A Comparison of developmental gains for preschool children with disabilities in integrated and self-contained classrooms

Annette Holahan

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A Comparison of Developmental Gains for Preschool Children with Disabilities
in Integrated and Self-Contained Classrooms

Master’s Thesis

Submitted to the Faculty
Of the School Psychology Program
College of Liberal Arts
ROCHESTER INSTITUTE OF TECHNOLOGY
By

Annette Holahan

In Partial Fulfillment of the Requirements
for the Degree of
Master of Science

Rochester, New York October 15, 1997

Approved: V. Costiuliadek

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Abstract

The effects of classroom integration on the developmental and social growth of preschool children with disabilities was investigated on 15 pairs of children (n=30) matched for chronological age, sex, initial level of functioning, related services received, and attendance schedules. Progress was measured using the Brigance Diagnostic Inventory of Early Development. Results indicate that children functioning at a lower level of social and emotional functioning perform equally well in integrated and segregated settings while children functioning at a relatively higher level performed better in integrated settings than in segregated settings. No significant differences were found between the integrated and segregated groups in areas of self help, general knowledge and comprehension, or overall development.

Additionally, the relationships between developmental progress and the length of the school day and the amount of related services received per week were investigated on 66 subjects. Children in full-day classrooms had greater developmental delays but achieved higher rates of progress than their half-day peers in the areas of social and emotional development and overall development. Furthermore, a positive correlation was found between minutes of related services received each week and the rate of social and developmental progress.
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A Comparison of Developmental Gains for Preschool Children with Disabilities in Integrated and Self-Contained Classrooms

Introduction

The Education for All Handicapped Children Act of 1975 (Public Law 94-142) and its 1990 revision, the Individuals with Disabilities Education Act (Public Law 101-476), along with parallel state legislation require that all children with disabilities receive a free appropriate public education in the least restrictive environment. The 1986 Amendments to the Education for All Handicapped Children Act (Public Law 99-457) extended this guarantee to include preschool age children. These laws have both reflected and encouraged an adoption of the concept of mainstreaming, resulting in an increase in the placement of children with disabilities into integrated settings (Cooke, Ruskus, Apolloni & Peck, 1981; Fewell & Oelwein, 1990).

Numerous rationale for the integration of preschool children with disabilities with typically developing peers have been advanced (Bricker, 1978; Hanline & Murray, 1984; Jenkins, Speltz, & Odom, 1985; Odom & McEvoy, 1988; Peck & Cooke, 1983) and are succinctly summarized by Bricker (1978) along three dimensions. First, from a legal perspective, federal and state legislation mandate that all children with disabilities receive educational services in a setting with, or in close proximity to, children who are not disabled. Second, the moral and philosophical argument is that children should not be segregated from their normally developing peers. Such segregation goes against basic human rights and would have negative effects on children with disabilities. Furthermore, integration could result in a positive change in societal attitudes toward these children. Bricker’s third rationale for integration of preschool age children...
children is that there may be developmental and educational benefits to placing a preschool child with a disability with normally developing peers.

Additionally, Buysse and Bailey (1993) review reasons why integration has been especially advocated during the preschool years. First, they argue that young children have not yet formed negative stereotypes of individuals, thus minimizing the possibility of teasing and rejection and maximizing the possibility of the social acceptance of students with disabilities. Second, early interactions with individuals with disabilities will increase the likelihood of later acceptance of people with disabilities by their normally developing peers. Third, the initial and early placement of children with disabilities into typical settings creates the expectations of parents and professionals that such integration is the norm and better prepares the child to later function in typical environments.

Although all of the rationales supporting integration appear to have face validity (Jenkins, et al., 1985), systematic empirical research considering these positions has only begun to accumulate (Fewell & Oelwein, 1990; Peck & Cook, 1983; Buysse & Bailey, 1993). Of particular interest for this study is Bricker's third rationale regarding the educational and developmental benefits of integration on children with disabilities. The premise that integration will result in positive gains by students with disabilities without being detrimental to their development is implicit in this argument (Peck & Cooke, 1983). Likewise, Bricker implies that the philosophical goal of the normalization principle (Wolfensberger, 1972) outweighs possible educational costs. It is important, however, to examine these assumptions in light of empirical research into the developmental and educational effects of integration on preschool children with disabilities.
The following discussion will focus on the available research examining social and developmental growth of preschool age children in integrated and segregated settings and will include a critique of the quality of research to date. It will begin with a functional definition for the terms integrated, segregated and self-contained as used for the purposes of this paper. The research findings in the areas of developmental and social-behavioral outcomes will be considered, followed by a review of the literature regarding the effects of the degree of disability on developmental progress in integrated and segregated settings. Finally, the nature of the present study will be described.

Definition

Successful integration at the preschool level is complicated by the fact that there generally are no publicly funded preschool programs in school districts (Jenkins, et al., 1985; Odom & McEvoy, 1988). Therefore, finding typically developing preschool children for integration opportunities requires district collaboration with private agencies and day care centers (Odom & McEvoy, 1988). Consequently, integration in early intervention programs takes on a variety of forms including Head Start, private preschools and day cares, cooperatives, and home-based child care (Templeman, Fredericks & Udell, 1989). Classes are generally labeled as mainstreamed if they contain typically developing children with some children with disabilities in attendance and as integrated if they are special education classes in which some typically developing children are enrolled as peer models (Jenkins, Odom & Speltz, 1989). For the purposes of this paper, the term integrated will be used broadly to encompass any preschool classroom in which children with disabilities are enrolled with typically developing peers, while the terms self-contained and segregated will be used interchangeably to define those special education classrooms in which only preschool children with disabilities are enrolled.
Research

