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Peer-Assisted Learning Strategies: Making Classrooms More Responsive to Diversity

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The primary focus of this study was to determine the effectiveness of a classwide peer tutoring program in reading for three learner types: low achievers with and without disabilities and average achievers. Twelve schools, stratified on student achievement and family income, were assigned randomly to experimental and control groups. Twenty teachers implemented the peer tutoring program for 15 weeks; 20 did not implement it. In each of the 40 classrooms, data were collected systematically on three students representing the three learner types. Pre- and posttreatment reading achievement data were collected on three measures of the Comprehensive Reading Assessment Battery. Findings indicated that, irrespective of type of measure and type of learner, students in peer tutoring classrooms demonstrated greater reading progress. Implications for policymaking are discussed.

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> From 1980 to 1990, the number of children with limited English proficiency increased nationwide by 26%; the number of immigrant children by 24%; and the number of linguistically isolated children (those in households in which nobody older than 14 speaks English "very well") by 20%. The percentage of minority children in the schools has grown steadily from 21% in 1970 to 40% by 1992. Whites now account for 7 out of 10 school-age children; by the year 2020, the figure will change to 5 out of 10. By the same year, the proportion of Hispanics will increase from one in nine to one in four. During the same period, the proportion of poor children in the schools is expected to rise to 26%. (Carnegie Foundation, 1995)

Melting Pot Versus Cultural Pluralism

Such diversity brings to mind an earlier time in our nation's history. In the first 3 decades of the 20th century, 19 million immigrants journeyed to the United States, mostly from southern and eastern Europe. Between 1890 and 1920, they and their children constituted between 50% and 75% of the populations of New York, Chicago, Cleveland, Milwaukee, Boston, San Francisco, and St. Louis (Fass, 1989). Such demographic change fanned the flames of xenophobia (Higham, 1955) and strengthened a desire for social solidification and cultural maintenance among "Americans"—those migrating here before the start of the 20th century (Fass, 1989). This reaction, in turn, gave birth to the Americanization Movement, the adherents of which "wished to quickly and forcibly assimilate the millions of new immigrants into the mainstream of American society" (Appleton, 1983, p. 4). The public schools played an important role by imposing an Anglocentric curriculum and not infrequently punishing immigrant children for using their mother tongue. "Anglo conformity," wrote Appleton, "often thinly disguised in the 'melting pot' metaphor, became the dominant ideology and has strongly influenced the shaping of our social institutions, particularly the schools, to this day" (pp. 4-5).

The Americanization Movement did not go unchallenged. Progressives like Grace Abbott forcefully rejected the Americanization or "steamroller" approach to schooling, which, she wrote,

> is contrary to sound educational standards. It means that ... native [White Anglo Saxon Protestant] Americans set themselves up as the true American type to which the immigrants must conform. This would ... be reckless in its disregard of the talents and capacity of other people. (Cited in Fass, 1989, p. 31)

Horace Kallen, credited with coining the phrase *cultural pluralism,* argued that "democracy implied the right of newcomers to retain their ethnic and cultural affiliations and that therefore they should not suffer any debilitating consequences from the exercise of this right" (Appleton, 1983, p. 72).

During the past 3 decades, the philosophy of cultural pluralism has experienced a strong revival, largely as a result of the ethnically conscious

movements by Blacks and other minorities in the 1960s and of similar movements launched by feminists and White groups, particularly from working-class backgrounds, in the 1970s (Appleton, 1983). Today, with 8.7% of Americans foreign born—the highest percentage since before World War II (Headden, 1995)—diversity is viewed by many as one of this nation's signature or defining characteristics. By this we do not mean it is merely an indisputable demographic fact but rather it has become a touchstone concept as legitimately American as football on a fall Saturday afternoon. Evidence of this abounds—from the Benetton clothing ads to the excitement that surrounded the possibility of Colin Powell's presidential bid. The philosophy of cultural pluralism also may be found in many of our public schools, reflected in policies supporting multicultural and bilingual education, the inclusion of children with disabilities, and detracking.

Diversity's Double-Edged Sword

Mr. Stasis's Class

Now picture this: 34 children in an urban third-grade classroom, one third of whom live in poverty. Six live with grandparents, and three are in foster care. Five come from homes in which a language other than English is spoken; two children do not speak English at all. Seven, six, five, three, two, and one are African American, Hispanic American, Korean, Russian, Haitian, and Chinese, respectively. Six are new to the school, and four will relocate to a different school next year. Only five of the 34 students are at or above grade level in reading; 10 are two or more grade levels below. There is a 5-grade spread in reading achievement. In addition, three students have been certified as learning disabled. One is severely mentally retarded, and another is deaf. According to the Department of Health and Human Services, the child with mental retardation and two other students in the class have been physically or sexually abused.

The teacher of this imaginary but arguably representative (see Headden, 1995; Hodgkinson, 1991, 1995; Jenkins, Jewell, Leicester, Jenkins, & Troutner, 1990; Natriello, McDill, & Pallas, 1990; Puma, Jones, Rock, & Fernandez, 1993) urban class is Mr. Stasis, who believes it is his job to present information, his students' job to listen and learn. His stand-and-deliver approach reflects the view that teaching is a centralized and unidirectional phenomenon. Mr. Stasis uses the texts in reading, mathematics, social studies, and science that were adopted by his district's central office. And, on orders from this office, his students get these books regardless of their reading level and math skills.

Zero-Sum Game

What may be most obvious in the description of the children in Mr. Stasis's class are the multiple obstacles (e.g., poverty, abuse, disability) they must hurdle to achieve some semblance of school success. Less obvious, but more to the point of this article, is the breathtaking, befuddling range of Mr. Stasis's

students' cultural and experiential backgrounds, knowledge, and skills to which Mr. Stasis must somehow respond. An unavoidable question is how can he reach out to everyone? The answer: He can't and doesn't.

Inherent in this conventional teacher's class is a zero-sum game (Brown & Saks, 1981, 1987; Gerber & Semmel, 1984). By necessity, there will be winners and losers. According to Gerber and Semmel, "teachers aim their instruction 'plans' at ... relatively homogeneous groups in an apparent attempt to reduce the sheer cognitive complexity of planning and instruction associated with broad ranges of student characteristics and abilities" (p. 141). In other words, to make possible the impossible, Mr. Stasis chooses whom he will and won't try to teach. He can work with his most needy charges and hope the more skillful will fend for themselves, or he can think of himself as a doctor in a M.A.S.H. unit where the accepted strategy of triage dictates attending to those who have the best chance at long-term survival.

Who are the winners and losers? A large corpus of research indicates that, by and large, "classroom teachers naturally orient, both in terms of effort and positive affect, towards students whom they consider 'teachable' and away from students [who] are ... difficult-to-teach" (Gerber & Semmel, 1984, p. 141). When interacting with lowest-achieving students, teachers tend to provide less wait time for answers (Allington, 1980); supply correct responses rather than try to improve incorrect responses (Brophy & Good, 1974); criticize more often for failure (Babad, Inbar, & Rosenthal, 1982); interact less frequently (Adams & Cohen, 1974) and in a less friendly manner (Babad et al., 1982); provide briefer and less detailed feedback (Cooper, 1979); and make few substantial modifications in instruction (Baker & Zigmond, 1990; Durkin, 1990; L.S. Fuchs, D. Fuchs, & Bishop, 1992; Fulk & Smith, 1995; McIntosh, Vaughn, Schumm, Haager, & Lee, 1993; Peterson & Clark, 1978; Zigmond & Baker, 1994). Furthermore, this research indicates that low-achieving children receive less instruction and practice than more accomplished classmates (Hall, Delquadri, Greenwood, & Thurston, 1982; Lesgold & Resnick, 1982; McDermott & Aron, 1978; O'Sullivan, Ysseldyke, Christenson, & Thurlow, 1990). In one study, a low-performing fourth grader was permitted less than 10 seconds of reading practice in a 2-week period (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986).

