

Peer Interactions in Mainstreamed and Specialized Classrooms: A Comparative Analysis

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ABSTRACT: The peer interactions and cognitive levels of play of mildly developmentally delayed preschool children were compared as they participated in mainstreamed and in specialized settings. When in mainstreamed playgroups, delayed children engaged in a substantially higher rate of peer-related social behaviors and played more constructively. In relation to previous findings, these results suggested that the proportion of nonhandicapped children in mainstreamed settings and the availability of children similar in chronological age to the delayed children are important programmatic factors in early childhood mainstreaming efficacy research. The potential value of mainstreamed settings as a framework for more systematic and individual treatment programs for mildly developmentally delayed preschool children also was discussed.

■ Early childhood mainstreaming has been a topic of intense interest since the late 1970s (Guralnick, 1978). Although the fundamental rationale for mainstreaming rests on humanistic and legal grounds, the potential of mainstreamed programs for promoting the development of young handicapped children has been one of its most intriguing features to educators, developmentalists, and researchers alike. From a research perspective, whether mainstreamed programs are in fact more effective than specialized ones is, of course, a highly complex issue. As is well known to those involved in efficacy research in any area (see Guralnick, in press; Guralnick & Bennett, 1987), threats to internal and external validity are found in virtually every

decision and in virtually every experimental procedure. Even if designs involving random assignment of subjects can be achieved and all potential confounds somehow avoided, each study is constrained by the choice of programmatic variables selected to address the efficacy question, such as the ratio of handicapped to nonhandicapped children or the type and severity of the handicaps of participating children. The generality of efficacy findings must be established through many investigations that systematically probe the effects of essential programmatic factors (Guralnick, 1981a).

Interest in comparative efficacy research in early childhood mainstreaming has centered on the possibility that mainstreamed settings may promote the peer-related social development of handicapped children to a greater extent than do specialized settings (Guralnick, 1986a). In fact, the existence of a peer-interaction deficit exhibited by handicapped children enrolled in specialized settings (see Guralnick, 1986b), especially children with general (cognitive) developmental delays (Guralnick & Groom, 1985;

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Guralnick & Weinhouse, 1984), offers the possibility that involvement with normally developing children may have beneficial effects. While investigators recognize that programming at the individual child level or the implementation of a comprehensive peer-relations curriculum can promote peer-related social competence, the nature and ultimate effectiveness of these interventions may well be governed to a substantial degree by the social context in which those interventions occur.

Most experimental comparisons of mainstreamed and specialized programs have involved similar groups of children already enrolled in different programs (e.g., Cooke, Ruskus, Apolloni, & Peck, 1981; Novak, Olley, & Kearney, 1980). Although important preliminary information can be gained from these studies, problems of interpretation will always remain when nonequivalent settings or intact groups of children are involved. Even when random assignment has been possible (e.g., Jenkins, Speltz, & Odom, 1985), matching on the basis of teacher ratings rather than pretest scores due to practical constraints yielded nonequivalent classroom groups. The Jenkins et al. investigation, despite having a very small proportion of nonhandicapped children in the setting containing primarily mildly handicapped children, was actually a major advance in that control or monitoring over virtually all other potentially confounding factors was maintained. Other investigators have adopted within-subjects designs, and they have manipulated systematically the presence or absence of handicapped or nonhandicapped children (Field, Roseman, DeStefano, & Koewler, 1981; Guralnick, 1981b; Strain, 1984). This design avoids the equivalence-of-subjects problem and minimizes the possibility that differences other than those related to the characteristics of the children's peers in the setting are responsible for any obtained differences. This design, however, also limits the generalizability of the findings and is restricted to an assessment of immediate effects on peer interactions.

