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# Social Participation of Preschool Children in Same- versus Mixed-Age Groups

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GOLDMAN, JANE A. Social Participation of Preschool Children in Same- versus Mixed-Age Groups. Child Development, 1981, 52, 644-650. Using point-time sampling procedures, this study investigated (a) the amount of time that children in same- versus mixed-age groups spend in various forms of social participation and (b) the age relationships of children in mixed-age groups. Social participation was observed in 3 classes of 3-year-olds, 3 classes of 4-year-olds, and 3 mixed-age classes. For both 3- and 4-year-olds, social participation in mixed-age classes differed from social participation in same-age classes. Compared with their age mates in same-age classes, 4-year-olds in mixed-age classes spent more time in solitary play but less time in parallel play or teacher-directed activities. Among the 3-year-olds, those in mixed-age classes spent less time in parallel play. Within the mixed-age groups, age did not appear to be a major factor influencing choice of playmates. Results are discussed in terms of their implications concerning the developmental potentials residing in mixed-age groupings.

Researchers concerned with the social and intellectual development of young children have begun to emphasize the essential role played by peers in the process of development (Hartup 1976b; Lewis & Rosenblum 1975). However, the literature concerning peer influences has been, by and large, a literature of interactions among age mates. Overall, both observational and laboratory studies of peer influence have failed to include age difference as an independent variable (Hartup 1976a).

Responding to this lack of information concerning the influence of age as an independent variable, researchers have begun to investigate ways in which interactions with age mates are similar to or different from interactions with non-age mates. The majority of these studies have involved laboratory experiments in which children are observed in dyads or triads. For example, Graziano, French, Brownell, and Hartup (1976) compared the behaviors of first and

third graders who were assigned to same-sex triads which varied in age composition. Analyzing their results in terms of the contributions made by individual members of the triads to a simple block-building task, they found that the participation of third graders varied according to the composition of the group. For these third graders, singleton status (one third grader with two first graders) was associated with the highest level of performance. For the first graders there was little difference in performance across the types of triads.

Working with preschool children who were assigned to same-sex dyads, Lougee, Grueneich, and Hartup (1977) found that social activity of the older children was lower in the cross-age dyads than in the same-age dyads. In contrast, social activity of the younger children was more frequent in the cross-age dyads.

Results of such laboratory studies indicate that children do respond differently when

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placed in the same-age versus cross-age situations. However, because these studies have been limited to investigations of interactions occurring among children in isolated dyads or triads, questions remain about the ways in which children are influenced by peers of various ages when they are interacting as members of larger ongoing groups, such as preschool classes.

While not the major foci of their studies, a few researchers have presented data concerning peer interactions in preschool groups with alternative age mixtures. For example, Reuter and Yunik (1973) reported that children in mixed-age groups were more sociable with peers and spent less time interacting with adults. In contrast, both Clark, Wyon, and Richards (1969) and O'Connor (1975) reported that children in mixed-age groups were less sociable with peers and spent more time with adults. However, in both the Clark et al. and O'Connor studies, the meaning of these results concerning sociability is not clear. In both cases, scores for sociability did not differentiate between interactive (associative and cooperative play) and noninteractive (watching, proximity, parallel play) aspects of social participation.

Although each of these observational studies suggests that age grouping does have a significant influence on the behaviors of preschool children, in each study the results concerning heterogeneity of age grouping were confounded by a number of variables (child/adult ratio, curriculum model, etc.). The present study was designed specifically to investigate the influence of heterogeneity of age grouping on the social relationships of children in preschool groups. To the degree that this was possible, the intent of the study was to apply systematic controls, parallel to those of the laboratory investigations of heterogeneity of age grouping, to a field investigation of the social participation of children in same- versus mixed-age groups. The study will be presented in two sections: Part I compares the social participation of children in same- versus mixed-age groups, and Part II describes the age relationships of playmates within the mixed-age groups.

