

Similarity of Behavioral Profiles Among Friends in Early Childhood

Stéphanie Barbu
University of Rennes 1, France

Abstract

This study aimed to assess whether behavioral similarity is associated with social preferences in early childhood. Longitudinal observations of social interactions among children in a nursery school throughout a school year and behavioral sociometry were used to explore whether a) children who preferred to interact with some peers more than with other peers exhibited social behavioral profiles that were more similar to those of their preferred partners than to those of the less or nonpreferred peers and b) whether similarity between preferred partners increased over time. Our findings revealed that most of the children were highly selective in their peer affiliations, that is, children interacted with a small number of available peers. However, the similarity of behavioral profiles was not greater between children who preferred to interact together than between children who did not. The only differences in the similarity of behavioral profiles that were statistically significant were found for children who appeared the most frequently as nonpreferred peers. The behavioral profiles of the nonpreferred children were less similar to the children with whom they preferred to interact. Finally, although similarity did not increase between preferred partners over the school year, a general convergence was observed in behavioral profiles within the entire peer group; that is, on average, differences in classmates' social behaviors were reduced over the school year. Findings are discussed from a developmental perspective. Conceptual and methodological issues are also examined.

Friendships with same-age peers are considered particularly important for children's social, emotional, and cognitive development and have also been identified as a protective factor that increases resistance to risks to healthy child development (Allès-Jardel, Barbu,

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Correspondence concerning this article should be addressed to S. Barbu, UMR CNRS 6552 Ethologie Evolution Ecologie, Université de Rennes 1, Campus de Beaulieu, Avenue du Général Leclerc, F 35042 Rennes Cedex, France. E-mail: stephanie.barbu@univ-rennes1

& Jouanjean, 2003; Hartup, 1996; Hay, Payne, & Chadwick, 2004 for reviews). Given the developmental importance of friendships, researchers have wondered why children develop friendships with certain peers, but not with others. What attracts one child to another? The attributes of interest include demographic as well as behavioral and attitudinal characteristics of children. The effects of age, sex, and ethnicity on social preferences are determinant because in childhood, friends are typically same-age (Guralnick & Groom, 1988), same-sex (Barbu, Le Maner-Idrissi, & Jouanjean, 2000; Howes & Phillipsen, 1992), and same-ethnicity (Berndt, 1988). The most important factors that contribute to interpersonal attraction among children are thought to include the degree to which children share common attitudes, interests, or personality and whether children engage in similar forms of social behavior (Byrne & Griffitt, 1966; Clark & Mills, 1979; Erwin, 1985).

Beyond the descriptive information about young children (e.g., age, sex, ethnicity, physical attractiveness) who engage in social interactions, relatively little is known about the relations between the behavioral mechanisms involved in the regulation of these social interactions and children's social preferences (Hartup, 1996). What is known derives generally from databases that focus on emergence of aggression or deviant behaviors of school-age children and adolescents who have negative developmental outcomes (Cairns, Cairns, Neckerman, Gest, & Garipey, 1988; Haselager, Hartup, Van Liesthout, & Riksen-Walraven, 1998; Kandel, 1978a,b; Kupersmidt, Derosier, & Patterson, 1995; Poulin, Cillessen, Hubbard, Coie, Dodge, & Schwartz, 1997; Vitaro, Gagnon, & Tremblay, 1992); less is understood about early development of children's prosocial or competent behavior (Rubin, Lynch, Coplan, Rose-Krasnor, & Booth, 1994).

There are several limitations to interpretation of findings from these studies. First, studies have relied on indirect methods of assessing children's behavior, such as children's reports of their perceptions of behavioral similarity or on the reports of peers, parents and teachers. Researchers caution that responses of young children on self- and peer-reports can be highly unreliable (Hymel, 1983). Furthermore, estimates of behavioral similarity derived from perceptions of individuals may be inflated to the extent that the individuals share biases in perceiving relationships (Poulin et al., 1997).

Second, researchers often use global indices to assess children's maturity of play, involvement in play, or interactive style in general terms of prosocial, antisocial and withdrawal behavior. Thus, there is a notable lack of detailed observation of the social behaviors that are associated with preferential attraction between children in early childhood (Rubin et al., 1994).

