Social Impact of Age Mixing and Age Segregation in School: A Context-Sensitive Investigation

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The effect of a school's age organization (age-segregated vs. age-mixed) was examined within a quasi-experimental design. Sixth-, seventh-, and eighth-grade boys and girls (N = 702) in age-segregated or age-mixed settings completed measures of popularity, perceived competence, and mixed-age and cross-sex friendships. Higher amounts of mixed-age friendship were correlated with less advanced perceived social or cognitive development in the mixed-age setting, but not in the age-segregated setting. As predicted, the mixed-age setting increased the incidence of mixed-age friendships, but primarily for less intense types of friendship. However, no global effects of age organization on students' social development were found. These results suggest that the functions of mixed-age friendships vary substantially across settings. Implications for the age organization of schools and for the translation of experimental research into educational interventions are discussed.

A significant degree of age segregation currently characterizes schools for children and early adolescents in our society. This age segregation fits Sarason's (1982) description of the systematic behavioral regularities that frequently go unquestioned within schools. Yet evidence that our society is relatively age segregated in comparison with other cultures (Aries, 1962; Bronfenbrenner, 1970) has heightened concerns over the effect of this segregation on young people. Several studies that have attempted to examine the extent of age segregation among children in various settings in our society have found little age segregation in neighborhoods (Barker & Wright, 1955; Ellis, Rogoff, & Cromer, 1981) and in mixed-age schools (Allen & Devin-Sheehan, cited in Allen, 1976). However, Montemayor and Van Komen (1980) reported finding substantial amounts of age segregation among children attending age-segregated schools, and they noted that this segregation was found whether these children were examined in neighborhood or school groupings. The implication of that study—that traditional age-segregated schools may promote a great deal of age segregation among young people—suggests the importance of understanding the effects of age segregation and age mixing in schools.

A great deal of the existing research suggests that interactions among young people of different ages may provide unique opportunities for healthy social development (Hartup, 1976, 1983). Researchers have suggested a variety of benefits of mixed-age interactions. Such interactions can provide the older children involved with the chance to practice assertive and help-giving behaviors and to develop self-confidence (French, Waas, Stright, & Baker, 1986; Hartup, 1976, 1983). Mixed-age interactions can provide the younger children in the interaction with opportunities to develop help-seeking behaviors (Hartup, 1976, 1983) and with the chance to observe and imitate older role models (Brody & Stoneman, 1981; Thelen & Kirkland, 1975) and thus learn appropriate social norms (Kabasigawa, 1968). These findings suggest a need to at least question the age segregation that currently is the norm in schools and to ask whether selective use of more heterogeneous groupings should be considered as an educational option.

These findings are limited, however, because they are based on studies conducted primarily with preadolescents in experimentally created situations that were generally outside of the context of any natural educational settings. Research on person–situation interactions suggests that phenomena such as mixed-age interaction may have stable meanings to individuals only within specific contexts and settings (Bronfenbrenner, 1977; Magnusson, 1981). The power of schools as behavior settings (Barker, 1964) and cultures (Sarason, 1982) to influence behavior suggests that research on mixed-age interaction outside of schools may have only moderate applicability to age segregation and age mixing within schools.

A further limitation of research on the effects of mixed-age groupings is that it has focused almost exclusively on preadolescents, even though age segregation in schools is almost as extensive for early adolescents as it is for younger children. A developmental perspective suggests that mixed-age interaction might have quite different effects across different stages of development (Stoddart & Turiel, 1985).

One feature of adolescence that is relevant to exploring the effects of age segregation and that distinguishes it from earlier developmental stages is the increase in importance of friendships and peer interactions. In early adolescence, friendships increase in both intensity and intimacy (Berndt, 1982), and adolescent friendships become the sphere in which new social skills can be learned and practiced (Hunter, 1984; Hunter & Youniss, 1982). This suggests the importance of examining friendships when examining the impact of age segregation.
and age mixing in adolescence, as opposed to considering only short-term measures of social interaction.

Research on perceived and actual similarity between friends in adolescence suggests that adolescents tend both to become friends with others who are similar to themselves in terms of social competence, attitudes toward school, self-reliance, and so on, and to become more similar to their friends over time (Berndt, 1982; Epstein, 1983; Kandel, 1978; Kurdek & Krile, 1982). This research suggests that adolescents may form friendships across age barriers primarily when they perceive similarities between themselves and their friends that might balance the lack of similarity in age. This implies that socially or intellectually precocious young adolescents might prefer older friends and that socially or intellectually slow older adolescents might prefer younger friends.

