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Investigating Factors Associated with Low Achievement Early in School: A Pilot Study

Kevin Sutherland

Virginia Commonwealth University, kssuther@vcu.edu

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Kevin S. Sutherland, Ph. D.
Department of Special Education and Disability Policy
Virginia Commonwealth University
Richmond, VA 23284

Donna Jovanovich
MERC Research Assistant

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Abstract

The purposes of the current study were to (a) examine the relationship between academic achievement and social competence in a sample of kindergarten and first grade students, and (b) investigate the interventions their teachers are using with low achieving students. Sixty kindergarten and first grade students and 15 teachers participated in this study. Results indicated significant differences between low achieving and typically achieving students on reading achievement and teacher reported academic competence. No other significant difference between groups were found. Teachers reported that they most often use explicit instruction with low achieving students; evidence-based practices such as data-based decision making and peer tutoring were not reported as being primary instructional practices. Limitations of the current study and implications for practice are discussed.

Investigating Factors Associated with Low Achievement Early in School: A Pilot Study,

academic success achieved early in a child's school experience is associated with many positive

developmental outcomes (Gottfried, Fleming, & Gottfried, 2001). At the same time academic

problems, like early antisocial behaviors, if not remediated become extremely resistant to

intervention over time (Hinshaw, 1992). Meanwhile, teachers are providing instruction to

classrooms of students that are increasingly diverse in a multitude of areas, including academic

ability, social competence, disability, culture, linguistics, and socio-economic status, to name a

few (Maheady, Harper, & Mallette, 2001; Mathes, Torgesen, & Allor, 2001). For example, the

academic abilities of students in a first grade classroom already can vary by several grade levels

(Mathes, 1999). Teachers must also accommodate these differences in an educational context

that emphasizes application, problem-solving, and teaching for understanding, all tied to high-

stakes testing (Maheady et al. 2001). As Maheady et al. note "In essence, classroom teachers are

being asked to do more with less, while ultimately doing it better." (p. 6)

Further adding to the instructional challenge faced by classroom teachers in the 21st

century is the complex relationship between academic problems and behavior problems. Many

students who are low achievers academically also exhibit problematic classroom behavior that

makes them even more difficult to teach (Sutherland & Wehby, 2001). To illustrate, Tomblin,

Zhang, and Buckwalter (2000) found a significant relationship between reading problems and

behavior problems in a sample of second grade students. Rabiner, Coie, and the Conduct

Problems Prevention Research Group (2000) examined the relationship between attention

problems and reading achievement; findings indicated that attention problems play an important

role in the development of reading problems.

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The relationship between academic problems and problem behavior has implications for students' later academic success. Specifically, students' frustration from academic problems may lead to aberrant classroom behavior (Gunter & Coutinho, 1997), students' problem behavior may lead to further academic failure due to lessened exposure to academic material (Wehby, Symons, Canale, & Go, 1998), or some combination of academic problems and problem behavior may interact in a reciprocal manner over time (Sutherland & Oswald, in press). Regardless, both academic problems and problem behavior are associated with decreased teacher attention in the classroom, often characterized by fewer learning opportunities, and these transactions over time place a portion of our student population at heightened risk for academic failure and other negative developmental outcomes (Sutherland & Morgan, 2003; Sutherland & Singh, 2004).

Identifying students at the greatest risk for academic failure due to both academic problems and social competence deficits early in their school career can help teachers and other service providers target and remediate deficits associated with negative developmental outcomes such as school failure, negative peer associations, and disruptive behavior disorders. In light of research indicating the difficulties inherent in changing developmental trajectories as children get older (e.g., Elbaum, Vaughn, Hughes, & Moody, 2000; Hinshaw, 1992), early identification is critical. Therefore, the purposes of the current study were to (a) examine the relationship between academic achievement and social competence in a sample of kindergarten and first grade students, and (b) investigate the interventions teachers are using in these classrooms with low achieving students.