Despite over two decades of research regarding the effects of preschool integration, the number and quality of studies designed to assess the efficacy of preschool integration using a comparative design is a concern (Buysse & Bailey, 1993; Fewell & Oelwein, 1990). Although a relatively large body of literature exists that describes the behavior and developmental progress of children with disabilities enrolled in integrated programs and compares them to their typically developing peers (Buysse & Bailey, 1993), relatively few studies have examined and compared the developmental and educational achievement of children in integrated versus segregated settings (Fewell & Oelwein, 1990). Many studies lack both comparison groups and the random assignment of students to classrooms (Jenkins, et al., 1985). Buysse and Bailey (1993) also identified other threats to the validity of the studies conducted on preschool integration including problems with instrumentation and research design, selection confounds, and the lack of control for programmatic variables between treatment groups. For these reasons, numerous researchers have called for more well designed comparative studies on the effects of preschool integration (Buysse & Bailey, 1993; Cooke et al., 1981; Fewell & Oelwein, 1990; Jenkins et al., 1985; Odom & McEvoy, 1988).

Social-behavioral outcomes. The majority of studies of preschool integration have focused on the social interactions of children with disabilities (Buysse & Bailey, 1993). Using behavioral observations and teacher rating scales, the integration of preschool children with typically developing peers has generally been found to have modest, positive results on social outcomes (Buysse & Bailey, 1993; Guralnick et al., 1995). An increase in social interactions with peers has been reported in integrated settings (Beckman & Kohl, 1984; Beckman & Kohl, 1987; Guralnick & Groom, 1988; Guralnick et al., 1995; Jenkins et al., 1985; Novak, Olley &
Kearney, 1980; Peck & Cooke, 1983), as well as more advanced social play as characterized by associative play with peers (Esposito & Koorland, 1989), less object play (Novak et al., 1980), and less isolated and more complex play with peers and toys (Beckman & Kohl, 1984; Beckman & Kohl, 1987; Guralnick & Groom, 1988; Guralnick et al., 1995). Teachers also rate children with disabilities higher in social competence in integrated settings (Jenkins et al., 1989).

Additionally, positive behavioral outcomes including less inappropriate behavior (Carden-Smith & Fowler, 1983) and less inappropriate play (Guralnick, 1981) has also been attributed to integrated settings.

Some researchers, however, have reported mixed or no significant differences in social outcomes between integrated and segregated settings (Rule et al., 1987; Jenkins et al., 1985; Jenkins et al., 1989). Peck and Cooke (1983) assert that without structured interventions designed to increase interactions even the positive statistical differences that have been found are relatively slight functional increases in social interactions between children with disabilities and typically developing peers. Other researchers (Buysse & Bailey, 1993; Hanline & Murray, 1984; Jenkins et al., 1989; Rule et al., 1987; Strain, 1990) also argue that the mere proximity of children with disabilities to children without disabilities will not automatically result in positive outcomes without carefully planned interventions that promote interactions, imitations and initiations of contact among children. Further support for the necessity of facilitated peer-related interactions is offered by Jenkins et al. (1989) who observed more isolate and unoccupied play in the integrated settings in absence of such planned interventions. True social integration and its positive benefits are not achieved by placing children of various abilities in the same classroom without specific and carefully planned programming (Jenkins et al., 1989).
Developmental outcomes. Compared to studies of social and behavioral outcomes, fewer studies have been conducted that examine the developmental progress of children with disabilities in integrated classrooms (Buysse & Bailey, 1993; Fewell & Oelwein, 1990). In general, preschool children with disabilities enrolled in early intervention programs make significant developmental gains that can not be attributed to maturation alone (Odom & McEvoy, 1988). However, little of the research conducted in this area employed comparison groups of children in self-contained versus integrated settings against which to gauge the outcome effects (Odom & McEvoy, 1988). In fact, only seven studies reviewed by Buysse and Bailey (1993) addressed educational and developmental outcomes using a comparison between integrated and segregated settings. These seven studies indicate that children’s performance over time, as measured by standardized instruments, does not vary as a function of the type of setting. All seven studies found either no differences between integrated and segregated classrooms or mixed results.

Over the course of a three year study, Cooke et al. (1981) found mixed results with regard to developmental outcomes for preschool children with disabilities in segregated and integrated settings. For two years of the study they found that children did equally well in both settings but for one year of the study they found better developmental outcomes for children with disabilities in integrated settings. Unfortunately, the inconsistencies in their findings may be due to problems with the design of the study which contained a number of threats to internal validity (Buysse & Bailey, 1993).

Other researchers, however, have more consistently reported no differences between developmental outcomes in integrated and segregated settings. Harris, Handleman, Kristoff, Bass and Gordon (1990) studied 10 preschool children diagnosed with autism and found no
significant differences in changes in language ability between those in segregated and integrated classes. Jenkins et al. (1985) found that despite higher ratings of social play, children in integrated settings made comparable developmental gains on cognitive and language measures as did children in segregated settings. In a second study by Jenkins et al. (1989), designed to determine if a specific treatment program aimed at increasing social integration would result in greater gains for children in integrated versus segregated settings, no significant developmental differences were noted. Using another social integration model of providing services to preschool children with disabilities within mainstreamed day care settings, Rule et al. (1987) found no differences in developmental or social gains between the social integration model and either self-contained or other integrated settings. Fewell and Oelwein (1990) also found that the amount of time spent in integrated settings had no effect on the scores of the children in any of six developmental domains including gross and fine motor skills, cognitive skills, receptive and expressive communication and social/self help skills.