Research on the tendency of adolescents to become more similar to their friends (Kandel, 1978; Kurdek & Krile, 1982) and research on the social modelling effects of mixed-age interaction (Kabasigawa, 1968) suggest that mixed-age interaction may facilitate acquisition of new social behaviors. One important set of social behaviors in early adolescence surrounds the initiation and maintenance of relationships with members of the opposite sex. Adolescent friendships that cross age boundaries may provide opportunities for younger adolescents to observe and to learn ways of handling the increase in mixed-sex interaction and friendship that typically occurs during this period (Blyth, Hill, & Thiel, 1982; Kabasigawa, 1968; Roopnarine, 1984). Thus, we might expect adolescents with older friends to have more mixed-sex friendships than adolescents without older friends. Conversely, older adolescents with few mixed-sex friends may prefer the company of younger adolescents, where the presence of such friendships is less normative.

Another potential effect of increased age mixing in adolescence is that it will provide an alternate peer group to adolescents who are not able to find friends in their own age group. For example, Ford (1982) noted that "social competence" may be largely dependent on setting and social context: Behaviors that are competent or incompetent with one reference group may be treated differently in other groups. Mixed-age groupings may provide adolescents who are less socially competent than their same-age peers with opportunities to find other reference groups within which to socialize. Thus, a decrease in age segregation among adolescents might provide a wider range of potential friends for less socially competent adolescents. Similarly, for socially precocious adolescents, mixed-age groupings may provide greater opportunities to socialize with older adolescents. Thus, a decrease in age segregation could potentially affect adolescents' perceptions of their own competence as well as their popularity with their peers.

Mixed-age friendships may also affect adolescents' perceptions of themselves by allowing them to play different roles in social interactions. For example, Bierman and Furman (1981) have examined the effects of playing the tutor or tutee role in peer tutoring interactions. They assigned the roles to different fourth graders and systematically varied the explanations given for why particular roles were assigned. Bierman and Furman found that students' evaluations of both themselves and their roles could be substantially altered depending on both the role given (i.e., tutor vs. tutee) and the explanation of why the role was given (i.e., random vs. on the basis of students' abilities). Effects of taking on different roles might be further magnified in adolescence because of the generally increased salience of peer relationships during this period.

In summary, research on the effects of mixed-age interaction among children and research on social development in adolescence, particularly research on adolescent friendships, suggests that age mixing in schools could affect adolescents' friendship patterns, their perceptions of their own competence, their popularity, and their mixed-sex friendships. However, no research has yet directly assessed the impact of age mixing and age segregation on any of these variables in adolescence. Furthermore, a number of different strains of research suggest that a monolithic view of age mixing in adolescence (as uniformly having certain social effects, regardless of the setting within which it occurs or the adolescents it affects) may be inappropriate. Recent research suggests that an educational intervention, such as reducing age segregation in a school, might serve different functions for different students (Wright & Cowen, 1982). This suggests the need for a context-sensitive investigation that considers the possibility that mixed-age friendships may serve different functions in a naturalistic mixed-age setting than they do in more traditional school settings or in the experimental settings that have served as the basis for most research on mixed-age interaction to date.

This study addressed questions about the nature and effects of mixed-age friendship in schools with different organization by age, using a quasi-experimental design in a middle school for sixth, seventh, and eighth graders. The school was divided into two highly comparable settings with very different age structures: A mixed-age setting was designed to promote mixed-age interaction for students attending one part of the school, and an age-segregated setting followed the more traditional pattern of segregating children into distinct sixth-, seventh-, and eighth-grade classes.

This study examined the effects of age mixing and age segregation in a population of early adolescents in real-life school settings. The study considered students' perceptions of their own competence as well as an aspect of social intercourse—friendship—that reflects the cumulative impact of important social interactions over time and in natural contexts. To accomplish this, a setting that facilitated age mixing was compared with a traditional age-segregated setting to address three central questions: (a) Does use of a mixed-age school structure actually increase the incidence of mixed-age friendships within it? (b) Does use of a mixed-age school structure directly affect adolescents in terms of their perceived competence, popularity, or mixed-sex friendships? (c) What are the social and psychological correlates of adolescents' mixed-age friendships within age-segregated settings and within mixed-age settings, and do these correlates differ across the two settings?"
han school district in the northeastern United States. The school was divided into three physically separate "houses" with equal numbers of students and teachers, equal class sizes, equal financial and curricular resources, and virtually identical physical plants. The comparability of the houses was further enhanced by the fact that they shared the same principal, vice principal, and administrative facilities; thus, hiring decisions and important decisions about educational philosophy were standardized across houses.