Method

Participants

This study proposed to sample 30 Kindergarten and first grade classrooms from eight school districts for this research. However, only five of the eight participating school districts contributed data to this study. (See limitations below for how this response rate impacts interpretation of the results.)

Teachers. Fifteen female teachers from five school districts participated in this research. Nine teachers reported teaching Kindergarten (years experience $M = 12.1$, $SD = 6.6$), while six reported teaching first grade (years experience $M = 20.5$, $SD = 9.8$). Four Kindergarten teachers reported co-teaching math and/or reading, while no first grade teachers reported co-teaching math and/or reading.

Students. Sixty students from 15 classrooms participated in this research. See Table 1 for demographic characteristics for the participating students. See below for a discussion of how groups (low achieving and typically achieving) were created.

Table 1. Demographic characteristics of participating students.

Characteristic	Low Achieving (n = 16)	Typical Achieving (n = 44)
Grade		
Kindergarten	13	26
First grade	3	18
Gender		
Male	10	19
Female	6	25
Ethnicity		
African-American	7	15
Caucausian	8	29
Other	1	0

Design

    A static-group comparison design (Campbell & Stanley, 1963) was used to examine the relationship between academic achievement and social competence. Descriptive statistics were used to examine the interventions teachers reported using with low-achieving students in their classrooms.

Data Collection

Representatives from each of eight school districts (Metropolitan Educational Research Consortium study team members) were provided packets to distribute to three Kindergarten and three first grade teachers in February, 2004. These packets included instructions for data collection, parent/guardian consent forms, Interpersonal Competence Scales for Teachers (ICS-T; Cairns, Leung, Gest, & Cairns, 1995), and a survey form on instructional practices (see below). After identifying classrooms, packets were provided to the participating teachers.

The first step in data collection involved each participating teacher identifying three low achieving and three typically achieving students in her classroom. The criteria for low achieving was a score of 25 or less on the Phonological Awareness Literacy Screening (PALS; Invernizzi, Meier, Swank, & Juel, 1997) in both Kindergarten and first grade. The criteria for typical achievement was a score on PALS of greater than 40 (Kindergarten) and 50 (first grade). However, due to the limited sample size, for the purpose of this study typical achievement was defined as scores above 25 in both Kindergarten and first grade.

After receiving informed consent from the parent/guardian of each target student, teachers completed a survey instrument (see below) which assessed their use of instructional practices with low-achieving students. Teachers also completed an ICS-T for each participating student and noted demographic information about the student and the student's PALS score. The teacher then forwarded the completed survey, ICS-T forms, and consent forms to the study team member, who forwarded packets to the first author.

Instrumentation

Phonological Awareness Literacy Screening. The Phonological Awareness Literacy Screening (PALS) is administered to all Kindergarten and first grade students in each of the school districts involved in this research. PALS is used to identify students who may be in need of additional reading instruction beyond that provided to typically developing readers, and it measures literacy factors such as phonological awareness and alphabet knowledge. The PALS instruments have evidence of good reliability and validity (Invernizzi, Sullivan, Meier, & Swank, 2004).

Interpersonal Competence Scale-Teachers. The ICS-T is an 18-item questionnaire consisting of 7-point Likert scales that teachers completed for each student participant. The ICS-T yields composite scores on popularity, olympian (good at sports), affiliative, academic, aggressive, and internalizing behaviors. Reliability coefficients are typical of similar self-ratings and other ratings on the factors assessed (i.e., .50-.70). The ICS-T has convergent validity with direct observation, student record (i.e., grades, discipline reports) and peer-nomination measures (Cairns & Cairns, 1994; Cairns, et al., 1995; Leung, 1996), and it has predictive validity over an eight year period for adult adjustment, early school drop out, and teenage parenthood (Cairns & Cairns, 1994). Independent samples t-tests were conducted to examine potential differences between low-achieving and typically-achieving students on each of the six factors.