### Part I

Method

Subjects.—Social participation was observed in three classes of 3-year-olds, three classes of 4-year-olds, and three mixed-age classes. Classrooms were defined as same-age

groups if at least 80% of the children were within the designated age range. Classrooms were defined as mixed-age groups if at least 40% of the children were 3-year-olds and 40% 4-year-olds. Children classified as 3-year-olds ranged in age from 2-9 to 3-8 at the beginning of the school year. Children classified as 4year-olds ranged in age from 3-9 to 4-8. In order to equalize the opportunity for cross-sex versus same-sex interaction, classes were selected in which at least 40% of the children were boys and at least 40% girls. Median class size was 12. Taking into account both children who left during the course of the study and new children who enrolled, a total of 116 children were enrolled in the nine classrooms studied. Details regarding the age-sex distribution of children in each class are presented in Goldman (1977).

All groups were ongoing nursery school classes which were selected to minimize the influence of confounding variables. For example, all groups were morning classes which met at least three mornings per week. All classes were located in the same homogeneous middle-class neighborhood, and all were sponsored by community groups. In order to reduce the influence of curriculum variables, all of the classes fit Weikart's (1972) description of the "traditional" child-centered, permissive nursery school class.

Behavior categories.—Behaviors were classified according to the following eight categories of social participation:

Unoccupied: The child is not involved with materials or with people.

Onlooking: The child is not involved with materials or with people but is engaged in sustained observation of a particular person or group.

Solitary play: The child is playing alone in a project area, or the child is playing in a project area with other children but is (a) more than 3 feet from the nearest child or (b) involved in a totally unrelated activity.

Parallel play: The child is playing in a project area with other children and is working with similar materials but is not interacting with them.

Teacher-directed activity: The child is a member of a group which a teacher is directing. Attention is focused directly on the teacher.

Positive interaction: The child is engaged in activities which include one or more of the following behaviors (except those forms of contact or exchange which are included under negative interaction): eye contact, physical contact, verbal ex-

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change, moving together, involvement in a mutual project.

Negative interaction: The child is engaged in an interaction which involves a physical or verbal threat or attack, interfering with the ongoing activity of another, or denying activities or privileges.

Adult-only relationships: The child is alone with an adult.

These categories reflect an integration of the categories described by Parten (1932) in her classic study of social participation with the more recent guidelines for behavioral observations which have been presented by researchers working from an ethological perspective (e.g., Blurton Jones 1972; McGrew 1972). Categories were defined in terms of overt body movements, eye contact, verbalizations, and proximity. Detailed descriptions of the categories and coding procedures are presented in Goldman (1977).

Observation procedures.—Each class was observed on 10 different days for a minimum of 30 min per day. Observations were recorded only during free play and only when at least two-thirds of the class was present. The observations, which were conducted over a 4-month period, were evenly divided between two female observers. For each classroom, observations were distributed over the days of the week and over the period of data collection.

Observations were made following pointtime sampling procedures (Altmann 1974). The free-play periods were divided into 3-min segments. One cycle of observations was completed during each segment, with each cycle including one observation of each child in the class. For each cycle of observations the observer looked at child A and recorded the form of social participation in which the child was engaged and the names of any playmates, looked at child B and recorded this child's participation and playmates, and so forth, until she had completed one observation of each child in the class. For each day of observation the children were observed in a predetermined random order. The mean number of observations per child was 147, with a range of 41–235. The number of observations per child varied due to absences and day-to-day fluctuations in the length of the free-play period.

In order to obtain an ongoing measure of observer agreement, the two observers conducted 5 days of simultaneous observations. These observations were distributed across the period of the study. Following the recommendations of Johnson and Bolstad (1973) that measures of observer agreement be calculated on unit scores equivalent to those used in the data analysis, observer agreement was calculated in terms of the summary scores of each observer for each child. Consequently, for each category of behavior, product-moment correlations between the scores of the two observers were calculated based on the observers' summary scores for each child for the given behavior. Agreement for the occurrence of each of the categories of solitary play, parallel play, teacher-directed activity, positive interaction, and adult-only relationships ranged from .91 to .96. Because of the low frequency with which the categories of unoccupied, onlooking, and negative interaction occurred (see table 1), agreement for these categories was not calculated and the categories were not subject to further analyses.