Implicit in these findings is that many teachers create homogeneity by eliminating difficult-to-teach students from consciousness (see Peterson & Clark, 1978). More overt means of assuring greater student sameness is to refer lagging or disruptive students for testing and special education placement or to suspend or expel them.

The fallout. The effects of the mental and physical elimination of low-achieving children from the classroom are as tragic as they are obvious. Among low-performing students who remain, including those with disabilities, many fail to make adequate—if any—progress (e.g., D. Fuchs, L. S. Fuchs, & Fernstrom, 1993; D. Fuchs, Roberts, Fuchs, & Bowers, 1996; Gottlieb, Alter, Gottlieb, & Wishner, 1994; Marston, 1988), resulting in an ever-increasing gap between student achievement at different performance

levels (Greenwood, Hart, Walker, & Risley, 1993; Juel, 1988; Lesgold & Resnick, 1982; Nagy & Anderson, 1984). Many children removed from the regular class are placed part-time in special education settings, which, in an increasing number of districts, are becoming too crowded to offer the individualized instruction that is special education's raison d'être (see D. Fuchs & L. Fuchs, 1995a; Gottlieb, Alter, & Gottlieb, 1996; MAGI Educational Services, 1995).

General educators do not feel good about this. But because they believe themselves ill-prepared to deal competently with the diversity that demographic and policy changes are fostering (e.g., Coates, 1989; Houck & Rogers, 1994; Scruggs & Mastropieri, 1995; Semmel, Abernathy, Butera, & Lesar, 1991), they feel helpless to do anything about it (see Idstein, 1993; West Virginia Federation of Teachers, 1993).

What prevents teachers like Mr. Stasis from responding to the needs of a greater range of their students, say reform-minded educators like Sizer (1984), the Holmes Group (cited in Murphy, 1991), and the Carnegie Forum (1986), is the top-down, lock-step structure of classrooms. What is needed, we are told, is a *decentering* of the teaching and learning process: a restructuring, or a loosening of the strait-jacketed nature of traditional classrooms. A popular decentering strategy is peer tutoring, typically defined as the pairing of a more accomplished student with a less accomplished student for the purpose of working on academic content (L. Fuchs, D. Fuchs, Phillips, Hamlett, & Karns, 1995).

Peer Tutoring

Brief History

In the late 18th and early 19th centuries, before the advent of public schooling, two British educators developed similar approaches to peer tutoring. The first was Andrew Bell, who, in 1789, became superintendent of a school for orphans in Madras, India. When the school's faculty balked at implementing his innovative ideas, he trained the school's students in the techniques and developed a system by which they could teach each other, thereby circumventing his unwilling faculty.

> Each class was paired into tutors and tutees and to each class was attached an "assistant teacher" to supervise and instruct the tutors. The assistant teacher reported to a teacher, who reported to "ushers" who in turn reported to the "school master." Virtually all ... positions in [this] elaborate hierarchy were filled by the pupils. (Topping, 1988, p. 13)

In 1801, Joseph Lancaster opened the Borough Road School for disadvantaged boys in London, England. Lancaster's *monitoring system*, like Bell's, was noteworthy for its hierarchical organization of students, by which a single teacher managed the basic learning of hundreds of children. Lancaster's tutorial approach had "immediate and dramatic international

impact upon educational practice" (Gerber & Kauffman, 1981, p. 155). In 1817, Bell boasted that 100,000 school children in England and Wales were participating in what he called the *Bell-Lancaster* system (Topping, 1988).

However, by the second half of the 19th century, enthusiasm for peer tutoring waned, perhaps because of the start of public schooling and the increasing professionalization of teachers (Topping, 1988). It was not until the late 1960s that American educators, concerned about chronic underachievement among many poor and minority children, rediscovered peer tutoring. This rejuvenation of interest was based on a view that peer tutoring represented an economical means of providing individualized, intensive instruction to academically needy pupils. One of the earliest and best-known peer tutoring programs of this era was Youth Teaching Youth, an after-school program implemented in Philadelphia and Newark, New Jersey (Gerber & Kauffman, 1981). By 1970, more than 200 school districts had adopted some type of after-school tutoring program (Gerber & Kauffman, 1981).

Effectiveness

Since Bell and Lancaster, many forms of peer tutoring programs have been developed. These programs have varied by whether the tutor is of similar age as the tutee and whether the tutor's and tutee's responsibilities are reciprocal. The programs have differed, too, in terms of structure (high vs. low); setting (classroom vs. special education); intensity (e.g., one 15-min. session per week vs. five 45-min. sessions per week); time of day (during school vs. after school); targeted domain (personal/social vs. academic); scope (e.g., supplementing the curriculum vs. supplanting the curriculum); and so forth. Whereas much of the evidence on peer tutoring has been anecdotal (see Gartner, Kohler, & Riessman, 1971), several meta-analyses and narrative reviews of research conducted since the 1960s indicate that peer tutoring can contribute to students' school achievement.

General findings. Cohen, Kulik, and Kulik (1982) conducted a meta-analysis of 65 peer tutoring studies and found that, in the 52 studies that included results on achievement tests, "the average child in the tutored group scored at the 66th percentile of the students in the untutored or control group" (p. 241). Cohen et al. also found academic benefits for tutors, corroborating prior research (Devin-Sheehan, Feldman, & Allen, 1976; Dineen, Clark, & Risely, 1977; Ehly & Larsen, 1980; Rosenshine & Furst, 1969). Greenwood, Carta, and Hall (1988) added greater specificity to the findings of Cohen et al. by reporting that peer tutoring produces academic gains "equivalent to and even greater than conventional procedures involving lecture and student discussion" (p. 262). Moreover, Levin and colleagues (Levin, Glass, & Meister, 1984; Levin & Meister, 1986) determined that cross-age tutoring among students or adult tutoring was most cost effective in comparison with three other well-known reform strategies—reduced class size, computer-assisted instruction, and a longer school day.

Classwide peer tutoring (CWPT). CWPT is a well-known type of peer tutoring with particular relevance to the study described in this article. Based on Bell's early efforts, it is a system by which all students in a class are paired and work simultaneously. Delquadri and associates (e.g., Delquadri et al., 1986), the R & D team today most closely associated with CWPT, were inspired in their work by the observation that much teacher-designed instruction fails to engage the academic behaviors of students of diverse abilities (Greenwood, Delquadri, & Hall, 1989). Hence, for Delquadri and colleagues, a central purpose of CWPT is to "increase the proportion of instructional time that all students engage in academic behaviors and to provide pacing, feedback, immediate error correction, high mastery levels, and content coverage" (Greenwood et al., 1989, p. 372). CWPT, then, resembles Bell's work, not just in terms of form, but also because it reflects an implicit skepticism about classroom teachers' capacity to provide intensive, systematic, effective instruction to a broad range of learners via conventional large-group instruction (see Greenwood et al., 1988). Research indicates that students participating in CWPT can dramatically outperform their counterparts in control classes in reading, spelling, and math (e.g., Fantuzzo, King, & Heller, 1992; Greenwood et al., 1989), and at the elementary (e.g., Greenwood et al., 1989; Maheady & Harper, 1987) and secondary levels (Maheady et al., 1987, 1988).