**Developmental outcomes as affected by degree of disability.** Unfortunately, all of the studies reviewed by Buysse & Bailey (1993) which examined developmental outcomes used group means as a basis of comparison and failed to account for the extent to which each child’s initial level of developmental skill influenced their progress within the integrated and segregated settings. There have been some studies that indirectly indicate that the degree of disability or initial developmental level may influence the gains made by children in the different settings. Galloway and Chandler (1978) report that developmental progress in integrated settings is related to the child’s degree of disability, with lower functioning students making the smallest gains. However, they attributed their findings to the inadequacy of the educational program to meet the needs of the more severely disabled children and the inability of the outcome measures to
accurately assess growth in skills at such a low developmental level. Despite finding no differences in the rate of developmental growth between integrated and segregated groups of children, Fewell and Oelwein (1990) reanalyzed their data and found that the children with Down syndrome had greater gains in expressive language in segregated settings as compared to integrated settings.

Odom and McEvoy (1988) found that level of functioning may partially determine the amount of social interaction with peers which may ultimately affect not only social growth, but the growth of other developmental skills as well. They found that children without disabilities prefer to interact with other children who have no disabilities or only mild disabilities and argue that there is considerable evidence to suggest that social integration may occur naturally for children with mild disabilities but does not occur spontaneously for those with moderate or severe disabilities. Guralnick (1980, 1981) also found that higher functioning children (non-disabled or mildly disabled) interacted more with each other than they did with their less advanced peers, while the lower functioning children interacted equally with all the children in the group. Guralnick and Paul-Brown (1980) found similar results and additionally discovered that higher functioning children are able to adjust the complexity and other characteristics of their communication to the level of the listener.

Cole et al. (1991) attempted to more directly assess the impact of the degree of disability on the developmental gains of children in integrated and segregated settings by randomly assigning children to integrated or segregated settings and assessing their progress over the course of an academic year. Using the McCarthy Scales of Children’s Abilities, the Peabody Picture Vocabulary Test-Revised (PPVT-R), the Test of Early Language Development (TELD) and the Test of Early Reading Ability (TERA) as dependent variables, the authors found that
there was no significant main effect for integrated and segregated settings. There was, however, an interaction effect, with higher functioning children demonstrating greater developmental growth in integrated classes with lower functioning children making greater gains in segregated classrooms.

The primary focus of the present study is to expand on the work of Cole et al. (1991) by examining the effects of classroom integration on the developmental and social growth of preschool children with disabilities. Specifically, the interaction between level of initial functioning and type of setting using a criterion-referenced measure was examined. It was hypothesized that children initially functioning at a higher level would make more social and developmental gains in integrated classrooms while children initially functioning at a lower level would demonstrate more progress in self-contained classrooms.

A secondary focus of the present study is to examine the relationship of children’s measured progress along two dimensions for which there is little available research: the amount of related services received and the length of the child’s school day. The relationship between the rate of developmental progress achieved and the amount of related services children receive in the form of speech and language therapy, physical therapy, occupational therapy, music and/or play therapy was investigated. Although there is ample research on the efficacy of specific individual therapy programs and techniques, research on the more general effect of time spent in related services on children’s overall developmental progress is lacking. It was hypothesized that children with greater developmental delays would be mandated to receive more related services and that there would be a positive relationship between the amount of services received each week and the rate of developmental progress achieved.
Research on the effects of half-day versus full-day preschool attendance is also limited (Edmister & Ekstrand, 1987; Eno & Woehlke, 1987) and has often been confounded by effects of other variables such as social class and the subjective nature of data collected (Vlietstra, 1981). In fact, much of the research examining the length of the school day has been conducted on kindergarten-age children and has been generalized to preschoolers, despite the fact that preschoolers fatigue more easily and frequently require a daily nap (Eno & Woehlke, 1987).

Cleminshaw and Guidubaldi (1979) compared children in half-day, everyday kindergartens with those enrolled in full-day, alternate day kindergartens and found significant differences for academic and social skills favoring the full-day programs. In a review of research on kindergarten attendance Naron (1981) describes the advantages of full-day, everyday attendance including longer and more useful instructional periods, increased time for socialization and an increased opportunity to address the increasing academic nature of kindergarten.

In the typically developing preschool population, Vlietstra (1981) found that full-day children spent more time on teacher-directed tasks, had more positive interactions with peers and engaged in more motor activities as compared to half-day children. However, the teachers in this study rated the full-day children as less able to get along with peers, more aggressive and less tolerant of frustration. Among preschool children with disabilities, Eno and Woehlke (1987) found that children attending half-day everyday programs did not differ in developmental progress from those attending full-day, alternate day programs after controlling for entering differences. Taylor, White and Pezzino (1984) also found mixed results when comparing preschool children with disabilities attending half-day and full-day programs. Those children with communication disorders had a small but significant gain in expressive language scores in the full-day versus the half-day classroom, while preschoolers with mental retardation performed
better in half-day programs on measures of cognition and expressive language than in the full-day programs. Additionally, Taylor et al. (1984) found that the additional engaged learning time in full-day programs was not much greater than in half-day programs due to frequent breaks, lunchtime and naptime.

Due to the limited number of studies in this area specific to preschool children with disabilities and the mixed results of the research that does exist, Edmister and Ekstrand (1987) recommended that the individual child’s past and present progress, specific educational needs and physical and mental stamina be considered when making placement decisions regarding attendance schedules. In order to augment information on half-day versus full-day attendance, data from the present study was analyzed along this dimension. It was hypothesized that children with greater developmental delays would be placed more often in the full-day classrooms than in the half-day programs due to the expectation that such children would benefit from extended instructional time. Additionally, despite the assertion by Taylor et al. (1984) that engaged learning time is not much greater in full-day programs than half-day programs, it was predicted that children attending the full-day classrooms would progress at a faster rate than those attending half-day classrooms due to greater exposure to the educational setting which includes those times of the day such as lunch, nap and breaks in which the children may not be receiving direct instruction but are engaged in social interactions and the development of self-help skills.

