

C: social clique; G: girls; B: boys; M: mixed.

gender differences in terms of the three affiliative roles (Chi2 (2) = 3.50, p >.17). Table 3 summarizes the information about affiliative roles within the three peer groups.

Table 3
Group Composition by Affiliative Roles

Affiliative Roles	Group A	Group B	Group C	Total
Girls	N=13	N=5	N=7	N=25
Clique members	85%	80%	86%	84%
Aggregate members	0%	0%	0%	0%
Social Outliers	15%	20%	14%	16%
Boys	N=10	N=16	N=13	N=39
Clique members	90%	56%	77%	62%
Aggregate members	0%	31%	0%	13%
Social Outliers	10%	13%	23%	15%
Total	N=23	N=21	N=20	N=64
Clique members	87%	62%	80%	76%
Aggregate members	0%	24%	0%	8%
Social Outliers	13%	14%	20%	16%

The results of network analyses for the three groups yielded a total of 16 subgroups (14 cliques and 2 aggregates) and 10 outliers for a total of 26 social units. Table 4 summarizes the information about subgroup composition for each of the preschool classes. Globally, the affiliative structures of the three groups were similar both in terms of total number of affiliative subgroups and number of social outliers. A trend toward gender homogeneity for social cliques was evident in all three groups. Indeed, only two of the social cliques were of mixed sex composition, one in Group A the other in Group

C. Overall, social cliques were composed of an average of 3,5 subjects (standard deviation of 1,2). A Student t -test revealed no significant differences in average size between boys' and girls' cliques (t (10) = -.04, 2-tails, p > .97). The two social aggregates identified in Group B were composed respectively of 2 and 3 boys. Overall, inspection of the findings indicated that the number of social outliers is proportional to the number of subgroups for both sexes.

Table 4

Group Composition by Social Units

Social Units	Group A (N=23)	Group B (N=21)	Group C (N=20)	Total
Girls				
Social Cliques	3	1	1	5
Social aggregates	0	0	0	0
Social Outliers	2	1	1	4
Boys				
Social Cliques	1	3	3	7
Social aggregates	0	2	0	2
Social Outliers	1	2	3	6
Mixed Social Cliques	1	0	1	2
Total of Social Units	8	9	9	26

Ingroup Bias of Affiliative Subgroups

Children's positive nominations were distinguished in two categories; nominations given to co-members of their social unit (ingroup) and to other children in the peer group

Table 5

Ingroup/Outgroup Positive Nominations of Peers

(Clique versus Aggregate Membership)

Subject Membership	Allocation of Nominations	Observed	Expected	Chi-square
Social Clique	Total:	140		
(N=49; Nu=14)	Ingroup:	53	19.6	
	Outgroup:	87	120.4	66.18 ***
Social Aggregate	Total:	16		
(N=5; Nu=2)	Ingroup:	2	1.3	
	Outgroup:	14	14.7	0.44

*** $p < 0.001$;

N=number of subjects; Nu=number of social units

Table 6

Ingroup/Outgroup Negative Nominations of Peers

(Clique versus Aggregate Membership)

Subject Membership	Allocation of Nominations	Observed	Expected	Chi-square
Social Clique	Total:	125		
(N=49; Nu=14)	Ingroup:	14	17.5	
	Outgroup:	111	107.5	0.81
Social Aggregate	Total:	13		
(N=5; Nu=2)	Ingroup:	3	1	
	Outgroup:	10	12	4.02*

* $p < 0.05$

N=number of subjects; Nu=number of social units

(outgroup). Observed frequencies of ingroup and outgroup positive nominations were summed separately for members of cliques (49 children within 14 social cliques) and aggregates (5 children within 2 social aggregates). The same procedure was employed with negative nominations. Ingroup and outgroup expected frequencies were calculated for both positive and negative nominations according to a chance model based upon the number of possible partners in each group. Observed and expected frequencies were compared with chi-square tests. The results of these analyses are shown in Tables 5 and 6.

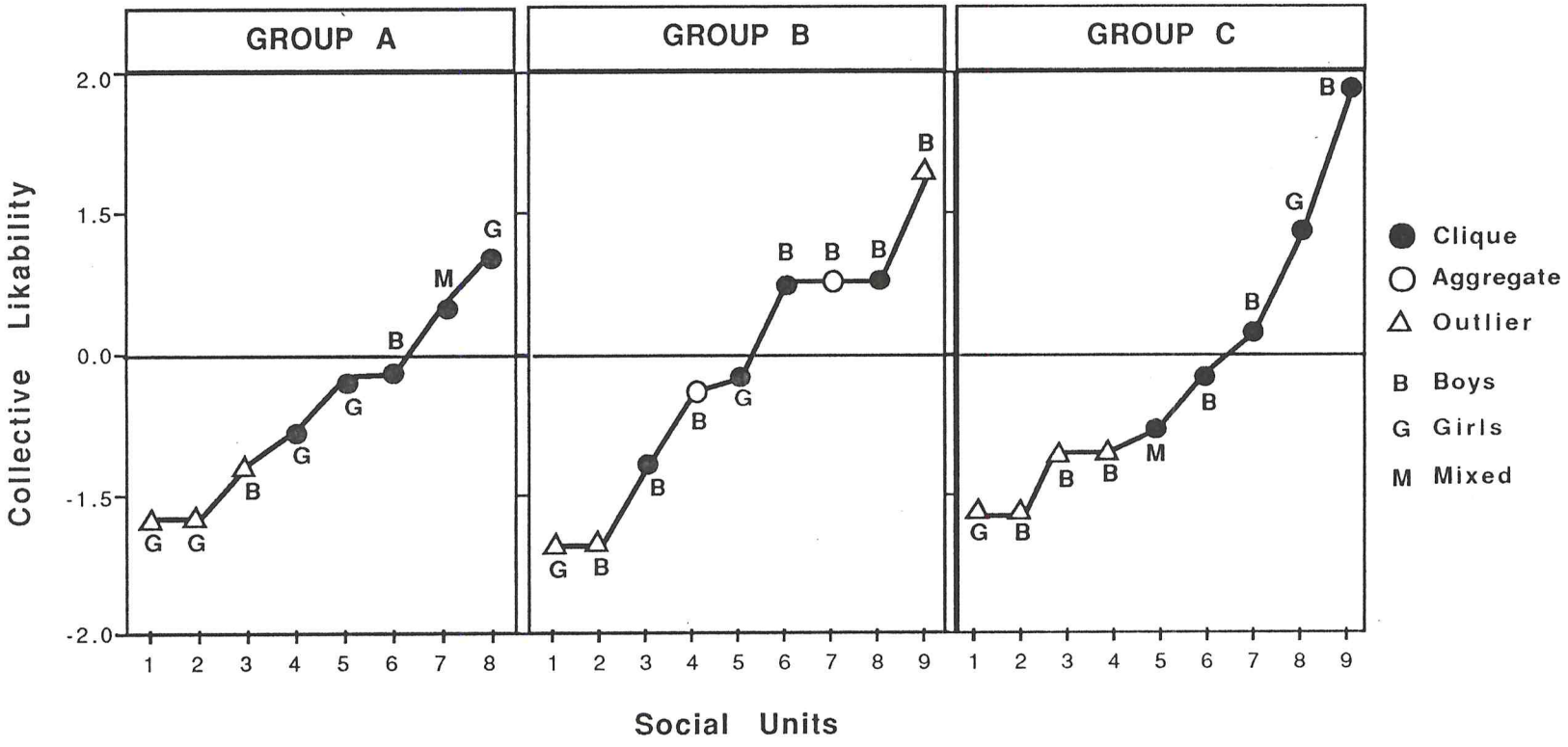
Chi-square tests revealed that clique members' positive nominations of co-members were markedly more frequent than expected by chance ($Chi2\ (1) = 66.18$, $p < .001$). Results further indicated that clique members' allocation of negative nominations towards peers outside of their local entourage did not attain significance. In contrast, positive nominations of children in social aggregates were not more frequently directed towards co-members than expected by chance, while negative nominations of co-members reached significance levels ($Chi2\ (1) = 4.02$, $p < .05$).

Stratification of Affiliative Networks

The total number of positive nominations received by each subgroup member from his peers was transformed into a standardized likability score (IL) for each group. The collective likability (SL) of each subgroup was calculated by averaging the likability scores of its members. Figure 4 shows subgroup scores plotted by descending magnitude against a vertical axis reflecting standard values on received positive nominations. Individual likability scores for social outliers are also identified Visual inspection of each of the three graphs revealed that most and least attractive subgroups can be differentiated in terms of peer likability.

FIGURE 4

Social Units Stratification on Collective Likability



Note: The collective likability (CL) of each subgroup is calculated by averaging the standardized likability scores of its members. For social outliers, (CL) corresponds to their standardized likability scores.

Subgroup similarity on peer likability

In order to test if individual likability was associated with subgroup membership, two distance scores were calculated for the members of subgroups in the preceding analyses. The absolute value of each child's likability (| IL |) provided a distance score (Δ ML) to the group standardized mean likability (ML=0). Similarly, the subgroup likability score (SL) was subtracted from each child's likability score (IL); Δ SL, the absolute value of this difference provided a distance score to the subgroup mean (Δ SL = | IL - SL |). A paired Student t-test statistic comparing both distance scores showed a significant tendency for children's likability to be closer to that of their immediate subgroups than to that the whole peer group (Δ SL = 0.54, sd= .51; Δ ML = 0.77, sd= .57; $t(53) = 3.25$, $p < .01$, two-tailed test).

Ingroup Bias as a Function of Clique Status

For each peer group, clique likability scores were transformed into percentile ranks (PR) and three status conditions were identified (High: $PR \geq 70$; Medium: $70 < PR > 30$; Low: $PR \leq 30$). Fourteen social cliques from the three groups were included in this analysis (High-status: 6 cliques, total of 18 children; Medium-status: 3 cliques, total of 14 children; Low-status: 5 cliques, total of 17 children). Gender and subgroup bias were then examined controlling for type of clique. Comparison of social status and gender revealed no differences between boys' and girls' cliques (Chi^2 (2) = .21, $p > .90$). Results for the subgroup bias analyses are presented in Tables 7 and 8. Chi-square tests revealed that positive nominations of co-members were markedly more frequent than expected by chance for members of high (Chi^2 (1) = 42.47, $p < .001$) and medium status (Chi^2 (1) = 45.95, $p < .001$) cliques. Positive nominations of co-members did not reach significance levels for members of low status cliques. None of the negative nominations were directed more often than expected to members of the other social units.

Table 7
Ingroup/Outgroup Positive Nominations of Peers
(by High, Medium and Low-Status Clique Membership)

Subject Membership	Allocation of Nominations	Observed	Expected	Chi-square
High-status	Total:	55		
(N=18; Nu=6)	Ingroup:	20	5.5	
	Outgroup:	35	49.5	42.47***
Medium-status	Total:	38		
(N=14; Nu=3)	Ingroup:	25	8	
	Outgroup:	13	30	45.95***
Low-status	Total:	47		
(N=17; Nu=5)	Ingroup:	8	5.6	
	Outgroup:	39	41.4	1.12

*** $p < 0.001$; N = number of subjects; Nu = number of social units

Table 8
Ingroup/Outgroup Negative Nominations of Peers
(by High, Medium and Low-Status Clique Membership)

Subject Membership	Allocation of Nominations	Observed	Expected	Chi-square
High-status	Total:	46		
(N=18; Nu=6)	Ingroup:	3	4.6	
	Outgroup:	43	41.4	0.62
Medium-status	Total:	39		
(N=14; Nu=3)	Ingroup:	4	8	
	Outgroup:	35	31	2.71
Low-status	Total:	40		
(N=17; Nu=5)	Ingroup:	7	4.8	
	Outgroup:	33	35.2	1.15

DISCUSSION

In the present socio-structural analyses, there was great similarity in the obtained affiliative structures. The large majority of children was firmly integrated in cohesive social cliques. The present network analyses with five-year-old children revealed levels of subgroup cohesive association almost equal to those reported for primary school children (LaFerté & Legault, 1991; Strayer 1991; Veríssimo & Santos, 1991). This shows that procedures for affiliative network analyses provide consistent findings even when operational definitions of social association are conceptually distinct, when there are important variations in social and cultural contexts, and when there are relatively large age differences in groups under study. Multivariate techniques appear to provide a robust method for identifying structural properties of peer group affiliative organization.