Prior to the study, one of the three houses had a mixed-age organization in which all classes contained approximately equal numbers of sixth-, seventh-, and eighth-grade students. No distinctions were made between students on the basis of grade level in this mixed-age setting. In the other two houses, students were strictly segregated into separate sixth-, seventh-, and eighth-grade classes. Equal weight was assigned to academic subjects for students in both types of settings. However, of necessity, in the age-mixed house, material within courses was presented in a less cumulative fashion across years than is traditional—for example, there was no seventh-grade science curriculum building on a sixth-grade curriculum, because all science classes had children from all grades in them.

The division of the school into mixed-age and age-segregated settings existed for 9 years prior to the study. The original decision to use the mixed-age structure resulted from the belief of a number of faculty that such a structure was more conducive to students' social and emotional development. The school was willing to experiment with different educational practices and thus permitted a part of the school to function without traditional age segregation. This "experiment" has continued since its inception, with faculty in each house preferring the age structure of that house. Students in all houses spend approximately one-third of their time in nonacademic programs (e.g., industrial arts and physical education) in which they are mixed with students from other houses and other grades.

Assignment of Children to Settings

Prior to this study, when children first entered the school, parents had the option of requesting that their child attend a certain house. Of the 702 students in the study, 235 were placed in a particular house as a result of self-selection by their parents. A slightly higher percentage of children in the mixed-age house were self-selected than in the age-segregated houses (for mixed-age house, 45%; for age-segregated house, 34%), \( \chi^2(1, N = 702) = 7.53, p < .01 \). The remaining children were assigned randomly by staff, with the exception of small changes made to balance out average achievement test scores and gender composition in each house. The self-selection process occurred only prior to entry into the school; it was rare for a student to change houses after this time. Archival data on students indicated that students in the traditional and age-mixed houses were statistically indistinguishable from each other in their performance on the Comprehensive Test of Basic Skills (CTB/McGraw Hill, 1981; both groups performed on average in the 75th percentile nationally in total score for overall academic skills), and no significant differences existed in the gender composition of each house.

Subjects

Seven hundred two students met the following criteria for inclusion in the study: (a) having attended the school from the start of sixth grade and having spent their entire school career in the same house (i.e., sixth graders had been in the same house for 1 year, seventh graders for 2 years, etc.); (b) agreeing, with parental consent, to participate in the study (only 20 students chose not to participate); (c) agreeing to receive all measures to be administered; and (d) having adequate records in school files. Although data were not collected on students' racial/ethnic backgrounds, school records indicated that the student body was well over 90% White. In the ungraded setting, there were 89 sixth graders (42 boys and 47 girls), 79 seventh graders (34 boys and 45 girls), and 67 eighth graders (25 boys and 42 girls). In the graded setting, there were 172 sixth graders (80 boys and 92 girls), 160 seventh graders (74 boys and 86 girls), and 135 eighth graders (60 boys and 75 girls). For the ungraded setting, grade in school reflected subjects' age-appropriate grade (i.e., adolescents entering the school following fifth grade would be classified as sixth graders); although these grades were used administratively to track adolescents' progress through the school over 3 years, they were not used or referred to in daily school activities.

Measures

Demographic information. Children indicated their sex and date of birth on a brief questionnaire. Data on grade level, placement in a mixed-age or age-segregated setting, and whether placement was assigned or self-selected by parents at the time the student first entered the school, were collected from school records.

Self-concept. Students completed Harter's (1982) Perceived Competence Scale for Children, a 28-item self-report measure that asks students to describe their competence in four domains: physical, social, cognitive, and general. Social competence is measured primarily in terms of perceived popularity with one's peers. Physical competence is defined in terms of perceived ability at sports and outdoor games. Cognitive competence is intended to reflect primarily perceived school and academic performance. Finally, the scale for general competence is intended to tap the child's general feelings of worth or self-esteem independent of any particular skill domain (Harter, 1978).

The scale uses a forced-choice methodology whereby, for each item, children must decide which of two clauses of a descriptive statement describes them best, and to what extent the clause applies to them. For example, an item tapping social competence states, "Some kids find it hard to make friends, but for other kids it's pretty easy." Children must choose which clause best describes them, and decide whether it is sort of true or really true of them. This yields a single score on a 4-point scale for each item. Seven items are used for each of the four domains tapped, and scores are summed and then averaged across these items to produce a perceived competence score in each of the four domains on a 0 (least competent) to 4 (most competent) scale.