Data analysis.—In order to compare the amount of time that children in the same-

TABLE 1

Percentage of Observations during Which Target Children Were
Observed in Each Category of Social Participation

Category of Social - Participation	3-Year-Olds				4-Year-Olds			
	Mixed Age		Same Age		Mixed Age		Same Age	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Unoccupied	1	3	2	2	1	2	1	2
Onlooking	3	2	2	3	2	2	2	$\bar{2}$
Solitary play	28	26	23	24	26	28	17	19
Parallel play	27	36	36	40	30	38	39	44
reacher-directed activity	1	1	2	3	1	2	8	7
Positive interaction	34	25	28	22	34	23	27	21
Negative interaction	1	1	1	0	1	0	0	0
Adult only	5	7	6	7	5	4	5	6

versus mixed-aged groups were observed in solitary play, parallel play, teacher-directed activity, and adult-only relationships, tabulations were made indicating the number of cycles during which each child was observed in each of the categories. To control for the fact that the children were observed for different numbers of cycles, for each child these frequency scores were converted to percentages. To normalize these scores for analysis, all proportions were transformed using the arcsine transformation. For each category, a hierarchical regression analysis was performed with class entered before sex, age, and heterogeneity (same vs. mixed age). This was equivalent to an analysis of variance design with class nested within age mix. However, because of the unequal cell sizes and the nesting of class within age mix, the regression analysis, which performs an exact least-squares solution, was preferred. Class and class-by-sex effects, respectively, were used for significance testing. Given that the study involved three types of classes (3-year-old same age, 4-year-old same age, and mixed age) with three classes per type, the class variable accounted for 6 of the 115 degrees of freedom.

#### Results

Four-year-olds in the mixed-age groups, as compared with 4-year-olds in the same-age groups, spent significantly more time in solitary play,  $F(1,6)=6.40,\ p=.044,\$ but less time in both parallel play,  $F(1,6)=9.92,\ p=.020,\$ and teacher-directed activities,  $F(1,6)=5.62,\ p=.054$  (see table 1). Three-year-olds in mixed-age groups, as compared with 3-year-olds in same-age groups, spent significantly less time in parallel play,  $F(1,6)=6.91,\ p=.038.$  For the 3-year-olds, no significant differences were found for positive interaction or any of the remaining categories.

In terms of sex and age differences, boys spent significantly more time than girls in positive interaction,  $F(1,6)=6.55,\,p=.042$ . Girls tended to spend more time than boys in parallel play,  $F(1,6)=5.05,\,p=.064$ . There were no significant differences between the 3- and 4-year-olds in the percentage of observations during which they were engaged in any of the categories of social participation.

## Part II

Method

Subjects.—In order to assess the salience of age as a factor in playmate selection, Part II

of the study investigated the age relationships of children within the mixed-age classes. Subjects included all children in the mixed-age classes who were present from the beginning of the study. Data from two children who entered during the course of the study were not included. Observation and coding procedures were those described in Part I. Observer agreement for choice of playmates ranged from .85 to .95.

Data analysis.—To assess playmate patterns during positive interactions, tabulations were made indicating the number of cycles during which each child in the mixed-age classes was observed in a positive interaction with every other child in the class. For each child, then, it was possible to calculate the distribution of the child's playmates across these four age-sex peer groups (3-year-old boys, 3year-old girls, 4-year-old boys, 4-year-old girls) However, because the number of children in each of the peer groups varied between classes and also within classes (due to absences, tardiness, etc.), there was no meaningful way in which these observed percentages could be compared. Consequently, baseline figures for each child, which indicated the exact number of playmates of each age and sex who were available to the child during each observation, were also calculated. Summing across these baseline figures, for each child it was then possible to compute "availability quotients" for playmates in each of the age-sex peer groups. These availability quotients indicated the percentage of playmates who would have fallen into each peer group if selection of playmates had occurred on a random basis. Using these availability quotients, it was then possible to compare the percentage of observed playmates who fell into each of the age-sex peer groups with the percentage of playmates who would have fallen into the group if selection of playmates had occurred on a random basis.