The present findings also indicate that networks analyses based on spatial proximity and shared interest in joint activities may complement results obtained from a subgroup nomination procedure with older children (Cairns, et al. 1985) or those obtained from observation of naturally occurring behavior affiliative behavior with younger children (Strayer, et al. 1988). Focusing on the preschool period, the study of affiliative organization can be pursued without using measures of affiliative exchange between children. Such a proximity assessment of affiliative networks may prove useful for future research attempting to assess how membership in an affiliative subgroup constrains modes of individual social functioning. Such complementary information could also be quite useful for research with primary school children. Comparison of social networks based upon proximity and subgroup nominations could help to clarify whether age-related differences in children's reports about the cohesive

structure of their group reflect cognitive changes in social representation capacities or real changes in the organization of affiliative activity with peers.

Results of ingroup bias analyses showed that five-year-old clique membership was clearly associated with ingroup preference. This result provides an important validation of our socio-structural analysis for representing early affiliative networks. In addition, it is consistent with the contention that membership within social cliques may provide important occasions for the development and maintenance of interpersonal relationships. More importantly, clique members did not show any significant outgroup rejection. Absence of outgroup rejection appears for the moment to be a distinctive feature in five-year-olds groups, since the opposite result has been reported in research on primary school children (Laferté & Legault, 1991). Further research should disentangle which processes are responsible for outgroup rejection among older children.

Regarding children identified on social aggregates, present findings show quite different patterns of ingroup preference which conform to expectations regarding the non-cohesive nature of their loose associations. The speculation that the absence of selective association and mutual preference among these children might increase their probability of mutual negative choices received some support. Results showed that children in social aggregates actually had significant ingroup rejection. In fact, their reported similarity in peer association may only reflect their tendencies to selectively approach the same playmates. Thus, such a finding may reflect tacit competition among these children for inclusion in an established clique. However, such interpretations are at best tentative, since only two social aggregates were identifyed in this study.

The expectation that affiliative subgroups are stratified on a likability dimension also received positive support. Subgroup similarity on peer likability further clarified initial results on ingroup bias and provided grounds for a more detailed analysis of status differentials. The introduction of status differentials in the analysis of ingroup bias revealed that the salience of co-members as most liked play partners was particularly strong for members of high and medium-status cliques, but that it did not exceed chance expectations among members of the low-status cliques. This is an important finding since it suggests that social cliques are not all governed by the same social rules. However, once again this finding warrants replication, since it is possible that more sensitive measurement of social likability would help to clarify the apparent lack of ingroup preference in low status cliques.

From an ethological perspective, a major advantage of the approach adopted in this study was the derivation of an affiliative structure based on observation of social proximity. Such an index of social organization invites a more detailed consideration of how social insertion in the peer group differentially influences children's social activity. However, the subgroup observation technique is not a common data collection technique either in animal or in child ethology. The question remains open concerning whether a more traditional sampling method would replicate the present findings. Another major concern relates to the validity and precision of the forced sociometric nomination procedure. Different sociometric methods might improve the present assessment of subgroup social discrimination. More precise information about peer likability might reveal stronger subgroup similarity indices and more accentuated effects for the interaction of ingroup bias and clique status. These issues justify extending the the network approach using alternative measures of social proximity and peer likability.

Overall, the results of ingroup bias, social stratification and subgroup similarity do not contradict the contention that peer group affiliative structure constrains individual social likability. Given their greater subgroup cohesion, high status clique members may play a more salient role in the social adjustment of their peers. High status subgroups may have important reference roles for the other members of the peer group. However, the present findings do not permit concluding that some social subunits have special socializing functions for group members. Independent measures of social influence are needed to support this claim.

CHAPTER III

A SOCIO-STRUCTURAL STUDY OF PRESCHOOL AFFILIATIVE NETWORKS AND SOCIAL ATTENTION

Network analyses of the cohesive structure appear to provide an alternative means for assessing individual differences in social integration within the preschool peer group. The joint use of these analytic techniques and sociometric measures of acceptability yields a view of a stratified affiliative structure that reflects higher-order organizational properties in the group. Analysis of organizational features of the social unit permits an empirical assessment of specific affiliative roles within the peer group. The identification of stratified subgroups appears to offer new insights about the nature of early preferences among preschool children.

However, before concluding that social stratification and social bias are definitive properties of five-year-old peer groups, a number of methodological issues merit further clarification. In this second study, potential methodological limitations in the network procedures are examined and alternative data collection procedures are proposed. A first objective in this study entails controlling for potential bias in the derivation of associative profiles that results from tabulating collective contexts rather than individual patterns of interpersonal proximity. In addition, a second objective entails developing a more precise measure of social likability in order to permit a more accurate assessment of ingroup bias and subgroup stratification. Finally, a third research objective involves validating the findings from network analyses with a behavioral measure of naturally occurring social activity. This final question involves examining the relations between obtained assessments of subgroup membership and network status with a theoretically relevant behavioral index of social referencing (Chance, 1967; Kummer, 1971).

An Alternative Approach to Networks Analysis

The Assessment of Association Profiles

In previous socio-structural approaches to affiliative organization, a basic question arises as to whether the obtained social networks offer more than a mere summary of structures already imposed by data collection procedures. In fact, both the subgroup nomination procedure (Cairns et al, 1985) and the proximal subgroups procedure (Santos, preceding chapter) require pooling information about perceived subgroups. The former approach employs children's perceptions of specific social subunits, while the latter reflects trained observers' perception of spontaneous occurring subgroups. The tabulating algorithm used for transforming lists of subgroups into a single matrix of dyadic co-occurrence may artificially inflate measures of similarity in association profiles. The multiple entries in the co-occurrence matrix may also distort indices of density in peer association. Thus, the obtained subunits -- the cliques, aggregates and outliers -- that emerge in the preceding socio-structural analyses may only reflect statistical byproducts of aggregating data generated by selected social informants.

In ethological research, dyadic co-occurrence matrices are usually constructed from unbiased estimates of rates or probabilities of social interaction (Lehner, 1979; Strayer et al, 1988). Using repeated, but independent assessments of social proximity for each member of the social group would permit describing children's affiliative roles in a fashion that overcomes this potential methodological flaw in the subgroup identification procedure. Focal observations derived from a nearest-neighbor technique, a measure that is unrelated to size of the immediate social entourage, permits an independent assessment of individual and collective patterns of social association. The use of such unbiased

measures would provide confirmatory evidence the appropriateness of socio-structural analysis of affiliative organization in children's play groups.

Measures of Bias and Stratification

Although the analysis of ingroup bias provided evidence for the coherence of the obtained social cliques, the focus on positive and negative peer nominations imposed limits on understanding ingroup bias and social stratification. Requesting that children furnish three positive and three negative nominations may not be congruent with their daily social experiences. In fact, behavioral assessments of dyadic affiliation suggest that most five-year-olds do not have three stable friendships (Strayer, Tessier et Gariépy, 1985). Furthermore, it remains unclear whether sociometric nominations, especially negative choices, provide reliable information about preschool children's true preferences (Asher et al, 1979; Boivin, Tessier & Strayer, 1985; Hartup et al, 1967). A more stable and informative measure of peer preferences seems necessary for a more accurate assessment of stratification and ingroup bias within preschool peer groups.

Vaughn & Waters (1980, 1981) have argued that a paired-comparisons sociometric technique is a more appropriate procedure for obtaining valid measures about social preferences with preschool children. In a paired-comparison approach, preferences are established by tabulating the total number of times that each child is chosen as preferred when contrasted with all other peer group members. Although the method usually provides a rank ordering of peers on a likability scale, it can also serve to establish each child's most and least preferred playmates. An important advantage of this method is that it is not limited by preconceptions about the child's capacity to readily list three most and three least liked peers. Children are not directly asked to furnish positive or negative

evaluations, they are only required to judge choose which child they prefer in complete a series of dyadic contrasts.

In present study, the measure of ingroup bias is derived from scaled preference scores based upon paired comparisons of more-liked peers. Since the method yields a bipolar continuum of social likability, it provides a more precise index for assessing ingroup preference and outgroup rejection. Children in social cliques who selectively associate with co-members should judge them more often as preferred peers whereas outsiders should fall to the lower extreme of the likability scale. In contrast, given their predicted lack of mutual association, members of social aggregates should not show any systematic preference for or rejection of co-members.

The use of more accurate sociometric indices also has implications for the evaluation of stratification of the affiliative network. In fact, even all co-members are not among three top three choices (for example, when there are more than three peers in a clique), they may still be viewed more positively than an average peer. If we predict that cohesive associations should involve more favorable comparisons of co-members, higher status cliques might show the highest levels of ingroup preference and outgroup rejection. However, we might also expect that members of low status cliques still favor co-members viz-a-viz an average peer. Thus, a more continuous measure of social preference would better reflect the dynamics of both ingroup bias and peer judgements about the differential likability of children in other subgroups. Taken together, the more exact assessment of these two effects could reveal a higher degree of subgroup similarity within the peer group.

Socio-structural Constraints on Social Behavior

The ethological interest in peer group dominance has often been based upon an underlying theoretical assumption that dominance status provides a non-intrusive child-based measure of social competence with peers. For example, more dominant children are assumed to have more effective strategies for resolving disputes with their peers (Omark, 1980). Chance and Jolly's (1970) proposed an alternative model which postulated that dominant individuals rose in status and were able to control the action of others because they were able to command more attention within the social unit. In studies of preschool children, Abramovitch (1976) and Hold (1977) presented empirical data that supported Chance's model. Other studies have shown that being looked at is related to serving as a model for imitation by peers (Abramovich & Grusec, 1978); to the initiation, organization and regulation of group activities (Abramovitch & Strayer, 1978; Hold, 1977); to sociometric rank as well as to the capacity to facilitate and sustain play activities (Vaughn & Waters, 1980).

However, Strayer (1978, 1979) argued that the theoretical analysis of the receipt of social attention overemphasized the importance of social dominance. His analyses of sociographic representations of the affiliative bonds indicated that social attention in four and five-year-old peer groups was more closely coordinated with affiliative bonds than with asymmetrical power relations. In a later study, Strayer & Trudel (1984) suggested that the apparent correlation between receipt of social attention and social dominance may only reflect colinearity in assessments of dominance and affiliative status within preschool groups.

Psychological studies of peer social relations also criticized Chance's notion that dominant children command the attention of peers. Dismissing the central role of social dominance, Vaughn & Waters (1980, 1981) proposed that social competence was the critical theoretical construct for understanding both the allocation of social attention and peer group social organization. From their perspective, individual differences in social competence were the primary determinant of the differential allocation of peer group attention. Implicitly, competence and social learning were seen as basic mechanisms leading to the coordination of affiliative and dominance roles within the peer group. Vaughn & Waters (1981) reported strong positives correlation between individual competence, likability and attention rank.

Strayer (1980c) criticized this view noting that the competence model of peer group social organization involved a reduction of higher order social processes to a calculus of individual differences. Although at a psychological level the model may provide an attractive explanation for early socialization processes, its focus on the individual traits leads inevitably to neglect of the more dynamic aspects of social processes. Such a critique is especially pertinent for the network approach to affiliative social organization. Observational assessment of social attention allocated to particular peers could clarify the extent to which the group's affiliative structure constrains the allocation of social attention. If visual regard is coordinated with affiliative bonds (Strayer, 1980b), members of cohesive cliques should selectively attend to co-members as most frequent targets of social referencing. In contrast, members of social aggregates should not necessarily attend to their co-members. The demonstration of this effect could provide both an important validation for network analyses and some clarification of the relative salience of individual differences in social competence as a determinant of visual

regard in natural peer groups. Since previous network findings suggest stronger ingroup bias among higher status cliques, we predict that the degree of ingroup referencing will also vary as a function of the affiliative status of the social cliques.

