

Social Interactions of Toddlers and Preschoolers in Same-Age and Mixed-Age Play Groups

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We observed the play of 32 toddlers and preschoolers randomly assigned to eight play groups. Four of the play groups contained children of the same age; the other four contained children who were 2 years apart in age. No differences were found in overall patterns of play as measured by Parten's (1932) play codes. Although negative behaviors occurred infrequently in both settings, younger children tended to exhibit more negative interactions in same-age settings, and older children exhibited more negative interactions in mixed-age settings. Younger children in mixed-age settings played with same-age and older playmates at expected rates; older children in mixed-age settings, however, were more likely to choose other older children as playmates. The results, which differ to some extent from previous research, may be due to the familiarity of children with peers within the group and common day-care experiences prior to the study.

The importance of age and competence in social development has led researchers to question the relative merits of same-age versus mixed-age groups with respect to children's social behavior. Although it has been argued that mixed-age groups are more consistent with human evolution in the context of small hunter-gatherer societies (Konner, 1975), same-age groups are predominant in complex, industrialized societies (Hartup, 1976). It has been noted that most studies of children's social development have been conducted in same-age environments (Lougee, Grueneich, & Hartup, 1977). Consequently, much of our knowledge about social behavior and development may be context-specific.

The question of whether children should be grouped homogeneously or heterogeneously with respect to age has important applied implications for caregivers and organizers of early childhood programs, and arguments could be made

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for both arrangements. For example, same-age groups may do a better job of preparing children for school settings, which are almost invariably same-age in composition. Older children may be able to engage in more extended and complex activities when they are not interrupted by younger children. In addition, teachers may find same-age settings to be easier because they do not have to plan and prepare activities for children of diverse developmental levels. Conversely, mixed-age settings provide opportunities for younger children to learn by observing competent older peers. Older children may be more likely to learn and practice helping behaviors in mixed-age settings. Furthermore, it could be argued that while same-age groups may prepare children for success in school, mixed-age groups are more relevant to life outside of school.

Several studies have investigated the extent to which the social behavior of young children is influenced by the age composition of groups. Three laboratory studies have observed dyads of children grouped according to various ages. Lougee et al. (1977), for example, observed same- and mixed-age dyads of 3- and 4-year-olds. Younger same-age dyads exhibited the lowest amount of positive social interaction, whereas older same-age dyads displayed the most. Intermediate levels were observed in the mixed-age dyads. A similar pattern was observed for mean length of utterance. Task orientation did not differ among the groups. Howes and Farver (1987) studied dyads in which 2-year-olds were paired either with same-age or 5-year-old partners. Toddlers engaged in more social pretend play when paired with the older children. Brownell (1990) observed dyads of 18- and 24-month-old toddlers and found that the younger children were more interactive and more positive when paired with an older child than with an age-mate. They initiated more, produced more complex initiations, and imitated older partners more than same-age peers. Older children, on the other hand, made fewer initiations in mixed-age dyads; when they did initiate, however, it was likely to be longer and more complex than with same-age peers.

Three additional studies have examined play behaviors in the context of larger child-care groups. Goldman (1981) observed naturally occurring classes consisting either of 3-year-olds, 4-year-olds, or a mixture of 3- and 4-year-olds. The 4-year-olds in mixed-age groups spent more time in solitary play but less time in parallel play or teacher-directed activities than did their counterparts in same-age groups. Three-year-olds in mixed-age groups spent less time in parallel play than 3-year-olds in same-age groups. Within the mixed-age groups, playmate choices were more likely to be influenced by the partner's gender rather than age. Field (1982) observed same- and mixed-age groups and reported that mixed-age groups resulted in more verbal interaction, imitation, and fantasy play. Urberg and Kaplan (1986) found more interactive-functional play in mixed-age groups for all children, but more conversation and parallel-functional interaction in same-age groups. Younger children engaged in more dramatic play and negative interactions in mixed-age groups.