Moreover, although there is a general consensus among researchers that friendship involves a close, mutual, dyadic relationship, there is little agreement on how to operationalize this construct, especially among young children (Bukowski & Hoza, 1989; Erdley, Nangle, & Gold, 1998). To date, approaches that have been used when defining a friendship between a particular dyad include the following: positive nominations and peer-ratings (Asher, Parker, & Walker, 1996; Bukowski & Hoza, 1989) and behavioral criteria (Hinde, Titmus, Easton, & Tamplin, 1985; Howes, 1983, 1987). While the degree of similarity between friends is mostly derived from comparisons between friends and nonfriends, the definition of nonfriends (i.e., acquaintances, disliked peers, strangers) remains problematic as well (Newcomb & Bagwell, 1995). Several authors have stressed

that the variability in findings is likely a result of heterogeneity in operational criteria and further reflection on the issue of whether or not friendship is a categorical or continuous construct may be required (Erdley et al., 1998; Hartup, 1995; Newcomb & Bagwell, 1995). Friendship identifications are currently categorical (friend versus nonfriend) whereas these relationships may vary more on a continuum (e.g., best friend / good friend / occasional friend / ... / nonfriend).

Finally, the similarity of social behaviors that is observed between existing friends can be attributed to two processes: selection, that is, the selective affiliation with peers who are similarly constituted in terms of attitudes, personality and interests, and socialization, that is, mutual influences that maintain friendships. The concomitant contribution of both selection and socialization has been demonstrated for deviant behaviors among adolescent friends (Kandel, 1978a), and for aggressive behaviors among preschooler friends (Snyder et al., 1997). Behavioral similarity between friends may increase with the duration of friendship when, as part of that friendship, children share an increasing number of experiences (Kandel, 1978a,b; Vitaro et al., 1992). If this is indeed the case, longitudinal studies are all the more important to capture the dynamics of these processes. As longitudinal studies are particularly rare in this area, further efforts are also needed in this direction.

The purpose of the present study was to examine whether behavioral similarity is associated with preferential associations in early childhood. The two main goals were (a) to provide a detailed account of behaviors observed during social exchanges and, (b) to operationalize the construct of friendship on a continuum. To reach these empirical goals, direct observations of children's social interactions and behavioral sociometry were conducted to assess children's social behavior and social preferences. Ample research evidence is available to show that young children select particular peers as targets for their social exchanges, and the interactions they engage in with their friends differ qualitatively and quantitatively from their interactions with other peers (Hinde et al., 1985; Howes, 1983, 1987; Ross & Lollis, 1989; Snyder, West, Stockemer, Gibbons, & Almquist-Parks, 1996). Sociometry introduced by Moreno (1934), has been currently adapted to behavioral data to assess social preferences (Santos & Winegar, 1999 for review). Social preference, operationalized as the proportion of time that children spend interacting together, is among the behavioral criteria widely used and validated in previous research to identify friends (Guralnick & Groom, 1988; Hinde et al., 1985; Howes, 1983, 1987, 1996). Therefore, in this study, we utilize social preference as an indicator of the magnitude of friendship between two children. We formulate two hypotheses: first, that children who prefer to interact with some peers more than with other peers will exhibit social behavioral profiles that are more similar to those of their preferred partners than to those of the less or nonpreferred peers and second, similarity in behavioral profiles between preferred partners will increase over time.

Proximity contributes strongly to selection of friends between young children (Epstein, 1989); for instance, children generally report more friends in school than out of school (Kupersmidt et al., 1995); therefore, classmates in a nursery school were selected as the sample group to investigate these predictions.

Method

Participants

Participants were 24 children in a preschool class at a French nursery school. All children attended nursery school regularly throughout the school year. At the beginning of the fall session, ages of children ranged from 3 years 10 months to 5 years 4 months (mean age = 4.4 years). This age range (i.e., 4–5 years) is typical to this grade in French nursery schools. The 9 girls and 15 boys had similar family backgrounds (« upper-middle » class) and lived in an urban area of France. Most children had already attended this nursery school for one or two years. They came from three different classes. Thus, some children knew each other before the study. Only three of the children were new to the school. Each child in the study was assigned a pseudonym to keep all identifying information confidential to protect the privacy of the children who provided us with data throughout the study.

