

Effects of Classroom Age Composition on the Play and Social Behaviors of Preschool Children

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Preschool children enrolled in same- and mixed-age day care classrooms were observed during free play to examine patterns of social and play behavior. In mixed-age rooms, there was more interactive-functional play, for both older and younger children, more dramatic play and negative interactions for younger children, and a tendency for older children to be onlookers. In the same-age rooms, there was more conversation and more parallel-functional interaction for both older and younger children. While previous research has emphasized the benefits of mixed-age rooms, the current research indicates that some costs may also be involved.

The natural play patterns of children constitute a rich source of information about the development of social and play skills during the preschool years. Observations of play suggest that the age composition of the peer play group influences both the type and amount of interaction among children. Further clarification of the effects of peer group age composition on children's play and social behavior is clearly of both theoretical and practical interest to researchers, teachers, and caregivers. Although the topic of cross-age interaction is receiving more attention, very few studies have been done examining interactions in naturally occurring preschool settings. As a result, advice directed toward child care professionals about grouping children in age homogeneous or heterogeneous classrooms relies primarily on theory with little empirical verification.

Only two studies have focused specifically upon this question (Field, 1982; Goldman, 1981). Goldman (1981) used several ongoing preschool programs as the setting for her study of social participation in same- and mixed-age classrooms. She found that both 3- and 4-year-olds spent less time in parallel play in the mixed- than in the same-age rooms. Older children in mixed-age rooms spent more time in solitary play and less time in teacher-directed activities. She con-

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cluded that mixed-age rooms are more beneficial for the children because children in mixed-age rooms are more social than those in same-age rooms. It is not clear, however, that her findings warrant this conclusion. While the children engaged in less parallel play in mixed-age rooms, there is no indication that they were engaging instead in more peer interaction. In fact, the higher incidence of solitary play suggests just the opposite. Goldman also argues in favor of mixed-age rooms because she views the greater involvement of older children in solitary play in that setting as positive. This view stems from the recent finding that solitary play is not necessarily a less mature form of play (Rubin, 1982). However, while solitary play is not necessarily immature (or evil), neither can it be classified consistently as a mature behavior. Solitary play can be observed both in children who have not yet developed the skills to interact well with their peers and in more mature children who can interact well with other children but choose to spend time in solitary, cognitive activities.

Field (1982) found more verbal interaction, imitation, and fantasy play in mixed- than in same-age preschool groupings. Such findings seem to reinforce Goldman's (1981) conclusions on the benefits of mixed-age groupings. Unfortunately, the same-age groups each contained 8 children while the mixed-age groups each contained 24 children. Thus, the availability of space and toys was greater in same-age groups while the availability of children was greater in the mixed-age groups. This confounding of group age composition with group size makes clear interpretation of the findings difficult.

While several studies have looked at play behavior as a function of the age composition of the classroom, other social behavior has not been examined. Laboratory studies suggest that older children seem to have more social influence than younger children. For example, young children have been found to imitate selectively same-age and older peers (Brody & Stoneman, 1981). Further, in a study of preschool sibling dyads, Abramovich, Corter, and Pepler (1980) found that younger children imitated older siblings more than they were imitated, and that the older children directed both more agonistic and prosocial behavior at their siblings than did the younger children. If these findings of asymmetries in social power among sibling dyads apply to unrelated children in groups, this suggests that younger children in a mixed-age setting may receive help from older children, but may be denied dominance and leadership roles.

The current study was designed to compare the social and play behavior of younger and older preschoolers in mixed- and same-age, naturally occurring preschool classrooms. Two sets of variables were chosen for study. The first was a set of play variables. A modification of Rubin's (1982) combination of Parton's (1932) and Smilansky's (1968) play categories was utilized. This system allows for distinctions among various types of solitary, parallel, and interactive play. A major intent of the study was to discover whether different types of play were more prevalent in same-age as compared to mixed-age settings.