Other studies have observed older children or have noted unplanned observations of possible differences between same- and mixed-age groupings. Graziano, French, Brownell, and Hartup (1976), in a study of task performance in same- and mixed-age triads of first- and third-graders, found more conversations in same-age triads. Whiting and Whiting (1975) suggested that aggression is more likely in same-age groups, whereas nurturing behaviors are more commonly observed in mixed-age groups.

The research conducted thus far is limited in several respects. The laboratory studies have relied on observations of dyads of children who were not previously acquainted. Because Mueller and Brenner (1977) showed that acquainted toddlers were more likely to interact with each other in a sustained fashion than nonacquainted peers, the question is raised of whether this research would generalize to the typical day-care or play group context consisting of more children, all of whom are acquainted with each other. The group studies, however, have not randomly assigned children to conditions or standardized observational environments or adult roles. For example, in Field's (1982) study, each same-age group contained 8 children, whereas the mixed-age groups contained 24 children. Goldman's (1981) study required only 80% of the children in the classes to be within the designated age ranges, thus reducing the likelihood of differences between settings. Only two studies were found that included children under 3 years of age (Brownell, 1990; Howes & Farver, 1987). The definition of *mixed-age* has varied widely across studies, with differences as little as 6 months between older and younger children (Brownell, 1990) and as great as 3 years (Howes & Farver, 1987). The outcomes assessed have varied widely across the studies, measuring effects on domains such as overall social behavior, differentiated levels of social play, pretend play, task performance, and task orientation. Although this variability reflects the diversity of possible effects, replication of findings within each outcome domain is essential.

The present study was designed to explore further the effects of same- and mixed-age groupings on the social behavior of children between the ages of 18 and 60 months. As part of a longitudinal, prospective study, it extends previous research by systematically observing behavior in the context of previously acquainted play groups, by randomly assigning children to groups, and by including 1- and 2-year-olds. The study was designed to determine whether social behavior among young children was influenced by age composition of the group.

METHOD

Subjects

Subjects were 32 children ranging in chronological age from 18 to 60 months. The children were equally distributed across four age groups (1-, 2-, 3-, and 4-year-olds at the beginning of the school year), with 8 children of each age. The

children were selected from a waiting list of applicants to the day-care program to ensure a representative population of subjects.

Of the 32 children, 15 were girls and 13 were members of a minority group, predominantly African-American. Approximately one third of the children were from low-income families, one third from middle-income, and one third from upper-income. Minority and income status were equally distributed across the ages as well as across experimental conditions.

Setting

Classroom Information. The children were enrolled in 1 of 8 “family” groups in a university-based child-care program; each group consisted of 6 children (2 with disabilities and 4 normally developing) and a day-care teacher. Each family group had a self-contained space designed to meet the needs of the children in the group. This included a variety of play areas, toys, and materials placed on low shelves for easy access, cots for naps, and access to child-sized sinks and toilets. Classroom areas were separated by low dividers approximately 4 ft high.

Teachers. Nine teaching staff worked in the 8 classrooms used in this study; the room for 1-year-olds had two teachers to comply with state day-care regulations. All of the teachers were women, with a mean age of 46.5 years (range = 33.4–59.4), a mean length of employment at the center of 15.3 years ($SD = 3.7$), and mean education expressed in grades completed (including higher education equivalents of one grade level for each year completed) of 13.9 ($SD = 1.5$).

Curriculum. All children at the center participated in the “Learninggames” curriculum (Sparling & Lewis, 1979, 1984). The curriculum consists of 200 carefully developed but simple games to encourage learning and social-emotional growth.

A typical schedule for the day-care center consisted of arrival and free play (7:30–9:00), breakfast (9:00–9:30), diapering and clean-up (9:30–10:00), planned group and individual activities (10:00–10:45), circle and story time (10:45–11:00), outdoor play (11:00–11:30), preparation for lunch (11:30–11:50), lunch and clean-up (11:50–12:30), nap and quiet activities (12:30–3:00), getting dressed and snack (3:00–4:00), and free play (4:00–4:30). During the free play times at the beginning and the end of the day, the children were grouped by age (all 1-year-olds together, all 2-year-olds together, etc.). Between 9:00 a.m. and 4:00 p.m. children were in their family groupings.