Procedures

Setting. Observations were made daily, during free play periods in the classroom, which had a variety of play areas (e.g., bedroom, kitchen, garage). Periods of free play, even if they do not last long in French nursery schools, appear favorable to observe for the emergence of interactions during which children exhibit both affiliative and spontaneous behaviors. Moreover, children could choose the peers with whom they wanted to associate, and the size of playgroups was not controlled. Thus, during free play periods, external control of child behavior by adults (teachers) was reduced, whereas during structured activities, the teachers exerted control over the format and the composition of the social group. For instance, during structured activities, teachers assigned children to work tables and these mixed sex groups were fixed over the school year.

Observational design. Children were observed daily early in the morning in one-hour sessions over an academic year (i.e., from the beginning of September to the end of June). Three observation periods were separated by one-month intervals (P1: November–January; P2: March–April; P3: May–June). Observations started after a preliminary habituation phase during which the observer was present in the classroom daily. Observations were conducted only when all children enrolled in the class were in attendance. The same observer made all the observations and recorded social exchanges among children with a video camera. The observer remained visible to the children and adopted an integrative nonparticipant attitude (McGrew, 1972).

Focal sampling was chosen for data collection (Altmann, 1974). This method requires continuous recording of one subject's behavior during a fixed time interval. Each focal child was observed on three occasions during the school year; each session included three 5-minute observation periods. In total, the data set included 45 minutes of observations on each child over the course of the year. Focal children were observed according to a randomized schedule each day.

Behavior coding system. All behaviors initiated by the focal child, as well as the behaviors directed by others toward the focal child were recorded using a selected behavioral repertoire, inspired by Blurton-Jones and Woodson's general catalogue (1979). A fixed interval (i.e., 45 minutes), event coding system was used to document the observation of a large range of social behaviors in this repertoire: approaches, contacts (positive and negative), withdrawals, positive facial expressions, gazes, interactive activities mediated by objects (positive and negative), gestures, vocal and verbal utterances (see Barbu, 2003a for a detailed presentation of the repertoire). The observer transcribed and coded behavioral data on a computer using a three-item syntax that identified the child who initiated the behavior, the category of behavior, and the child to whom the behavior was directed. This coding system produced a measure of both the duration of social interactions and the frequency of specific social behaviors within each interaction.

Inter-coder reliability. To assess the reliability of the coding, an independent, trained observer recoded 25% of video-tappings selected randomly across days of observation and focal children. Inter-coder reliability (agreements / agreements + disagreements + omissions) on observational sequences ranged from 89% to 98% (median: 95%). Moreover, the order of coding videotapes was randomized to minimize effects of increased familiarity of the observer with the setting and to reduce order effects.

Data Analysis

Friendships. Measures of children's social preferences were derived from the time that children spent interacting with each peer in the class. A sociomatrix with cells that contained the percentage of the time that a child spent interacting with each partner was constructed for each observation period (P1, P2, P3). A gray scale was used to construct a graphic representation of the proportion of time that each child spent in interaction with a specific partner. Thus, the strength of friendship each child shared with a social partner was shown on a continuum beginning with the most preferred partner in the first cell of the matrix. Two children were identified as friends when they spent at least 30% of their observation time interacting together (Hinde et al., 1985).

Behavioral profiles and similarity. As illustrated in Figure 1, a behavioral profile for each child was constructed from the frequencies of observed behaviors during each observation period (P1, P2, P3).