The second was a set of social variables chosen to index leadership, competi-

tion, hostility and prosocial behavior. It was expected that younger children in a mixed-age room, compared to those in a same-age room, would be the recipients of more prosocial and hostile behavior as found by Abramovich et al. (1980) in their study of siblings. It was also hypothesized that young children would have more opportunity to exhibit leadership skills and dominant behavior in a same-than in a mixed-age setting where the older children might take most of the leadership roles.

METHOD

Subjects

Sixty-three children enrolled over a 2-year period in a university laboratory day care center with two similarly equipped and staffed rooms were observed. During the first year of the study, each of the two classrooms contained a mixed-age group (28–62, and 32–62 months, respectively). During the second year, the classrooms were age-stratified into a younger (34–51 months) and an older (49–64 months) classroom. The median age in both years was 50 months. Thus, in the mixed-age rooms there were 8 younger and 7 older males along with 8 younger and 8 older females. In the younger same-age room there were 7 males and 9 females, while in the older same-age room there were 9 males and 9 females. The subjects were from middle- to upper-middle class families and were 44% white, 46% black, and 10% biracial or other. The sample was 47% male and 53% female.

Data Collection Procedure

Observational data on the play and social behavior of the children were collected in March and April of each year. Thus, the children had been in the same group for about 6 months before data collection began and were quite familiar with one another. Four undergraduate students and the two authors recorded data each year. The observers trained until a level of 85% interobserver reliability on occurrence of each category was achieved. During data collection, 10% of the observations were overlapped at random times throughout the data collection to assess reliability.

A point-time sampling procedure (Altman, 1974) was employed in collecting play behavior data. During the free play time, each child was observed for 15 seconds. The play behavior of the child as well as the identity of the child's playmates were recorded. Fifty observations were collected for each child, with no more than three observations, separated by at least 15 minutes, made each day. The social behavior data were collected using interval sampling. Each subject was observed continuously for 5 minutes, with behaviors recorded at 15-second intervals. Observations on each child were separated by at least 1 day. An hour of observation (12 5-minute observations) was collected for each child.

Instruments

Rubin's (1976) play categories were modified to form the play behavior instrument by adding four categories; (1) interacts with teacher alone, (2) interacts with teacher in the presence of peers, (3) self care (included washes hands, puts on shoes, etc., without help), and (4) interaction-conversation. Rather than scoring associative and cooperative play separately, the general category of positive interactive play was utilized. As in Rubin's system, the major categories (solitary, parallel, positive and negative interaction) were subdivided. Subdivisions included functional, cognitive, and dramatic categories of play. The "cognitive" category differed from Rubin's "constructive" category in that it included both cognitive activities such as looking at a book or sensory exploration of materials, as well as creative or constructive endeavors engaged in to produce a product such as painting or building with blocks.

The following play variables were used.

Alone with Teacher. The child interacts with a teacher and no other children are involved.

With Teacher and Peers. The child interacts with a teacher in the presence of one or more children.

Onlooker. The child watches other children at play but does not participate or talk to the children (see positive interaction-conversation).

In the following solitary categories, the child plays alone and independently of other children who may be in proximity.

Solitary-Functional. The child's activity involves simple, repetitive muscle activity that may or may not involve objects.

Solitary-Cognitive. This category includes both constructive and cognitive activities. The child's activity is goal-oriented and involves either creative activities such as art projects or cognitive activities such as looking at books or copying letters.

In the following parallel play categories, the child plays beside another child or children and is engaged in the same activity, but there is no attempt to affect the play of the other child(ren).

Parallel-Functional. (see functional definition above).

Parallel-Cognitive. (see cognitive definition above).

In the following positive interaction categories, the child is engaged with another child or children and there is evidence that the play is influenced by the actions or words of both the children as in imitation, turn-taking or working toward a common goal.

Positive Interaction-Functional. (see functional definition above).

Positive Interaction-Cognitive. (see cognitive definition above).

Positive Interaction-Dramatic. In this play, there is evidence of the use of pretend situations, objects or roles in the children's play.