Taken together, the results of these and related comparative studies (see reviews by Guralnick, 1981c, 1982; Peck & Cooke, 1983) have shown only minimal positive effects as a result of the involvement of nonhandicapped children on the peer relations of either handicapped or nonhandicapped children. No adverse effects have been reported. Positive effects for

handicapped children have included an increased frequency of positive social interactions (Field et al., 1981; Strain, 1984), more social "peer entry" behavior (Jenkins et al., 1985), and a reduced level of inappropriate play for more severely delayed children (Guralnick, 1981b). The consistency of the findings of these studies is noteworthy. Nevertheless, their generality can be questioned in that most of the studies compared specialized programs to settings containing a relatively small proportion of nonhandicapped children. Thus, the "mainstreamed program" often constituted what is generally referred to as an "integrated" program; i.e., one designed primarily for handicapped children but including either selective involvement with nonhandicapped children or enrollment of a relatively small proportion of nonhandicapped children as "models" (the latter is sometimes referred to as a "reverse mainstreamed" program). In some instances, these integrated programs consisted merely of a group of handicapped children in their specialized class coming together with a group of nonhandicapped children for a specific and limited period of time. In contrast, mainstreamed programs are designed primarily for normally developing children but adapt their activities, setting, and curriculum to accommodate a small number of handicapped children.

It is possible that integrated programs may tend to minimize any effects of involvement with nonhandicapped children since the forms of social interaction may be regulated by the relatively large number of handicapped children in the setting. In addition to the integrated rather than mainstreamed nature of existing comparative studies, nonhandicapped children in the integrated settings were typically 1 year younger than their handicapped peers. Recent research has suggested that, for developmentally delayed preschool children at least, children at similar chronological ages may have the most impact on the peer relations of delayed children (Guralnick & Groom, 1987). This is the case despite the fact that the normally developing children are developmentally more advanced than their handicapped classmates.

The purpose of the present study was to compare mildly developmentally delayed children's peer-related social interactions in a mainstreamed program to their interactions occurring in settings containing only other delayed children. The mainstreamed program

was a specially designed playgroup containing primarily same-age and younger-age nonhandicapped peers. Since the same subjects were observed in both settings, this design avoided the subject-equivalence problem, but could not provide complete assurance that all factors other than the developmental status of the handicapped children's classmates were identical. The mainstreamed playgroup and specialized settings, however, were highly similar in terms of number of children, teacher-child ratio, and environmental characteristics. Moreover, possible differences in teacher behavior patterns were minimized by observing peer interactions during free-play periods. Consequently, if findings similar to previous studies occur with this variation of major programmatic factors (i.e., chronological ages and proportion of nonhandicapped children), confidence in the general outcome pattern of minimal impact noted earlier will be increased. If a different set of findings is obtained, alternative explanations focusing on the mainstreamed as opposed to the integrated nature of this comparison and the chronological ages of the nonhandicapped children must be considered.

METHOD

Overview

This investigation was part of a larger study of the peer-related social interactions of nonhandicapped and mildly developmentally delayed children in mainstreamed playgroups (Guralnick & Groom, 1987). Eight playgroups were formed over a period of 2 years, each composed of three nonhandicapped 3-year-olds, three nonhandicapped 4-year-olds, and two mildly developmentally delayed 4-year-olds. All children were boys and were previously unacquainted with one another. The delayed children were matched in terms of chronological age with the nonhandicapped 4-year-olds and in terms of developmental level with the nonhandicapped 3-year-olds. Each playgroup operated 5 days per week for 2 hours per day for a 4-week period. During that time, the social and play interactions of each child were videotaped from an adjacent observation room during a designated free-play period. The delayed children, who were enrolled concurrently in a specialized early intervention program containing only other handicapped children, were observed in their specialized

classrooms within 3 weeks of the completion of each playgroup.

Subjects

Of the 16 mildly delayed children who participated in the playgroups, 11 were available for observations in the specialized setting. For four of the children their specialized programs ended before follow-up could be obtained. One child moved shortly after the completion of the playgroup. (See Guralnick and Groom, 1987, for subject-selection procedures, inclusion criteria, and characteristics of the original sample.) For this group of 11 children, mean chronological age (CA) was 53.64 months (range 49-59), mean mental age (MA) was 44.36 months (range 40-53), and mean IQ was 71.73 (range 65-86). One child did exceed the IQ cut-off of 80 (see Guralnick & Groom, 1987, for details), but was included due to the existence of a syndrome (Williams) consistent with the developmental pattern of other children in the sample. Etiologies of their handicaps varied and were classified as follows: 18.2% chromosomal disorders; 18.2% perinatal disorders and trauma; 18.2% postnatal trauma and other environmental causes; and 45.4% unknown. The mean language age for the mildly delayed group on the Preschool Language Scale (Zimmerman, Steiner, & Pond, 1979) was 42.51 months (range 36.8-54.8). All children had no prior experience in mainstreamed programs, were unacquainted with the nonhandicapped children, were enrolled in different classes in their specialized program and exhibited no major sensory, motor, or behavioral impairments.