METHODS

Subjects

The sample consists of a group of American preschool children, predominantly white, attending the nursery school at the Institute of Child Development, Minneapolis, Minnesota. Children were observed during the three sessions of the school year (Fall, Winter, Spring). At the beginning of the Fall session the group was composed of 22 children (8 girls and 14 boys; age range : 48 to 58.8 mo). Two girls left the group after the Fall session, one re-entered at the beginning of the Spring session. Twenty children participated regularly throughout the school year. More than half of the children came from professional families, while the remainder came from various socioeconomic backgrounds.

Procedures

Spatial proximity was identified using the nearest neighbor techniques (Lehner, 1979; Kummer,1968). Sequential focal sampling of individual children was conducted in the classroom during free play periods for three sessions of the school year. Each child was observed for 10 seconds and the name of the nearest neighbor was recorded. A minimum of 40 observational rounds per child were conducted during the Fall session while a minimum of 100 observational rounds were obtained during the Winter and Spring sessions. The order in which the children were observed was random. The two observers responsible for the data collection maintained a percent agreement above 80%.

Picture sociometric assessments were conducted at the end of each session (Fall, Winter, Spring). Each child was photographed and cards were prepared for each possible pairing of children in the group. These pairs were presented to each child, one at a time. Children were asked "Which of these two children do you especially like?". The order of presentation was such that a photograph could not be presented twice before all the other children of the group were seen at least once by the child. Each child's picture appeared an equal number of times on both left an right sides of the stimulus cards.

Frequency of visual regard among peers was assessed independently of proximity sampling. Sequential focal sampling of each child's looks and glances towards peers was conducted in the classroom during free play periods. A look was defined as an orientation of the face and eyes towards a peer for two seconds or more. A glance was defined as a similar orientation of face and eyes towards a peer for less than two seconds. Each child was observed for 10 seconds and the names of peers looked or glanced at were recorded. However, a target child was scored as contributing a single unit of visual regard to a given peer during any 10 second interval, even though several looks might have been directed towards the same peer. Only looks and glances clearly directed to a peer and not towards toys or other objects were included as data. A minimum of 100 observational rounds per subject were made during each session of the school term.

RESULTS

Identification of Affiliative Networks

The first step in the network analysis involved tabulating nearest neighbor observations for each child. Children were assigned rows in a dyadic matrix and observed frequencies of proximity with each other peer as nearest neighbor were tabulated

into columns. This operation was conducted separately for each session. As a result of this first tabulation three asymmetrical dyadic matrices were obtained. In a second step each matrix was rotated on its major diagonal and added to itself. As a result of this transformation, three symmetric dyadic co-occurrence matrices were obtained The dyadic co-occurrence matrix for the Spring session is shown in Table 9. Co-occurrence matrices were used for examining similarity of associative profiles. Pearson correlations provided frequency independent measures of similarity of association. Similarity coefficients of associative profiles were obtained for each session.

The similarity matrix for the Spring session is shown in Table 10. The similarity matrices were analyzed with complete linkage hierarchical cluster analyses. The cutting point of the dendrograms ($p < .05$) separated unclustered children from those included in social subgroups. Chi-square analyses distinguished social aggregates ($Chi2\ (1) < 10.51$, $p > .001$) from cohesive social cliques ($Chi\ Square\ (1) > 10.51$, $p < .001$) in terms of selective association between co-members. Figures 5, 6 and 7 show the three affiliative networks obtained for each session. The social roles evident within each of these affiliative structures again included clique members, members of aggregates and social outliers.

Table 11 summarizes the information about group composition by affiliative roles throughout the preschool year. These descriptive results reveal consistent structural information across qualitatively different data sets (social proximity versus nearest neighbor) and socio-cultural contexts (Portugal versus U.S.A.). The majority of children were clearly integrated within social cliques in the first session of the school year (68%).

Table 9
Dyadic co-occurrence matrix for the Spring

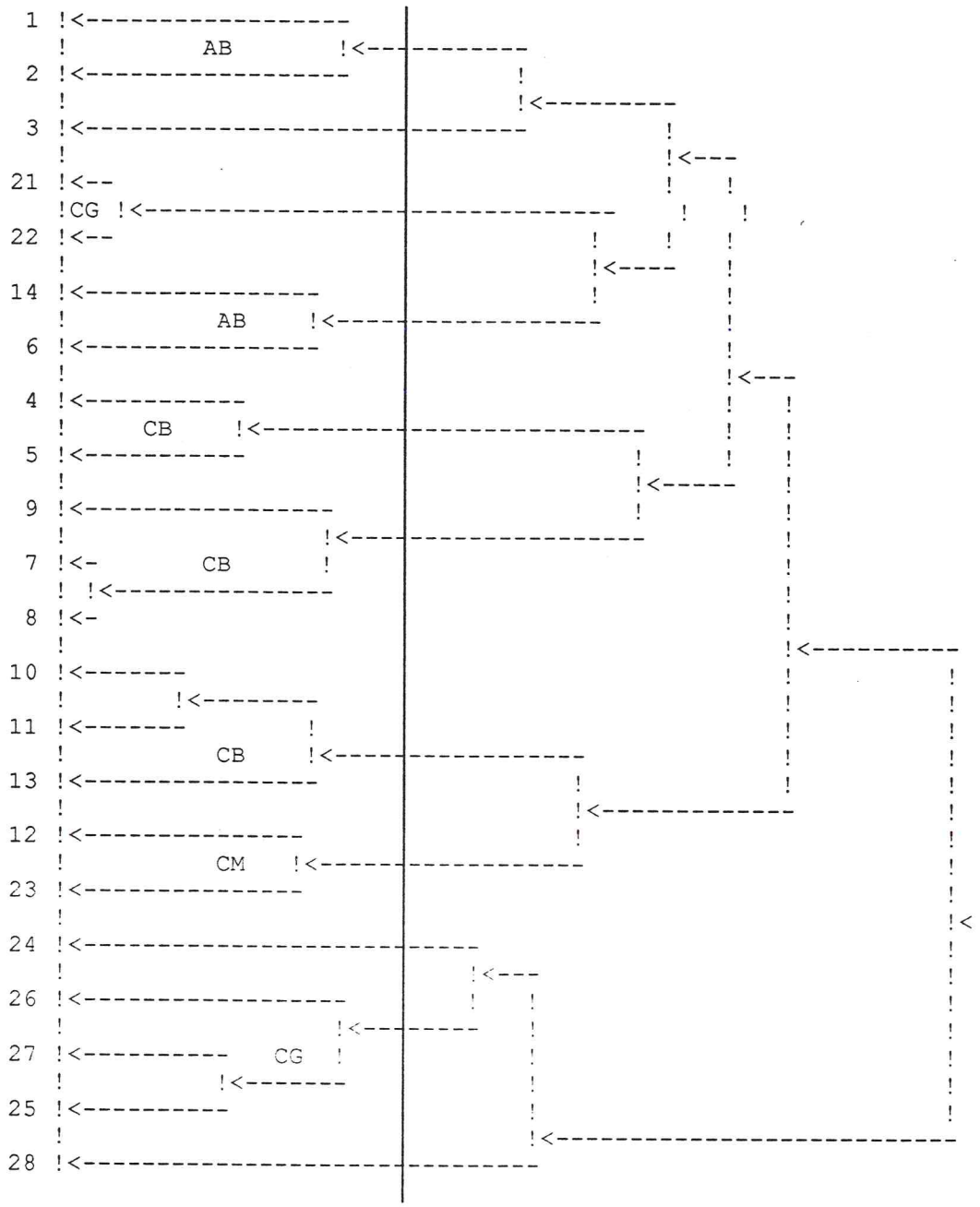
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	22	23	24	25	26	27	28
1	--	32	12	24	2	6	22	15	6	4	6	6	2	12	18	10	9	10	4	20	18
2	32	--	9	11	6	11	10	9	4	12	12	7	2	3	3	2	8	5	2	5	4
3	12	9	--	16	4	5	10	5	7	6	8	11	2	3	11	10	2	7	4	4	6
4	24	11	16	--	28	9	11	12	8	8	9	5	9	8	9	7	6	3	4	7	8
5	2	6	4	28	--	10	7	19	4	8	4	2	7	11	7	6	0	3	6	4	5
6	6	11	5	9	10	--	9	13	10	4	4	10	9	8	4	5	4	3	6	6	7
7	22	10	10	11	7	9	--	54	30	6	5	5	5	4	11	6	2	5	10	5	2
8	15	9	5	12	19	13	54	--	10	4	14	5	6	6	6	4	4	1	16	8	7
9	6	4	7	8	4	10	30	10	--	6	5	8	5	23	8	7	8	3	10	1	30
10	4	12	6	8	8	4	6	4	6	--	30	20	16	8	0	8	4	2	6	2	8
11	6	12	8	9	4	4	5	14	5	30	--	20	10	7	5	8	6	3	4	3	2
12	6	7	11	5	2	10	5	5	8	20	20	--	4	6	6	7	5	6	2	1	1
13	2	2	2	9	7	9	5	6	5	16	10	4	--	11	3	6	0	4	4	3	8
14	12	3	3	8	11	8	4	6	23	8	7	6	11	--	25	16	12	4	8	7	10
22	18	3	11	9	7	4	11	6	8	0	5	6	3	25	--	3	12	31	26	27	12
23	10	2	10	7	6	5	6	4	7	8	8	7	6	16	3	--	2	4	10	11	7
24	9	8	2	6	0	4	2	4	8	4	6	5	0	12	12	2	--	14	9	30	4
25	10	5	7	3	3	3	5	1	3	2	3	6	4	4	31	4	14	--	22	22	2
26	4	2	4	4	6	6	10	16	10	6	4	2	4	8	26	10	9	22	--	18	20
27	20	5	4	7	4	6	5	8	1	2	3	1	3	7	27	11	30	22	18	--	27
28	18	4	6	8	5	7	2	7	30	8	2	1	8	10	12	7	4	2	20	27	--

Table 10
Similarity matrix for the Spring

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	22	23	24	25	26	27	28
1	1,00	,54	,46	,15	,36	,24	,15	,22	,25	-,21	-,13	-,26	-,20	-,20	,12	-,19	,30	,12	,25	,21	,01
2		1,00	,41	,54	-,01	-,03	,24	,22	-,10	,03	,17	,29	,02	-,13	-,04	,15	-,06	-,14	-,32	,02	,01
3			1,00	,23	,33	,05	,09	,20	-,01	,08	,12	,17	,02	,14	-,18	-,08	-,03	-,02	-,07	-,02	-,11
4				1,00	,55	,26	,23	,28	-,11	-,07	-,11	-,06	-,08	,02	-,19	,07	-,30	-,15	-,27	-,15	-,02
5					1,00	,46	,37	,17	,12	-,10	,16	-,03	,42	-,10	-,18	,02	-,09	-,25	-,05	-,23	-,08
6						1,00	,53	,31	,19	,15	,16	-,32	,02	-,14	-,28	-,08	-,24	-,39	-,27	-,49	,02
7							1,00	,84	,17	-,24	,11	-,05	-,10	,15	-,14	-,15	-,06	-,15	,11	-,13	,30
8								1,00	,50	,01	-,21	-,11	-,02	-,18	-,02	,02	-,20	-,05	-,10	-,20	-,08
9									1,00	-,08	-,19	-,23	,22	,15	,08	,21	-,24	-,19	,18	,20	,22
10										1,00	,87	,70	,45	-,24	-,35	,09	-,31	-,37	-,55	-,45	-,38
11											1,00	,81	,46	-,21	-,50	-,03	-,27	-,29	-,37	-,42	-,24
12												1,00	,53	-,09	-,44	,04	-,23	-,31	-,31	-,35	-,21
13													1,00	-,05	-,26	,32	-,16	-,49	-,14	-,38	-,15
14														1,00	,08	,05	,05	,37	,34	,29	,48
22															1,00	,49	,70	,81	,65	,63	,36
23																1,00	,33	,00	-,19	-,24	,39
24																	1,00	,64	,47	,65	,57
25																		1,00	,66	,67	,44
26																			1,00	,69	,33
27																				1,00	,27
28																					1,00