Study's Purpose

Unfortunately, we know little about peer tutoring's effects on the academic achievement of different learner types in the regular classroom. Studies of peer tutoring in regular classes, for example, rarely have included students with disabilities (see Greenwood et al., 1989). This is unsatisfactory for at least two important reasons. First, narrative reviews (Osguthorpe & Scruggs, 1986; Scruggs & Richter, 1985) and meta-analyses (Cook, Scruggs, Mastropieri, & Casto, 1986; Mathes & Fuchs, 1994) of investigations of peer tutoring conducted in special education settings, or with special-needs students as tutors and tutees, show that tutoring can be an effective technique for promoting academic gain among children with disabilities. Second, reform-minded educators are expressing *decreasing* interest in classroom interventions that work for only part of the student body—be it for achievers or nonachievers. Teachers' current message to program developers seems to be, "If you wish us to use your work, it must help us become more successful with the range of children in our charge" (see Oakes, 1995; Schumaker, Deshler, & McKnight, 1991; Vaughn & Schumm, 1994). Hence, the primary purpose of this study was to explore the effectiveness of Peer-Assisted Learning Strategies (PALS), a version of CWPT, by comparing the reading progress of three learner types—low-achieving students with and without disabilities and average-achieving pupils—to corresponding controls. Besides evaluating PALS's effects on several learner types, we attempted to build on previous studies by (a) systematically sampling a relatively large number of participants (N = 120) from 40 classrooms in 12 schools repre-

senting 3 districts; (b) conducting the treatment for 15 weeks; (c) collecting fidelity-of-treatment data at several points during treatment implementation; (d) using teachers' written instructional plans to understand the larger context of their reading instruction and how PALS may have influenced it; and (e) requiring trained examiners to measure each participant individually and repeatedly, rather than use student performance on the districts' high-stakes, teacher-administered, large-group tests.

Method

Schools, Teachers, and Students

School selection. We obtained the following data on 22 elementary and middle schools: (a) proportion of students receiving free or reduced lunch and (b) mean reading scores—at the school and grade levels—on a standardized test administered statewide under the auspices of the State Board of Education. We then divided these 22 schools into *high-level, middle-level,* and *low-level* groups. High-level schools had a relatively high mean reading score and a comparatively low proportion of students on free or reduced lunch; low-level schools had the reverse profile; middle-level schools fell between the two on both indexes of reading performance and family income. Stratifying on these high-, middle-, and low-level groupings, we randomly assigned schools to PALS or No-PALS conditions. (Detailed description of how we operationalized this stratification of schools is available from the first author.)

Teacher selection. Within PALS and No-PALS schools, teachers were recruited who had in their reading class one or more students with learning disabilities (LD) with a reading goal in their individual educational plan. PALS and No-PALS teachers were told that they were part of a study to examine how teachers accommodate student diversity in their classrooms; No-PALS teachers were *not* informed that they were part of a control or contrast group. Both teacher groups were promised modest cash stipends at the study's conclusion.

Our recruitment efforts eventually yielded 40 teacher volunteers who taught Grades 2 to 6 in 12 schools in three contiguous districts in the middle of a southern state. The 12 schools were equally divided between PALS and No-PALS conditions and among the high-, mid-, and low-level designations such that there were 2 high-level PALS schools and 2 high-level No-PALS schools, 2 mid-level PALS schools and 2 mid-level No-PALS schools, and 2 low-level PALS schools and 2 low-level No-PALS schools. Half of the teacher sample (n = 20) constituted the PALS condition and half (n = 20) the No-PALS condition. Both groups of 20 teachers were drawn about equally from the three school types. Six schools were part of a large urban school system; six were in two suburban districts. Seven PALS and 10 No-PALS teachers were part of the urban school system, and 13 and 10 PALS and No-PALS teachers, respectively, worked in the two adjacent districts. One-way analyses of variance (ANOVAs) revealed no significant differences between the

teachers in the two treatment conditions on chronological age, class size, grade taught, or years of teaching experience. Similarly, chi-square analyses indicated no reliable relations between teacher group and highest degree earned, gender, amount of special education coursework, or race (see Table 1).

Student selection. All 40 teachers identified three students in their reading class: an LD student certified as such in reading in accordance with state regulations, which, in turn, reflect the LD definition in the Individuals with Disabilities Education Act (IDEA); a nondisabled but low-performing (LP) student judged by the teacher to be in the lowest quartile in reading in the class; and a student estimated to be an average-achieving (AA) reader. These 120 target students (3 students x 40 teachers) were the only pupils on whom we collected data systematically, once their parents or guardians gave their written consent. (In a majority of classes, teachers identified replacement students for whom we also obtained permission to collect data in the event that one or more of the originally identified students moved away.)

A one between-subjects (treatment: PALS vs. No PALS), one within-subjects (type of student: LD vs. LP vs. AA) ANOVA indicated no significant differences on student age or teacher-estimated grade-level reading performance. Chi-square analyses showed no relations between treatment condition and students' gender or race. One-way ANOVAs conducted only on LD students' IQ and years enrolled in special education indicated no reliable between-group differences (see Table 2).

Project Staff

There were five staff persons, all female, each of whom devoted 20 hours per week to the study. Two of the five were doctoral students in curriculum and instruction, one was enrolled in a school psychology doctoral program, and two were master's students in special education. Three had prior teaching experience in mainstream elementary classrooms. The number of PALS teachers assigned to each ranged from one to six, with a median of four. Staff members' responsibilities were to ensure that teachers and students were well trained in PALS and were implementing procedures with fidelity. Staff were available to help teachers train their students; they provided technical assistance to the teachers on an as-needed basis, which, averaged across teachers, occurred about once per week; and they collected fidelity-of-treatment data. In addition, staff conducted the pre- and posttesting of the target students in PALS and No-PALS schools, convened structured interviews with PALS students and teachers following completion of the study, and delivered to and collected from PALS and No-PALS teachers questionnaires on instructional planning.

PALS Condition

PALS was conducted during regularly scheduled reading instruction, 35 minutes per day, 3 times per week, for 15 weeks (not including training or vacations).

Table 1

Teacher Demographic Data by Treatment

	PALS (n = 20 classrooms)				No PALS (n = 20 classrooms)					
Variable	***M***	***(SD)***	***n***	**(%)**	***M***	***(SD)***	***n***	**(%)**	***F*(1,38)**	**$\chi^2(df)$**
Age[a]	2.95	(1.19)			2.55	(1.00)			1.33	
Class size	23.60	(1.46)			24.25	(2.79)			.48	
Degree										2.32 (2)
BS/BA			7	(35.0)			11	(55.0)		
MEd/MS			12	(60.0)			9	(45.0)		
EdD/PhD			1	(5.0)			0	(0.0)		
Gender										—
Female			20	(100.0)			20	(100.0)		
Grade taught	3.50	(1.27)			3.25	(1.12)			.43	
Hours of special education coursework										3.10 (3)
0–3			10	(30.0)			14	(70.0)		
4–6			6	(50.0)			3	(15.0)		
7–12			1	(5.0)			2	(10.0)		
13+			3	(15.0)			1	(5.0)		
Race										.00(1)
Caucasian			18	(90.0)			18	(90.0)		
Years of teaching experience	16.25	(8.05)			13.50	(8.29)			.14	

[a]Age was categorized as 1 = 20–29 yrs.; 2 = 30–39 yrs.; 3 = 40–49 yrs.; 4 = 50–59 yrs.; 5 = 60+ yrs.

Table 2

Student Demographic Data by Treatment

		PALS (n = 20 classrooms)				No PALS (n = 20 classrooms)							
Variable	Student type	M	(SD)	n	(%)	M	(SD)	n	(%)	F^a	F^b	F^c	χ^2
Age in years	LD	9.87	(1.49)			10.09	(1.03)			.02	8.79*	1.46	
	LP	9.76	(1.46)			9.83	(1.29)						
	AA	9.62	(1.34)			9.49	(1.33)						
Grade level performance[d]	LD	3.22	(1.38)			2.70	(1.07)			1.01	44.97**	2.60	
	LP	3.20	(1.17)			2.78	(1.11)						
	AA	3.85	(3.59)			3.73	(1.01)						
Gender													.00
Male	LD			12	(60.0)			13	(65.0)				1.60
	LP			8	(40.0)			13	(65.0)				.90
	AA			12	(60.0)			8	(40.0)				
IQ	LD	103.75	(10.59)			96.65	(13.34)			3.48			
Race													.00
Caucasian	LD			15	(75.0)			16	(80.0)				.11
	LP			14	(70.0)			12	(60.0)				.00
	AA			19	(95.0)			18	(90.0)				
Years in special ed	LD	1.13	(.76)			1.44	(.98)				.41		

Note. For both groups, LD = learning disabled (n = 20); LP = low performer (n = 20); AA = average achiever (n = 20).
[a]F values for treatment (PALS vs. No PALS) main effect; df(1,38).
[b]F values for student (LD vs. LP vs. AA) main effect; df(2,76).
[c]F values for treatment × student interaction; df(2,76).
[d]Estimated by teacher.
*$p < .01$. **$p < .001$.