For the 24 nonhandicapped same-age children (3 participating in each of the 8 playgroups) mean CA was 53.75 months (range 48-59), mean MA was 65.50 months (range 54-74), and mean IQ was 110.83 (range 93-124). For the 24 nonhandicapped younger children, mean CA was 36.54 months (range 31-42), mean MA was 44.83 months (range 38-58), and mean IQ was 106.50 (range 93-123). Socioeconomic status as measured by the Siegel Prestige Scale (Hauser & Featherman, 1977) did not discriminate significantly ($p > .05$) among the nonhandicapped or delayed groups. Details of the selection criteria and specific demographic information for this sample of nonhandicapped children (i.e., those constituting the classmates of the delayed children in the playgroups), can be found in

Guralnick and Groom (1987). Although no similar information was available for the classmates of the 11 delayed children in their specialized setting, all classes consisted of groupings homogeneous with respect to developmental level and chronological age (see section on "Specialized Classroom Setting and Procedure").

Mainstreamed Playgroup Setting and Procedure

Each playgroup operated 2 hours per day, 5 days per week for a minimum of 4 weeks (20 sessions) in either a morning or afternoon time period (3 morning and 5 afternoon sessions). Playgroups were supervised by a teacher and a graduate assistant in a spacious university-based laboratory preschool classroom. Children participated in a wide array of group and individual activities typical of nursery school programs including circle time, music, art, snack, and story. In addition, a 50-minute free-play period was scheduled on most days. During this time children had access to the extensive array of toys and equipment, with separate areas provided for housekeeping, blocks, puzzles, games, and pre-cast and manipulative toy play activities as well as for individual reading. Although teachers generally encouraged social and play interactions among the children in their free-play activities, during this study the staff was requested to limit their interactions to providing assistance to children when necessary.

Children's social and play interactions were videorecorded in color from an adjacent observation room through a one-way mirror. The child being recorded at the time (focal child) wore a specially designed lightweight vest equipped with a radiotelemetry microphone and a wireless transmitter (HME model WM 225A) secured in a hidden pocket in the back of the vest. In this way, both a visual and auditory record of each child's interactions could be obtained without imposing any restrictions on the normal flow of activities.

Across the 4-week period, each child was observed for a total of 100 minutes during free play. Recordings commenced on the third playgroup day and were divided into segments of 10 consecutive minutes for each of 10 recording periods per child. The order of recording children in the playgroup was randomized within blocks of eight 10-minute segments, and no child was observed more than

once per day (usually every other day). Only the last four recordings were used in this study for comparison with children's social play interactions in their specialized program.

Specialized Classroom Setting and Procedure

The delayed children participated in individual and group instruction activities in a self-contained classroom for 2.5 hours per day, either 4 or 5 days per week. Classes were small (approximate mean = 9.7 children), and were staffed by one lead teacher and one assistant. A daily free-play session lasted 30-40 minutes. During that time children had access to toys and equipment similar to those in the mainstreamed playgroups. Teachers generally encouraged children to play as in the playgroups but were asked only to provide assistance when necessary during free play.

Observations began within 3 weeks following the completion of each child's mainstreamed playgroup. Two trained observers coded the social and play interactions of each child during classroom free-play activities. No videotape equipment was used. Observers closely monitored each child, unobtrusively moving to each classroom play area as necessary. Each child was observed for a total of 80 minutes (actual observation time) over a period of 5-8 days.