Positive Interaction-Conversation. The child engages in simple conversation where there is no concurrent functional or cognitive activity nor any evidence of a dramatic theme.

In the negative interaction categories, the children influence one another in negative ways, either physically (hits, pushes, etc.) or verbally (threatens, calls names, etc.).

Total Negative Interaction. All types of negative interaction (functional, cognitive, dramatic, and conversation) were summed to form a single category due to the low frequency of negative interaction.

Self Care. The child independently engages in an activity that is focused upon body health and comfort such as hand washing or zipping a jacket. The following categories were scored but dropped from the analyses due to low frequency: unoccupied, solitary-dramatic, and parallel-dramatic.

The social behavior instrument was adapted from White and Watts (1973). The peer interaction categories from the Social Behavior Checklist were used, with the exceptions of "pride in product and attributes," "imitation of adults," "child role play," and "adult role play." These categories were eliminated as they did not directly involve peer social interaction. The negative peer interaction categories occurred too infrequently to analyze and are not discussed.

The positive peer interaction categories used and their operational definitions are as follows.

Leads in Peer Activities. This category was scored when the child made overt attempts to influence the behavior of peers in either a verbal or physical manner. It was also scored as either successful or unsuccessful depending on whether or not the other child responded to the attempt to lead.

Competes with Peer. This category was scored when there was evidence of overt competition between children for either equipment or attention (peer or adult). This was also scored as either successful, unsuccessful, or unresolved, depending on whether the child secured the object of the competition.

Serves as Model. Other children imitated or followed the child's lead without the child giving a specific directive.

Follows Lead of Peer. The child followed the verbal or physical directive of another child.

Refuses to Follow Lead. The child ignored or said no to a directive by another child.

Imitates. The child imitated the words or behavior of another child.

Expresses Affection. The child's expression of affection could be verbal such as shared laughter or statements expressing liking or affection or it could be physical such as hand holding and hugs.

Expresses Prosocial Behavior. This category combined helping and sharing. It was scored when the child offered another child a valued object or assisted another child.

Expresses Hostility. This was scored when the child either verbally or physically expressed hostility such as hitting or disrupting another child's activity or verbally expressed dislike to another child.

Receives Affection, Receives Prosocial Behavior, and Receives Hostility. These categories were scored when the child received any of the behaviors described as expressing affection, prosocial behavior, or hostility.

Interobserver reliability was measured with Cohen's kappa (Hartmann, 1982). For the play behavior categories, the reliability coefficients ranged from .66 to .95. For only 2 of the 15 categories was the coefficient less than .80. For social behaviors, the reliability coefficients ranged from .72 to .94.

Analyses

Fourteen of the children were present for both years of the study. They were among the younger children in the year 1, mixed-age rooms and then were in the older group in the year 2, same-age room. To meet the assumptions of independence for multivariate analyses of variance, it was necessary to analyze the data on the older and the younger children separately or to drop these children from one of the years of the study. Since the sample was only moderate in size, the data for the older and younger children were analyzed separately. This means that a direct statistical test of an interaction between age and age composition of the classrooms or sex of the child could not be done. However, a significant finding for an independent variable with one age group, and not with the other, is equivalent to an interaction.

RESULTS

Play Variables

The play variables were used as dependent variables in separate MANOVAs for older and younger children. Classroom age composition and sex were independent variables. For both younger and older children, the Multivariate F value (Wilk's lambda in all cases) for the interaction between classroom age composition and sex was nonsignificant. The Multivariate F for the main effects of classroom age composition and of sex were significant for both younger and older children: Younger children, age composition, $F(11,18) = 8.59, p = .001$; sex, $F(11,18) = 2.43, p = .046$, and for older children, classroom age composition, $F(11,19) = 4.55, p = .002$; sex, $F(11,19) = 3.58, p = .007$. The means (M) and F values for the univariate analyses of age composition can be seen in Tables 1 and 2.