Student pairings. Teachers paired all students in their class by first ranking them on reading performance and then splitting the ranked list in half. The top-ranked student in the stronger half was paired with the strongest reader in the weaker half. Next, second-ranked students in each half were paired. This matching process continued until all students had a partner. Teachers were then advised to inspect the pairings to determine whether one or more were socially incompatible. If such a coupling was found, it was changed. Within each pair, the role of tutor and reader (tutee) was reciprocal; that is, each student in each pair served as reader for part of the time and as tutor for an equal amount of time. Pairs remained together for 4 weeks, after which the teacher announced new pairings.

Reading activities. Students engage in three strategic reading activities more typically addressed during teacher-directed instruction: partner reading with retell, paragraph summary, and prediction relay. These activities are designed in aggregate to provide students with intensive, systematic practice in reading aloud from narrative text, reviewing and sequencing information read, summarizing increasingly large chunks of connected text, stating main ideas, and predicting and checking story outcomes. Given that much of the peer tutoring research in reading has involved word-level or low-level comprehension activities (Pearson & Fielding, 1991), PALS is unique in its focus on comprehension strategy training.

Student pairs read from text at the instructional level of the weaker reader. Because of considerable variation in reading skill among students in many classrooms, pairs often read from different texts.

Partner reading with retell is based on the work of Delquadri and associates (Delquadri, Greenwood, Stretton, & Hall, 1983; Delquadri et al., 1986), as well as Dowhower (1987) and O'Shea, Sindelar, and O'Shea (1987). Its primary purpose is to increase students' oral reading fluency. During the activity, each partner reads aloud connected text for 5 minutes, for a total of 10 minutes. The stronger reader reads first, with the weaker reader serving as tutor; then they switch roles. Because the lower performing student reads what has just been read by the higher performing student, it is more likely that she or he will read it fluently and comfortably. This re-reading, or repeated reading, is also meant to aid comprehension. As suggested by LaBerge and Samuels's (1974) theory of automaticity, repeated reading reduces the cognitive demands of decoding and word recognition and makes cognitive resources available for comprehension. Indeed, research (e.g., Dahl, 1979; Delquadri et al., 1983; Delquadri et al., 1986; Dowhower, 1987; O'Shea et al., 1987; Samuels, 1979; Shany, 1992) indicates that repeated reading strengthens decoding and comprehension of narrative text.

In partner reading with retell, students are trained as tutors to correct word recognition errors, which include saying the wrong word, leaving out a word, adding a word, and pausing longer than 4 seconds. Tutors also are trained to correct errors as they occur and to encourage the reader to reread the sentence with accuracy. After students complete their turns at oral reading, the lower performing reader "retells" in sequence what had been

read during the previous 10 minutes. Tutors prompt their partners by asking, "What did you learn first?" And then, "What did you learn next?" If the weaker reader cannot remember, the tutor provides the information, and the retelling continues. "Retells" last 1 or 2 minutes, depending on grade level.

Paragraph summary targets the skills of summarization and main idea identification. Students read aloud one paragraph at a time and attempt to identify the subject and main idea by responding to the following questions or directives printed on 5.5 inch x 8.5 inch cue cards: "Who or what was the paragraph mainly about?" and "Tell the most important thing learned in the paragraph." If the reader answers incorrectly, the tutor says, "Try again." If the reader's answer is still wrong, the tutor says, "Read the paragraph silently and try again." If the third try is unsuccessful, the tutor provides the answer. Paragraph summary represents a modification of a strategy developed by Jenkins, Heliotis, Stein, and Haynes (1987) to address the apparent fact that some students with LD and other poor readers tend to be *inactive learners* (Torgesen, 1977); that is, unlike many stronger readers, they do not make spontaneous use of a set of mediation activities to facilitate comprehension. Doctorow, Wittrock, and Marks (1978) and others have observed enhanced comprehension and retention of material when students summarized recently read text to another student.

In the first 4 weeks of PALS, paragraph summary is conducted for 20 minutes: First, the stronger reader in each pair reads and answers questions for 10 minutes; then it is the weaker reader's turn. During the next 11 weeks, time for paragraph summary is reduced by half to make room for prediction relay.

Conceived as an extension of paragraph summary, *prediction relay* is introduced during the 5th week of PALS after students are comfortable with the basic procedures and have become better at summarizing and identifying the main idea. In prediction relay, the reader makes a prediction about what will be learned on the next page, reads aloud from the page, confirms or disconfirms the prediction, summarizes the just-read text, makes a new prediction, and turns to the next page (see Anderson & Pearson, 1984). Each student follows this routine for 5 minutes. Again, the higher performing reader reads first. The tutor is still responsible for correcting word recognition errors, as well as determining whether the reader makes a reasonable prediction, checks the prediction, and correctly summarizes the most important information on the page. (For a detailed description of these PALS activities, see D. Fuchs, Mathes, & Fuchs, 1996, or Mathes, Fuchs, Fuchs, Henley, & Sanders, 1994.)

Team assignments and points. In addition to assigning students to pairs, teachers assign pairs to one of two teams, giving PALS a competitive as well as a cooperative dimension. (See Slavin, 1989, on the benefits of such a reward structure accompanying certain classroom-based activities.) Students earn points for their team by reading sentences without error in partner reading; working hard and trying their best during retells; identifying the correct subject and main idea during paragraph summary; making reason-

able predictions, reading half a page, checking predictions, and summarizing the main idea during prediction relay; and behaving cooperatively. Points are awarded by tutors and teachers and are recorded by students on score cards. Each pair shares a score card. At the end of each week, they report to the teacher the number of points they earned together. The teacher totals the teams' points and announces the winner. Members of the winning team stand and are applauded by the second-place team. Such recognition aside, points do not earn material benefits, opportunity to engage in valued activities, or anything else that may be construed as rewards. After 4 weeks, new team (and pair) assignments are made to increase the probability that all students eventually will be members of a winning team.

Materials. Teachers use whatever reading materials they believe are appropriate. In this study, they all relied on their basal text as primary reading material. However, they also made use of library books, short novels, weekly readers, other basals, and content area texts. Unlike other peer-tutoring programs (e.g., the Delquadri et al., 1986, oral reading procedures and the Maheady, Sacca, and Harper, 1987, math program), the PALS program does not require teachers to acquire, develop, or modify materials. Two exceptions are the score card, on which students record points, and a cue card, which displays comprehension questions accompanying paragraph summary. Both cards were provided to study participants.

PALS Training

Full-day workshop. In preparation for implementing PALS, teachers attended a full-day workshop during which they were shown how to train their students and maintain PALS activity during the 15-week treatment. Teachers first were provided an overview of the three reading activities. Then they were grouped into dyads, in which they engaged in partner reading, paragraph summary, and prediction relay activities, alternating the roles of tutor and tutee, under the direction of project staff. Next, discussion focused on the logistics of assigning seats, pairing students, scheduling PALS, and choosing reading materials. Finally, each teacher was given a comprehensive and detailed manual, which included scripted lessons to facilitate student training (see D. Fuchs, Mathes, & Fuchs, 1996).