Because it could not be assumed that the interactions of any one child in a group were independent of the interactions of the other children in the group, it was deemed most appropriate to analyze these data on an individual basis. For each child the observed proportion of interactions involving playmates of the same age was compared with the corresponding availability quotient. The resulting z score indicated if the child played with sameage peers significantly more or less than would have been expected by chance or if there was no significant difference between the two per-

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centages. Similar analyses indicating whether each child interacted with same-sex peers significantly more or less than would have been expected by chance were also conducted.

Given the low frequency of negative interactions in the mixed-age classes, it was not possible to conduct similar analyses on these data. Rather, sign tests were used to assess the distribution of negative interactions between the two age groups (each child receiving a + if involved in more negative interactions with same-age peers than with cross-age peers, or a — if involved in more negative interactions with cross-age peers). Sign tests were also used to assess the distribution of negative interactions between boys and girls.

## Results

Positive interactions.—As indicated in table 2, sex rather than age appeared to be the dominant factor influencing choice of playmates within the mixed-age groups. Among the 3year-old boys, 4-year-old boys, and 4-year-old girls, 83%, 88%, and 100% of the children, respectively, interacted with same-sex peers significantly more than would have been expected by chance. The 3-year-old girls were the only group in which a majority of the children showed no preference for same-sex peers. Looking at age of playmates, the 4-year-old boys were the only age-sex peer group in which a majority of the children (58%) interacted with same-age peers significantly more than would have been expected by chance.

Given the findings of strong segregation on the basis of sex and the possibility that the results concerning age relationships might have been confounded by this segregation, these analyses were replicated on subsets of data involving same-sex interactions. Again, comparatively little segregation on the basis of age was found. The salience of sex as opposed to age as a factor in playmate selection is further emphasized by the fact that while 47% of the children interacted with same-sex cross-age peers significantly more than would have been expected by chance, only 5% of the children (two 3-year-old girls) interacted with sameage cross-sex peers significantly more than would have been expected by chance. Not one of the children interacted with cross-age crosssex peers significantly more than would have been expected by chance.

Negative interactions.—Results of the sign tests indicated that negative interactions were "equitably" distributed across the two age groups. For the girls, the distribution of negative interactions across the sexes was not significantly different from chance. For the boys, however, results of the sign test approached significance (p < .06, two-tailed), suggesting that the boys engaged in negative interactions more frequently with other boys than with girls.

## Discussion

These results indicate that the age composition of children in a preschool group does influence the pattern of social participation. For both the 3- and 4-year-olds, social participation in mixed-age groups differed in signifi-

TABLE 2

PLAYMATE PATTERNS IN MIXED-AGED GROUPS: PERCENTAGE OF CHILDREN ENGAGED IN POSITIVE INTERACTIONS WITH SAME- VERSUS CROSS-AGE AND SAME- VERSUS CROSS-SEX PEERS SIGNIFICANTLY MORE THAN EXPECTED BY CHANCE

	AGE	OF PLAY	MATE	SEX OF PLAYMATE			
-	Same	Cross	No Pref	Same	Cross	No Pref	
3-year-olds:							
	25	0	75	88	0	13	
Boys4-year-olds:	38	25	38	38	0	63	
Boys	58 38	25 0	17 63	83 100	0 0	17 0	

Note.—N = eight 3-year-old boys, eight 3-year-old girls, 12 4-year-old boys, eight 4-year-old girls. Same = percentage of children who interacted with same-age (same-sex) peers significantly more than would have been expected by chance. Cross = percentage of children who interacted with cross-age (cross-sex) peers significantly more than would have been expected by chance. No Pref = percentage of children who showed no significant difference in the percent of interactions with same- vs. cross-age (same- vs. cross-sex) peers.

cant ways from social participation in same-age groups.