Observational Procedures and Measures

Two scales were used for both videotaped and live observations (see below). For the social participation and cognitive play scale, a time code superimposed on each videotape permitted coding to occur at 10-second intervals. A total of 40 minutes per child (four 10-minute segments) was used for analysis. For the live observations in the specialized setting, a sequence of "10-second observe" and "5-second record" intervals was paced by a prerecorded signal from a minicassette tape recorder. This was carried out for four 15-minute observation periods, also yielding a total observation time of 40 minutes per child. Previous research by Guralnick and Groom (1985) using training procedures involving videotaped records indicated the comparability of the continuous (tape) and alternating record-observe (live) procedures.

For the individual social behavior scale, each videotape was reviewed a second time and

observers recorded continuously the occurrence of behaviors organized within 14 major categories. For the live recordings, observers recorded the occurrence of the 14 peer-related social behaviors for an uninterrupted 10-minute period on four separate occasions for each child.

Social Participation and Cognitive Play. Coders recorded the quality of social participation and levels of cognitive play during each 10-second interval using a slightly modified version of the scale developed by Rubin and his colleagues (Rubin, Maioni, & Hornung, 1976; Rubin, Watson, & Jambor, 1978). This scale consists of 11 mutually exclusive and exhaustive categories. The first three were derived from Parten's (1932) social participation categories consisting of the following play classifications: (a) solitary (playing alone), (b) parallel (playing next to another child), and (c) group (playing with another child). Nested within these three social participation categories are four measures of cognitive play based on the work of Smilansky (1968): (a) functional (simple repetitive play), (b) constructive (learns to use materials, creates something), (c) dramatic (role taking and pretend play), and (d) games with rules (child behaves in accordance with prearranged rules). If any 10-second interval was coded as either solitary, parallel, or group play, then one of the four cognitive play categories also was scored.

The eight remaining categories were (a) unoccupied behavior (child not playing), (b) onlooker behavior (child watches other children but does not enter into play), (c) reading (reading, leafing through a book, or being read to), (d) rough and tumble (mock and playful fighting, running after one another), (e) exploration (examining physical properties of objects), (f) active conversation (talking, questioning, and suggesting to other children but not playing), (g) transitional (moving from one activity to another), and (h) adult-directed (any activity with an adult). More specific definitions for the social participation and cognitive play categories can be found in Rubin's (1981) manual. Coding rules and related modifications of this scale, as well as the coding manual for the individual social behavior scale, can be obtained by writing the first author.

Individual Social Behaviors. The individual social behavior scale was based on the work of White and Watts (1973) and adapted in a manner similar

to Doyle, Connolly, and Rivest (1980) and to Guralnick and Groom (1985). Specifically, observers recorded continuously the occurrence of any of 14 categories of individual social behaviors. Social interactions of the focal child toward peers were recorded in 11 categories: (a) gains the attention of a peer, (b) uses peer as a resource, (c) leads peer in activities—positive and neutral, (d) leads peer in activities—negative, (e) imitates a peer, (f) expresses affection to peer, (g) expresses hostility to peer, (h) competes with peer for adult's attention, (i) competes for equipment, (j) shows pride in product or attribute to peer, and (k) follows peer's activity without specific directions to do so. Two additional categories focused on the social behaviors of the focal child in response to directed activities of a peer: (l) follows the lead of a peer in response to verbal or nonverbal directions, and (m) refuses to follow or ignores peer's directions or requests. The final category (n) was one in which the focal child served as a model for a peer. The focal child's success in events (a), (b), (c), (d), (h), and (i) also was judged. Definitions for successful or unsuccessful social interactions were specific to each social behavior category.

Reliability

Before the mainstreamed playgroup or specialized setting observations, raters were trained for a period of 6-8 weeks on the two observation scales. Videotapes of pilot playgroups were used for training and final prestudy reliability assessments for the mainstreamed setting. Prestudy training and reliability for specialized setting observations were based on a previous study (Guralnick & Groom, 1985). Following the training programs, all raters achieved the minimum average criterion of 80% interobserver agreement for each of the major categories for five consecutive 10-minute segments for each of the two scales. Reliability also was obtained during 25% of the mainstreamed playgroup and specialized setting observations.