Classroom-based support. Soon after the workshop, teachers trained their students, with project staff present to provide help as necessary. The initial training of students required five 45-minute sessions. The addition of prediction relay in Week 5 of the treatment required two more 45-minute sessions. These seven training sessions were not counted as part of the 15-week treatment.

No-PALS Condition

The No-PALS teachers conducted reading instruction in their typical fashion. As indicated, they were told that the purpose of the study was to examine how teachers accommodate student diversity; they were not informed that they were a control group. Project staff interacted with them on four

occasions: to pretest and posttest their students and to deliver and collect the same questionnaire on teacher planning completed by PALS teachers. According to the No-PALS teachers' responses to this questionnaire, a majority used the basal reading series prescribed by their school districts. Informal observation in their classes corroborated this. Our classroom observations suggested something else as well: "Reading instruction" in No-PALS and PALS classrooms usually meant students reading silently from the basal texts, followed by teacher-led, large-group discussion. Little explicit teaching of reading and comprehension was observed in PALS and No-PALS classrooms.

Measures

PALS fidelity. An observation checklist comprising 23 and 112 teacher and student behaviors, respectively, was developed. The student behaviors were divided among partner reading with retell (n = 36), paragraph summary (n = 37), and prediction relay (n = 39). The checklist items were scored as either having *occurred,* or *not occurred,* or *not applicable.* Each observation yielded five scores: an overall teacher score, an overall student score, and separate student scores for each of the three reading activities.

During the 15-week treatment, PALS teachers were observed a minimum of 4 times by staff using this checklist. The first observation served primarily as a continuation of the teachers' training—a means of providing corrective feedback—not for data collection. Those who scored less than 80% on accuracy of implementation were provided with feedback on a second occasion. However, the purpose of the remaining three observations was strictly to document the accuracy with which the teachers and their students were implementing PALS. These observations were conducted during Weeks 4, 7, and 13 of the study, during which staff did not interact with teachers or students.

During each observation, only pairs that included a target (i.e., LD, LP, or AA) student were observed. Observers rotated from one such pair to another as reading activities changed. That is, Pair 1 was observed during partner reading, Pair 2 during paragraph summary, and so forth. A record was maintained of which target students were observed during which PALS activity; during the 15-week treatment each target student was observed at least once participating in every PALS reading activity.

Table 3 displays teacher and student fidelity using PALS implementation data from each of the three observations. Across observations, teachers and students, and reading activities, accuracy of implementation was relatively high: Mean fidelity scores ranged from 81.45% (partner reading at Time 1) to 90.20% (teacher overall score at Time 1). Interobserver agreement was assessed during one of the three observations for 19 of 20 PALS teachers, or on 32% of the data (20 teachers x 3 observations/19 interobserver observations) and was calculated as agreements/(agreements + disagreements), using the "overall agreement method" (see Sulzer-Azaroff & Mayer, 1977). Mean percentages of agreement for the overall teacher score, overall

Table 3
Teacher and Student Fidelity of PALS Implementation

	Time 1		Time 2		Time 3	
Activity	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
Teacher (overall score)	90.20	(12.17)	90.00	(11.11)	87.35	(16.21)
Student (overall score)	84.13	(9.82)	87.04	(15.16)	86.87	(15.56)
Partner reading	81.45	(13.34)	85.60	(16.15)	83.60	(19.27)
Paragraph summary	86.80	(10.03)	86.35	(18.55)	87.85	(15.50)
Prediction relay[a]	—	—	89.47	(16.67)	89.15	(18.06)

Note. 100% would signify that all aspects of PALS reading were implemented correctly.
[a]Prediction relay was implemented after Time 1 during the 5th week of the treatment.

student score, and student scores for partner reading, paragraph summary, and prediction relay were 94, 88, 87, 88, and 90, respectively.

Comprehensive Reading Assessment Battery (CRAB). The CRAB (L. S. Fuchs, Fuchs, & Maxwell, 1988) makes use of four 400-word traditional folktales, used in previous studies of reading comprehension (e.g., Brown & Smiley, 1977; Jenkins, Heliotis, Haynes, & Beck, 1986). The folktales were rewritten by Jenkins et al. (1986) to approximate a second- to third-grade readability level (Fry, 1968), while preserving their meaning. The CRAB requires students first to read aloud from one folktale for 3 minutes and then to answer 10 comprehension questions. On a second story, they (a) have 2 minutes to complete a cloze, or maze; (b) read aloud for 3 minutes; and (c) answer 10 comprehension questions. The comprehension questions, developed by Jenkins et al. (1986), require short answers reflecting recall of information contained in idea units of high thematic importance. The maze activity was prepared by leaving the first sentence intact; thereafter, every 7th word was replaced with a 3-item multiple choice, where only one item provides a semantically correct replacement. The CRAB generates three scores: the number of words, questions, and maze choices correct.

To generate a *words correct* score, examiners mark insertions, omissions, substitutions, hesitations longer than 5 seconds, and mispronunciations not caused by speech-related problems as the student reads. Omissions and additions of endings (*-ed, -s,* and *-ing*) are scored as errors; self-corrections are not. Student performance is scored as the number of words read correctly, averaged across the two 3-minute samples. Test-retest reliability ranges from .93 to .96 (L. S. Fuchs, Deno, & Marston, 1983). Concurrent validity with the reading comprehension subtest of the Stanford Achievement Test (SAT) was .91 (L. S. Fuchs et al., 1988).

For the number of *questions correct,* students respond aloud to 10 comprehension questions read to them by the examiner, who records their answers. Questioning is terminated after 5 consecutive incorrect answers. Student performance is scored as the number of questions answered correctly, averaged across two 10-question samples. The number of correct

comprehension questions correlated .82 with performance on the reading comprehension subtest of the SAT (L. S. Fuchs et al., 1988). Regarding the number of *maze choices correct*, scorers count the number of correct replacements. This measure's concurrent validity with the SAT's reading comprehension subtest was .82 (L. S. Fuchs et al., 1988).

The three CRAB subtests were administered to students individually. Students read two stories at both pre- and posttreatment testing. Across these occasions, they read from all four folktales, with stories and CRAB subtests counterbalanced across treatment conditions. Students in No-PALS classrooms were tested at the same time as PALS students, and posttreatment testing occurred in all classrooms within 1 week of treatment completion. Pre- and posttreatment adminstrations of the CRAB subtests were scored by two project staff members. Interscorer agreement, calculated on 20% of the protocols from both test administrations, was 99.8%, 99.0%, and 98.2%, respectively, for words correct, questions correct, and maze choices correct at pretreatment; 99.9%, 95.5%, and 99.0% at posttreatment.

Teacher questionnaires and student interviews. Between Weeks 13 and 15 of the treatment, PALS teachers independently completed a questionnaire with two parts. The first part asks teachers to express their views of the academic and social benefits of PALS—both overall benefits and those associated with more specific components of the treatment—for LD, LP, and AA students, using a 5-point Likert-type scale. The second part asks open-ended questions, encouraging teachers to suggest how PALS may be improved.

After posttesting on the CRAB, students responded to a questionnaire that was read to them by project staff, while they read along silently from their own copies. Before the first question, each child was told:

> I'd like to know what you're thinking about PALS. The reason is because my friends and I want to make it as helpful as it can be to students who are trying to become better readers. So, I've got some questions, which I'd like you to answer honestly. This isn't a test. Your answers are just for my friends and me, not for your teacher.

Like the teacher questionnaire, this measure uses a 5-point Likert-type scale and explores student satisfaction with PALS generally and with specific treatment components. The scale is anchored at both ends and in the middle by 2- or 3-word descriptors. After each question, the staff member showed the student the response options, explained them if necessary, and asked the student to circle a number.