Figure 5

Dendrogram for the Fall



Cutting point ($p < .05$)

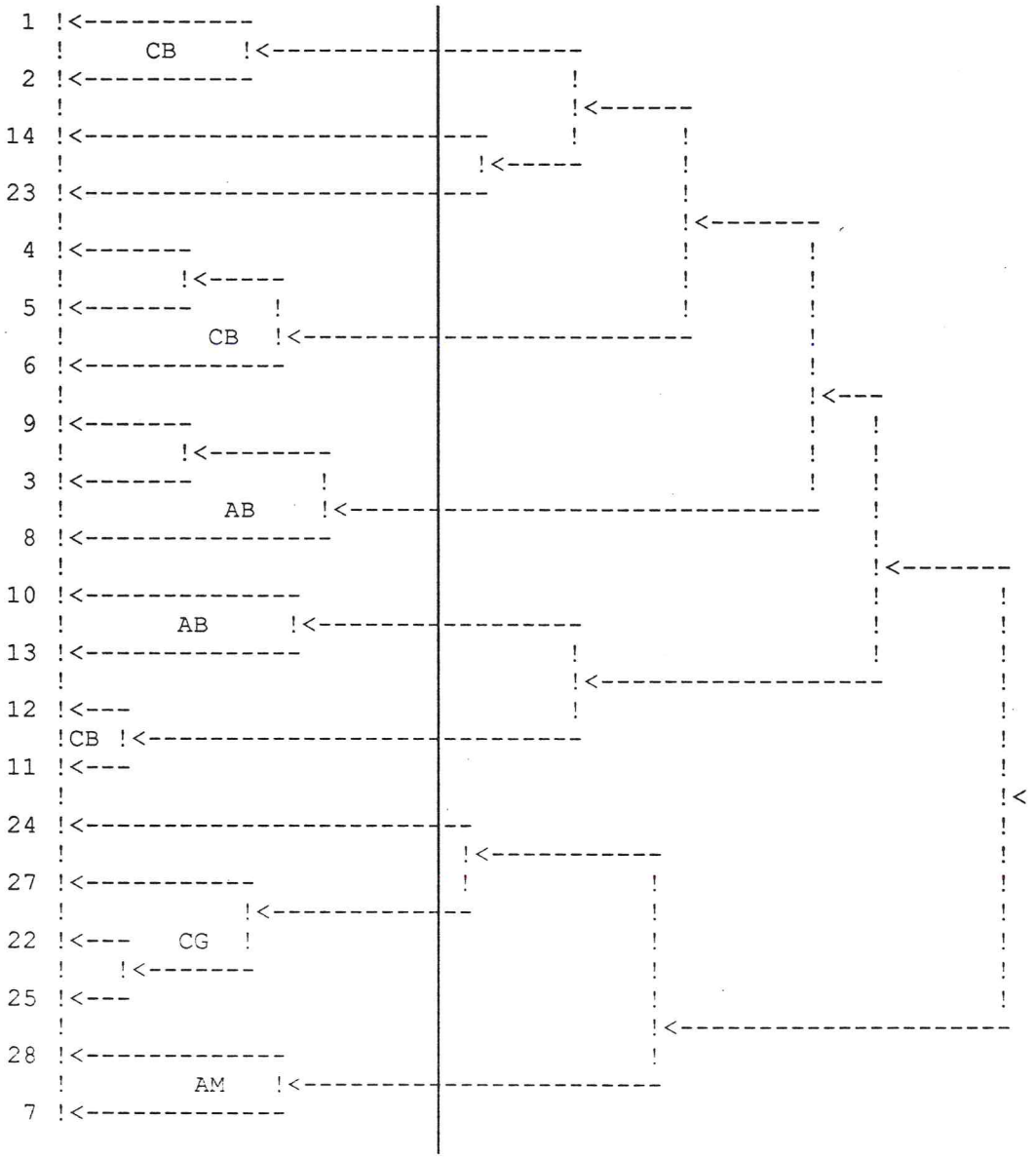
Boys: 1 to 14; Girls: 21 to 28. N=22

C: social clique; A: social aggregate

G: girls; B: boys; M: mixed.

Figure 6

Dendrogram for the Winter



Cutting point ($p < .05$)

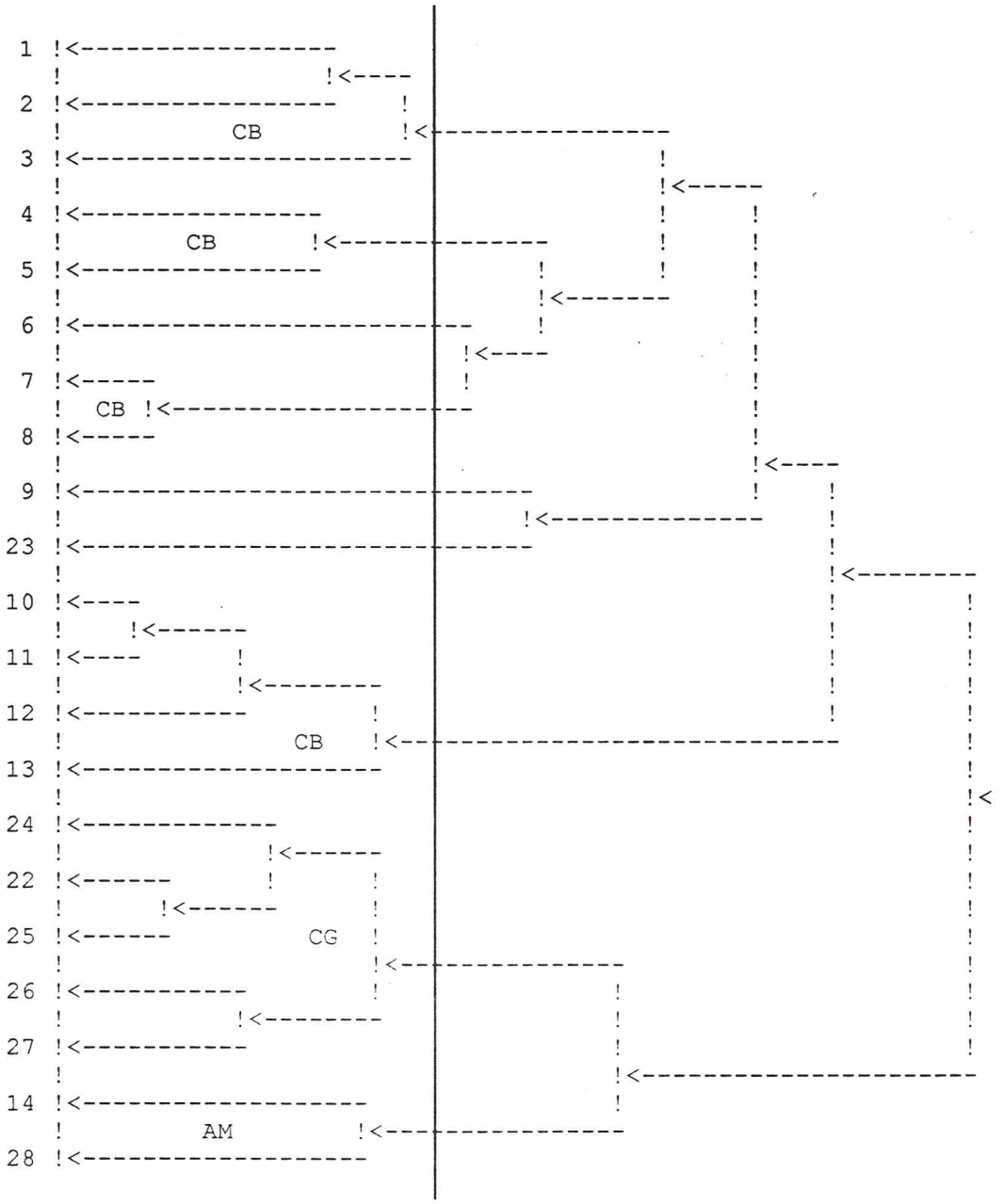
Boys: 1 to 14; Girls: 22 to 28. N=20

C: social clique; A: social aggregate

G: girls; B: boys; M: mixed.

Figure 7

Dendrogram for the Spring



Cutting point ($p < .05$)

Boys: 1 to 14; Girls: 22 to 28. N=20

C: social clique; A: social aggregate

G: girls; B: boys; M: mixed.

Although during the Winter Session only half of the children were were identified as clique members, in the Spring this proportion increased to 76%. Overall, there was no evidence for gender differences in terms of adopting particular roles in any of the three sessions (Chi2 (2) = 3.90, p >.14). The relative frequency of social roles for Spring evaluation is remarkably similar to results obtained for the three Portuguese groups.

Table 11
Group Composition of Affiliative Roles by Session

Affiliative Roles	Fall	Winter	Spring
Total	N=22	N=20	N=21
Clique members	68%	50%	76%
Aggregate members	18%	35%	10%
Social Outliers	14%	15%	14%
Boys	N=14	N=14	N=14
Clique members	64%	50%	79%
Aggregate members	29%	43%	7%
Social Outliers	7%	7%	14%
Girls	N=8	N=6	N=7
Clique members	75%	50%	72%
Aggregate members	0%	17%	14%
Social Outliers	25%	33%	14%

Composition of Social Units

Social cliques, aggregates and outliers characterize the nature and diversity of the affiliative contexts throughout the preschool year. Table 12 summarizes the information about subgroup composition for each of the three sessions. Globally, the three affiliative structures are quite similar. The number of social outliers remained relatively constant

indicating that the slight decrease in total number of subunits was due to increases in subgroup size. Such increases were accompanied with the reduction of the number of social aggregates; these children tended to become members of a social clique by the Spring Session.

Table 12

Group Composition by Social Units by Session

Social Units	Fall (N=22)	Winter (N=20)	Spring (N=21)	Total
Girls				
Social Cliques	2	1	1	4
Social Aggregates	0	0	0	0
Social Outliers	2	2	1	5
Boys				
Social Cliques	3	3	4	10
Social Aggregates	2	2	0	4
Social Outliers	1	1	2	4
Mixed social cliques	1			1
Mixed social aggregates		1	1	2
Total	11	10	9	30

There was a strong trend toward gender homogeneity particularly within social cliques for each Session. A single mixed clique, composed of two children, was identified in the Fall. In the Fall Session, there was a mixed social aggregate, again with only two children. Finally, a second mixed aggregate with two members was evident during the Winter Session. Social cliques had of an average of 2.7 children (standard deviation = 0.88). A Student t-test revealed no significant differences in average size

between 'boys' and 'girls' cliques (t (12) = -1.258, 2-tails, p > .23). Similar tests revealed no significant differences in size of cliques between sessions (Fall: mean= 2.5 sd= .55; Winter: mean= 2.5 sd= .58; Spring: mean= 3.2 sd= 1.30).