For the social participation and cognitive play scale, reliability was based on percent agreement obtained for each of the 10-second observation intervals (number of agreements divided by the total number of observations and transformed to a percentage). Cohen's (1960) Kappa also was calculated when appropriate. For prestudy reliability, raters agreed on a mean

of 90% (range 79-100%) of the intervals ($Kappa = .88$) for the 11 categories of the social participation scale. Using only those instances in which observers agreed that a cognitive play coding was required, interobserver agreement averaged 96% (range 86-100%) for the four cognitive play categories. In the mainstreamed setting, average interobserver agreements were as follows: social participation, 90% (range 80-97%), $Kappa = .90$; cognitive play, 98% (range 91-100%). In the specialized setting, these values were: social participation, 89% (range 83-95%), $Kappa = .86$; cognitive play, 95% (range 83-100%).

For the individual social behavior scale, raters were considered to be in agreement when codes matched exactly within specified 30-second intervals. A "no-interaction" event was added to complete all possible options within each interval. Percent agreement was obtained for each 10-minute segment by taking the total number of agreements, dividing by the total number of observed individual social interactions, and transforming to a percentage. One unit was added if both observers agreed that no interaction had occurred during an entire 30-second interval. Calculated in this manner, the average prestudy agreement for this scale was 86% (range 77-100%), $Kappa = .85$. Given agreement on the occurrence of a particular social interaction, observers further agreed on an average of 84% (range 69-100%) of the occasions as to whether the event could be classified as successful or unsuccessful. Mean reliabilities for the mainstreamed playgroup observations were: individual social behavior, 92% (range 83-100%), $Kappa = .91$; successful/unsuccessful, 98% (range 88-100%). In the specialized setting, these values were: individual social behavior, 91% (range 84-100%), $Kappa = .85$; successful/unsuccessful, 100%.

RESULTS

Measures reflecting peer-related social interactions of the mildly developmentally delayed children were compared across the two settings. For each measure, data were summed across the four observation periods, and a series of repeated measures analyses of variance (ANOVA) were carried out. When multivariate analyses of variance (MANOVA) were applied, Wilks' criterion was used (SAS Institute, Inc., 1982). The arcsine transformation was used when

frequency data were transformed to proportions, but only untransformed scores are presented in the tables and text. Results are organized in terms of the two observation scales.

Social Participation and Cognitive Play

A MANOVA carried out on the frequency of intervals coded for the 11 categories of the social participation scale revealed a significant multivariate effect, $F(10, 11) = 5.18, p < .01$. Separate univariate analyses were significant only for the transitional, $F(1, 20) = 7.94, p < .01$, and adult-directed, $F(1, 20) = 28.09, p < .001$, categories. In both instances, higher frequencies were observed in the specialized classroom.

As noted, the cognitive level of children's play was coded whenever solitary, parallel, or group play occurred. Separate ANOVAs were carried out on the percentages of functional, constructive, and dramatic play (the games category was dropped due to its very low frequency of occurrence). As seen in Figure 1, dramatic play occurred in only a small proportion of the intervals and to approximately the same extent in both settings ($p > .05$). However, the proportion of constructive play was considerably higher when children were in the mainstreamed playgroups, $F(1, 20) = 5.28, p < .05$. Although the proportion of functional play was greater in the specialized setting than in the mainstreamed playgroups, this difference just failed to reach statistical significance ($p < .061$).

Individual Social Behaviors

The individual social behavior measures were first reorganized into a negative interaction category (consisting of negative leads, competes for equipment, refuses to follow, and hostility) and a positive interaction category (all others). A separate ANOVA carried out on the number of positive interactions revealed a significant effect, $F(1, 20) = 15.80, p < .001$. As indicated in Table 1, mildly delayed children's rate of positive social interactions in the mainstreamed setting was over twice what occurred in the specialized classrooms. A similar finding was obtained for the frequency of negative interactions, $F(1, 20) = 5.89, p < .05$. Overall, delayed children were much more socially interactive with their peers in the mainstreamed setting ($M = 80.55$) in comparison to the specialized setting ($M = 34.00$).