This methodology was designed to reduce social desirability effects. Scale internal consistency, using Cronbach's alpha, ranged from .75 to .86. Test–retest reliabilities for scales over a 3-month period ranged from .70 to .87. In addition, Harter (1978) reports evidence of the factorial validity of the scales and evidence that the social and cognitive scales are related to independent ratings of students' social competence by peers and to cognitive competence ratings made by teachers (Harter, 1982).

Friendship measures. All friendship measures for this study were derived from a sociometric questionnaire asking children to name their best friends ("the people you like very much") and regular friends ("the people you like to work or play with, but do not like as much as best friends") in the school. Hallinan's (1976) procedure of allowing children to list as many friends as they wished was used to eliminate the social pressures and response biases of asking for a fixed number of friendship nominations (Hallinan, 1974; Holland & Leinhardt, 1970). Both best and regular friendship nominations were collected to ensure that a wide and sensitive range of children's friendships and acquaintances was tapped, which may not occur with just a "best friend" measure (Oden & Asher, 1977).

From this instrument, scores were obtained for the number of best friends and regular friends named by each child, as well as the number of reciprocated best friends (children named as best friends were reciprocated the nomination). The percentages of friendships were...
children from other grades in each of these three categories were calculated as the primary measures of mixed-age friendships. (Grade in school was used instead of age to maximize the number of subjects with complete data in the sample. This use was justified by the .91 correlation between grade and age within this sample, p < .001.) Whether a child had any opposite-sex friendships was determined from the child's named best and regular friends. Finally, the popularity of children in the study was computed using the number of times they were named as a best or regular friend by other children. This nomination method of determining peer popularity has a high degree of concordance with rating scale measures of children's peer relations (Asher & Dodge, 1986).

Procedure

Subjects completed measures during two 45-min testing sessions conducted during 2 school days in April. The Perceived Competence Scale for Children was administered first to all students in their homerooms. The demographic and peer sociometric data for all children were collected later in an industrial arts class that was age-mixed for all students. Measures were administered by teachers, who were supervised by the author.

Results

Because of the large sample size available for most analyses, effects were interpreted only when they both were statistically significant and accounted for more than 4% of a variable's variance (equivalent to a correlation of at least .20).

Mixed-Age Friendships

Preliminary analyses were conducted to determine whether the school settings described had an appreciable effect on children's mixed-age friendships. Main effects of age organization of school setting (mixed-age vs. age-segregated) on the number of children's mixed age friendships were computed in a one-way multivariate analysis of variance (MANOVA). The percentages of a child's reciprocated best friends and named best and regular friends who were from different grades were the dependent variables. These percentages were transformed with an arc sine transformation prior to all analyses, as is appropriate for analysis of percentage scales (Winer, 1971). The MANOVA revealed a highly significant effect of the mixed-age setting in promoting mixed-age friendships (Wilks's $\lambda = .737$, $F(3, 606) = 71.98$, $p < .001$). The mean percentage of mixed-age friendships of each type in the two settings and the results of follow-up analyses of variance (ANOVAs) for each variable are presented in Table 1.

These analyses reveal a consistent, significant setting effect on the proportion of students' friendships that were mixed age. The measure of the least intimate type of mixed-age friendship—named regular friends of different ages—was most affected by age organization of setting. Setting accounted for 24% of the variance on this measure, $F(1, 608) = 194.2$, $p < .001$, $MS_e = 0.068$. In addition to the analyses described above, three-way MANOVAs using the three measures of mixed-age friendship as the dependent variables indicated that there were no interactions of setting with sex, grade, or self-selection of setting and that there were no main effects of these variables that accounted for more than 4% of the variance on any measure of mixed-age friendship.

Table 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Reciprocated best friends</th>
<th>Named best friends</th>
<th>Named regular friends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>M</td>
<td>%</td>
</tr>
<tr>
<td>Mixed-age</td>
<td>22</td>
<td>0.61</td>
<td>30</td>
</tr>
<tr>
<td>Age-segregated</td>
<td>7</td>
<td>0.19</td>
<td>12</td>
</tr>
</tbody>
</table>

Variance accounted for by setting:

|                | 6.4*         | 12.0*         | 24.2*        |

Note: Means are number of mixed-age friends. All percentages were transformed with an arc sine transformation prior to analyses. Degrees of freedom for each analysis were (1, 608).