Ingroup Bias for Affiliative Subgroups

Analyses of average likability scores for co-members in comparison to other peers showed strong favoritism for members of the local entourage. In order to facilitate comparison of such ingroup bias with the previous findings, likability rankings were truncated to produce extreme positive and negative judgements. For each session, children's choices in the paired comparisons were visually inspected and up to three highest and three lowest scores were considered as strong positive and strong negative choices. Fewer than three peers were accepted if there were sequential ties in adjacent rankings for a given subject. Observed and expected frequencies of Ingroup and Outgroup choices were analyzed separately for clique members and members of social aggregates using the chi-square approach presented in the previous chapter . The results of these tests are presented in Table 12 and 13. With respect to positive choices, members of social cliques revealed high ingroup preference (Chi2 (1) = 48.89, p <.001). In contrast, members of social aggregates did not show ingroup preference. Analyses of negative choices indicated that clique members also showed significant outgroup rejection (Chi2 (1) = 8.84, p <.01). Once again, members of social aggregates did not differ from chance expectations. Analyses conducted separately for each session indicated that these results were stable.

Stratification of Affiliative Networks

The total number of positive comparisons received by each subgroup member from his peers was calculated and transformed into a standardized likability score (IL) for

Table 13

Ingroup/Outgroup Positive Comparisons of Peers

(Clique versus Aggregate Membership)

Subject Membership	Allocation of extreme choices	Observed	Expected	Chi-square
Social Clique	Total:	110		
(N=41; Nu=15)	Ingroup:	33	11	
	Outgroup:	77	99	48.89 ***
Social Aggregate	Total:	33		
(N=13; Nu=6)	Ingroup:	3	3.3	
	Outgroup:	30	29.7	0.03

*** $p < 0.001$

N=number of subjects; Nu=number of social units

Table 14

Ingroup/Outgroup Negative Comparisons of Peers

(Clique versus Aggregate Membership)

Subject Membership	Allocation of extreme choices	Observed	Expected	Chi-square
Social Cliques	Total:	100		
(N=41; Nu=15)	Ingroup:	3	13	
	Outgroup:	97	87	8.84**
Social Aggregates	Total:	29		
(N=13; Nu=6)	Ingroup:	1	1.7	
	Outgroup:	28	27.3	0.34

** $p < 0.01$

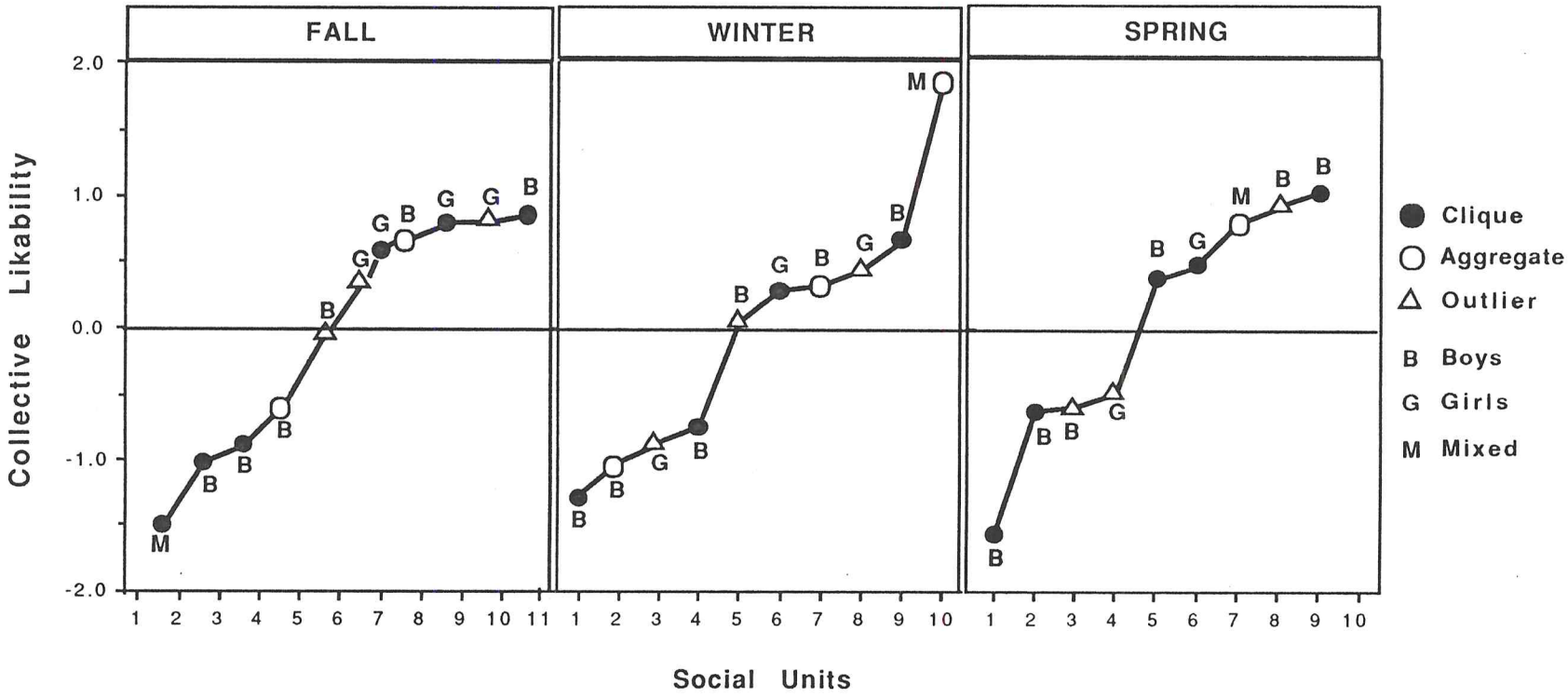
N=number of subjects; Nu=number of social units

each session. Subgroups' likability scores (SL) were subsequently calculated by averaging the standardized likability scores of its members. These subgroup scores were plotted by descending magnitude on a vertical axis. Average Individual likability scores were also calculated for social outliers. Figure 9 provides a graphic representation of stratification of the affiliative networks for each of the three sessions. Inspection of these three graphs showed that there was no systematic tendency for cliques to be more likable than aggregates or outliers. This finding differed from that reported for the Portuguese groups where stratification was derived from the nomination procedures (see figure 4, in the preceding chapter).

To determine if the earlier effect might reflect a potential artifact in the nomination procedure, the analyses were repeated using the extreme positive and negative choices described above. When only the most liked peers are considered in the analyses of sub-group stratification, a more dichotomous image of the affiliative structure was obtained. The distribution of average likability scores for the sub-groups was truncated with a number of subgroups obtaining similar neutral scores. In all three sessions social outliers decreased considerably in their likability scores while most liked children where much more clearly differentiated from other members of the peer group. Thus, the paired-comparison technique provided more nuanced information about individual children's likability. Accounting for likability scores of children who are somewhat liked, but not most liked, appears to contribute diversity in the stratification of the affiliative networks.

FIGURE 8

Social Units Stratification on Collective Likability by Season



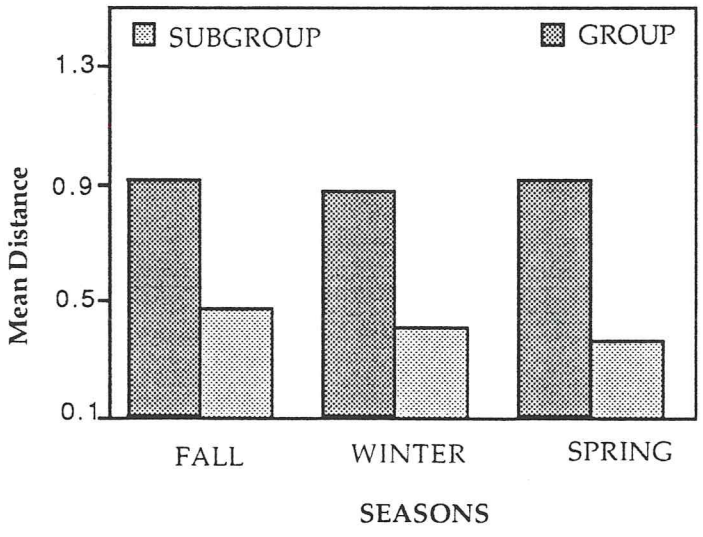
Note: The collective likability (CL) of each subgroup is calculated by averaging the standardized likability scores of its members. For social outliers, (CL) corresponds to their standardized likability scores.

Subgroup similarity on peer likability scores

For each session, individual distance to both the peer group (Δ GM= | IL |) and subgroup (Δ SM= | L - SL|) mean were calculated. In a first analysis, a paired t-test of both distance measures revealed a significant tendency for children's likability scores to be closer to their local norm than to the whole group norm (Δ GM : mean= .86; sd= .56; Δ SM : mean= .39, sd= .20; t (53) = 6.07, 2-tailed, $p < .001$). Separate analysis conducted for each session are displayed in Figure 3. In all three sessions, t-tests revealed that children's distances to their subgroup norm were significantly smaller than their distance to the group mean (Fall: t (18) = 3.26, 2-tails $p < .01$; Winter: t (16) = 3.15, 2-tails $p < .01$; Spring t (17) = 3.94, 2-tails $p < .001$).

Figure 9

Subgroup Similarity on Peer Likability



Ingroup bias as a function of clique status

For each session, cliques likability scores were transformed into percentile ranks (PR) and three status conditions were identified (High: PR ≥ 70; Medium: 70 < PR > 30; Low: PR ≤ 30). Fifteen cliques identified in one of the three sessions were included in this analysis. Gender was not considered as a factor since there was no evidence of differences in status between boy's and girls clique's (Chi2 (2) = 1.67, p >.43). The division of the cliques into high, medium and low categories gave the following results:

FALL: High status: 2 cliques, total of 5 children; Medium status: 2 cliques, total of 5 children; Low status: 2 cliques, total of 5 children.

WINTER: High status: 1 clique, total of 2 children; Medium status: 2 cliques, total of 6 children; Low status: 1 cliques, total of 2 children.

SPRING: High status: 1 cliques, total of 2 children; Medium status: 2 cliques, total of 8 children; Low status: 2 cliques, total of 6 children.

Children's extreme positive and negative choices were analyzed separately by clique status to test for differences in the degree of ingroup bias as a function of position in the affiliative structure. The results are displayed in Tables 15 and 16. Chi-square tests showed that all children had strong positive reactions to co-members of their social unit. Members of high status cliques revealed the strongest ingroup favoritism (Chi2 (1) = 58.89, p <.001), while members of medium (Chi2 (1) = 13.34, p <.01) were more biased toward co-members than low status cliques (Chi2 (1) = 5.77, p <.05). With respect to outgroup rejection, negative choices by members of high and low status cliques were not directed more often than expected to peers outside of their local entourages. However, children in medium status cliques showed a significant tendency to direct negative choices toward outgroup peers (Chi2 (1) = 4.07, p <.05).

Table 15

Ingroup/Outgroup Positive Comparisons of Peers

(by High, Medium and Low-Status Clique Membership)

Subject Membership	Allocation of extreme choices	Observed	Expected	Chi-square
High status	Total:	23		
(N=9; Nu=4)	Ingroup:	11	1.6	
	Outgroup:	12	21.4	58.89 ***
Medium status	Total:	53		
(N=19; Nu=6)	Ingroup:	15	6.4	
	Outgroup:	38	46.6	13.44 ***
Low status	Total:	34		
(N=13; Nu=5)	Ingroup:	7	3.1	
	Outgroup:	27	30.9	5.57 *

*** $p < 0.001$; * $p < 0.05$; N=number of subjects; Nu=number of social units

Table 16

Ingroup/Outgroup Negative Comparisons of Peers

(by High, Medium and Low-Status Clique Membership)

Subject Membership	Allocation of extreme choices	Observed	Expected	Chi-square
High status	Total:	22		
(N=9; Nu=4)	Ingroup:	0	1.5	
	Outgroup	22	20.5	1.66
Medium status	Total:	45		
(N=19; Nu=6)	Ingroup:	1	5.4	
	Outgroup:	44	39.6	4.07 *
Low status	Total:	33		
(N=13; Nu=5)	Ingroup:	2	3	
	Outgroup:	31	30	0.35

* $p < 0.05$; N=number of subjects; Nu=number of social units

Affiliative Constraints on Social Attention

Dyadic matrix of social attention

For the three sessions, the initial data on patterns of social attention were tabulated into a dyadic matrix of social attention. Each matrix summarized by rows the frequency of visual regard that each child directed toward every other peer group member. Subsequently, for each session, the frequency in each cell was transformed into a proportion score showing the probability that each child would look at each of the possible social partners. A example of a probability matrix of social attention for the Fall session is shown in Table 17.