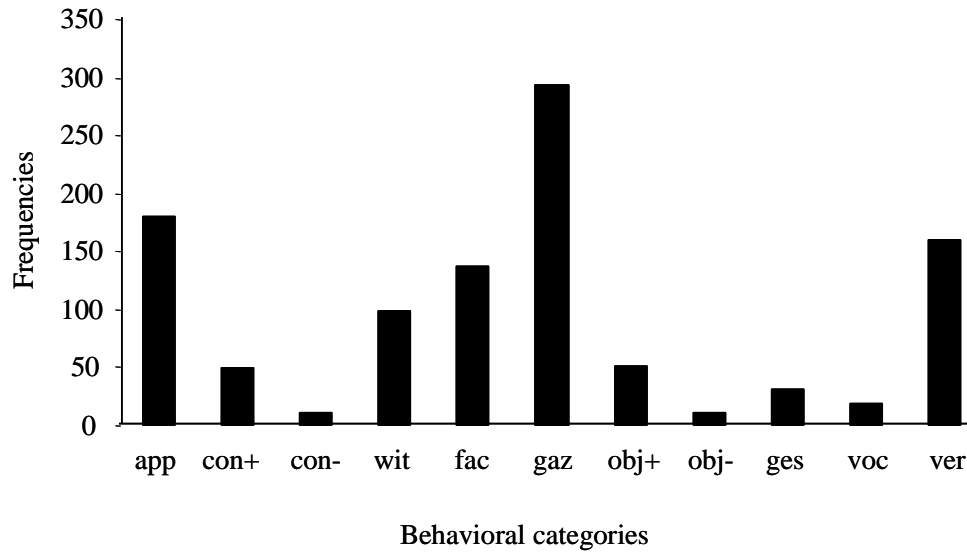


Figure 1. Behavioral profile of a child at the end of the school year (P3). app = frequencies of approaches; con+ = positive contacts; con- = negative contacts; wit = withdrawal; fac = positive facial expressions; gaz = gaze; obj+ = positive activities mediated by objects; obj- = negative activities mediated by objects; ges = gestures; voc = vocal utterances; ver = verbal utterances.

Behavioral profiles of children identified as preferred partners or as nonpreferred partners were then compared using an index of similarity. Indices of similarity were derived from chi-square distances of analysis of correspondence. The distance between two individuals i and i' in a contingency matrix of n_{ij} generic terms were defined as follows:

$$D^2(i, i') = \sum_{j=1}^p \frac{1}{f \cdot j} \left(\frac{f_{ij}}{f_{i \cdot}} - \frac{f_{i'j}}{f_{i' \cdot}} \right)^2,$$

where f_{ij} is the frequency of the cell ij (n_{ij}/N), $f_{i \cdot}$ is the marginal frequency of the line i (n_i/N), and $f \cdot j$ is the marginal frequency of the column j (n_j/N). Thus, the similarity index is as follows:

$$I_s(i, i') = \frac{2 - D^2(i, i')}{2}.$$

Indices of behavioral symmetry varied from 0 (dissemblance) to 1 (identity). A gray scale was used to visually illustrate the index of behavioral symmetry obtained between a child and each social partner represented by the cells of the sociomatrix. Therefore, if the behavior profiles of children and partners ranked as preferred were more similar than between children and partners ranked as nonpreferred, the gray scale densities of cells that represented indices of behavioral similarity would be congruent with the gray scale densities of cells in the sociomatrix that indicated social preferences.

Statistical analyses. An analysis of variance with repeated measures (ANOVA) on the indices of behavioral similarity was used to test whether on average, estimates of behavioral similarity obtained for children and partners ranked as preferred were statistically different from the indices of behavioral similarity obtained between children

and partners ranked as nonpreferred. Conversely, it was also of interest to evaluate whether the magnitude of friendship (i.e., ranked social preference) mediated behavioral similarity and further, whether indices of behavioral similarity were stable over the school year.

Results

Children's Friendships

As shown in Figure 2a, the majority of children at the beginning of the school year interacted with some classmates more than with others. Most children were highly selective in the allocation of their social activity among available partners and showed social preferences within their peer group. Nevertheless, not all ratings of social preferences reached the friendship criterion (i.e., the threshold of 30% of time spent in interaction) at the beginning (P1) of the year. Finally, it can be noticed that 4 children (16% of total sample) spent more than 50% of time with a preferred partner at the beginning of the year; whereas at the end of the year 11 children (45% of total sample) had at least one partner with whom they spent more than 50% of their time.