Assignment to Groups. The children were assigned to 8 groups, 4 consisting of children of mixed ages and 4 consisting of children of the same age. The 4 same-age groups each consisted of children within 12 months of age of each

other, with group assignment determined by age at the beginning of the school year. Thus there was a class of 1-year-olds, a class of 2-year-olds, a class of 3-year-olds, and a class of 4-year-olds. The average age difference among children was approximately 4 months. The four mixed-age groups consisted of 3 older children and 3 younger children, with an average difference of 25 months between the older and younger children. A 2-year age difference was used to approximate family-like spacing of ages and to maximize group heterogeneity. Two mixed-age groups consisted of 1- and 3-year-olds, and two contained 2- and 4-year-olds. Two children with disabilities were enrolled in each group. In the mixed-age groups, one child with disabilities was the same age as the younger children and one the same age as the older children. The children had a range of disabilities including Down syndrome, myelomeningocele, and cerebral palsy. Most had mild developmental delays; there were no differences between the developmental ages of the children with disabilities in the two groups as measured by the Battelle Developmental Inventory (Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 1984). The data from the children with disabilities are not reported in the present study. The eight groups are depicted graphically in Figure 1 (p. 266).

Assignment to groups used a variation of a stratified random assignment procedure. First, we wanted to ensure overall comparability between same- and mixed-age groups on the key variables of age, sex, race, and socioeconomic status (SES). Second, we wanted to ensure that each of the family groups was as comparable as possible on these variables. Group characteristics were therefore described (e.g., each group should have 3 boys and 3 girls, 4 normally developing and 2 with disabilities, etc.). Children having the characteristics needed for a given slot (e.g., a minority, typically developing girl between 24 and 36 months of age) were then randomly assigned to groups. This resulted in an overall equality of distribution by gender, minority status, age, SES, and disability status across the same- and mixed-age groups. The two experimental groups did not differ significantly in SES (based on Hollingshead's [1975] Four-Factor Index of Social Status), race, sex, chronological age, or developmental age as assessed by the Battelle Developmental Inventory (Newborg et al., 1984).

Controlled Play Environment. To provide a standardized context for studying social behavior, controlling the types of toys available and the teacher's role, the children were videotaped in a special 12 × 18-ft room designed to simulate a preschool classroom environment. The room was located in the day-care center. One end of this room was blocked off with modular blocks 30 in. high, leaving a play space of 12 × 12 ft. The remaining 72 ft² were used for two video cameras and two camera operators. The children could see but not reach the cameras and camera operators.

The play room was equipped with a standardized set of child-sized furniture and with toys appropriate for toddlers and preschoolers. The toys were selected