Instructional plan sheets. During weeks 12 and 13, PALS and No-PALS teachers completed instructional plan sheets, adapted from Wesson and Deno (1989), which require teachers to specify for the coming week the skills to be addressed; the number of days devoted to each skill; the materials, grouping arrangements, motivational strategies, and activities to be employed; and the number of minutes planned for each activity. The following information was coded from the plan sheets: (a) total number of

minutes per week of instruction; (b) number of minutes per week spent in one-to-one, small-group, and whole-class instruction, and independent seatwork; (c) number of minutes per week instruction was delivered by the teacher and by peers; (d) whether the teacher used motivational strategies; and (e) whether the teacher used systematic reinforcement. Intercoder agreement, calculated on 15% of the instructional plan sheets, ranged from 84% to 100% (average = 96.8%).

Results

Achievement

Means and standard deviations for pretreatment, posttreatment, and growth (i.e., change from pre- to posttreatment) scores on the three CRAB subtests are shown in Table 4 for LD, LP, and AA pupils. Averaged scores across the three student types are also shown, along with effect sizes for each growth metric.

Achievement data were analyzed using teacher as the unit of analysis. Teacher was the unit of analysis because LD, LP, and AA students in every PALS classroom shared the same teacher who trained them in PALS and supervised the PALS sessions. Thus, data on the three student types represented dependent observations. Type of student was treated as a within-subjects (i.e., within-teachers) factor to permit the direct comparison of the LD, LP, and AA students' achievement and to test for interactions between student type and treatment condition.

Pretreatment differences. To test for pretreatment differences, a one between-subjects (treatment: PALS vs. No PALS), one within-subjects (student type: LD vs. LP vs. AA) ANOVA was conducted on each CRAB score. Results indicated no significant effects for treatment, $F(1, 36) = .09$, .01, and .12 for words correct, questions correct, and maze choices correct, respectively. Results also indicated no significant effects for the interaction between treatment and student type, $F(1, 36) = 2.37$, .09, and 2.42 for the three CRAB scores, respectively. On each CRAB score, however, there was a significant effect for student type, as would be expected: $F(1, 36) = 24.79$, 32.96, and 17.78 for words correct, questions correct, and maze choices correct, respectively. Follow-up analyses indicated that, on all three CRAB scores, LD and LP students performed comparably but reliably lower than AA pupils.

Growth over time. To test for effects on achievement over time, we conducted a one between-subjects (treatment), two within-subjects (student type; trial: pre- vs. posttreatment) ANOVA on each of the three CRAB scores. Every ANOVA produced three main effects, three 2-way interactions, and one 3-way interaction. Regarding the questions addressed by this study, only two of these effects are relevant. First, the treatment by trial interaction is important because it explores whether PALS and No-PALS students progressed differentially during the study. Second, the 3-way interaction among treatment, trial, and student type is meaningful because it indicates whether the treatment groups' differential growth was mediated by student type.

Table 4

Reading Achievement by Treatment, CRAB Score, Student Type, and Trial

	PALS						No PALS						ES		
	WC		QC		MC		WC		QC		MC				
Student type/trial	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	WC	QC	MC
Learning disabled															
Pre	203.15	(123.86)	3.78	(2.29)	8.90	(5.71)	202.20	(132.80)	3.73	(2.22)	8.60	(6.13)			
Post	254.23	(117.99)	5.68	(2.28)	11.30	(5.72)	230.88	(116.78)	4.15	(2.55)	8.60	(5.35)			
Growth	51.08	(29.60)	1.90	(1.24)	2.40	(4.54)	28.68	(28.91)	.43	(1.60)	.00	(5.55)	.20	.68	.42
Low performing															
Pre	243.50	(109.37)	3.40	(2.20)	9.05	(5.50)	187.98	(113.05)	3.38	(2.10)	7.70	(4.92)			
Post	290.75	(95.67)	5.30	(2.21)	12.90	(5.30)	228.33	(119.78)	4.45	(1.99)	10.30	(5.43)			
Growth	56.25	(36.82)	1.90	(1.88)	3.85	(2.87)	40.35	(28.38)	1.08	(1.35)	2.60	(2.98)	.14	.40	.23
Average achieving															
Pre	291.58	(104.46)	5.75	(2.18)	10.75	(5.76)	310.98	(110.65)	5.95	(2.13)	13.95	(4.95)			
Post	351.08	(116.94)	6.95	(1.87)	14.60	(5.21)	348.35	(106.29)	6.95	(1.78)	14.55	(4.55)			
Growth	59.50	(47.32)	1.20	(1.77)	3.85	(4.00)	37.38	(45.25)	1.00	(1.42)	.60	(4.39)	.20	.10	.66
Across student type															
Pre	243.08	(100.99)	4.31	(1.92)	9.57	(5.04)	233.72	(101.68)	4.35	(1.73)	10.08	(4.57)			
Post	298.68	(98.71)	5.98	(1.79)	12.93	(4.50)	269.18	(96.07)	5.18	(1.66)	11.15	(3.88)			
Growth	55.61	(27.25)	1.67	(1.29)	3.37	(2.05)	35.47	(24.24)	.83	(1.05)	1.07	(2.68)	.22	.55	.56

Note. On the Comprehensive Reading Assessment Battery (CRAB), WC is average number of words correct read in 3 min. across two passages; QC is average number of questions correct (out of 10) across two passages; MC is number of correct maze replacements in 2 min. ES = effect size.

Regarding the treatment by trial interaction, we found significant effects on all three CRAB scores: On the words correct, questions correct, and maze choices correct, respectively, $F(1,38)$ ratios were 6.10, $p < .05$; 5.04, $p < .05$; and 9.28, $p < .005$. For each CRAB score, growth in PALS classrooms, averaged across student type, was greater than in No-PALS classes. Effect sizes, averaged across student type, were .22, .55, and .56 for words correct, questions correct, and maze choices correct, respectively (see Table 4 for effect sizes by CRAB score and student type).

We found no statistically significant effect for any of the 3-way interactions. For the three CRAB scores, respectively, $F(2,37)$ ratios were .13, 2.56, and .58. Therefore, the effectiveness of the PALS treatment was not mediated by student type.

For the sake of completeness, we report the remaining F ratios, which are not relevant to the questions posed in this study. As would be anticipated, we found a trial main effect on each measure (respective $F(1,38)$ ratios of 124.71, 45.38, and 34.49), indicating that, averaged across treatment and student type, children progressed academically over time. Also as expected, we found significant main effects for student type (respective $F(2,37)$ ratios of 24.72, 34.14, and 22.67); follow-ups revealed that, across the three scores and trials, the performance of LD and LP students was comparable but lower than that of AA students. No treatment main effect was significant (respective $F(1,38)$ ratios of .39, .50, and .21), indicating that, when averaged over trials and student type, PALS and No-PALS groups' scores were comparable. Moreover, we found no significant effects for the treatment by student type interactions (respective $F(2,37)$ ratios of .92, 1.08, and 2.35), showing that, averaged over trials, the treatment effects were not mediated by student type. For the trial-by-student type interactions, results were mixed. For words correct and questions correct, effects were not significant (respective $F(2,37)$ ratios of 1.23 and 1.09), revealing that, averaged across treatments, the change over time was not mediated by student type; on the maze score, however, growth was influenced by student type, $F(2,37) = 4.30$, $p < .05$. Follow-ups indicated that, averaged over treatments on the maze, LD students' growth was reliably lower than that of LP students but comparable to that of AA students; the growth of LP and AA students was similar. Because these results are not relevant to this study's purpose, we do not discuss them further.

Instructional Planning

According to the teacher-completed instructional plan sheets, PALS and No-PALS teachers allocated similar amounts of time to reading instruction. Nevertheless, PALS teachers planned for significantly more one-to-one instruction and peer-mediated activity. No-PALS teachers planned for significantly more teacher-led and whole-class instruction and independent seatwork. Both groups allocated comparable amounts of time to small-group instruction. Finally, PALS teachers were significantly more likely to plan for the

incorporation of systematic reinforcement than No-PALS teachers. See Table 5 for descriptive and inferential statistics.