Overall Friendship Pattern and Self-Concept Measures

Analyses were next performed to determine the effect of age structure of school setting on students' overall friendship patterns (combining both mixed-age and same-age friendships) using measures of total numbers of reciprocated best friends, named best friends, named regular friends, presence of opposite-sex friendships, and popularity. This was done to test the hypothesis that there would be setting effects on friendship patterns in general, and not simply on mixed-age friendships. In a three-way MANOVA design, with friendship measures as the dependent variables and age organization as the independent variable, no main effects of age organization or interactions with sex or grade accounted for more than 4% of the variance for any individual dependent variable, nor was the overall MANOVA significant.

Similar analyses were conducted examining the effect of age organization on students' perceived social, physical, cognitive, and general competence. Mean subscale scores in the graded and ungraded settings ranged from 2.75 to 2.92 (standard deviations ranged from .58 to .70), and no main effects of age organization or interactions of age organization with sex and grade, nor effects of self-selection or its interactions with age organization, accounted for more than 4% of the variance on the self-concept measures; nor did the overall MANOVA reveal any significant effects. Thus, although the two school settings clearly produced different proportions of mixed-age friendships, the settings did not appear to affect directly any of the broader social functioning measures expected to be most sensitive to age mixing in early adolescence. Further analyses examined the possibility that this was due in part to the fact that mixed-age friendships took on different functions for students in each of the two settings.

Sensitivity of Mixed-Age Friendship to Social Context

The meaning and functions of mixed-age friendships within a setting were analyzed by examining the correlates of mixed-age friendships with the social variables used in this study. These correlations were examined separately for each setting. This analysis of the social and emotional characteristics of students who engage in mixed-age friendships provided one window on the meaning of such friendships within a setting.
The percentage of a student's regular friendships that were mixed age was used as the dependent variable in these analyses because it was the measure that was most sensitive to the effects of age mixing.

The appropriate test of whether the social and emotional correlates of mixed-age friendships differ across settings is whether setting interacts with students' social and emotional characteristics in statistically predicting their amount of mixed-age friendship. A multivariate form of this test was performed by entering interaction terms of setting with measures of students' popularity, cross-sex friendships, and perceived competence as a block into a hierarchical regression equation after having entered the main effects of setting and of these student characteristics. If the interaction terms significantly increase the predictive power of the equation, then the overall pattern of correlates is considered to differ across settings (Pedhazur, 1982). Pedhazur recommends that significance levels of tests for such interactions be set at .10, or even .25, given that the cost of a Type I error will typically be only lost power, because correlations are followed up separately for different groups. To control for possible differences between correlates of mixed-age friendships with older versus younger children and to provide the maximum possible age difference for mixed-age friendships, data for only the youngest and oldest children in the setting (sixth and eighth graders) were examined. Analyses were conducted separately for each group so that a separate picture could be observed of mixed-age friendships with older and with younger children in a setting.1

A hierarchical multiple regression equation in which main effects of the social variables and setting were entered and then followed by the interactions of setting and the social variables, entered as a block, to predict the percentage of a student's regular friendships that were mixed-age friendships, revealed that a significant interaction with setting did exist for both sixth graders, \( F(13, 224) = 2.13, p = .05, SE = 0.249 \), and eighth graders, \( F(13, 153) = 2.43, p < .05, SE = 0.198 \). This indicates that the relationship between a student's percentage of mixed-age friendships and the social and self-concept variables differs significantly across the mixed-age and age-segregated settings. Analyses of the correlates of mixed-age friendship within each setting are thus presented separately by setting and by grade. Further analyses were conducted to determine whether specific social and emotional characteristics of students were differentially related to mixed-age friendship in the two settings. These analyses suggest a number of specific differences between settings in the correlates of mixed-age friendship. Table 2 presents the relationship between the percentage of sixth graders' friendships that were with older children and measures of the sixth graders' social and emotional characteristics. Table 3 presents parallel analyses for eighth graders' percentage of friendships that were with younger students.