For both older and younger children, there was more positive interaction-conversation in the same-age rooms but more positive interaction-functional and more self care in the mixed-age rooms. For the younger children only, there was more positive interaction-dramatic play, more total negative interaction, and a trend for more positive interaction-cognitive in the mixed-age rooms. For the older children only, there was a trend toward more onlooker behavior in the mixed-age rooms. Parallel-functional play occurred more often in same-age rooms for both younger and older children.

TABLE 1
Younger Children in Same- and Mixed-Age Classrooms: Means and Univariate Significance Tests for the Play Variables

	Same-age Rooms	Mixed-age Rooms	F	p
Younger Children ($df = 1,27$)				
alone with teacher	4.68	4.06	.429	n.s.
with teacher and peers	7.51	9.25	2.181	n.s.
onlooker	5.93	4.31	2.003	n.s.
solitary-functional	4.31	4.00	.065	n.s.
solitary-cognitive	2.62	3.25	.912	n.s.
parallel-functional	9.01	3.25	29.943	.000
parallel-cognitive	6.06	6.75	.439	n.s.
pos. interaction-functional	2.87	8.87	30.694	.000
pos. interaction-cognitive	1.33	2.57	5.389	.000
pos. interaction-dramatic	4.25	7.25	6.625	.015
pos. interaction-conversation	6.18	3.31	8.269	.007
total negative interaction	0.55	1.31	4.809	.036
self care	0.12	0.93	6.983	.013

TABLE 2
Older Children in Same- and Mixed-Age Classrooms: Means and Univariate Significance Tests for the Play Variables

	Same-age Rooms	Mixed-age Rooms	<i>F</i>	<i>p</i>
Older Children (<i>df</i> = 1,27)				
alone with teacher	2.77	4.98	2.322	n.s.
with teacher and peers	11.61	12.20	.243	n.s.
onlooker	3.38	5.40	3.665	.065
solitary-functional	2.55	2.21	.369	n.s.
solitary-cognitive	3.27	3.20	.008	n.s.
parallel-functional	5.72	4.13	3.651	.060
parallel-cognitive	9.55	10.01	.118	n.s.
pos. interaction-functional	2.38	6.00	16.680	.000
pos. interaction-cognitive	2.55	3.06	.409	.527
pos. interaction-dramatic	6.50	5.26	1.143	n.s.
pos. interaction-conversation	8.83	4.93	10.733	.003
total negative interaction	.138	.250	1.606	.216
self care	0.11	0.610	4.531	.041

The multivariate effect for sex was produced for younger children primarily by positive interaction-functional, $F(1,27) = 18.28$, $p = .001$, which was more common in boys (M of 7.71 and 4.20, respectively). For the older children, the effect was due to the fact that girls spent more time with the teacher in the company of other children than did boys (M of 13.39 and 10.44, respectively), $F(1,29) = 7.06$, $p = .013$.

Social Variables

For the social variables, two way MANOVAs with factors of age composition and sex were performed separately for the older and younger children. Dependent variables were: leads successfully (successful leads + serves as model), leads unsuccessfully, competes successfully, competes unsuccessfully, follows the lead of another child (follows lead + imitation), expresses affection, receives affection, expresses hostility, receives hostility, expresses prosocial behavior, receives prosocial behavior. For the older children, neither the multivariate nor univariate F value was significant for either of the main effects nor for the interaction. For younger children, the multivariate F value was again not significant for the main effects or the interaction. However, since specific hypotheses had been advanced for the younger children with respect to leadership, dominance, and receiving hostile and prosocial behavior, the univariate analyses for leads successfully, competes successfully, expresses hostility, receives hostility,

and receives prosocial behavior were examined. The younger children received more hostility, $F(1,27) = 5.06$, $p = .033$ (M of .68 and 1.65), as well as receiving more prosocial behavior $F(1,27) = 4.26$, $p = .049$ (M of .73 and 2.11) in mixed-age classes. There was no evidence that they led less $F(1,27) = 0.07$, $p = .791$ (M of 2.79 and 2.91), competed less $F(1,27) = 0.62$, $p = .437$ (M of .84 and 1.11), or expressed more hostility $F(1,27) = 1.55$, $p = .223$ (M of 1.15 and 1.80) in mixed- than same-age classes.