Methods

Overview

The developmental and social progress made by matched samples of preschool children enrolled in integrated and self-contained classrooms was evaluated. The children’s progress over one academic year was compared using the Brigance Diagnostic Inventory of Early Development
(Brigance, 1991) which was completed by the classroom teachers in the fall and spring for each child.

Setting

This study was conducted at two center-based special education programs for preschool children with disabilities in western New York. Both centers are operated by the same agency and function under the same mission statement and administrative guidelines. Within each location are integrated and segregated classrooms for children ages three to five years old. During the study, the enrollment of the integrated classrooms was approximately 50% children with disabilities and 50% typically developing children. Some of the classrooms operated on a half day schedule while others operated on a full day schedule.

A certified special education teacher led each classroom and was assisted by one teacher’s assistant and a teacher’s aide. Some of the integrated classrooms also had a regular early childhood education teacher. The child to teacher ratios of the segregated classrooms were all 12:1:1:1 (a child to adult ratio of 4:1) while the integrated classrooms were either 16:1:1:1 or 21:1:1:1:1 (a child to adult ratio of approximately 5:1).

Subjects for the Integrated versus Segregated Portion of the Study

The records of 101 children enrolled at the two centers were examined. Each child met the criteria to receive special education services as a preschooler with a disability according to New York State guidelines (Part 200 Regulations of the Commissioner of Education, New York State Education Department, 1992). Each child’s placement in a specific type of classroom was determined in the child’s Preschool Committee on Special Education in which the recommendations of the parents, school team, and sometimes the evaluators were considered. Since randomization of placement into integrated and segregated settings was not possible, the
subjects were matched on the following variables: chronological age, sex, initial level of functioning, minutes per week of related services received, number of days attending per week, and half-day versus full-day programming. This analysis resulted in 15 matched pairs of children (N=30) with one child in each pair enrolled in an the integrated classroom and the other child enrolled in a self-contained classroom.

**Chronological age.** All pairs of children were matched to within six months in age, with 93 percent of the pairs within four months in age. Subjects ranged in age from 41 to 60 months with a mean age of 54.3 months (s.d. = 4.53).

**Sex.** Children were matched by gender. At the two centers females represented only 21 percent and 32 percent of the enrollment. Given the small numbers of female students, it was not possible to find adequately matched female pairs. Therefore, all of the subjects in this portion of the study were males.

**Time in program.** In order to control for the amount of time spent in the preschool program each week, the children were matched according to both the number of days per week they were scheduled to attend programming (100 % of the pairs attended five days per week) as well as to whether they were enrolled in half- or full-day classrooms. Five pairs (N=10) attended half-day classrooms and 10 pairs (N=20) attended full-day classrooms.

**Related services received.** Most of the children enrolled at these centers received related services which included speech and language therapy, occupational therapy, physical therapy, music therapy and/or play therapy. It was important to match children on the amount of time per week that they received related services since during these times they were removed from the settings whose effect was being examined and they were also receiving individual, intensive instruction. Since each child had an individualized education program, there is great variability
among students on the type and frequency of services received. Therefore, children were matched according to the amount of time services were provided each week instead of matching by the type and frequency of service. Additionally, although services were at times provided directly within the classroom, this was not included in the matching criteria since observations of the classrooms and service providers indicated that the decision to provide push-in or pull-out services is often rather fluid and based on the needs of the child, the teacher and the service provider at the time. Children were matched to within 90 minutes per week of services as reflected in the child’s individual education plan. The amount of services received by the children ranged from zero minutes to 270 minutes per week with a mode of 90 minutes (mean = 99.0, s.d. = 65.0).

Initial level of functioning. Children were matched according to their scores on the fall administration of the Brigance Developmental Inventory of Early Development (Brigance, 1991). The children differed by no more than six months for the average score on the three subtests of the Brigance that were examined.

Outcome Measures

The Brigance Developmental Inventory of Early Development (Brigance, 1991) is a criterion-referenced inventory of 98 skills in 11 developmental domains: Preambulatory, gross, and fine motor skills; self-help skills; speech and language skills; general knowledge and comprehension; social and emotional development; readiness; basic reading skills; manuscript writing; and basic math. The Brigance can be used as an assessment tool as well as an instructional guide for creating educational objectives. In the present settings, the teachers administer it in the fall and the spring of each year in order to assess areas of developmental need and to measure growth. The same protocol is used repeatedly for each child using a different
colored pencil for each administration. In this way, a permanent record is established of the child’s progress while in the program.

The Brigance protocols were examined for each subject. Although administered by the classroom teachers, all item responses were rescored by the principal researcher and consolidated developmental ages for each child for the fall and spring administrations were established.

Three subtests of the Brigance were evaluated for each child: self-help skills, general knowledge and comprehension, and social and emotional development. These were chosen because they are representative of developmental growth in the areas adaptive, cognitive, and social skills. Together these three domains give a broad picture of the child’s overall functioning within the classroom. These three subtests were also the most consistently administered by the classroom teachers and, therefore, were the subtests for which data was most available.

Consolidated developmental age scores were calculated for each domain and a Composite developmental age score was computed as an average of the three subtest scores. Developmental delay scores for each domain and for the Composite score were calculated by subtracting the Brigance developmental age scores from the child’s chronological age. Results of the fall administration were used to match subjects for initial level of functioning. Bagnato and Neisworth’s (1980) Intervention Efficacy Index was used to calculate each subject’s rate of progress per month of enrollment by subtracting the child’s developmental age in each domain in the fall from their developmental age scores in the spring and dividing by the number of months between administrations of the Brigance.