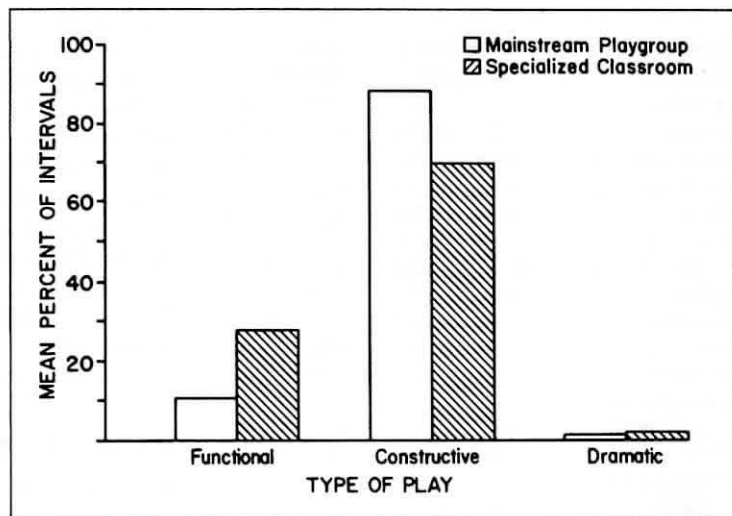
To evaluate which specific social behaviors were affected by the setting, a MANOVA was carried out on the frequency of occurrence for the categories of the individual social behavior scale. The category involving adults (competes with peer for adult's attention) was omitted, but a separate ANOVA was not significant ($p > .05$). A significant multivariate effect was obtained, $F(13,8) = 3.44, p < .05$. Separate univariate analyses revealed significant effects for the following categories: attention, $F(1, 20) = 7.36, p < .05$; lead (positive), $F(1, 20) = 5.01, p < .05$; follows lead, $F(1, 20) = 14.73, p < .001$; follows activity, $F(1, 20) = 5.82, p < .05$; refuses to follow, $F(1, 20) = 8.06, p < .01$; and pride in product, $F(1, 20) = 4.81, p < .05$. A strong trend also was observed for use as a resource ($p < .052$). As indicated in Table 1, a higher frequency for each of the categories occurred in the mainstreamed in comparison to the specialized setting. Finally, as noted, six of the individual social behavior categories were judged as successful or unsuccessful. The proportion of social interactions that were judged successful were summed across the six categories and a repeated-measures ANOVA was carried out. Overall, the delayed children were successful on nearly 40% of the occasions, but this did not vary significantly across the two settings ($p > .05$).

DISCUSSION

Increased Interaction in Mainstreaming

Mildly developmentally delayed children engaged in a much higher rate of peer-related social interactions when participating in mainstreamed playgroups in comparison to specialized classroom programs. Not only was the rate of social interaction in the mainstreamed setting more than twice that in the specialized setting, but higher rates also were noted for many individual

FIGURE 1
Mean Percent of Intervals Coded for the Cognitive Play Measure for the Mainstreamed and Specialized Settings



social behavior categories that are typically associated with peer-related social competence, such as "gains attention" and "positive leads" (Wright, 1980). Although alternative explanations for this finding are considered later here, it is most likely the result of increased child-child social interactions established by the nonhandicapped children in the mainstreamed playgroups. This explanation is supported by observations of playgroup interactions reported by Guralnick and Groom (1987).

Specifically, as expected, direct observations in the playgroups indicated that the peer-related social play of the nonhandicapped children was much more frequent and qualitatively at a higher level than that of the delayed children. Although the mildly delayed children in the playgroups were not selected as play partners as frequently as were other nonhandicapped children, social interactions between delayed and nonhandicapped children were nevertheless common occurrences. In fact, the mildly delayed children actually chose to interact more often with nonhandicapped children similar in chronological age to themselves than with any other group. Since this group of 4-year-old nonhandicapped children was more socially interactive than either the 3-year-old nonhandicapped group or the 4-year-old mildly delayed children, it is reasonable to suggest that the involvement of

TABLE 1
Mean Number of Individual Social Behaviors for the
Mildly Delayed Children in the Mainstreamed and
Specialized Settings