Play Partners

To describe the social environments in the two types of classrooms, average age of dyadic and group partners, number of dyadic and group interactions, and average group size were calculated for each child. These were used as dependent variables in separate MANOVA's for older and younger children. Independent variables were sex and age composition of the rooms. The means and univariate significance tests are shown in Table 3. The multivariate test was significant only for the effect of age composition: younger children, $F(5,24) = 54.24$, $p = .000$; older children, $F(5,24) = 83.59$, $p = .000$. As expected, given the wider age range of playmates available to them, younger children played more with older partners in mixed- than same-age rooms, and older children played more with younger partners in mixed- than same-age rooms. For younger children only, there was more group play in the mixed- than in the same-age rooms. Children played in larger groups in the mixed- than in the same-age rooms.

TABLE 3
Younger and Older Children in Same- and Mixed-Age Classrooms: M and Univariate Significance Tests for Playmate Variables

	Same-age Rooms	Mixed-age Rooms	F	p
Younger Children ($df = 1,27$)				
total group interactions	13.74	17.75	6.369	.018
total dyadic interactions	13.62	15.81	1.641	n.s.
M age group partners	40.43	46.62	37.068	.000
M age dyadic partners	39.68	48.00	287.387	.000
M group size	4.85	5.25	5.228	.030
Older Children ($df = 1,29$)				
total group interactions	17.78	18.35	.107	n.s.
total dyadic interactions	16.83	16.57	.026	n.s.
M age group partners	55.88	49.36	55.576	.000
M age dyadic partners	55.92	49.71	205.002	.000
M group size	5.04	5.76	4.595	.041

DISCUSSION

Our results indicate that the play and social behavior of both older and younger preschoolers is affected by the age composition of their day care classroom. The age composition of the room seemed to have a greater effect on the *social* behavior of younger children than on that of older children. However, classroom age composition effected the *play* behavior of both younger and older children, although in somewhat different ways.

The play behavior of the children in the two types of room differed in several ways. For the younger children, there was more positive interactive-dramatic play and, for both younger and older children, there was more positive interactive-functional play in mixed-age rooms. These types of interactive play seem to be the ones that could most easily accommodate cross-age play. In dramatic play, the older children can direct the play, assigning roles and mediating disputes in a way that younger children probably cannot (Fein, 1981). Interactive-functional play is primarily movement oriented and involves little verbal interaction. As probably the least sophisticated and demanding type of interactive play, interactive-functional play includes activities in which most children can easily participate. This play may represent a decrease in the average level of play for the older children and an increase for the younger children, and therefore serve as the "common meeting ground" for children of different ages.

For the younger children, there was both more positive interactive-functional play and more total negative interactional play in mixed- than in same-age rooms. It may be that younger children have a harder time monitoring and de-escalating their behavior in the mixed-age classroom where the level of interactive functional play tends to be high.

There was a trend, for younger children, toward more positive interactive-cognitive play in mixed- than in same-age classrooms. Since this category involved information sharing, and peer-instruction activities as well as constructing things with another child, it is not surprising that young children more frequently experienced this kind of play in rooms with older children than in homogeneously young rooms. Sometimes they may have been drawn into such activities due to the ongoing activities of older children. Other times, they may have been taught by an older child such as when an older peer showed a book or explained a science display to a younger child.

The type of interactive play found to be less frequent in mixed- than in same-age rooms was simple conversation. Thus, conversation may be an activity more often engaged in by children with similar levels of verbal fluency. Field (1982), in fact, suggested that verbal fluency was one of the major factors in playmate selection. This finding is also congruent with Graziano's (1978) laboratory-based finding of more conversation in same-age triads than in mixed-age ones. This finding does not preclude Freedman's (1982) suggestion that mixed-age rooms may facilitate language development in younger children. Children may learn by

short interactions with older children or by listening to them and yet still prefer a same-age child for more extended conversations.