Subjects for the Half-day versus Full-day and the Related Services Portions of the Study

The subjects for the integrated versus segregated portion of the study were matched along a number of variables in order to ensure comparability of the segregated and integrated groups.
Matching along these dimensions was not relevant for the half-day versus full-day and related services portion of the study. From the original 101 records of children that were examined, all children for which there was adequate and complete information were included in this portion of the study. This resulted in a sample of 66 children. These subjects ranged in age from 37 to 61 months with a mean age of 51.89 months ($s.d.=6.05$). Sixteen children were female and 50 were male. Twenty nine of the children in this group attended integrated classrooms while 37 attended segregated classes. Twenty seven were enrolled in half-day programs and 39 were enrolled in full-day programs. The amount of related services received by this sample of children ranged from zero to 330 minutes per week with a mode of 90 minutes ($mean = 122.27, s.d.=83.92$).

Results

Analysis of Group Comparability

To determine whether the matching process was successful in forming comparable groups, one-way analyses of variance (ANOVAs) were performed on the pretest variables. Results indicate that the subjects were well matched. There were no significant differences in age ($F(1,28)=0.27, p(two-tailed)=0.61$) or in related services received ($F(1,28)=0.34, p(two-tailed)=0.56$) between the segregated and integrated groups. Additionally, there were no differences between the two groups in initial level of functioning as measured by developmental delay in each of the measured domains: self-help skills ($F(1,28)=0.004, p(two-tailed)=0.95$), general knowledge and comprehension ($F(1,27)=0.75, p(two-tailed)=0.39$), and social and emotional development ($F(1,28)=0.28, p(two-tailed)=0.60$) as well as by the composite developmental delay score for each subject across the three domains ($F(1,28)=0.17, p(two-tailed)=0.68$). Means and standard deviations for both groups on all matching variables are reported in Table 1.
Effects on Progress

Setting and initial level of functioning. To test the hypothesis that children initially functioning at a higher developmental level would make greater social and developmental gains in integrated classrooms while children initially functioning at a lower level would demonstrate more progress in self-contained classrooms, two-way analyses of variance were performed. The rate of progress was calculated by subtracting each child’s developmental age for each domain in the fall from their developmental age scores in the spring and dividing by the number of months between administrations of the Brigance Developmental Inventory of Early Development (Brigance, 1991). The hypothesis was only partially supported. There was a significant main effect for setting in the area of social and emotional development ($F(1,24)=6.63$, $p_{(two-tailed)}=0.02$) with children in the integrated classrooms achieving a greater rate of social and emotional growth than those in the segregated settings. However, an interaction effect was present between delay in social and emotional skills and setting on the achieved rate of progress ($F(1,24)=4.69$, $p_{(two-tailed)}=0.04$). Children initially functioning at a lower level (greater delay) in social and emotional skills progressed at an equal rate in both settings while children initially functioning at a higher level (less delay) made more progress in the integrated settings than in the segregated settings.

There were no main effects for developmental delay on the rate of social and emotional development ($F(1,24), p_{(two-tailed)}=0.21$) or on the rate of progress for general knowledge ($F(1,24)=2.31$, $p_{(two-tailed)}=0.14$) and the average composite score ($F(1,26)=0.0003$, $p_{(two-tailed)}=.99$). The main effect for developmental delay on rate of progress in self-help skills approached but did not reach significance ($F(1,21)=3.25$, $p_{(two-tailed)}=0.09$). Interestingly,
although there were no significant main effects for developmental delay on rate of progress, the trend was for children with greater delays to progress at a higher rate.

Although the trend was for children to achieve a greater rate of progress in integrated settings, no other significant main effects for setting were found in the areas of self-help skills (F(1, 21)=0.15, p(two-tailed)=0.70), general knowledge and comprehension (F(1, 24)=0.37, p(two-tailed)=0.55), and the composite scores (F(1,26)=2.76, p(two-tailed)=0.11). Finally, with the exception of social and emotional development, no other interaction effects were found in the other domains between setting and initial level of functioning on the rate of progress. Table 2 contains detailed results of the relationship between level of functioning, setting and rate of progress.

**Length of day.** Using one-way analyses of variance, the hypothesis that children with greater developmental delays would be placed more often in full-day programs than in half-day programs was tested. Although the trend across all domains was for the full-day group to have greater delays than the half-day group, the differences did not reach significance in the areas of general knowledge (F(1, 63)=0.89, p(one-tailed)=0.17) and self-help skills (F(1, 60)=0.72, p(one-tailed)=0.20). Children in the full-day group, however, were significantly more delayed in their social and emotional development than were the children in the half-day group (F(1, 63)=6.53, p(one-tailed)=0.007). Additionally, the difference between the two groups on the average composite score approached significance (F(1, 64)=2.52, p(one-tailed)=0.059). See table 3 for details.

ANOVA’s were also used to examine the relationship between the length of the school day in the preschool program (half-day vs. full-day) and the rate of progress achieved in the three domains and in the overall average rate of progress. The rate of progress was calculated by
subtracting each child's developmental age for each domain in the fall from their developmental age scores in the spring and dividing by the number of months between administrations of the Brigance Developmental Inventory of Early Development (Brigance, 1991). The proposed hypothesis was partially supported. Although the trend across all domains was for the children attending the full-day classrooms to make greater developmental gains than those attending half-day classrooms, the half-day and full-day groups did not differ significantly in achieved rate of progress for general knowledge ($F(1, 62)=1.65, p_{(one-tailed)}=0.10$) or for self-help skills ($F(1,54)=2.19, p_{(one-tailed)}=0.07$). Full-day students did achieve a greater rate of progress for social and emotional skills ($F(1,59)=8.63, p_{(one-tailed)}=0.002$ and for the overall composite score ($F(1, 64)=5.86, p_{(one-tailed)}=0.009$. Table 4 for outlines these findings. There were no significant interaction effects between developmental delay and length of the school day on rate of progress.