Significant correlations were found between the presence of mixed-age friendships and students' social and emotional characteristics, primarily in the mixed-age setting. For sixth graders, the social and self-concept measures have an overall multiple correlation of .42 with the percentage of friendships that were with older children in the mixed-age setting, \( F(6, 67) = 2.4, p < .05, MS_e = 0.106 \). This means that a substantial amount of the variation in which of the students have the highest percentages of mixed-age friendships in this setting can be predicted from the students' social and emotional characteristics. Univariate follow-up analyses suggest that the mixed-age setting, sixth graders who have a higher percentage of friendships with older children perceive themselves as less cognitively and generally competent than those with fewer such friendships. For sixth graders in the age-segregated setting, however, there was no overall multivariate relationship between the social and self-concept measures and percentage of friendships that were with older children, \( F(6, 133) = 1.387, ns, MS_e = 0.032 \). This indicates that in the age-segregated setting, students who have higher percentages of mixed-age friendships are not generally distinguishable from other students in terms of the social and emotional characteristics measured in this study.

For eighth graders, the percentage of friendships that were with younger children was also related to students' social functioning and perceived competence only in the mixed-age setting. The social and self-concept variables had a multiple correlation of .48 with percentage of friendships that were with younger children, \( F(6, 46) = 2.3, p < .05, MS_e = 0.087 \). For eighth graders in the mixed-age setting, a higher percentage of friendships with younger children was correlated with lower perceived general competence, fewer opposite-sex friendships, and being less popular. In the age-segregated setting, no significant predictors of mixed-age friendship were found in either univariate or multivariate analyses.

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1 Although this decision was made on theoretical grounds, interaction analyses of the type described support this decision, indicating that grade level of student does in fact interact with students' characteristics in predicting mixed-age interaction.
Table 3
Correlates of Eighth Graders' Friendships With Younger Children

<table>
<thead>
<tr>
<th>Social and self-concept variables</th>
<th>Setting</th>
<th>Test of difference between correlations (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mixed-age</td>
<td>Age-segregated</td>
</tr>
<tr>
<td>Social competence</td>
<td>-.23</td>
<td>.00</td>
</tr>
<tr>
<td>Cognitive competence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical competence</td>
<td>-.19</td>
<td>-.05</td>
</tr>
<tr>
<td>General competence</td>
<td>-.37**</td>
<td>-.14</td>
</tr>
<tr>
<td>Opposite-sex friendships</td>
<td>-.35**</td>
<td>-.30*</td>
</tr>
<tr>
<td>Popularity</td>
<td>-.26*</td>
<td>-.16</td>
</tr>
</tbody>
</table>

R (from regression equation) .48* .26 2.43*

Note: Individual correlations were based on ns ranging from 58 to 64 in the mixed-age setting and from 115 to 124 in the age-segregated setting. Degrees of freedom for F tests of differences between individual correlations ranged from (1, 169) to (1, 184). For multivariate tests of differences between overall pattern of correlations, degrees of freedom were (13, 153).

Discussion

This study found that increased age mixing in a school altered the number of mixed-age friendships within the school but did not appear to directly affect students' perceived competence, sex-role development, or overall friendship patterns. The results of this study further suggest that students who appear to be socially or cognitively less competent than their peers may be more likely to have friends of different ages, although this relation was only apparent in a mixed-age school setting. Each of these findings, and their limitations and implications for age structures in school, will be discussed.

Setting Effects on Amount of Age Mixing

A basic finding of this study was that the age organization of a school setting could affect the number of mixed-age friendships within the setting, with increased numbers of mixed-age friendships found in a mixed-age setting. The magnitude of this effect, however, depended on the type of friendship measured. Differences between settings were strongest for the most casual types of friendships and weakest for the most intense types of friendships studied. The finding that students appear more age sensitive in forming close friendships than in their more casual encounters is not surprising, given the growing intensity of close friendships and the growing emphasis on peer similarity at this age (Berndt, 1982). However, this finding may also partly reflect a cohort effect in which only same-grade peers were in the same school together during the same 3-year period. Only with same-grade peers could students share three full years of school experience during which friendships could form and grow; younger and older friends would either begin attending the school later or leave for high school earlier than same-age friends.

Nevertheless, the consistent overall finding of at least some increases in the number of mixed-age friendships of all types in the mixed-age setting supports the hypothesis that the current age organization of most schools does indeed promote age segregation and suggests the importance of further efforts to examine the effects of this segregation. This finding is even more striking given the presence within the study of several factors that would tend to reduce any differences between settings in the number of mixed-age friendships within them. One such factor was the presence of mixed-age classes (e.g., physical education and industrial arts) for students in the age-segregated setting. In addition, students were mixed by age in various nonacademic school settings such as lunchrooms, clubs, and school buses. These factors could have increased the incidence of mixed-age friendships in the age-segregated setting and thus may have reduced differences between settings. Finally, mixed-age friendships may have been inhibited in the age-mixed setting by the fact that students were coming from, and would be going to, a relatively age-segregated school system. Thus, students would have been most likely to have friends of similar ages on entering the mixed-age setting in sixth grade, simply because they had just finished being in an age-segregated fifth-grade classroom. Considered together, all of these factors suggest that the differences found in mixed-age friendship in the two settings may actually underestimate the effects of age segregation in traditionally structured schools.