Ingroup bias of Affiliative Subgroups

For each season, average probabilities of looking to co-members and to other children in the peer group were calculated for each child. Since the average size of the peer group during the three sessions was equal to 21, if children looked equally often to all peers then their expected looking score to a particular peer should be about five percent of their total social attention (1 / (21-1) =. 05). To assess ingroup bias the observed probabilities were contrasted with a chance model based upon the number of available social partners. The results of these analyses comparing cliques and aggregates are presented in Figure 10. One-sample t-tests were used to evaluate the null hypothesis. Results revealed that ingroup attention was greater than expected for clique members (mean= .142, sd= .098; t (40) = 6.04, 2-tailed, $p < .001$); and that there were no significant differences for members of social aggregates (Ingroup mean= .059; sd= .098; t (12) = 1.03, 2-tails, p = .32). Separate analyses of the association between subgroup membership and ingroup bias phenomena conducted for each session confirmed the global findings.

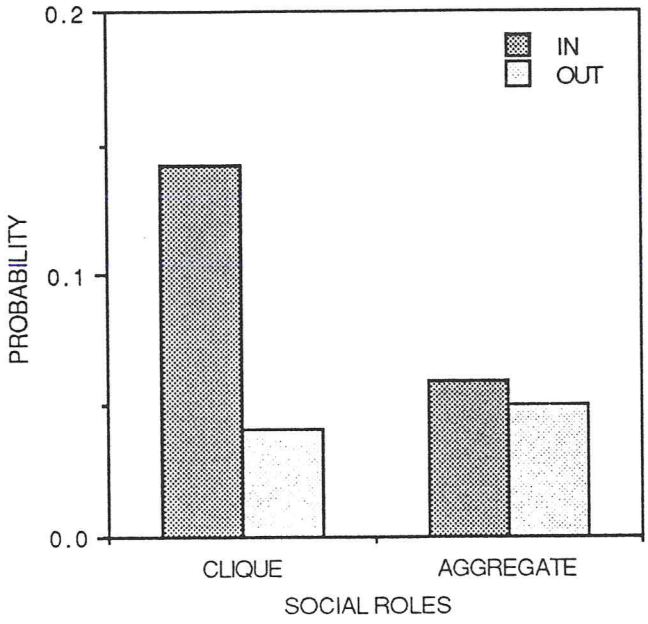
Table 17
Fall probability matrix of social attention

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	22	23	24	25	26	27	28
1	--	,19	,04	,03	,01	,01	,13	,05	,05	,00	,04	,04	,01	,01	,10	,03	,03	,06	,04	,13	,01
2	,20	--	,01	,03	,01	,04	,08	,04	,01	,09	,12	,00	,06	,05	,05	,02	,06	,04	,03	,02	,01
3	,12	,00	--	,03	,02	,05	,07	,03	,07	,00	,07	,00	,00	,05	,03	,02	,08	,13	,02	,15	,07
4	,05	,07	,05	--	,17	,03	,07	,08	,07	,00	,05	,07	,06	,04	,03	,03	,06	,05	,04	,00	,02
5	,14	,03	,04	,08	--	,06	,04	,09	,06	,00	,12	,03	,03	,08	,03	,01	,05	,01	,03	,03	,06
6	,06	,03	,11	,04	,11	--	,06	,06	,04	,10	,08	,08	,03	,06	,04	,06	,03	,00	,03	,00	,00
7	,06	,02	,04	,01	,02	,07	--	,35	,17	,00	,04	,01	,00	,00	,07	,01	,03	,00	,04	,02	,02
8	,06	,04	,02	,02	,05	,04	,38	--	,07	,01	,06	,00	,01	,02	,04	,02	,01	,00	,17	,02	,00
9	,02	,03	,05	,02	,00	,03	,38	,11	--	,00	,00	,00	,00	,00	,10	,02	,06	,00	,03	,03	,13
10	,01	,11	,03	,01	,00	,00	,03	,04	,06	--	,34	,15	,04	,01	,00	,03	,00	,01	,01	,04	,08
11	,03	,05	,07	,03	,02	,01	,05	,12	,02	,16	--	,06	,05	,06	,01	,02	,03	,06	,02	,04	,09
12	,00	,03	,02	,02	,03	,02	,02	,14	,02	,16	,09	--	,02	,07	,03	,05	,14	,00	,10	,02	,03
13	,06	,04	,00	,00	,06	,06	,04	,06	,04	,00	,21	,09	--	,04	,04	,02	,06	,04	,00	,02	,09
14	,10	,11	,02	,06	,04	,05	,05	,07	,04	,05	,06	,04	,02	--	,05	,05	,05	,02	,02	,05	,05
22	,08	,00	,03	,03	,00	,00	,16	,03	,03	,00	,00	,00	,01	,04	--	,02	,08	,16	,07	,18	,08
23	,06	,06	,10	,00	,04	,12	,07	,09	,07	,07	,06	,07	,00	,00	,03	--	,03	,00	,03	,04	,04
24	,04	,03	,01	,03	,01	,01	,06	,04	,05	,00	,07	,02	,01	,05	,07	,02	--	,05	,09	,28	,03
25	,13	,03	,04	,01	,00	,01	,03	,02	,03	,00	,03	,00	,00	,00	,23	,02	,08	--	,07	,18	,08
26	,06	,01	,03	,06	,02	,01	,12	,07	,03	,01	,06	,01	,01	,09	,10	,01	,10	,06	--	,06	,10
27	,12	,03	,03	,01	,01	,01	,01	,03	,01	,01	,05	,00	,01	,02	,12	,04	,16	,09	,09	--	,13
28	,00	,00	,00	,04	,03	,01	,04	,07	,10	,04	,10	,02	,03	,02	,08	,09	,03	,07	,12	,10	--

Figure 10

Ingroup/Outgroup Allocation of Social Attention

(Clique versus Aggregate Membership)



Number of cases: Clique membership = 41; Aggregate Membership = 13

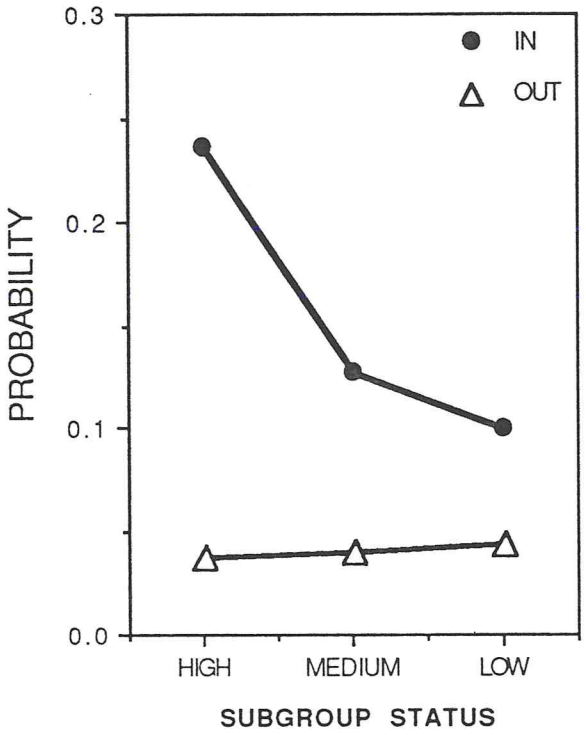
Ingroup bias as a function of clique status

Findings presented in Figure 11 show that ingroup attraction for children in cliques was higher than expected and increased as a function of status within the affiliative network (High: mean: =.236, sd=.155; Medium: mean =.127, sd= .051; Low: mean=.100, sd=.056). One sample t-tests revealed significant differences from chance for probability of attention towards co-members in all status conditions (High: $t(8) = 3.59$, 2-tails, $p < .01$; Medium: $t(18) = 6.54$, 2-tails, $p < .001$; Low: $t(12) = 3.24$, 2-tails, $p < .01$).

Fig. 11

Ingroup/Outgroup Allocation of Social Attention

(by High, Medium and Low Status Clique Membership)



Number of cases by clique status:
High = 9; Medium= 19; Low= 13

For a more detailed inspection of outgroup attention, the dyadic matrices for the three sessions were retabulated in terms of the stratified social units. Average ingroup attention score was calculated for each social subgroup taking in account the number of members. The results are presented in Figures 12, 13 and 14. The probability of ingroup attention is displayed on the diagonal of the matrices. Average outgroup attention is shown for each social unit identified in the analysis. These values are displayed on the off diagonal rows of the matrices.

Figure 12
Social Subgroups: Fall

SEX	IDEN	C1	O2	C3	A4	C5	O6	O7	A8	C9	C10	C11
B	7											
B	8	0,17	0,06	0,04	0,08	0,03	0,03	0,07	0,02	0,01	0,03	0,01
B	9											
G	28	0,07		0,03	0,02	0,12	0,07	0,07	0,03	0,01	0,02	0,02
G	21											
G	22	0,04	0,03	0,39	0,02	0,05	0,04	0,02	0,01	0,01	0,03	0,01
B	1											
B	2	0,01	0,06	0,03	0,10	0,05	0,02	0,06	0,01	0,03	0,03	0,02
G	26											
G	27	0,04	0,05	0,08	0,05	0,11	0,02	0,04	0,01	0,02	0,02	0,03
G	25											
G	24	0,07	0,05	0,02	0,03	0,03		0,10	0,06	0,04	0,05	0,04
B	3	0,04	0,02	0,04	0,04	0,04	0,15		0,04	0,02	0,07	0,02
B	14											
B	6	0,06	0,03	0,03	0,04	0,03	0,07	0,10	0,01	0,03	0,05	0,05
B	5											
B	4	0,07	0,01	0,03	0,04	0,03	0,07	0,01	0,02	0,24	0,04	0,03
B	11											
B	10	0,05	0,04	0,03	0,05	0,02	0,04	0,10	0,02	0,03	0,12	0,04
B	13											
B	12											
G	23	0,07	0,01	0,05	0,04	0,04	0,05	0,03	0,01	0,01	0,09	0,03

Social Cliques

Social Aggregates and Social Outliers

Figure 13
Social Subgroups: Winter

SEX	IDEN	A1	C2	O3	A4	C5	O6	C7	O8	A9	C10
B	7										
G	28	0,06	0,05	0,04	0,10	0,09	0,03	0,03	0,03	0,01	0,01
B	2										
B	1	0,10	0,08	0,05	0,06	0,06	0,05	0,04	0,04	0,02	0,04
G	24	0,04	0,08		0,04	0,13	0,04	0,02	0,06	0,01	0,02
B	8										
B	9	0,18	0,08	0,03	0,06		0,02	0,03	0,01	0,03	0,01
B	3										
G	22										
G	27	0,08	0,06	0,13	0,05	0,15	0,04	0,02	0,01	0,00	0,01
G	25										
B	14	0,09	0,02	0,10	0,10			0,01	0,00	0,04	0,04
B	5										
B	6	0,07	0,07	0,03	0,08	0,04	0,01	0,07	0,03	0,05	0,03
B	4										
G	23	0,02	0,09	0,04	0,06	0,05	0,10	0,03		0,02	0,08
B	10										
B	13	0,05	0,01	0,01	0,07	0,02	0,04	0,05	0,06	0,08	0,14
B	12										
B	11	0,10	0,07	0,04	0,02	0,03	0,03	0,06	0,08	0,07	0,08