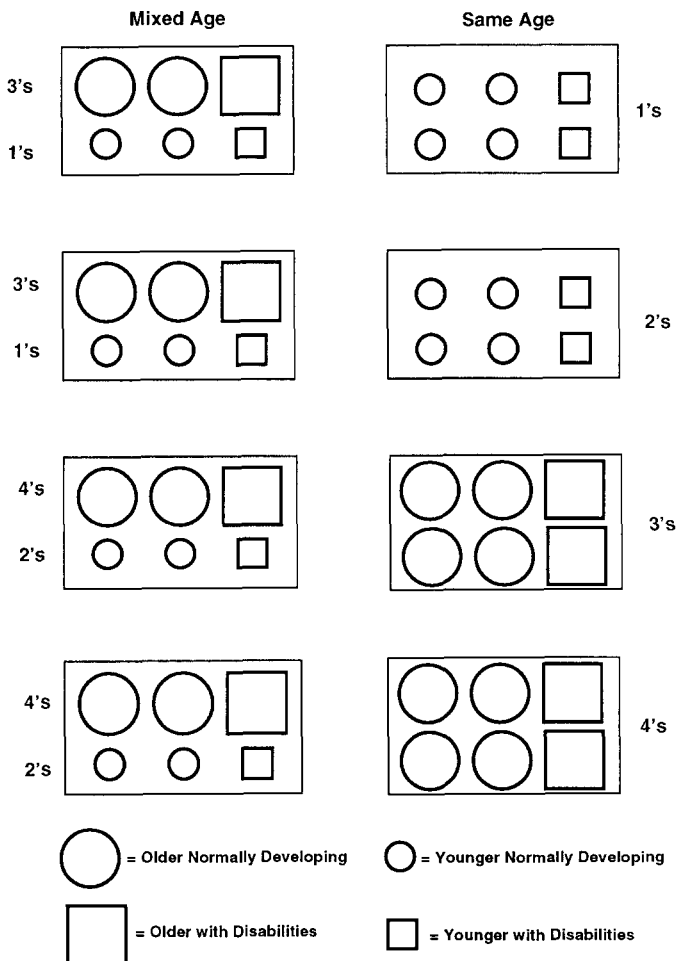


Figure 1. Distribution of children in eight experimental play groups.

to encourage social interactions, rather than isolate play. The three types of toys were pretend play (housekeeping, steering wheel, telephones), pretend clothes (hats, vests, scarves), and dolls. The dolls were anatomically correct and there were equal numbers of white and black dolls. One adult-sized comfortable chair for the adult monitor sat in a corner of the children's play area.

Procedure

Social engagement data were collected in the controlled play environment over 6 weeks in the spring. Therefore, the children were well acquainted with each

other (at least 6 months) prior to the observational setting. The children had a "habituation session" in the play room to become accustomed to the surroundings and the situation, before filming for data collection began. These sessions were identical in procedure and length to the data collection sessions. The camera operators were students who received training before and during the habituation sessions.

Each child was videotaped for 15 min on each of four separate occasions in the context of play with his or her group, for a total of 60 min of observed play time per child. To maintain equal probabilities for interaction, filming occurred only on those days when all children in a class were present. During each videotape session, two focal children were filmed (one per camera). The camera operators kept the focal child, as well as nearby playmates, in view. When the focal child looked at or addressed peers outside the camera's field, the camera panned to the target child and then back to the focal child, so that the data coders could later identify the target. Each group remained in the controlled play environment for 30 min (two filming sessions), but four different focal children were filmed in that time (i.e., no back-to-back sessions for focal children).

The children wore vests that served two functions: letters were pinned on the back to help the coders identify the children, and the vests held mini-microphones. Only the focal child for each camera had a vest with a microphone; the other children wore plain vests. At the beginning of each session, the cameras focused on a chart identifying the children in the group and the letter pinned to each one's vest. The children were told they could play with the toys in the room and were given four rules: (a) no hurting each other, (b) no hurting the toys, (c) use "inside" voices, and (d) clean up when done. (Clean-up occurred after the session was over and was not included for data collection.) The monitor (a research associate familiar to the children) sat quietly in a corner of the room, only intervening when rules (a) and (b) were broken.

Coding Procedure. At the completion of filming, a copy was made of each videotape which would be used later for coding. By interfacing the VCR with a computerized coding system, a computer-generated timing signal was placed on one of the audio tracks of the videotape. This timing signal allowed the tape to be coded while the computer automatically recorded the time. The software package used for coding was the Observational Coding System Tools developed by Triangle Research Collaborative, Inc. This system allowed the computer to be used to record duration of behavioral categories in a synchronized mode with the VCR. Using the timing signal on the audio channel, the system matched the keyboard input to the timebase. This allowed data to be collected at any time, then reviewed, edited, organized, and run through a primary analysis.

Prior to data coding, four coders were trained for approximately 4 weeks using tapes from the previous year. Coders were trained by watching previously coded tapes, checking the corresponding code sheets, and then discussing with other coders. Practice coding was done both on paper and then on the computer.