Teacher- and Student-Perceived Benefits of PALS

Table 6 displays data, organized by LD, LP, and AA students, on teacher and student perceptions of PALS. With respect to teacher responses, mean ratings across the three student types ranged from 3.70 to 4.75, indicating a belief that PALS positively affected reading achievement and social skills, irrespective of student type. A series of one between-subjects (student type) ANOVAs revealed, however, that teachers believed PALS was more beneficial to LD and LP pupils; that is, teachers believed PALS helped increase the reading achievement, reading self-confidence, and social skills of LD and LP children more than it did for AA students. Teachers also expressed the view that grouping the class into pairs for PALS helped LD and LP students more than AA pupils. Again, however, teachers believed their AA students benefited.

In addition to the questions that appear in Table 6, teachers were asked four more questions: (a) "How likely are you to use PALS next year?" (1 = definitely not, 5 = definitely yes); (b) "How worthwhile was your participation in the project?" (1 = a waste of my time, 5 = extremely valuable); (c) "What was the overall effectiveness of PALS?" (1 = not at all effective, 5 = extremely effective); and (d) "Did project participation contribute to your professional development?" (1 = not at all, 5 = a great deal). Teachers' averaged responses were 4.30 (*SD* = .92), 4.20 (*SD* = .89), 4.10 (*SD* = .89), and 4.11 (*SD* = .59), respectively.

The students also had positive perceptions of PALS, as suggested by their averaged ratings, which ranged from 3.55 to 5.0 (see Table 6). And unlike the teacher ratings, students' impressions did not differ by student type.

Discussion

PALS's Effects

Findings indicate that LD, LP, and AA students in PALS classrooms made significantly greater progress than their counterparts in No-PALS classrooms across the three reading measures. Moreover, the magnitude of these statistically significant between-group differences appears educationally important. Aggregated across LD, LP, and AA students, effect sizes were .22, .55, and .56, respectively, on the words correct, questions correct, and maze choices correct CRAB scores. Such differential gain for PALS students compares favorably with that of cooperative learning. Slavin (1994), for example, reported a median effect size of .32 for 52 studies of cooperative learning treatments that lasted more than 4 weeks and used what Slavin considered appropriate motivational components.

Consonant with the finding that PALS students outperformed No-PALS students were PALS teachers' written responses to a questionnaire administered in the last 2 weeks of the 15-week treatment. The teachers believed

Table 5

Information Obtained From Teachers' Instructional Plan Sheets for Reading

	PALS (n=20)				No PALS (n=20)					
Instructional dimension	*M*	(*SD*)	*n*	(%)	*M*	(*SD*)	*n*	(%)	$F(1,38)$	χ^2
Total number of min. per week of instruction	246.80	(65.13)			277.25	(77.21)			1.82	
Number of min. per week spent in:										
One-to-one instruction	121.20	(34.01)			29.00	(37.28)			66.76**	
Small group instruction	15.80	(32.72)			27.70	(45.46)			.90	
Whole class instruction	74.00	(51.17)			130.95	(65.60)			4.37*	
Independent seat work	35.05	(32.93)			87.45	(45.29)			17.52**	
Number of min. per week instruction is delivered by:										
Teacher	90.85	(56.45)			151.10	(67.06)			9.45*	
Peer	120.90	(35.16)			25.85	(31.65)			80.74**	
Does teacher use motivational strategies? Yes.			20	(100.0)			19	(95.0)		.00
Does teacher use systematic reinforcement program? Yes.[a]			20	(100.0)			4	(21.2)		22.43**

[a] n = 19 for the No-PALS group.

*p <.01. **p <.001.

Table 6

Teacher and Student Satisfaction With PALS

Questions	Type of student: LD (*n*=20) *M*	LD (*n*=20) (*SD*)	LP (*n*=20) *M*	LP (*n*=20) (*SD*)	AA (*n*=20) *M*	AA (*n*=20) (*SD*)	*F*(2,38)
	Teachers (1="Not at all," 5="Very")						
Did PALS help increase the overall reading achievement of student?	4.50	(.83)	4.55	(.76)	3.80	(1.61)	14.90***
Did PALS help improve the social skills of student?	4.10	(1.07)	4.10	(1.12)	3.70	(1.30)	4.41*
How much did awarding points contribute to the reading achievement of student?	4.35	(.99)	4.30	(1.03)	4.05	(1.00)	3.12
How much did working with a partner contribute to the reading achievement of student?	4.75	(.72)	4.75	(.72)	4.15	(1.04)	10.69***
How much did PALS increase the reading self-confidence of student?	4.55	(.76)	4.55	(.76)	4.15	(.75)	6.91**
	Students (1="Not at all," 3="Kind of," 5="A whole lot")						
How much do you think PALS helped you become a better reader?	4.75	(.55)	4.70	(.66)	4.60	(.82)	.22
How much did you like PALS?	4.10	(1.07)	3.75	(1.48)	3.60	(1.23)	.81
How much did you like being a coach?	4.00	(1.17)	4.00	(1.52)	3.55	(1.50)	.58
How much did you like being a player?	3.85	(1.53)	4.15	(1.09)	4.40	(1.10)	.97
Did you like earning points?	4.40	(.88)	5.00	(.00)	4.50	(.95)	3.12
Did PALS help you become better friends with other students?	3.70	(1.26)	3.85	(1.39)	3.55	(1.32)	.30

*$p < .05$. **$p < .01$. ***$p < .001$.

PALS had positively affected their LD, LP, and AA students' reading achievement and social skills (although they seemed to view PALS as benefiting LD and LP children more than AA students). The PALS students, too, irrespective of LD, LP, and AA designations, expressed a belief that the treatment had helped them become better readers.

PALS's effects are all the more noteworthy because of the small amount of time that teachers and students engaged in the activity. Given that most

participating teachers allocated about 90 minutes per day (or 450 minutes each week) for reading and language arts, PALS (at 35 minutes per day x 3 days, or 105 minutes per week) required between 20% and 25% of the reading and language arts block—and this was only during the 15-week implementation period. Perhaps this efficiency contributed to PALS's popularity among the teachers who on average expressed a strong preference for using it again.

Besides our use of comparable PALS and No-PALS groups (see Tables 1 and 2), there are several reasons why we believe PALS was causally related to the treatment group's stronger reading performance. First, data from the Instructional Plan Sheets suggested that PALS and No-PALS teachers provided similar amounts of reading instruction. From this, we infer that PALS was used (appropriately) as a partial substitute for, not as a supplement to, the PALS teachers' reading programs. Hence, it appears that the achievement differences distinguishing PALS and No-PALS groups cannot be attributed to a greater amount of reading time for PALS students.

Second, the Instructional Plan Sheets show that PALS teachers allocated considerably more classroom time to peer-mediated instruction and to one-to-one instruction (and less time to independent seatwork) than No-PALS teachers. PALS teachers also claimed to make more frequent and systematic use of rewards. Each of these findings corresponds to a dimension of the treatment and therefore may be interpreted as indirect evidence that PALS teachers implemented the program. More persuasively, perhaps, teachers and children were observed to be highly accurate in their implementation of PALS at Weeks 4, 7, and 13. This does not prove that PALS teachers used the intervention several times per week, 35 minutes per day—any more than the data from the Instructional Plan Sheets prove that PALS teachers in fact allocated more time, say, to peer-mediated instruction. But the fidelity data, especially at Weeks 7 and 13, suggest that teachers used PALS often. Otherwise, it would have been difficult for them and their students to sustain such high levels of treatment fidelity.