Survey Instrument. A survey was developed to collect standardized information on instructional practices used with low-achieving students by participating teachers. Respondents were first asked for demographic information and then completed a 42-item questionnaire. Respondents were asked to indicate how often they used certain instructional practices. Ratings

were on a Likert-type scale ranging from 1 (*Seldom*) to 4 (*Most of the Time*) with the other numbers representing points in between the two extremes. The survey was reviewed by the study team and one individual with expertise in survey development, and it is available upon request.

Due to the small sample size and the homogeneity of the sample, a factor analysis was not feasible. Factors were created using both theory and results from meta-analyses and literature reviews which have examined the effects of instructional practices on academic achievement of low-achieving students (e.g., Baker, Gersten, & Lee, 2002; Chard, Vaughn & Tyler, 2002; Elbaum, Vaughn, Hughes, & Moody, 2000). The factors, and number of and sample items that comprise each factor, included Explicit Instruction (7 items; e.g., *"I use letter-sound correspondence to teach recognition of words and groups of words," "I use explicit instruction to teach math concepts"*); Contextualized Instruction (8 items; e.g., *"I use reading and writing sentences to teach recognition of words and groups of words," "I use authentic problem solving to teach math skills"*); Fluency Training (4 items; e.g., *"I have students repeatedly read passages aloud with guidance," "My students read independent level texts to develop fluency"*); Peer Tutoring (9 items; e.g., *"My students develop fluency through partner reading (i. e., paired students taking turns reading aloud to each other)," "I use peer-assisted learning to reinforce math concepts"*); Data-based Decision Making (6 items; e.g., *"I use weekly assessment data to plan instruction for students in reading," "I use weekly assessment data to plan instruction for students in mathematics"*); Tutoring (2 items; *"I use one-one tutoring with a community volunteer to reinforce reading skills," "I use one-one tutoring with an adult trained in reading instruction to reinforce reading skills"*); Technology (2 items; *"I use technology to reinforce basic skills in reading," "I use technology to reinforce math skills"*); Families (2 items; *"I provide weekly information with parents about their children's efforts and successes in reading,"*

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"I provide weekly information with parents about their children's efforts and successes in math"); and Homework (*"I use homework to reinforce reading skills," "I use homework to reinforce math skills"*).

Results

Table 2 summarizes the means, standard deviations, and t-tests for each factor. Significant differences between groups were noted for both the PALS scores and the Academic Competence factor of the ICS-T. No other significant differences were found.

Table 2. Means, standard deviations, t-tests for factors of ICS-T and PALS scores.

Factor	Group		t Value	p Value
	Low Achievement	Typical Achievement		
	M (SD)	*M (SD)*		
PALS	15.31 (6.39)	58.09 (19.96)	8.38	.000
Popularity	4.94 (0.95)	5.41 (1.25)	1.34	.177
Olympian	4.77 (1.02)	5.05 (0.85)	1.05	.300
Affiliative	5.75 (0.89)	5.73 (1.15)	0.71	.943
Academic Competence	2.67 (1.47)	5.02 (1.61)	5.15	.000
Aggressive	2.50 (1.28)	2.26 (1.37)	0.62	.541
Internalizes	3.40 (1.14)	3.02 (1.18)	1.09	.279

Table 3 summarizes the means and standard deviations for factors of the teacher survey. Explicit instruction was the practice teachers identified as using the most with low-achieving students while peer tutoring was identified as being used the least.

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Table 3. Means and standard deviations of factors from teacher survey.