Coders were required to reach an interrater duration reliability of at least 80% for all the social play categories on four consecutive sessions of 5 min of tape or 25 codes (whichever came first). This required 6–12 practice sessions depending on the coder.

Coding took place over 4 months at a rate of 3–5 sessions per day. Data printouts were made at the end of each session, when corrections were made and entered into the computer. The data were uploaded periodically on to a main-frame computer to create a Stastical Analysis Systems (SAS) data set for statistical analyses.

Instrumentation

Parten's (1932) categories of social play were used as the initial basis for documenting the social engagement of children during the data collection sessions. The Parten system was chosen because of its demonstrated utility in describing broad categories of social play among children of varying ages. The coding system also included identification of the play partners and data on the style of play.

The social play categories ("what" codes) were operationally defined for the purposes of this study, the play partners ("who" codes) were identified by unique IDs, and the style of play ("how" codes) were also operationally defined, as indicated below. The operational definitions were determined before training the observers, and additional decision rules were devised in the early stages of training.

The following categories of *social play* were used: unoccupied, solitary, on-looking, parallel, associative, and coordinated. Summaries of the operational definitions are provided in Table 1. These categories were not mutually exclusive. For example, a child could be coded as both onlooking and parallel if he or she was sitting near a child, playing with similar materials, while watching another child in the room. For this study, however, only those time intervals in which a single code was recorded were used for the analyses.

The *play partner* was identified for each social engagement code, with the exception of unoccupied and solitary, which do not involve other people. Individual children, the classroom monitor, and the camera operators were identified by play partner codes. If the focal child's behavior stayed the same, but the targets changed, a new code was entered. When two people were the targets of the focal child's social engagement, they were both identified. When more than two children were the targets, the two primary people were coded, and the rest were not identified in the coding system, but a code indicated that more than two people were the targets of the social behavior.

In addition to the social play code and the targets of social behavior, the *style of play* was coded for each episode. The seven codes for style of play were as follows: rejection, distress, conflict, take, neutral, positive, and kind. Summarized operational definitions can be found in Table 2. A style of play code was

TABLE 1
Operational Definitions for Social Play Codes

Category	Definition
Unoccupied	The child is not purposefully engaged with either objects or people. He or she may look about as if searching for something to do, but does not sustain interest in any person, object, or event.
Solitary	The child is purposefully engaged with materials or activities, but not with any other person. He or she plays alone with toys or materials that are different from those of other nearby children.
Onlooking	The child focuses attention on a person or group of people for at least 3 s.
Parallel	The child plays near another child of whom he or she is aware and who is playing with similar materials or who is engaged in a similar play theme (e.g., one child sets the table, the other cooks a meal). The children are not interacting about the activity nor are they engaged in a coordinated pursuit, as defined below. In this example, if the children had decided to serve a meal, and each went to do his or her part, it would not be coded as parallel, but rather as coordinated.
Associative	The child is socially focused, including talking, laughing, sharing, and making physical contact but the nature of the interaction does not meet the criteria for coordinated play.
Coordinated	The child is engaged in associative play but in an activity that requires both children to interact. The dyad or group has a common outcome, goal, or product. This behavior includes pretend play where the children take on roles to act out a situation (e.g., "You be the Daddy; I be the Mommy").

entered for each social play code, whether or not the child was interacting with others. It was possible to code two of these "how" codes as concurrent behaviors, although this rarely occurred.

Finally, each child was assessed using the Battelle Developmental Inventory (Newborg et al., 1984). This measure provides an overall indication of the child's developmental age and was used initially to document equivalence of treatment groups. No differences were found between the developmental ages of children in the same-age ($M = 47$ months, $SD = 1.18$) or mixed-age ($M = 49$ months, $SD = 1.16$) groups.

Reliability

To determine reliability, 15-min segments for 17 (53%) of the children were recoded by an independent observer who was unaware of the original codes assigned. Each check consisted of coding the entire 15-min session in the same manner as the original coding.