**Related services received.** The hypothesis that children with greater developmental delays would be mandated to receive more related services each week was tested by calculating the correlation between minutes of services received and months of developmental delay for the three domains and the composite score of the Brigance. Because the data was not normally distributed, the Spearman's Rho coefficient was used. The hypothesis was generally supported by the data. Significant positive relationships were found for the areas of self help skills ($r_s=0.35, p_{(one-tailed)}=0.002$), social and emotional development ($r_s=0.31, p_{(one-tailed)}=0.007$), and the average composite score ($r_s=0.26, p_{(one-tailed)}=0.02$). The relationship between developmental delay and minutes of related services was not significant, however, for general knowledge and comprehension ($r_s=0.12, p_{(one-tailed)}=0.17$). Table 5 contains the correlation
coefficients and levels of significance between minutes of related services received each week and months of developmental delay for each domain and overall development.

The relationship between the minutes of related services received per week by the subjects and their rate of developmental progress was examined by calculating the Spearman’s Rho correlations between the minutes of related services and the achieved rate of progress for each domain and composite score. No significant relationship was found between the number of minutes of services received per week and the rate of progress in the area of general knowledge ($r_s=0.02, p(\text{one-tailed})=0.45$). Although there was a trend for the relationship between services received and the rate overall developmental progress to be in a positive direction ($r_s=0.18, p(\text{one-tailed})=0.07$), the relationship did not reach significance. A positive correlation was found, however, between the amount of related services received and the rate of progress for social and emotional development ($r_s=0.29, p(\text{one-tailed})=0.01$) and for self help skills ($r_s=0.26, p(\text{one-tailed})=0.03$). Table 6 contains these figures.

Discussion

Summary of Findings

Setting and initial level of functioning. The primary focus of the current study was to determine if there is an interaction effect between developmental delay and setting on the rate of developmental and social progress achieved by children in integrated and segregated settings. Would children initially functioning at a higher developmental level make more social and developmental gains in integrated settings while children initially functioning at a lower level demonstrate more progress in self-contained classrooms? Although Cole et al. (1991) found such an interaction effect and asserted that this interaction might explain the lack of differences found in previous studies in developmental outcomes in integrated and segregated settings, the
results of this study only partially support this position. A main effect for setting and an interaction effect were found, but only in the area of social and emotional development. This is consistent with the findings of other researchers (Beckman & Kohl, 1987; Buysse & Bailey, 1993; Guralnick et al., 1995; Peck & Cooke, 1983) who have reported positive effects of integration on social outcomes. Additionally, the lack of significant differences between integrated and segregated classrooms in the areas of self help skills and general knowledge and comprehension is consistent with the findings of others who have reported no effect of integration on developmental outcomes (Fewell & Oelwein, 1990; Harris et al., 1990; Jenkins et al., 1985; Rule et al., 1987).

An important consideration of these results is the finding that children with disabilities who were functioning at a relatively higher level of social and emotional development progressed at a slower rate in the segregated classrooms. Although children functioning at a relatively low level performed equally well in integrated and segregated settings, the results indicate that children who were less delayed in social and emotional skills actually may have experienced a detrimental effect by being placed in a segregated setting. Based on the findings of Odom and McEvoy (1988) and Guralnick (1980, 1981), the tendency of higher functioning children with disabilities to interact with peers who are either non-disabled or mildly disabled may have created a situation in the segregated classroom where there were fewer developmentally similar peers with whom to interact. This may have limited the social growth of these children.

A surprising finding was that no direct relationship was found between developmental delay and the rate of progress in any domain. Although non-significant, the trend across settings was for children with greater delays to progress at a higher rate. This is contrary to the findings by Galloway and Chandler (1978) that lower functioning children make the smallest gains.
this study, it is possible that the teachers underestimated the capabilities of certain children early in the school year, perhaps due to shyness or an initial adjustment to a new setting. With greater familiarity, by spring they were able to obtain more accurate assessments of the children's functioning. A second feasible explanation for this finding is that some children in this population may have been delayed due to a lack of adequate and stimulating home environment and once placed within the structure of the special education setting, they “blossomed” and were able to rapidly develop new skills.

**Length of day.** There is some evidence in the current findings that children are differentially placed in half-day and full-day programs based on their degree of developmental delay, with children who have greater delays being placed more often in full-day settings. Although the differences between the two groups were only significant in the area of social and emotional development and were in the borderline area of significance for overall delay, there was a strong trend toward supporting the hypothesis in the other domains. Significant differences may have been minimized due to the small sample size of the current study.

Given the differences in initial level of functioning between the half-day and full-day groups, it is noteworthy that children in the full-day classrooms, who were significantly more delayed than their peers in the half-day classrooms, were able to achieve a greater rate of progress in the areas of social and emotional skills and overall development. These findings lend support for the efficacy of full-day programs to provide the increased exposure and structure necessary to promote greater developmental progress for preschool children with disabilities. It must be remembered, however, that the subjects were not matched to ensure the compatibility between the half-day and full-day groups. However, there were no interaction effects for the degree of delay and the length of the school day, indicating that there were no differences in the rate of
progress for children in either the half or the full-day programs based on their level of functioning. More research with a larger, more carefully matched sample is needed to fully examine the cost-effectiveness and educational appropriateness of full-day preschool special education programs.

**Related services.** The positive relationship between developmental delay and amount of related services received by the children is reassuring. Children with the greatest needs are receiving the greatest amount of services. Results indicate that the decision to provide individualized therapies is based on factors directly related to children’s overall developmental delay, especially in the areas of social and emotional development and self help skills. In practice, such decisions are often based on deficits in the areas of speech and language and fine and gross motor skills (i.e. speech and language therapy, occupational therapy, and physical therapy). However, it is expected that such language and motor deficits are reflected in developmental delays in the social, cognitive and adaptive domains. The results of the current study suggest that such a relationship is present between delays in these educational domains and the criteria for determining the amount of services received. Furthermore, although there was no relationship between achieved general knowledge and the amount of related services, this is perhaps not unexpected since it is the role of the special education teachers in the classroom and not the therapists to focus on the cognitive development of children with disabilities.