<i>Individual Social Behaviors</i>	<i>Mainstreamed Playgroup</i>	<i>Specialized Classroom</i>
Attention	12.91 (7.09)	5.18 (6.24)
Resource	3.27 (4.63)	0.36 (0.67)
Lead (positive)	14.73 (12.79)	5.00 (6.65)
Lead (negative)	5.18 (8.07)	4.18 (5.79)
Model	1.18 (1.33)	0.36 (0.92)
Follows Lead	7.45 (4.16)	1.73 (2.69)
Follows Activity	11.27 (6.03)	6.27 (3.29)
Refuse	10.73 (10.11)	1.91 (1.97)
Imitation	1.09 (1.22)	1.45 (1.92)
Affection	0.91 (1.76)	0.82 (1.08)
Hostility	3.09 (6.22)	1.36 (2.16)
Competes for Equipment	8.00 (5.12)	4.64 (3.72)
Pride	0.45 (0.69)	0.00 (0.00)
Competes for Adult	0.27 (0.65)	0.73 (0.90)
Total Positive Interactions	53.55 (22.27)	21.91 (14.17)
Total Negative Interactions	27.00 (18.56)	12.09 (8.40)

Note: Data consist of mean frequencies summed over the four observation periods. Standard deviations are in parentheses.

the nonhandicapped 4-year-old children may have been responsible for the increased level of peer-related social interactions by the mildly delayed children in the mainstreamed setting. Although the peer interactions of the mildly delayed subjects' classmates in the specialized programs were not assessed, previous research has established that the level of peer interactions exhibited by subjects in the specialized classrooms in this study is typical of the other children in that setting (Guralnick & Groom, 1985).

Constructive Play in Mainstreaming

An additional important finding was the fact that delayed children played more constructively and tended to play less functionally in mainstreamed as opposed to specialized settings. A similar finding for functional play for severely delayed children was obtained previously by Guralnick (1981b). It is unclear why this effect occurred,

although observation of more advanced play and active involvement with the nonhandicapped children seem plausible explanations. In fact, when mildly delayed children engaged in group play in the mainstreamed playgroups, their companion was a nonhandicapped child of similar age on 60% of the occasions (Guralnick & Groom, 1987). Furthermore, virtually all of that group play was constructive or dramatic. Since meaningful involvement with toys is an important correlate of developmental progress and also serves as a catalyst for social interaction (Rubin, Fein, & Vandenberg, 1983), the improved quality of cognitive play by mildly delayed children observed in mainstreamed settings may well have significant developmental consequences over time.

Alternative Explanations

Alternative explanations for the apparently facilitative effects of mainstreamed settings on both peer interactions and level of cognitive play must be considered. The classroom settings for both the mainstreamed playgroups and the specialized programs were highly similar in terms of teacher-child ratio, the availability and type of toys and materials, and other similar factors known to affect children's peer relations. Nevertheless, although obtaining data only during free play periods may have minimized further any differences, more subtle factors may still have existed between the settings and affected the outcomes of this study. In addition, the specialized setting was not observed until after the completion of each playgroup. Although the difference in time was likely to be trivial in relation to the measures of peer interaction in the study, the absence of involvement with nonhandicapped children following the end of the playgroups may have had a contrast effect, thereby reducing the level of peer interaction in the specialized setting. Arguing against this possibility is the fact that the delayed children continued to be enrolled in their specialized classes even during the mainstreamed playgroups. Moreover, there was a delay of at least 1 or 2 weeks prior to observations in the specialized classes, probably allowing for any adjustments to be made.

It is also possible that differences between the settings could be related to the fact that the same videotaped records were used for both scales in the playgroups, but were based on

separate observation periods during live recording in the classroom. Although this procedural variation may have had some unknown effect, primarily in terms of variability, most recordings in the classroom for each scale did take place on the same day for each child. The possibility does exist that more social behaviors were observed on the videotaped records, since observers could return to any portion of the tape. However, live recordings actually provided a clearer view of all interactions; and most social behaviors in the classroom setting were very apparent, given the typically low level of social interaction occurring in the specialized classrooms.