However, because this study only considered one school with a relatively homogeneous population, its findings should not be taken as definitive statements of the impact of schools on age segregation in adolescence. Furthermore, although a naturalistic study such as this one provides unique opportunities to observe the effects of age mixing in naturally occurring contexts, such studies inevitably contain certain design limitations. For example, the lack of true randomization in assigning students to settings, although apparently not an important influence on the indices studied, can never be fully assessed in a naturalistic design. Furthermore, although the age structure of the settings was the major distinguishing feature between them, we cannot rule out the possibility that other differences between the settings partially account for the findings reported. Thus, this study's conclusions all require replication in other settings. Nevertheless, this study does make it clear that limitations in the age range of children's friendships may be fostered by traditionally age-segregated schools and that future research on age segregation and age mixing must consider factors such as the nature of the settings studied, the impact of students' participation in nonacademic settings, and the type of friendships being measured before drawing broad conclusions about the effects of age segregation in schools and neighborhoods.

Correlates of Mixed-Age Friendships Across Settings

A second important set of findings of this study was that, in a mixed-age setting, higher percentages of mixed-age friendship were associated with indices of less successful social
development. This result applied to friendships with both older and younger children. Furthermore, multivariate regression and interaction analyses revealed that the correlates of mixed-age friendships differed substantially across the two school settings, suggesting that mixed-age friendship takes on different meanings depending on the setting in which it occurs. Together, these findings tend to confirm the ecological/interactionist prediction that the nature and function of mixed-age friendships would be context-sensitive (Bronfenbrenner, 1977; Magnusson, 1981).

Surprisingly, the correlation of mixed-age friendship with less successful perceived social development in the mixed-age setting existed for both friendships with younger students and friendships with older students. This is in contrast to current theories that focus primarily on the benefits of mixed-age interaction for immature older children interacting with younger children (Hartup, 1976, 1983). Within a mixed-age setting, it appears that mixed-age friendship may have a powerful attraction to less socially or cognitively adept students, whether older or younger. Conversely, the most adept students were the most likely to associate primarily with same-age peers. One possible explanation of this finding is that, in adolescence, a heightened emphasis on peer conformity (Berndt, 1979) makes seeking same-age peers a maximally adaptive strategy even for precocious adolescents; for adolescents who are accepted by their same-age peers, seeking different-age friends may simply have too high a social cost with same-age peers. For less competent adolescents, who lack acceptance from same-age peers, the cost of seeking different-age peers may be much lower, and the rewards of finding another peer group may be relatively greater.

In the mixed-age setting, it is interesting that sixth graders with relatively more mixed-age friendships perceived themselves as less cognitively and generally competent, whereas eighth graders with more mixed-age friends appeared to be less socially competent, in terms of their popularity and mixed-sex friendships, and perceived themselves as less generally competent. The finding for eighth graders is consistent with the view that mixed-age interaction provides an opportunity for socially less successful students to find friends among a socially less mature group of younger students. This view is also supported by the finding that the number of eighth graders' friendships with younger students was correlated with lower rates of opposite-sex friendship in both the mixed-age and age-segregated settings. Younger students, however, appeared to seek mixed-age friendships, not when they were socially precocious, but when other factors—lower academic and general competence—distinguished them from their peers. These findings suggest that in a mixed-age setting, mixed-age friendships may provide outlets for both older and younger children who are in some ways having trouble keeping up with their peer groups.