Behavioral Similarity

Matrices of similarity obtained at the beginning (P1), middle (P2), and end (P3) of the school year revealed that differences between children's behavioral profiles were limited (i.e., $0.50 \leq I_s \leq 1$) (see Figure 2b). Nevertheless, for each observation period, review of individual child behavior profiles showed that some children differed from their classmates: for example, *max* during the first observation period, *wil* during the first and second periods, and *jus* during the first and third periods. As the index of similarity was derived from an analysis of correspondence between behaviors, it was possible to identify the specific behaviors that distinguished these children from their peers. They were characterized by higher frequencies of agonistic behaviors including negative contacts and negative interactive activities mediated by objects.

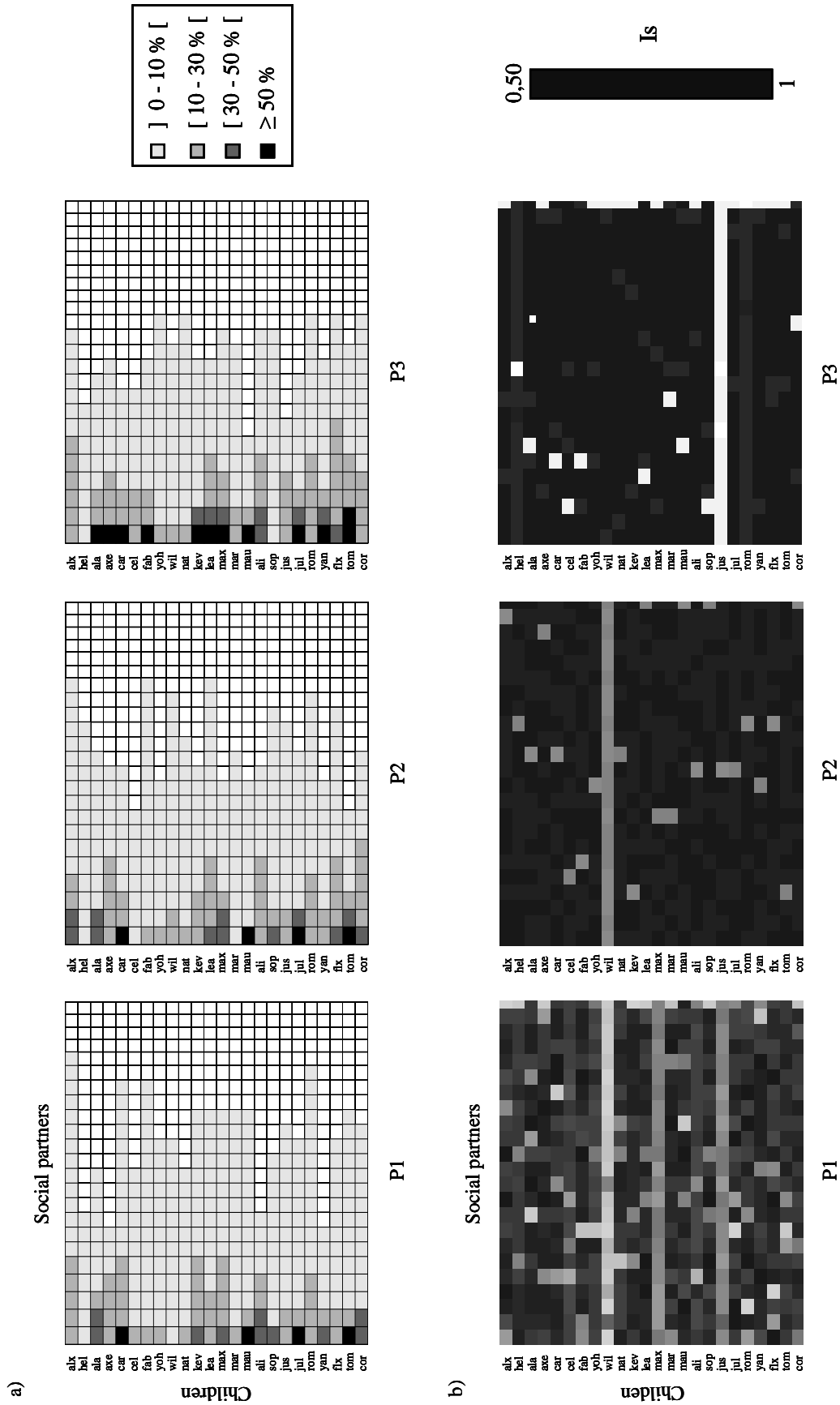


Figure 2. Social preferences and behavioral similarity for the first (P1), second (P2), and third (P3) observation period. a) In sociomatrices, gray scale indicates the percentage of observation time that a child (column) spent in interaction with a particular classmate (line). Children's social partners are ranked according to the amount of interaction (from the left to the right: high to low). b) In similarity matrices, gray scale indicates the value of the similarity index obtained between a child (column) and a particular classmate (line). Children's social partners are arranged in the same rank as in sociomatrices.

Results of the repeated measures analysis of variance (ANOVA) conducted on the measure of behavioral similarity showed a significant main effect for the rank of social partner, $F(22, 529) = 5.03, p < .001$. Review of Fisher's z planned contrasts suggests that on average, the behavioral similarity indices obtained for social partners ranked as nonpreferred (i.e., children who interacted the least amount of time with others) were smaller than behavioral similarity indices obtained for social partners ranked as preferred (i.e., children who interacted more often with their social partners; see Figure 3). Specifically, the difference in behavioral similarity indices were significant for two partners at the first observation period: for partner 22, behavioral similarity indices were significantly smaller for partner 2, 3, 4, 7 and 16 (all $ps < .01$) and for partner 23, behavioral similarity indices were statistically smaller for all partners (all $ps < .05$). At the second and third period, differences on the similarity indices were significant only for partner 23: the child who interacted with other children the least amount of time. The children with whom the others interacted the least were the two children described previously: *wil* and *jus*. Furthermore, the interaction obtained between time and social partner on the measure of behavioral similarity was not statistically significant, $F(44, 1058) = 1.25, p < 0.13$. Social partner differences on mean indices of behavioral similarity were stable over all three time-periods.