The positive relationship found between the amount of services received and the rate of progress in social and emotional development as measured by the Brigance suggests that children benefit emotionally from direct, intensive, individualized instruction and gain social skills that are utilized within the classroom setting. Additionally, children who experience individualized services gain specific adaptive skills that are reflected in increased independence in the self help
domain. This is perhaps due to the emphasis in occupational and physical therapy on adaptive skills such as dressing, eating and ambulation. Although not significant, the trend for a positive relationship between services received and overall developmental progress also provides some limited support for the efficacy of related services on improving the rate of general developmental progress for preschool children with disabilities. Again, the lack of relationship between related services and progress in the domain of general knowledge and comprehension provides further support for the differentiation of the roles of therapists and special education teachers.

Limitations

There are a number of limitations to the current study. First, the child to adult ratios for the segregated and integrated settings differed slightly. Not only were there more children per adult in the integrated setting (a child to adult ratio of approximately 5:1 compared to 4:1), but the integrated classes also had larger group sizes (16 or 20 students compared to 12). Such differences could result in a disparity in peer and adult interactions as well as inequalities in the amount of direct, individualized instruction delivered. Additionally, it should also be recognized that if children with disabilities are placed in natural settings such as community-based day care centers and typical preschool programs, the child to adult ratios are generally higher (7:1 or 8:1) and the generalizability of studies using ratios of 4:1 or 5:1 to these more natural settings is limited (Buysse & Bailey, 1993).

A second limitation of the study is that although all items on the Brigance protocols were rescored by the primary researcher, the items were administered by multiple classroom teachers. The teachers had received a variety of training experiences in administering the measure. Therefore, consistency in the administration and recording of responses could not be assured.
Third, the matching criteria employed in this study to ensure comparability of the integrated and segregated groups resulted in a small sample size. The availability of more subjects would have increased the sample size and power and may have resulted in more statistically significant findings. Furthermore, no matching criteria were used to ensure comparability between the half-day and full-day groups.

Fourth, this study is limited to two settings within the same geographic region and included little cultural diversity among the subjects. Further research could enlarge the subject pool to include children from a representative selection of geographic areas, population densities, and socio-economic and cultural backgrounds. Additionally, future studies should make efforts to include an equal number of female subjects in the sample.

Finally, although all of the subjects were selected from classrooms in two centers which were operated by the same agency and functioned under the same mission statement and administrative guidelines, it was not possible to control for teacher, curriculum, and classroom differences across the nine classrooms in which the children were enrolled. Differences in teaching styles, academic emphasis, and the structure and atmosphere of the learning environment could have influenced the progress achieved by the children in the study.

In fact, such programmatic variables as teaching style, program philosophy, staff-child ratios, ratio of disabled to non-disabled children, instructional methods, types of learning activities, availability of resource specialists, and the education, training and competence of the teachers are factors which may mediate the effectiveness of integrated settings (Buysse & Bailey, 1993; Odom & McEvoy, 1988; Stafford & Green, 1996). Additionally, the degree to which educational programs employ direct interventions to increase social interaction between disabled and non-disabled children may also influence the efficacy of integrated programs (Odom &
McEvoy, 1988). Such interventions could include arranging the classroom environment to promote social interaction between the groups, incorporating teacher- or peer-mediated social integration strategies, and preparing the non-disabled children before the integration begins by sharing information and engaging in simulation activities (Odom & McEvoy, 1988). Several researchers have suggested that the type of curriculum employed and the quality of instruction may have a greater impact on developmental outcome and skill acquisition than the presence or absence of non-disabled peers (Fewell & Oelwein, 1990; Odom & McEvoy, 1988; Peck & Cooke, 1983).

Unfortunately, although Salisbury (1991) and Smith and Rose (1994) each outline a set of indicators of high-quality programs and Salisbury describes an outcomes-based process for making administrative and pedagogical decisions, the research base on quality indicators of integrated special education preschool programs is presently inadequate (Buysse & Bailey, 1993; Fewell & Oelwein, 1990; Odom & McEvoy, 1988). Further research on quality indicators and their impact on the integration of special education preschool programs is needed in order to improve the quality of integrated settings rather than merely trying to legitimize and prove the efficacy of integration (Peck & Cooke, 1983).

In sum, the current study generally supports previous findings on preschool integration. However, given the long-term implications found by Miller, Strain, McKinley, Heckathorn and Miller (1993) of segregated preschool special education on the increased likelihood of later school placement into segregated classrooms, the increased need for services, and the accompanying fiscal costs associated with these special education placements, the need for further research on the effects of the degree of disability and programmatic variables on preschool integration is clear.
References


Table 1

Analysis of Integrated versus Segregated Group Comparability for Matching Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Integrated (N=15)</th>
<th>Segregated (N=15)</th>
<th>F</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>x</td>
<td>s.d.</td>
<td>x</td>
<td>s.d.</td>
</tr>
<tr>
<td>Chronological age (months)</td>
<td>54.73</td>
<td>4.01</td>
<td>53.87</td>
<td>5.11</td>
</tr>
<tr>
<td>Related services (minutes)</td>
<td>92.10</td>
<td>64.61</td>
<td>106.00</td>
<td>66.95</td>
</tr>
<tr>
<td>Developmental Delay (months)a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self help skills</td>
<td>6.67</td>
<td>6.28</td>
<td>6.53</td>
<td>5.15</td>
</tr>
<tr>
<td>General knowledge</td>
<td>5.14</td>
<td>5.88b</td>
<td>7.00</td>
<td>5.63</td>
</tr>
<tr>
<td>Social and emotional skills</td>
<td>7.20</td>
<td>7.22</td>
<td>8.53</td>
<td>6.55</td>
</tr>
<tr>
<td>Composite score</td>
<td>6.60</td>
<td>4.85</td>
<td>7.33</td>
<td>4.79</td>
</tr>
</tbody>
</table>