A second possible interpretation of these correlational findings is that, whereas friendships with older children created a sense of lower cognitive and general competence in younger children, friendships with younger children led to developmental delays and to decreased popularity among older children. Finally, it is possible that other unmeasured variables, such as de facto grouping of students by teachers, changes in the level of competition and cooperation within school, or an increase in the amount of helping behaviors in the mixed-age setting, operated to produce the correlations reported. For example, it may be that, in the ungraded setting, teachers tended to segregate more and less socially competent children of different ages. Although there is no a priori reason to expect that this is true, this study, because of its design, cannot rule out the existence of such unexamined influences. One limitation to the findings presented is that they apply only to the most casual type of friendship measured (named best and regular friends); the correlates of more intense, reciprocalized mixed-age friendships could not be assessed, given the relatively small numbers of students with such friendships. Thus, the findings presented provide descriptive data on the correlates of one type of mixed-age friendship that suggest several chains of causal influence that may be operating simultaneously. Further research, however, is needed to learn which of these influences is actually most important.

The finding that the correlates of mixed-age friendships differed across the mixed-age and age-segregated settings suggests that knowledge of mixed-age interaction gained by observing such interaction on the part of students in age-segregated settings cannot be simply generalized to other settings. In this study, it may be that the reduction of social barriers to mixed-age friendship in the age-mixed setting permitted less adept students to form such friendships. In contrast, the age-segregated setting, a tendency of mixed-age friendships to appeal to less adept students may have been cancelled by the existence of structural barriers to such friendships that could only be overcome by students who were more socially skilled.

Effects of Mixed-Age Settings and Implications for Structures in School

The lack of global positive or negative effects of age organization in school in a study such as this one, with adequate statistical power and age-appropriate measures of social functioning, should not be surprising. Although it remains possible that effects did exist in areas of social functioning not tapped in this study, or that the lack of true randomization somehow hid the effects of school structure, the results are entirely consistent with an interactionist reading of prior research. That is, the potential benefit of friendships with younger children in experimental settings might not directly translate to adolescents in naturalistic settings or might not be seen in simple main-effects analyses.

The finding of context-specific correlates of mixed-age friendship suggests that there were differences in friendship patterns in the mixed-age as compared with the age-segregated settings, but not differences that led to overall changes in indices of social development. This is consistent with prior research on school-based social interventions that has found that such interventions may be best evaluated not in terms of global effects, but in terms of whether they have an impact on specific types of children (Wright & Cowen, 1982). Unfortunately, the cross-sectional design of this study does not permit it to identify groups of students who were similar
some ways (i.e., had lower perceived competence) prior to entering the settings, to determine how they fared in different settings. Thus, the findings of this study leave open the possibility that the mixed-age setting may have beneficial effects for certain types of students, although it seems likely that both the mixed-age and age-segregated settings have strengths and weaknesses that differentially affect different types of students.

Even though longitudinal research is needed to determine which type of student fares best in which setting, the findings of this study suggest a potential advantage of offering both types of settings to students. Although initial self-selection of setting did not appear to account for any of the effects found in this study, it is clear that, within the mixed-age setting, a great deal of self-selection took place in terms of which students engaged in high levels of mixed-age friendship. Providing opportunities for both mixed- and same-age friendship within a school may be the best way of maximizing the beneficial effects of each of the different types of friendship.

Implications for Future Research

The finding that the correlates of mixed-age friendship are highly context-sensitive also has implications for future research on the effects of mixed-age friendship. This study points to the need to take a more ecologically sensitive approach to studying important social and friendship variables within schools. Some additional areas of future research and limitations of this study should also be noted. First, this study used a population—early adolescents—for which great variation in terms of physical, social, and emotional development is normative. Particularly in terms of physical development, the degree of overlap between immature eighth graders and mature sixth graders is great. This heterogeneity, combined with the relatively small age range examined, may have somewhat muted the effects and correlates of mixed-age friendship observed. Future research with a larger age range might well find that the impact and correlates of mixed-age friendship increase as the age range of students studied increases.

Second, although this study may be used to draw tentative causal inferences about the effects of age organizations in one middle school, the main findings of the study—about context differences in the correlates of mixed-age friendship—remain correlational in nature. Longitudinal studies are needed to examine questions such as whether students who appear less socially adept on entering a mixed-age setting do indeed seek and benefit from increased mixed-age friendship.

Finally, the importance of contextual variation in this study suggests that great care should be used in generalizing the findings of this study to other implementations of ungraded structures—particularly those with other age-ranges of students. A critical step for future research, then, is to begin to quantify the ways in which contextual variables affect school age mixing and other types of socially oriented interventions. Studies are also needed that examine other ways in which the age structure of a school might affect the relation between characteristics of students' social interaction and students' social competence. Rather than diminishing the value of experimentally based studies of variables such as mixed-age friendship, such research might suggest the appropriate principles to use in translating experimentally based and other context-sensitive research into sound educational interventions.

References


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