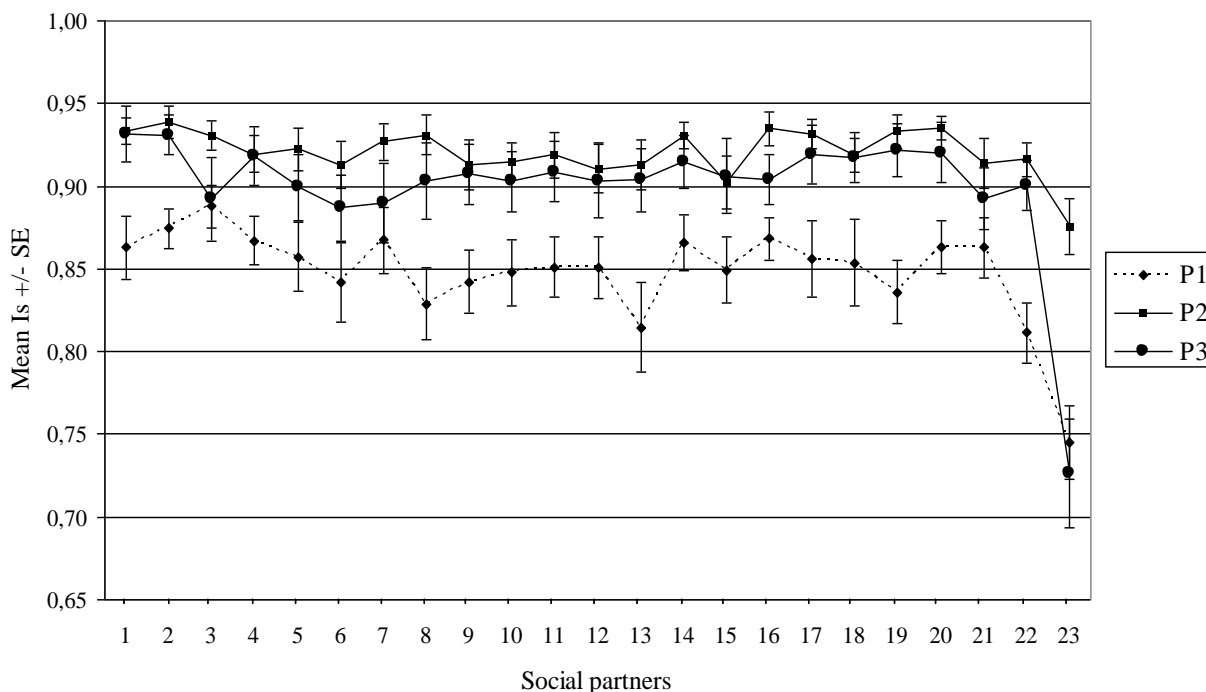


Figure 3. Mean similarity indices between children and their different social partners during the first (P1), second (P2) and third period (P3) of the school year. Social partners are ranked according to children's social preferences (from the most preferred partner on the left: partner 1, to the most nonpreferred partner on the right: partner 23).

Finally, a significant effect was found for time, $F(2, 1058) = 121.47, p < .01$; review of the univariate contrasts suggests that on average, differences in the indices of similarity between children's behavioral profiles increased significantly from the beginning of the school year (P1, mean $I_s = 0.848 \pm 0.006$) to the middle of the school year (P2, mean $I_s = 0.921 \pm 0.004$). A decrease in the mean indices of similarity was significant at the end of the school year (P3, mean $I_s = 0.900 \pm 0.006$); however, this decrease was mostly due to the very low indices of behavioral similarity found between one child (*jus*) and his social partners.

Discussion

Our observations showed that most of the children were highly selective in their peer affiliations, that is, children interacted with a small number of available peers, as noted in previous reports (Barbu, 2003b; Hinde et al., 1985; Howes, 1983; Ross & Lollis, 1989; Snyder et al., 1996). However, our findings revealed that similarity in behavioral profiles was not greater between children who preferred to interact together than between children who did not interact together. The only significant differences were found for children who appeared the most frequently as nonpreferred peers. These children were indeed isolated or rejected children; their behavioral profiles differed from those of other children by having higher frequencies of agonistic behaviors (see Barbu, 2003a for details). Finally, as children's social preferences are very flexible in preschoolers and as preferred partners change from time to time over a school year (Barbu, 2003b), it is not surprising that similarity in behavioral profiles increased for *all* partners over the school year and was not limited to preferred partners. Put another way, the magnitude of difference in classmates' social behaviors was reduced over the school year.

Behavioral Similarity from a Developmental Perspective

Ample evidence from research that incorporates either direct or indirect measures suggests that children who are aggressive tend to associate with other aggressive children from preschool-age to adolescence (Cairns et al., 1988; Haselager et al., 1998; Kandel, 1978a,b; Kupersmidt et al., 1995; Poulin et al., 1997; Snyder, Horsch, & Childs, 1997; Vitaro et al., 1992). Age-related differences were found when behavioral similarities in terms of competent behavior in early childhood were considered. Findings from a recent study by Howes & Phillipsen (1992) failed to show significant similarity between toddler- and preschool-age friends either in terms of activity level or in social interactive style. Toddler-age friends, but not preschool-age friends, were found to be more similar in social skills than nonfriend dyads. Previously, we have reported, using a similar observational protocol with younger children (mean age: 3 years 5 months), that friends were similar both in social activity levels and behavioral profiles (Barbu, Jouanjean, & Allès-Jardel, 2001). These findings, combined with those of the current study, suggest that behavioral similarity between friends varies as a function of age of the children observed (Epstein, 1989; Newcomb & Bagwell, 1995). For instance, similarities in social behavior may induce social attraction between very young toddlers with age-appropriate rudimentary social skills by facilitating social interactions, but not between older, preschool-aged children with more mature social skills. One might also suppose that friendships in the

early preschool years are formed only by children who have sufficient social skills to establish close relationships. Caution must be taken when comparing findings from studies of children at different developmental ages and with varying levels of social skill.