For older children, there was a trend toward more onlooker behavior, and for both older and younger children, there was more self care in the mixed-age rooms. Since the mixed-age rooms included a wide range of ages, teachers might have had a difficult time providing a sufficient variety of activities to keep all children interested and involved. The younger children may also have learned self care from the older children and become more capable. Possibly all the children were thrown on their own more to take care of themselves while the teachers met the demands of these very busy classrooms characterized by high levels of interactive-functional play. Difficulties in classroom management may also explain Goldman's (1981) finding of more solitary play and less participation in teacher-directed activities by older children in mixed-age rooms.

Our hypotheses about the social behavior of young children in mixed- versus same-age classes were mostly confirmed. In accord with the results for sibling dyads (Abramovich et al., 1980), the younger children in the mixed-age rooms both received more prosocial behavior and more hostility than the young children in same-age rooms. However, there was no indication that young children in the mixed-age rooms were more often the victims of aggression than young children in same-age rooms. Thus, there is some evidence that Abramovich's results from sibling dyads in a home setting do generalize to unrelated children in groups in a day care setting; however, a caution needs to be provided. Our data collection procedure did not allow us to determine whether the hostility and prosocial behavior that these young children received came primarily from the older children.

These results do not provide a straight-forward answer to the question of whether same- or mixed-age classrooms provide the best environment for pre-school children. At first glance, it appears that mixed-age classrooms may be preferable for two reasons. First, there was more group social interaction in these rooms. However, the results of the social behavior of the young children provide a cautionary note here. The young children in the mixed-age rooms received more prosocial behavior and expressed more affection than those in same-age rooms. While this seems unequivocally positive, the finding that they also received more hostility in mixed-age rooms suggests that further investigation into the causes of this hostility is warranted.

Second, younger children engaged in more dramatic play in mixed-age rooms and showed a trend toward more interactive-cognitive play. Dramatic play has been shown to have a number of positive effects (Connolly & Doyle, 1984; Saltz, Dixon, & Johnson, 1977). However, these studies used age-homogeneous groups. Whether these benefits will accrue to the younger child in a mixed-age group whose dramatic role may be less central (the baby or the dog) is still an open question. Certainly, the trend toward more interactive-cognitive play appears to represent a benefit for the younger children in the mixed-age rooms.

With respect to language development, it is unclear whether same- or mixed-age settings are more beneficial. More simple conversation (without a dramatic or cognitive theme) occurred for both age groups in same- than in mixed-age rooms. This would appear to be a point in favor of the same-age classrooms. On the other hand, slightly older models are widely believed to encourage language learning (Freedman, 1982). However, the long-term effects of more conversation, or the presence of older children as models, on children's overall language development are unknown. Perhaps the child can benefit from either situation.

Finally, the results suggest that the mixed-age setting may be problematic in some ways for both older and younger children. Older children engaged in more interactive-functional play and less conversation which may represent a decrease in their average level of play. They also engaged in more self care and showed a trend toward more onlooker behavior which may have reflected some difficulty on the part of the teachers in meeting the needs of the older children in the room due to the greater demands of classroom management in a mixed age setting. Although the overall rate of total negative interaction was low for both older and younger children, age composition had an effect on total negative interaction only for younger children. Younger children were more likely to interact in negative ways in mixed-age rooms. Interestingly, they were also more likely to receive hostility in mixed- than in same-age rooms. It would be interesting to be able to tease apart the causes of these negative interactions. Perhaps there are frustrations inherent in interaction between children of different language and play skill levels that lead to these outcomes.

In conclusion, it has not been our intent to argue that mixed-age rooms are inferior, only that the benefits have been more assumed than demonstrated. The results of this study demonstrate some of the complex factors to be considered in making decisions about preschool classroom age composition. It is clear, for example, that older and younger children respond differentially in some important ways to mixed- and same-age settings. More research is needed in several areas to understand the behavior of children in natural, mixed- and same-age settings and to specify the long-term outcomes of these behaviors.

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