Because the analyses performed used total percentages of time engaged in various behaviors, Pearson product-moment correlation coefficients were used

TABLE 2
Operational Definitions for Style of Play Codes

Category	Definition
Negative	
Rejection	The child spurns or clearly ignores another's social overtures.
Distress	The child cries, whines, complains, or otherwise displays being upset.
Conflict	The child hurts or tries to hurt another, whether verbally or nonverbally. This behavior may include insulting, name-calling, hitting, kicking, and so on.
Take	The child takes or attempts to take another's materials, space, or turn. This code was used when the target child had neither given permission for the "take" to occur or when it was anticipated that conflict or distress might ensue.
Neutral	The child does not demonstrate rejection, distress, conflict, taking, positive, or kind behavior.
Positive	
Positive	The child demonstrates positive affect or thoughtfulness toward others. This behavior can include smiling, affectionate behavior, laughter, sharing, turn-taking, helping, and so on.
Kind	The child displays noncontingent altruistic behavior, such as giving toys to others, consoling upset children, spontaneously helping children in difficulty.

initially to assess the degree of agreement between the two observers. The resulting correlations for the social play categories were as follows: unoccupied (.72), solitary (.99), onlooking (.99), parallel (.92), associative (.96), and cooperative (.99). This analysis indicated extremely high agreement among observers as to the rank order of play behavior. Cohen's coefficient kappa was also calculated to correct for chance agreement. The resulting coefficients were as follows: unoccupied (.46), solitary (.73), onlooking (.65), parallel (.64), associative (.70), and coordinated (.92), indicating moderate to substantial agreement (Landis & Koch, 1977). For style of play codes, which were collapsed into three categories as described subsequently, correlation coefficients were as follows: neutral (.76), negative (.90), positive (.73). Coefficient kappas were .44 for neutral, .71 for negative, and .73 for positive styles. The mean percentage of agreement on partners was 84.3%.

Analyses. As noted earlier, each child was observed for 15 min on each of four occasions, for a total of 60 min. Preliminary analyses were completed on each occasion and across occasions. Given the similarity of the results for each occasion, we aggregated the data for all four occasions. Of all the play time observed, 5.5% was coded using multiple codes. Because multiple codes pose

difficulties in data analyses, these data were deleted; thus, all analyses are based on the remaining 94.5% of observed time.

A multivariate analysis of variance (MANOVA) procedure was first applied across the six categories of social behavior. To control for possible variations in developmental levels within and across the same- and mixed-age groups, the MANOVA tested the effects of both developmental age (as measured by the Battelle Developmental Inventory) and group condition on patterns of social behavior, as well as any possible interaction effects. Because style of play was generally coded as neutral, and in order to reduce the number of tests conducted, the style of play codes were combined as follows: rejection, distress, conflict, and take were combined to create a single measure of negative style, and positive and kind were combined to create a single measure of positive style. The neutral code was retained as a separate measure. MANOVA procedures were then used to analyze the patterns of positive and negative play styles across the two groups.

Distributional assumptions were handled by transforming the values of the dependent variables (proportions) using the Inverse Sine Transformation as recommended by Kirk (1982). The results reported here reflect descriptive statistics on raw data and tests of significance on transformed data.

RESULTS

The mean percents of time spent in each social play category are displayed in Table 3 and each style of play category in Table 4 (p.272).

Social Behavior

For the six categories of social behavior, the multivariate *F* (Wilks' Lambda) indicated a nonsignificant interaction between developmental age and group

TABLE 3
Mean Percentages of Time Spent in Social Play Categories^a

Group	Social Play Categories					
	Unoccupied	Solitary	Onlooking	Parallel	Associative	Cooperative
Same Age	5	30	7	16	22	11
Younger	7	37	7	18	20	3
Older	4	23	6	14	24	19
Mixed Age	5	37	9	12	22	9
Younger	5	43	10	12	18	5
Older	5	32	8	12	26	13

^aData reflect overall mean percentages of time in each category for all children in each group as well as separate percentages for those classified as younger (in the 1- and 2-year-old groups) and older (in the 3- and 4-year-old groups).