Methodological Issues

Observational versus indirect measures. Studies that utilize indirect measures of social relations and behaviors are found to reveal greater overall friend/nonfriend differences than studies that incorporate analysis of direct observations (Newcomb & Bagwell, 1995). Some properties of friendship, such as behavioral similarity, may be more apparent in children's reports on their relationships than observed directly in their interactions. This lack of congruity in findings may be due to biases in children's perception of relationships or to observational methods that fail to capture subtle behaviors in social interactions. Our failure to find similarities between friends may also be related to limitations in our observational methods. Clearly, future research should include multiple methods that include both direct and indirect measures for assessing behaviors associated with the intimate and subtle aspects of friendships.

Friendship identification. The friendship literature has a history of considerable disparity in the definition of friendship and in the choice of comparison groups that represent critical moderator variables. Indeed, the magnitude of the overall differences between friends and various comparison groups seems to be determined both by the degree of liking and the degree of knowing (Newcomb & Bagwell, 1995). We compared the behavioral profiles of friends and their classmates, while other studies compared children with strangers or disliked peers. First, as strangers are low in their degree of knowing and of liking, this comparison provides the greatest contrast with friends (Newcomb & Bagwell, 1995). Our findings corroborate this view, as similarity was high among all classmates and increased during the school year. Acquaintances, especially classmates, ought to be more similar than strangers because they share experiences. They benefit from the same teaching and the same social experiences that could influence children's social skills (Clarke-Stewart, 1989). Furthermore, familiarity also influences social behavior within and among peer groups (Doyle, Connolly, & Rivest, 1980; Schwartz, 1972). Second, the effects observed in comparisons with disliked peers may be more attributable to individual characteristics of disliked peers than to the quality of friendships. For instance, our results revealed that some children were less similar to others than their classmates. We showed in previous research that these children were isolated and were disliked by their peers (Barbu, 2003a). Ample research evidence shows that isolated or rejected children behave differently than their age-mates; they are often characterized by withdrawal or agonistic behaviors (Coie & Kupersmidt, 1983; Dodge, 1983; Ladd, Price, & Hart, 1988). Our results are congruent with these findings and suggest that the use of disliked peers in comparison groups may inflate the degree of similarity observed between friends. Third, the definition of friendship—reciprocal versus unilateral—is an issue that investigators must also consider because reciprocity is an essential feature of these relationships (Bukowski & Hoza, 1989). In our study, all friendships were reciprocal (i.e., children spent more than 30% of their time interacting together). Finally, our attempt to view friendship along a continuum questions the saliency

of identification of friendships through positive nominations by peers such as when children are asked to select their three best friends or the classmates they like the most (Erdley et al., 1998). When the definition of friendship is based on social preferences, we showed that not all the children had three good friends or even a best friend, whereas some children had several very good friends. The number of peer nominations is fixed by the researcher and as such, may either overestimate or underestimate the number of friends that a child interacts with socially.

Longitudinal perspectives. Friendship progresses along a developmental trajectory that includes a beginning, middle and end. With the exception of Gottman's (1983) seminal work with preschool children, little is known about how a friendship changes with time or what makes some acquaintances develop into friendships. Previous studies in the literature provide only static, categorical comparisons between friends and nonfriends. Therefore, important questions regarding relations between behavioral similarity and friendships remain unanswered. Our findings showed that the degree of behavioral similarity between social partners differed over time and more dynamic analyses are required to tease out the nature of this variation.

To conclude, having a friend appears over the course of life is an indicator of social adaptation (Allès-Jardel et al., 2003 for a review). Nevertheless, analysis of developmental outcomes must not be reduced to determining whether a child has a friend or not, but must consider the identity of the friend and the quality of the friendship (Hartup, 1996). For instance, deviant friends or negative relationships could induce poor social adjustment (Berndt, 1996; Vitaro et al., 1992). Clearly, further studies are needed to shed light on why and how children select their friends.

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