Another explanation is that experiences prior to playgroup participation of the delayed children in the specialized setting with generally noninteractive classmates produced an artificially low level of peer interactions in that setting in comparison to the shorter-term playgroup. However, two factors suggest that this is not the case. First, having highly familiar classmates should have proved to be an advantage in terms of peer interactions to the children in the specialized setting (Doyle et al., 1980). Second, Strain (1984) has demonstrated that the low level of peer interactions in specialized settings is not due simply to prior experiences with unresponsive peers since the same low level of interacting is apparent when handicapped children are placed in new specialized settings. Moreover, it is important to note that the overall level of peer-related social interactions of the delayed children was generally stable across the 4 weeks of the playgroups, and it is likely that this is representative of the level of interactions that would occur over a more extended period of time. In addition, these results cannot be attributed to differences in morning or afternoon programs since the same strong effects were observed in both sessions.

The finding that the delayed children in the specialized setting were involved in adult-directed activities to a much greater extent than in the mainstreamed setting deserves comment. It is important to note that teachers in both settings received the same instructions, i.e., to minimize contact unless it was essential. However, institutional practice could have produced a differential response pattern that may have affected child-child social interactions in the specialized setting. A more likely explanation for this finding is the fact that the delayed

children in the specialized setting took the initiative in interacting with adults more often because the peers in the specialized setting were not as responsive or interactive as those in the mainstreamed playgroups.

Larger Numbers of Nonhandicapped Children

Assuming that these alternative explanations account for only a very minor proportion of the very marked effects of setting that were obtained in this study, it is important to consider why these findings differed from previous research in which only minimal differences at best were observed. An important factor may well be the relatively small proportion of nonhandicapped children participating with handicapped children in the previous studies. As noted above, these typically were *integrated* as opposed to *mainstreamed* settings, with the level of social relationships presumably being governed primarily by the handicapped children in the program. This fact is likely to have reduced any potentially facilitative effects of the presence of nonhandicapped children from occurring. By contrast, in the present study, the nonhandicapped children constituted 80% of the sample.

Inclusion of Older Nonhandicapped Children

In addition, most previous studies included normally developing children who were 1 year younger than their handicapped classmates, but in the present study the mainstreamed playgroups included children of similar chronological age, and therefore more developmentally advanced, as participants. Since it is this older nonhandicapped group that accounted for a considerable portion of the social activity in the playgroup setting and were the preferred play partners of the delayed children, this group-composition factor may have had a major influence. It was not possible to evaluate in this study the relative contributions of a greater proportion of nonhandicapped children and the inclusion of nonhandicapped children similar in chronological age to the delayed children. However, it is likely that a chronological age threshold of perhaps $3\frac{1}{2}$ to 4 years of age for nonhandicapped children will be required for any substantial effects to occur. By that age most children have sufficient peer-interaction skills, particularly those involving directive functions, to produce an impact on develop-

mentally delayed children in the setting. Future research should consider these issues because they appear to be programmatic factors that will affect significantly the outcome of efficacy studies in early childhood mainstreaming.

Implications for Mainstreaming

Finally, a word of caution is in order with regard to the implications of these findings for improving the peer interactions of mildly developmentally delayed children. Despite a higher frequency for most of the individual social behavior measures in the mainstreamed playgroups, the extent to which the delayed children engaged in group play did not differ significantly between the two settings. Accordingly, although important aspects of peer-related social interaction can be facilitated by involvement in mainstreamed settings, the social skills required to engage in sustained child-child play must receive specific attention. Mainstreamed programs appear to provide an excellent substrata for these more advanced social behaviors, but systematic training must occur. Selective involvement of peers at varying developmental levels can be of value (Guralnick, 1984) as can specific training using nonhandicapped peers as confederates (Strain & Odom, 1986).

Mainstreamed settings not only allow these techniques to be applied but also serve as responsive social environments more likely to support generalized outcomes (Strain, 1984). Nevertheless, the development of an effective set of peer-interaction skills, such as those needed to enter group play, to resolve conflicts, or to have strategies available that are capable of maintaining social play in the face of many competing demands, will require careful, individualized, and systematic attention that extends well beyond the social interaction characteristics of a handicapped child's peers. The development of such comprehensive treatment programs is a major challenge to the field (Guralnick, 1986b).

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