In view of our knowledge concerning the social development of preschool children (Parten 1932), it was not surprising that the 3-year-olds who were enrolled in mixed-age groups with the more "mature" 4-year-olds spent less time in parallel play than did their counterparts in same-age groups. What was less expected was that the 4-year-olds who were enrolled in mixed-age groups also spent less time in parallel play, as well as less time in teacher-directed activities but more time in solitary play.

Based on the argument of Rubin, Maioni, and Hornung (1976) that within a social-cognitive play hierarchy, parallel play is the least mature level of play, the finding that children in the mixed-age classes spent less time in parallel play suggests that mixed-age groups have a facilitative influence on social participation. Also supporting arguments concerning a facilitative influence of mixed-age groupings was the finding that 4-year-olds in the mixedage groups spent more time in solitary play. While solitary play frequently has been maligned, as indicative of poor social-cognitive adjustment, recent findings suggest that solitary play frequently involves goal-directed and educational activities (Roper & Hinde 1978; Rubin et al. 1976). In fact, Roper and Hinde (1978) argued that the solitary, parallel, and interactive components of social participation should not be thought of as representing a single linear dimension, but that the component of solitary play is orthogonal to a group play (parallel vs. interaction) component. It has also been suggested that participation in activities in which there is not a great deal of adult involvement encourages the development of independence, initiative, and novel use of materials (Carpenter, Huston-Stein, & Baer, Note 1). If this is the case, the finding that 4-yearolds in the mixed-age groups spent less time under the direct guidance of an adult also supports the suggestion that mixed-age groups have a facilitative influence on development. Furthermore, given the "equitable" distribution of negative interactions within the mixedage groups, there were no indications that the older children in these groups "picked" on the younger children, or vice versa.

Overall, these results support the findings of Reuter and Yunik (1973) that children in mixed-age groups are more sociable and spend less time with adults. They contradict the findings of Clark et al. (1969) and O'Connor (1975) that children in mixed-age groups are less sociable. Given that Clark et al. and O'Connor failed to differentiate between interactive and noninteractive forms of play in their definitions of sociability, the present findings suggest that their findings of less social interaction in the mixed-age groups may have reflected a lower incidence of parallel play in these groups rather than a lower incidence of either associative or cooperative play.

Within the mixed-age groups, sex rather than age appeared to be the major factor dictating choice of playmates. However, while age did not appear to be a major factor dictating the friendship choices of the majority of these children, caution must be taken in generalizing to friendship choices in other situations or among other age combinations. For example, reports of the interactions of preschool children in classes with wider age ranges suggest that age may be a more salient feature within such groups (Green 1933). Also, while age may not be of primary importance within groups limited to 3- and 4-year-olds, Day and Hunt (1975) report that it is a more salient factor in the playmate choices of children in primary school settings, including children in "open," ungraded classes of 4-, 5-, and 6-year olds.

Results of the present study also suggest that, in evaluating the influence of mixed-age groupings on the behaviors of young children, considerable caution must be taken in generalizing from situations involving mixed-age dyads to situations involving larger groups of children in which a number of children of each age are present. For example, the findings of Lougee et al. (1977) indicated that participation in a mixed-age dyad may have a facilitative influence on the behavior of the younger but not the older member of such a dyad. In contrast, findings of the present study indicate that mixed-age groupings have a facilitative influence on the behaviors of both the older and younger children in larger mixed-age groups. In fact, these findings are probably more similar to those of Graziano et al. (1976), who found that mixed-age groupings had the greatest influence on the behaviors of the singleton older children in their mixed-age triads.

In conclusion, results indicate that the social participation of children in preschool groups is influenced by the age composition of the group, and that, at least within groups of 3- and 4-year-olds, mixed-age groups have a facilitative influence on social participation. In

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terms of bridging the gap between developmental research and social policy, these results indicate that caution must be taken in generalizing from experimental assessments of mixedage groupings to applied situations.

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