TABLE 4
Mean Percentages of Time Spent in Style
of Play Categories^a

Group	Style of Play Categories		
	Negative	Neutral	Positive
Same Age	6.6	90	2.9
Younger	8.6	89	2.3
Older	4.6	92	3.6
Mixed Age	5.1	91	3.2
Younger	4.3	93	2.3
Older	5.8	90	4.2

^aData reflect overall mean percentages of time in each category for all children in each group as well as separate percentages for those classified as younger (in the 1- and 2-year-old groups) and older (in the 3- and 4-year-old groups).

assignment, $F(6, 23) = 1.22$, $p = .33$. Likewise, the test for a main effect for same-age versus mixed-age groups was nonsignificant, $F(6, 23) = 2.07$, $p = .097$. Because this value approximated significance, we conducted follow-up individual tests of each play category to determine possible trends in group differences. The groups were virtually identical in levels of social play within each of the six categories. None of the univariate analyses for group effect was significant.

As expected, the MANOVA test for developmental age effects was significant across the six categories of social play, $F(6, 23) = 4.33$, $p < .005$. Follow-up univariate tests were significant ($p < .05$) for all categories except associative play. Developmentally younger children spent more time in unoccupied, solitary, onlooking, and parallel play, whereas developmentally older children spent more time in cooperative play.

Style of Play. The vast majority of play time was coded as neutral. (The positive codes were used only in instances of overtly positive behavior.) Analytic procedures identical to those described earlier were used to assess the effects of group and developmental age across the categories of negative and positive styles of play. The multivariate F for an interaction of developmental age and group was nonsignificant, $F(2, 27) = 2.49$, $p = .10$. Tests for main effects approximated significance for both group assignment, $F(2, 27) = 2.83$, $p < .08$, and developmental age, $F(2, 27) = 3.10$, $p < .07$. Follow-up univariate analyses indicated an interaction between developmental age and group assignment, with developmentally younger children exhibiting more negative styles of play in same-age groups (8.6% versus 4.3%) and developmentally older children exhibiting more negative styles in mixed-age groups (5.8% versus 4.6%), $p < .04$.

The univariate tests for positive play styles were nonsignificant for a Developmental Age \times Group interaction or for a main effect for group assignment. A main effect was found for developmental age, with older children generally exhibiting more positive styles of play than younger children ($p < .05$).

Partner Choices

Mixed-age groups provided an opportunity to examine the partner choices made by children. Because of the small sample size, descriptive statistics were used to suggest patterns of choice that should be tested more rigorously in a larger study. For this analysis, only dyadic interactions coded as onlooking, parallel, associative, or coordinated were examined. The proportion of dyadic play time spent as a function of age of the play partner did not appear to vary across the two groups for younger children (18–35 months), who spent 67% of their time playing with older children (a 60% rate would be expected by chance). Older children, however, spent most of their time (73%) playing with other older children (a 40% rate would be expected by chance).

DISCUSSION

The primary purpose of this study was to determine whether grouping children heterogeneously or homogeneously with respect to age significantly influences the amount and nature of their social behavior. No main effects for same-age versus mixed-age groups were found in categories of social play, with remarkable similarity between the two groups in terms of play type. Children in both same-age and mixed-age groups spent about the same amount of time in social behavior. Subsequent analyses of the individual categories of social behavior revealed a similar pattern. With regard to style of play, most of the behaviors were coded as neutral for both same-age (91%) and mixed-age (92%) groups. These data suggest that the two group types do not result in dramatic differences in social behavior across children. Two exceptions to this statement are warranted, however. First, it appears that the rate of negative styles of play may be influenced by age composition of groups, with younger children exhibiting more negative styles of play in same-age groups and older children in mixed-age groups. It should be noted, however, that the overall level of negative behavior was low in both settings. Second, an analysis of the choice of play partners suggests that older children in mixed-age groups are likely to spend most (three quarters) of their time interacting with other older children.