Note. a Developmental delay scores were calculated by subtracting each child’s developmental age score for each domain as measured by the Brigance Developmental Inventory of Early Development (Brigance, 1991) from the child’s chronological age.

b N=14 in the integrated group for the general knowledge domain.
Table 2

Effects of Months of Developmental Delay and Educational Setting (Integrated versus Segregated) on the Rate of Progress of 15 Matched Pairs of Preschool Children

<table>
<thead>
<tr>
<th>Domain</th>
<th>Main Effect for Developmental Delay F</th>
<th>Main Effect for Setting F</th>
<th>Interaction Effect (Delay * Setting) F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self help skills</td>
<td>3.25*</td>
<td>0.15</td>
<td>0.89</td>
</tr>
<tr>
<td>General knowledge</td>
<td>2.31</td>
<td>0.37</td>
<td>0.27</td>
</tr>
<tr>
<td>Social/emotional development</td>
<td>1.69</td>
<td>6.63**</td>
<td>4.69**</td>
</tr>
<tr>
<td>Composite score</td>
<td>0.0003</td>
<td>2.76</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Note.  *p<.10,  **p<.05

Developmental delay scores were calculated by subtracting each child's developmental age score for each domain as measured by the Brigance Developmental Inventory of Early Development (Brigance, 1991) from the child's chronological age.
Table 3

Relationship between Months of Developmental Delay and Classroom Placement (Half-day versus full-day) for 66 Preschool Children

<table>
<thead>
<tr>
<th>Domain</th>
<th>Developmental delay (months)</th>
<th>Half-day</th>
<th>Full-day</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>s.d.</td>
<td>n</td>
</tr>
<tr>
<td>Self help skills</td>
<td></td>
<td>6.92</td>
<td>6.58</td>
<td>25</td>
</tr>
<tr>
<td>General knowledge</td>
<td></td>
<td>6.00</td>
<td>6.91</td>
<td>26</td>
</tr>
<tr>
<td>Social and emotional skills</td>
<td></td>
<td>5.52</td>
<td>8.79</td>
<td>25</td>
</tr>
<tr>
<td>Composite score</td>
<td></td>
<td>6.59</td>
<td>6.55</td>
<td>27</td>
</tr>
</tbody>
</table>

Note. Developmental delay scores were calculated by subtracting each child’s developmental age score for each domain as measured by the Brigance Developmental Inventory of Early Development (Brigance, 1991) from the child’s chronological age.
Table 4

Relationship Between Length of School Day (Half-day versus Full-day) and Rate of Progress for 66 Preschool Children

<table>
<thead>
<tr>
<th>Domain</th>
<th>Mean rate of progress (months)</th>
<th>Half-day</th>
<th>Full-day</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>s.d.</td>
<td>n</td>
</tr>
<tr>
<td>Self help skills</td>
<td></td>
<td>0.72</td>
<td>0.62</td>
<td>20</td>
</tr>
<tr>
<td>General knowledge</td>
<td></td>
<td>1.08</td>
<td>0.90</td>
<td>25</td>
</tr>
<tr>
<td>Social and emotional skills</td>
<td></td>
<td>0.83</td>
<td>0.80</td>
<td>23</td>
</tr>
<tr>
<td>Composite score</td>
<td></td>
<td>0.095</td>
<td>0.65</td>
<td>27</td>
</tr>
</tbody>
</table>

Note. Rate of progress was calculated by subtracting each child’s developmental age for each domain in the fall from their developmental age scores in the spring and dividing by the number of months between administrations of the Brigance Developmental Inventory of Early Development (Brigance, 1991).
### Table 5
**Correlation Between Months of Developmental Delay and Minutes of Mandated Related Services Received per Week by 66 Preschool Children**

<table>
<thead>
<tr>
<th>Developmental domains</th>
<th>Correlation coefficient</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self help skills</td>
<td>0.35</td>
<td>p&lt;.01</td>
</tr>
<tr>
<td>General knowledge</td>
<td>0.12</td>
<td>N.S.</td>
</tr>
<tr>
<td>Social and emotional skills</td>
<td>0.31</td>
<td>p&lt;.01</td>
</tr>
<tr>
<td>Composite score</td>
<td>0.26</td>
<td>p&lt;.05</td>
</tr>
</tbody>
</table>

**Note.** Developmental delay scores were calculated by subtracting each child’s developmental age score for each domain as measured by the Brigance Developmental Inventory of Early Development (Brigance, 1991) from the child’s chronological age. Correlations between months of developmental delay and minutes of services received per week were calculated using the Spearman’s Rho coefficient.
Table 6

Correlation Between Rate of Progress and Minutes of Mandated Related Services Received per Week by 66 Preschool Children

<table>
<thead>
<tr>
<th>Developmental domains</th>
<th>Correlations Coefficient</th>
<th>Significance (one-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self help skills</td>
<td>0.26</td>
<td>p&lt;.05</td>
</tr>
<tr>
<td>General knowledge</td>
<td>0.02</td>
<td>N.S.</td>
</tr>
<tr>
<td>Social and emotional skills</td>
<td>0.29</td>
<td>p&lt;.05</td>
</tr>
<tr>
<td>Composite score</td>
<td>0.18</td>
<td>p&lt;.10</td>
</tr>
</tbody>
</table>

Note. Rate of progress was calculated by subtracting each child’s developmental age for each domain in the fall from their developmental age scores in the spring and dividing by the number of months between administrations of the Brigance Developmental Inventory of Early Development (Brigance, 1991). Correlations between rate of progress and minutes of services received per week were calculated using the Spearman’s Rho coefficient.