Explaining PALS's Effects

All of which leads to the question: What explains PALS's effectiveness for average-achievers and low-performing children with and without disabilities?

Contextual reasons. There are at least two contextual reasons. The first is that PALS materials are concrete, specific, and user friendly—criteria to be reckoned with if new practices are to be implemented (see McLaughlin, cited in Gersten, Vaughn, Deshler, & Schiller, 1995). A comprehensive manual, written expressly for teachers, guides implementation. And whereas the manual is a must, there is no need for teachers to develop additional materials, use novel curricula, or, as mentioned, devote more time than usual to reading. Furthermore, PALS materials and activities can complement whole language instruction as easily as phonics-based approaches because

the PALS treatment enhances teachers' ongoing reading practices, rather than substitutes' radically different techniques (see Gersten et al., 1995, Greenwood et al., 1988, and Smylie, 1988, on why innovations should enhance, not substitute for, teachers' current practice).

A second factor may have been the technical assistance we provided. As mentioned, project staff was available to help teachers train their students, and, thereafter, staff was available on an as-needed basis. We believe the availability of this on-site support increased teachers' comfort level and willingness to stick with PALS when the procedures were still somewhat unfamiliar to them and their students, which, in turn, engendered growing proficiency and confidence in using the treatment (see Miles, 1983, for a discussion of these interconnections). Thus, we speculate that technical assistance and user-friendly materials increased the frequency and accuracy with which teachers and students implemented PALS.

Substantive reasons. We also offer several substantive explanations for PALS's effects, beginning with the reading activities—partner reading, paragraph summary, and prediction relay. As noted, the purpose of these procedures is to encourage students to practice strategies that have been shown to strengthen reading comprehension when implemented regularly with accuracy and with narrative text written at students' instructional levels. Second, we believe that PALS's structured, reciprocal, one-to-one interaction between partners (a) permits frequent opportunity to respond, (b) facilitates immediate corrective feedback, (c) increases academic engaged time, and (d) offers social support and encouragement—features that comply with generally accepted principles of effective instruction. Third, the points students earn by reading sentences correctly, formulating appropriate main idea statements, offering reasonable predictions, and displaying cooperative behavior seem highly motivating and appear to foster an esprit de corps.

Of course, these are mostly impressions. A more convincing explanation of what makes PALS tick requires a different study from that which we conducted: a component analysis exploring the relative effects of PALS's various dimensions. Future research no doubt should address this issue to clarify indispensable—and perhaps dispensable—components of PALS.

Nevertheless, prior research is not without bearing in this regard. Simmons, Fuchs, Fuchs, Hodge, and Mathes (1994), for example, conducted a component analysis of peer tutoring in Grades 2 through 5 and reported that partners engaging in role reciprocity made greater reading gains than partners who did not. Fantuzzo, Riggio, Connelly, and Dimeff (1989) undertook a component analysis of a college-level peer-tutoring program and found that a combination of dyadic interaction and structured academic activity did more to enhance cognitive gain than either of the two dimensions separately. In another study, Fantuzzo et al. (1992) demonstrated that fourth- and fifth-grade students in a structured-dyadic-interaction-plus-rewards group achieved the highest level of accurate math computation in comparison with a structured-dyadic-interaction-only group, a reward-only group, and controls.

Thus, results of these component analyses, as well as a considerable amount of related research on peer tutoring (e.g., Cohen et al., 1982; Delquadri et al., 1986; Jenkins & Jenkins, 1981, 1985; Slavin, Madden, & Karweit, 1989), support our impressions: A systematic reward structure, explicit academic activity, and structured and reciprocal interactions between student pairs contribute to PALS's positive outcomes. With this in mind, we offer the following: If "one-to-one tutoring is the most effective form of instruction known" (Slavin, 1990, p. 44)—for good students and at-risk students alike (e.g., Bloom, 1984; Levin et al., 1984; Slavin et al., 1989; Wasik & Slavin, 1993)—then perhaps one-to-one tutoring is what low-achieving children, with and without disabilities, require more of—as part of both peer- and adult-mediated activity.

Study Limitations

Technical assistance and research design. Technical assistance, just mentioned as a likely contributor to PALS' effectiveness, may also be seen as a study limitation because it restricts our capacity to generalize results to other situations where help of the sort we provided is absent. If a school district, for example, were to offer its teachers a 2-day in-service on PALS without follow-up, we would not expect the students of these teachers to achieve at a level comparable to that of the students in this study.

A second study limitation is that, although schools were assigned randomly to PALS and No-PALS conditions, the design would have been stronger if classes *within* schools had been assigned randomly to the two conditions. The nesting of classes within schools would have controlled for possible differences between PALS and No-PALS schools. We chose against this design, however, because of our fear of contagion; that is, to avoid having teachers who were officially in the No-PALS group implement PALS procedures learned on the sly from a colleague next door.

PALS and the inclusion movement. A final point, more of a clarification than a study limitation, concerns the students with LD. As reported, those in PALS classes on average displayed considerably stronger reading gain than those in No-PALS classrooms, as evidenced by effect sizes of .20, .68, and .42 on words correct, questions correct, and maze choices correct subtests, respectively. Because of the current popularity of inclusion—a policy by which many students with disabilities are placed full-time in regular classrooms (see D. Fuchs & Fuchs, 1995b; Roberts & Mather, 1995)—some readers may see PALS as a sure-fire inclusionary strategy. This could be a mistake.

Whereas we believe PALS enhanced the inclusion of many students with LD in the study, there are reasons to suspect that our sample was unrepresentative of the larger population of such students. First, when we began the study, we found our LD students already in regular classrooms for reading, suggesting that their teachers perceived them to be capable of profiting from mainstream instruction. Second, their averaged pretest scores were not significantly different from those of the LP students (see Table 4)—a fact at

odds with a large corpus of evidence that students with LD on average perform significantly poorer in reading and other academic areas than low-achieving nondisabled students (e.g., Kavale, Fuchs, & Scruggs, 1994). Thus, as a group, the LD students in this investigation appear to have been relatively accomplished readers, begging the question, How would those with more severe LD fare in PALS classes?

As a first step toward answering this question, we conducted a post hoc analysis of the distributions of reading gain for the 20 students with LD in both PALS and No-PALS classes (Zubov & Fuchs, 1996). We found the reading progress of four PALS students with LD to be markedly inferior to the average gain of LD students in No-PALS classes, suggesting that, for 20% of the students with LD, the PALS treatment was ineffective. We discovered, too, that these four students were the poorest readers among those with LD in PALS and that three of the four were also described by their teachers as disruptive. These findings, together with (a) evidence on the importance of special education for such children (see Zigmond et al., 1995) and (b) the official positions of professional and advocacy groups (e.g., Learning Disabilities Association, 1993; National Joint Committee on Learning Disabilities, 1993), suggest that students with severe LD may require intensive, individualized instruction from specialists before profiting from peer-mediated strategies like PALS.

These important caveats notwithstanding, we believe we have provided evidence of the success of a modest, but unique, peer-tutoring program, which requires participants to practice various cognitive strategies to strengthen reading comprehension. Moreover, analyses of the performances of LD, LP, and AA students showed that PALS may be similarly effective for many children at different points on the achievement continuum. The tentativeness of this second conclusion reflects the fact that it is based on an acceptance of the null hypothesis inherent in our nonsignificant 3-way interactions. One of these 3-way interactions, in fact, approached significance: For growth on the questions correct score on the CRAB, the p value for the 3-way interaction was .084. This suggests that, with greater statistical power, PALS may have proven more effective for the LD students (ES = .68) than AA students (ES = .10), as indexed by this reading score (see Table 4). Our point here is that the generalizability of PALS' effects is a question that requires corroborating evidence. Nevertheless, as public school classrooms become more diverse, complex, and challenging, activities like PALS would appear to be of increased importance to those committed to the proposition that all students can learn to much higher levels.

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