This study generally failed to support many of the findings reported by other investigators. In almost every study reviewed, significant differences between groups have been documented in some aspect of social play. In general, these findings suggest that mixed-age groups may enhance the social behavior of younger children but not necessarily of older children. What factors contribute to this discrepancy in findings?

Our conclusion is that this study demonstrates the essential need for replica-

tions and extensions of existing research under a variety of controlled (and sometimes uncontrolled) conditions. This study is unique in that we randomly assigned children to play groups and allowed children a 6-month period to establish friendships and patterns of play. All of the children had initially been enrolled in the day-care center between 6 weeks and 3 months of age. During this time the children were exposed to a standard curriculum and all were enrolled in the same child-care facility, where all of the teachers were encouraged to adopt a common philosophy of caregiving that involved activity-based learning. These procedures increased the likelihood that the two groups were similar with respect to the amount and nature of center-based child-care experiences. Perhaps the fact that each of the published laboratory studies used unacquainted dyads of children influenced the rate at which certain behaviors occurred. Our findings suggest the possibility that familiarity and common experiences shared by the children participating in research studies may result in a pattern of behavior that differs from what would be observed with children who have no prior experiences with each other.

When play behaviors were observed, we used a standardized play environment so that group differences in play would not be inadvertently affected by type of toys available. The role of the adult in the play environment was limited and standardized across the classes, and we collected data only when all 6 children were present in each class, to ensure equality in partner choices during each session. Previous research involving groups of acquainted children has not controlled for group size, group assignment, activity type, toy availability, or adult role, variables known to influence social behavior. Our data suggest that when such variables are controlled, patterns of social play may be similar in the two age groupings.

Four limitations of the present study point to the need for replication and extension of this research. First, the sample size was small, especially considering the number of independent and dependent variables. Although some significant results were obtained despite the small sample size, a replication would be important to verify these findings. In addition, our study looked at play groups consisting of 6 children. Replications are needed in which size of the group is systematically varied. It may be that a larger group size, such as that more typically found in day-care centers, would result in a different pattern of play. Second, the analyses were limited to a broad-based system for coding social behavior. Further studies should examine sequences of interactions or the cognitive levels of play to determine if the complexity of play varied by group type. Third, although the use of an analogue play environment helped to control key variables that might influence social behavior, the extent to which these findings would generalize to other play environments is uncertain. Replication studies should use other typical child-care activities (e.g., sand and water play, outdoor play, circle time, woodworking) to determine if cross-age interactions and levels of social play vary by activity type. Finally, the presence of children with disabil-

ities undoubtedly contributed to the heterogeneity within the same-age groups, thus reducing the likelihood of finding significant differences between the two groups. Although integrated early childhood settings are becoming more common, a replication study is needed to determine if the same findings would pertain when the groups did not contain children with disabilities.

What are the implications of the present study for child-care providers who must make decisions about how to organize child-care settings? Our data suggest that the two arrangements do not affect the overall level of social interactions, and thus teachers should make this decision on the basis of other factors. However, the limitations of this study and the discrepancies with prior studies suggest that any final suggestions may be premature. In addition, a recent longitudinal study (Bailey, Burchinal, & McWilliam, 1993) indicates that mixed-age settings may benefit younger but not older children in terms of developmental progress, with the exception of social development, which appeared to be superior for both older and younger children in mixed-age groups.

Bronfenbrenner (1976, 1977) suggested that much research has limited generalizability because it is not conducted in the ecology in which children and adults live and function. This poses a dilemma for researchers who want to explain behavior and control for alternative interpretations. This study adds to the current literature in that it controls for a number of variables in extending the same-age/mixed-age literature to applied contexts. As with other studies, the factors that contribute to experimental control limit the generalizability of findings and thus create a need for further research.

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