Social Cliques

Social Aggregates and Social Outliers

Figure 14
Social Subgroups: Spring

SEX	IDEN	C1	O2	A3	C4	C5	O6	O7	C8	C9
B	7									
B	8	0,37	0,12	0,01	0,04	0,04	0,01	0,05	0,02	0,01
B	9	0,25		0,06	0,04	0,03	0,02	0,03	0,01	0,00
B	28									
G	14	0,06	0,07	0,04	0,06	0,04	0,07	0,03	0,04	0,04
G	26									
G	22									
G	27	0,06	0,03	0,06	0,12	0,04	0,02	0,01	0,01	0,01
G	24									
G	25									
B	2									
B	1	0,07	0,03	0,03	0,07	0,09	0,02	0,03	0,02	0,04
B	3									
G	23	0,08	0,07	0,02	0,03	0,07		0,12	0,02	0,05
B	6	0,06	0,04	0,03	0,02	0,06	0,06		0,07	0,07
B	5									
B	4	0,07	0,07	0,05	0,03	0,06	0,02	0,05	0,12	0,04
B	11									
B	10	0,06	0,04	0,06	0,03	0,04	0,03	0,02	0,02	0,11
B	12									
B	13									

Social Cliques

Social Aggregates and Social Outliers

Visual inspection of the three attention matrices indicates that outgroup attention remained relatively constant even when the different social units are distinguished according to status in the affiliative network. Differences in the allocation of outgroup attention were evident for both high status and low status subgroups. Subsequent analyses tested whether outgroup referencing, or residual attention to other peers varied as a function of the status of subgroups in the stratified affiliative networks. The residual scores of individual probability of attending to outsiders was transformed into a single vector. In parallel, a corresponding vector was tabulated for collective likability scores. The correlation of individual attention scores with the subgroup likability permitted assessing if outside attention was correlated to the affiliative status of the social partner. Correlations were also calculated separately for each child in order to determine the extent of individual variation for each session. The resulting Pearson coefficients are displayed in Table 17.

Table 18

Correlations Between Residual Attention and

Position in the Stratified Affiliative Structure

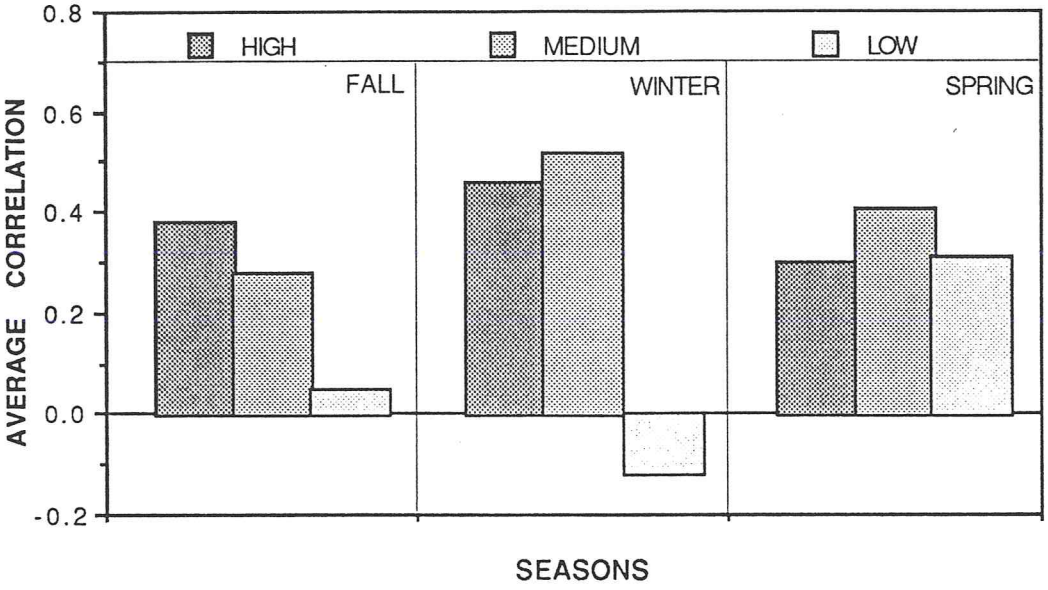
	N	MEAN	ST.D	CORRELATION	p level
FALL	22	.21	.23	.20	.01
WINTER	20	.34	.29	.33	.01
SPRING	21	.28	.27	.27	.01

Findings indicated a significant, but modest relationship between outside attention to others and differentials in affiliative status. However, examination of inter-individual variability suggested strong differences in how subgroup members allocated residual attention in relation to status within the stratified affiliative networks. Accordingly, in a second step means and standard deviations were obtained for high, medium and low status subgroups (High: PR $\geq$ 70; Medium: 70 < PR > 30; Low: PR $\leq$ 30). The results are presented for the three sessions in Figure 15.

The obtained coefficients indicated that children's allocation of residual attention varied as function of the status of their subgroup. A substantial positive relationship was evident for members of high and medium status subgroups. When not looking to their co-members, high status children tended to look more often to other children of high status subgroups (Fall: mean=.36, sd=.08; Winter: mean:.44, sd=.14; Spring: mean=.28, sd=.16). Medium status children tend to look more often to members of the same or higher status subgroups (Fall: mean=.26, sd=.29; Winter: mean:.26, sd=.29; Spring: mean=.39, sd=.27). In contrast, children within low status subgroups looked primarily to members of other lower status subgroups in the first two sessions. However, at the end of the school year they also began to monitor high status subgroups (Fall: mean=.03, sd=.28; Winter: mean:-.10, sd=.22; Spring: mean=.29, sd=.16). Overall, findings suggest that the global relation of residual attention and status in the stratified affiliative network is primarily due to members of high and medium status subgroups looking more to peers of similar or higher status.

Figure 15

Residual Attention and Peer Stratification by Session



DISCUSSION

The descriptive results of this study extend the multivariate socio-structural network procedures using unbiased measures of spatial proximity. These findings provide an innovative and complementary technique for research in social ethology. For both within and between species comparisons, the application of multivariate clustering procedures can be envisioned with a diversity of stable groups and social populations. In both developmental and comparative studies, the identification of cohesive networks using nearest neighbor technique offers a suitable technique for observation at relatively large distances in more or less diverse contexts and across age and sex classes.

With respect to child development, the introduction of scaled preference scores reflecting paired comparisons of more-liked peers showed clearly that ingroup preference was directly associated with clique membership. When interpreted in conjunction with findings on bias in social attention, these findings support the earlier speculation that cohesive entourages provide interpersonal contexts for the development of dyadic relationships and the emergence of mutual social influence. Expectations that the stratification of affiliative subgroups on a likability dimension could be improved by introducing a more precise sociometric index received positive support. As a consequence of these improved indices, assessments of similarity in subgroup member's likability also revealed stronger effects. These findings validate and extend the stratification approach to affiliative status introduced in the first study. The more robust correlation between degree of ingroup bias and affiliative status suggests that peer likability is influenced by position in the stratified affiliative organization of the peer group. In spite of being more costly in terms of preparation and more time consuming as an interview technique, the paired-comparisons procedure provides useful information about children's affiliative preferences, and contributes substantially to a socio-structural analysis of peer group affiliative organization.

Analyses indicated that level of ingroup preference for clique members was systematically related to subgroup status. Moreover, with the more precise measure, such positive bias was evident even for children in lower status cliques. This result is more coherent with the structural assumptions about cohesive investment among clique members. On the other hand, outgroup rejection was only apparent for children in medium status cliques. This result may merely reflect statistical artifacts based upon the arbitrary truncation of the likability continuum into high, medium and low zones, or on the

other hand, it may reflect strategic rejection of low status peers by middle-ranking subgroups. Clearly, future research must clarify the nature and importance of negative judgements to members of the outgroup.

The differential results of ingroup attention obtained in function of children's subgroup membership demonstrates a necessary connection between affiliative networks and social communication (Kummer, 1971). These findings in themselves offer an important external validation of the present socio-structural approach. Furthermore, the consistent degree of ingroup attention suggests that for all clique members, peers in the local entourage are the most probable sources of social influence. Similar effects were not evident for members of social aggregates. Finally, members of higher status subgroups appear to have slightly more capacity to attract the residual attention of other peer group members. Such a result supports the notion that social standing as well as cohesive bonding influences the distribution of social attention within the stable peer group.

Past research in behavioral biology viewed social attention as a prerequisite for interpersonal communication, and as an important index of individual differences in the ability to influence other members of social group (Chance, 1967; Strayer & Gariépy, 1986). The revision of the social attention model, proposed by Vaughn & Waters (1981), rested upon empirical evidence indicating that preschool social competence was systematically related to high rank of received attention in natural peer groups. In short, they argued that children look more at competent peers because there is much to be learned from them. Our results indicate that children's social attention is more strongly constrained by prevailing cohesive bonds and to a lesser extent by the affiliative status of other group members. In this sense, most competent individuals may receive slightly more attention from others, but the majority of children look predominantly at closely

connected peers. Unless we assume that the more competent children are evenly distributed among the various subgroups regardless of affiliative standing, it is difficult to continue to endorse the competence interpretation of the structure of social attention.

Perhaps the most important contribution of this study concerns the development of more adequate models for the representation of peer group affiliative networks (Cairns et al, 1985; Strayer et al 1988). Although of essentially descriptive nature, the reported findings contribute directly to the understanding of social contexts and their impact on child development. Without dismissing the contribution of individual differences in social competence and qualitative differences in early social relations, a socio-structural analysis of the peer group demonstrates that an exclusive focus on individual characteristics risks to obscure understanding of contextual factors that shape choices of social activity among young children. After all is said and done, it seems counter-intuitive to believe that the complex network of interpersonal relationships present in a five-year-old peer group can be fully understood by an exclusive focus on individual differences. Analyses of initiated or received social behavior are most preliminary, and cannot account for dynamic aspects of social exchange nor for the undeniable constraints imposed by established social order. Although the results of the network analyses merit replication, they provide preliminary evidence for an alternative model of social cohesion. Furthermore, they suggest interesting avenues for future research on how the insertion of individual children into the peer group relates to development of particular interactive strategies and to the acceptance of particular roles within a structured social world.

CHAPTER IV

GENERAL DISCUSSION

The Nature of Preschool Affiliative Networks

Ethological models of social development stress that natural groups provide a variety of social contexts that differentially shape individual growth and development (Crook, 1970; Kummer, 1971). However, behavioral studies of human and non-human primates have most often been limited to aggressive relations and social dominance structures (Omark, Strayer & Freedman, 1980). Investigations of the organization of affiliative behavior have been hampered by a lack of models and methods for the study of cohesive social structures (Strayer, 1980b). Network analyses of patterns of peer association provide an alternative basis for investigating the social organization of stable play groups and for assessing how structured roles within the group may influence individual development (Cairns et al., 1988; Strayer et al, 1988). Findings of the present research contribute directly to the operationalization of such descriptive models for representing cohesive structures in children's peer groups.

The major goal of the first empirical study was to integrate current approaches to network analysis. Individual associative profiles, derived from observational assessments of social subgroups (Cairns et al , 1985), were analyzed using the matrix algorithms elaborated by Strayer et al (1988). Findings showed considerable similarity in the affiliative organization of three preschool groups, with a large majority of children integrated within cohesive social cliques. The obtained networks closely resembled those reported for older children (Laferté, 1993). These findings demonstrate the utility of extending network analytic procedures for a socio-structural investigation of affiliative relations among younger preschool children.

A second research objective was to evaluate the degree of ingroup bias among five-year-old preschoolers. In an initial analysis, the joint use of socio-structural and sociometric information provided a direct validation of the analytic procedures for the definition of affiliative subgroups. Results from this first empirical study showed that clique membership was highly associated with strong ingroup preferences. A third research goal concerned documenting the nature of social stratification within the affiliative networks. Results showed that affiliative subgroups could be distinctively stratified on a likability dimension. More interestingly, there was a significant tendency for subgroup members to have highly similar likability scores. Finally, the assessment of status differentials clarified global findings about the nature of ingroup bias. Results showed that members of high and medium status cliques discriminated in favor of co-members, while children in low status cliques showed no ingroup preference. This result raised questions about the cohesive nature of low status cliques that were addressed in the second empirical study.

Although, the results from the first study provided support for the validity of network procedures, a number of technical question about sampling and analytic procedures remained unresolved. In the second study, the initial procedures were extended. Unbiased measures of interpersonal proximity offered further evidence for the robustness of the network approach in the analysis of affiliative structures in children's play groups. Analysis of association profiles derived from nearest-neighbor data showed similar affiliative networks with distinct affiliative roles in a preschool group observed during each of three terms in the school year. Social cliques were equivalent in terms of size and gender composition. Taken together these two studies using social proximity indices of cohesive organization provide strong evidence for similar affiliative roles in two

quite different socio-cultural contexts, as well as at different moments in the school year. Particularly for future research, it seems important to note that proximity-based indices of social networks provide measures of cohesive structure that are independent of observed patterns of affiliative behavior. Such indices should be especially useful for future research on how position within the group's cohesive network influences developmental changes in children's social behavior.

A major preoccupation in the second study involved elaborating more precise techniques for the assessment of social stratification within the peer group affiliative structure. Status measures derived from a paired-comparisons sociometric method showed stronger subgroup similarity in peer likability as well as clearer stratification effects on the degree of ingroup bias. Members of high status cliques had more extreme preferences for co-members than children in medium or low status clique. However, both types of children showed significant ingroup preference when bias was assessed in terms of this more precise measure. These results extended the initial treatment of affiliative status and provide additional validation for the network conception of cohesive social cliques.

The final research objectives concerned the selection of a behavioral index for validating the socio-structural, or network approach to the study of cohesive organization. Social attention was chosen, because it is a powerful observational index for assessing individual differences in social learning and social influence (Chance,1967, Strayer, 1976). Moreover, the choice of this behavioral index offered the possibility to contribute to an ongoing debate in the child ethology literature concerning models of social organization. Analyses of the average probability of attending to particular peers revealed that all clique members were highly biased towards co-members. Members of social

aggregates showed no such bias in the allocation of their social attention. These findings confirm the earlier view of differences in the cohesive nature of the two types of affiliative subgroups. Analyses of bias in social attention for clique members indicated that the magnitude of children's ingroup preference increased as a function of the status of their clique. Supplementary analyses of the distribution of residual attention not directed to co-members indicated that high status affiliative subgroups were more frequently monitored by children outside of their local entourage.

These findings support the claim that more popular children receive more attention from peers (Strayer, 1980b). However, they show even more clearly that social attention received from peers comes predominantly from members of a child's immediate social clique and to a considerable lesser degree from peers outside the immediate affiliative entourage. If we assume that social monitoring provides an indirect index of likelihood of social learning and social imitation, then we can conclude that co-members are the most probable sources of social influence for preschool children. In this sense, the notion of cohesive social clique based on socio-structural analyses of patterns of association offers promising avenues for improving our understanding of dynamic processes underlying social adaptation in the peer group.

In summary, results from the network analyses and stratification procedures, revealed the relative salience of social subgroups within the larger interpersonal context. Coherent relations between affiliative status and patterns of ingroup preference were demonstrated. At a conceptual level, network analyses based upon differences in spatial associations provide a higher order organizational principle for the study of cohesive group structure (Hinde & Stevenson-Hinde, 1976; Strayer, 1980b). Similarity of association and collective differences in peer likability serve as abstract indices that are

comparable to the rules of asymmetry and transitivity underlying the stratification of social roles in the group dominance hierarchy. Similarity of associations situated each dyad in relation to all dyads within the group, while stratification analyses distinguished the relative salience of the different subgroups within the network. In general, results from the two empirical studies support the contention that there may be qualitative differences in the socializing influence of particular affiliative units that constitute the cohesive network of the peer group.

Social attention is a very powerful tool for gathering and conveying information on ongoing activity of conspecifics. Furthermore, it constitutes a prerequisite for social learning and observational modeling (Strayer, 1976). Young children learn from social partners while they watch them and what they learn necessarily influences what they see and do. In human and non-human development, social attention is the necessary prerequisite for collective adaptation (Chance, 1967). Researchers in child development working on peer group relations have proposed three distinct models for understanding the differential allocation of children's social attention: an agonistic or dominance based model (Abramovitch, 1976; Hold, 1977); a hedonic or friendship model (Strayer, 1980b) and finally a social competence model (Vaughn & Waters, 1981). Findings from the network analyses conducted in the second study strongly support the central role of affiliative relations in the structuring of social attention within the stable peer group.

First, evidence indicated that children's social attention was selectively directed towards co-members. Secondly, supplementary analyses of attention non-directed to co-members revealed that children's monitoring of the outgroup is moderately correlated with collective likability, or popularity of the targets. Previous studies of five-year-old preschool social organization indicate that popularity is positively correlated with

dominance status (Strayer & Trudel, 1984) and social competence (Vaughn & Waters, 1981). In this sense, the presented findings strongly suggest that children monitor preferentially co-members and to a lesser extent the most popular children (who are quite likely to be the more dominant and competent peer in the group). A definitive test of such assumption should be conducted in future research by separately assessing children's outgroup attention, their relative dominance status and the levels of social competence. Further descriptive information is necessary regarding the relative weight of each of three major dimensions of social organization as well as the coordination of these aspects of social life during the phases of subgroup formation during the school year. Finally, age differences among preschool children must be also considered as potential sources of variation regarding the predictive power of these facets of group life.

These are undoubtedly interesting avenues to pursue in future research. From a socio-ecological point of view, it is important to enlarge the scope of the behavioral assessment of social roles within the early peer group to other dimensions of social activity (e.g. social control, cooperation, altruistic intervention, etc.). A more complete description of play activities should be integrated into a network assessment in order to obtain a more detailed appreciation of the quality of social relations among members of affiliative subgroups. Such a fine grained descriptive approach could clarify processes of social adaptation and differences in individual functioning that may result from participation in the same cohesive subgroup. Finally, from a socio-ethological perspective, either individual roles or social competence must be examined as a context dependant adaptation rather than as a stable individual trait.

Socio-Structural Constrains on Individual Development

Researchers in child development have been preoccupied with continuity in social adjustment (see Parker & Asher, 1987; Strayer, 1989). At a meta-theoretical level, this reflects a number of assumption about more or less stable psychological characteristics revealed by consistent behavioral styles in interaction with peers. Similar notions are found in the application of models from classical ethology to the study of children's social behavior (Blurton Jones, 1972; Montagner,1978). From a socio-ecological perspective, "such a view neglects tactical adjustments that children make as participants in a co-adaptive process where individual actions are shaped by the ongoing activity of social partners" (Strayer, 1989).

Group structures reflect a dynamic equilibrium of both physical an behavioral ecological constraints, canalizing forces that reflect local variability and diversity in individual social roles and adaptation (Crook, 1970). Changes in group context require re-negotiation of the individual's social roles. In this sense, continuity in a child's social performance must be related to constancy in social participation across group contexts. Ethological evidence regarding the temporal stability of behaviorally based social styles reveals plasticity rather than rigidity as the defining characteristic of preschool social styles (Strayer, 1989). Children classified as rejected during the preschool period are reported to be the most stable in sociometric status during the primary school years (Rubin, Daniels-Beirness & Brem, 1984). However, Santos (1993), in a recent integration of sociometric classifications and affiliative network evaluations, provides additional evidence for the notion of plasticity in early social styles. He reported that two thirds of children classified as rejected according to sociometric techniques were in fact members of social cliques, and

not rejected by their immediate co-members. Such results suggest that social cliques may provide a buffer that attenuates the impact of rejection from the larger peer group.

If five-year-olds' cliques are seen as prototypes of later social groups, we might speculate that preschoolers are already influenced by social categorization processes and emerging social identities (Tajfel, 1978; Tajfel & Turner, 1979). The child's emerging sense of self, and continuity in social adjustment may be directly related to the stability of participation in more or less valued subgroups. These remain unanswered, but important questions for the field of child development. On the other hand, a more direct focus on interpersonal relationships within natural peer groups might reveal greater plasticity in early identity than that revealed by more experimentally based analyses of social categorization and social identity (Doyle, Sufrategui & Aboud, 1992; Yee & Brown,1993).

From a developmental point of view, an important question concerns whether patterns of association depend upon conscious categorization of others in the social world or upon social comparison with other members in the peer group. This question seem especially pertinent given the extreme degree of sexual segregation in the obtained affiliative cliques. That five-year-old children tend to play with same-sex peers has been documented in the developmental literature since the 1930's (Parten, 1932). However rather than endorsing a cognitive or socio-cognitive model to explain this effect, the majority of modern researchers proposed complementarity or sinchrony in the interactive styles (e.g. Jacklin & Maccoby, 1978; Lafreniere, Strayer & Gauthier, 1984; Legault, 1991). From this perspective, children associate in same-sex cliques because of similarities in behavioral repertoires and styles of social participation.

Alternative explanation of same-sex affiliative association can be formulated in terms of social categorization and social identity or more general sex-typed socialization. However, both these latter models depend upon the children's ability to identify the gender of peers. The social categorization approach explains ingroup bias by means of categorical differentiation, a cognitive process in which both between groups differences and within groups similarities are exaggerated (Tajfel, 1978). The social identity approach stresses that individual self-worth derives in part from group membership and the social comparaison of different groups (Tajfel & Turner, 1979).

Such interpretation depend upon children's acquisition of a gender concept. An important aspect of children's developing a sense of gender is an understanding of gender constancy . For example, three-year-olds know that they are boys and girls and the attributes usually associated with their gender, but they still think that changes in superficial characteristics (e.g. hair style; sex-typed play) produce changes in gender. Even among five-year-olds the understanding of gender constancy is not complete, and only at the age of seven do children's show a firmly established gender concept (Maccoby & Jacklin, 1974; Kohlberg, 1966). Thus, efforts to explain the emergence of same-sex affiliative cliques among preschool children in terms of adult cognitive categories, are unlikely to render justice to the underlying developmental processes.

In this sense, current evidence showing same-sex subgroups as well as temporal fluctuation in affiliative roles and subgroup composition, suggest that subgroup cohesion is in fact linked more to processes of behavioral compatibility during social interaction and to the establishment of stable dyadic affiliative bonds (Legault, 1991; Strayer, 1980a). In fact, even for adult social behavior, it seems possible that the salience of representational categories and social identity may depend more on immediate support from the local entourage than upon an abstract symbolic representation of their social world. A more

detailed comparison of observationally based assessments of social participation and verbally based statements about social networks, social categories, and social identity might advance understanding of how social structures constrain conceptions of the self. The integration of these two approaches to social analysis could provide critical information about how children and adults represent the social world and how such representations correspond with daily experiences in natural social groups.

In conclusion, more than ever, the interdisciplinary field of behavioral biology has great pertinence for students of child development. Only through the concerted effort between social psychologists and social ethologists can we hope to begin the gradual construction of a conceptual and empirical basis for exploring how "qualitative differences in affiliative relationships and social roles in the stable peer group should be explored in relation to more traditional developmental assessments of individual status and competence" (Strayer, 1980b). Future ethological studies of child social development must necessarily expand their socio-structural consideration of group processes to include the network of affiliative relations within stable peer groups. Only a balanced, and open-minded approach to cohesive and dispersive activity will permit furthering our understanding of how the early peer group impacts on children's social adaptation and shapes their long term social development.

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