Factor	Mean	Standard Deviation
Explicit Instruction	3.73	.223
Homework	3.61	.764
Fluency Training	3.31	.630
Contextualized Instruction	3.28	.442
Family	2.67	.919
Data-based decision making	2.58	.623
Technology	2.40	1.00
Tutoring	2.39	.836
Peer Tutoring	1.91	.529

Discussion

The purposes of this study were to (a) examine the relationship between academic achievement and social competence in a sample of kindergarten and first grade students, and (b) investigate the interventions teachers are using with low achieving students. Results suggest that the groups of students identified by teachers did differ on the measure of academic achievement (PALS scores) and the Academic Competence factor from the ICS-T. No other significant differences were found. The main limitation of this study is its lack of statistical power. While mean differences between low and typically achieving students on several factors of the ICS-T will be discussed, the reader is urged to interpret these findings with extreme caution. Further, the distribution of PALS scores, in combination with the small sample, forced us to include students who scored above 25 on both the Kindergarten and first grade PALS as "typically achieving" when in fact some of these students might be at-risk for academic failure; their inclusion in the typically achieving group may also limit interpretation of the findings and increase the likelihood of a Type II statistical error.

First, teachers were clearly able to differentiate low achieving from typically achieving students in their classrooms, as indicated by the significant difference between groups on the Academic Competence factor of the ICS-T. Interestingly, the mean PALS scores for each group closely approximates the mean PALS scores for a sample of students identified as at-risk and typically developing by the authors of the PALS test (Invernizzi, Juel, Swank, & Meier, 2004). To illustrate, in the Fall of 2003 students in a statewide sample identified by the PALS test as needing additional reading instruction had a mean score of 16.82 ($SD = 6.96$) in comparison to those in our sample with a mean of 15.31 ($SD = 6.39$). Additionally, students not identified as needing additional instruction had a mean score of 60.50 ($SD = 19.39$) while the typically achieving students in our sample had a mean score of 58.09 ($SD = 19.96$).

According to mean differences students in the typically developing group tended to be rated by their teachers as more popular and more athletic (Olympian) than low achieving students. Meanwhile, low achieving students tended to be rated by their teachers as more aggressive and more withdrawn than typically achieving students. Research would suggest that these difference may increase over time as the achievement gap widens between these two groups of children (Hamre & Pianta, 2001).

Early assessments, including teacher ratings of students' social competence, may be useful in identifying the subsample of low achieving students most at-risk for negative developmental outcomes. The results of these assessments can lead to targeted interventions focusing on the one to three percent of the total student population most at-risk for the dual deficits of academic failure and antisocial behavior. An obvious implication of the preceding discussion is the importance of early interventions both in terms of programming for young children and intervening at the earliest signs of academic difficulties and problem behavior

among school-aged children. The long-standing policy within education not to provide services for students with learning and behavior problems prior to the end of the primary grades means that students are permitted to experience extensive failure before they are eligible for specialized services, a point at which there may be too little too late. However, there is evidence that we can reduce the risk for academic failure through early identification and academic interventions for learning problems (Osher, Dwyer, & Jackson, 2003). Research at the preschool and primary levels are promising, indicating that early identification and intervention for academic learning problems reduce the likelihood that students will engage in disruptive classroom behavior (Lane et al., 2002; Scott, Nelson, & Liaupsin, 2001). Evidence-based instructional practices are potentially useful in preventing and modifying children's early classroom behavior problems.

While low achieving students were rated as less popular, more withdrawn, and more aggressive than their typically achieving counterparts, teachers rated both groups of students similarly on the Affiliative factor. This finding supports recent research on the social interactional perspective of peer interactions; namely, that while students with social competence deficits might be more aggressive than their peers, they do participate in social group structures in the classroom rather than being rejected by their peers (Farmer et al., 2002). In turn, if classroom behavioral norms tend to support the aggressive behavior patterns of these students, they might become more prominent in the classroom social structure over time. At the same time, if the classroom social structure does not support aggressive behavior patterns, students' aggressive behavior may be constrained to better comply with the classroom norms. Regardless, the tendency of students with aggressive behavior patterns to be as affiliative early in school as their non-aggressive counterparts has implications for teachers; these students must be identified early in order to maximize the remediation of their social deficits; meanwhile, the social

structure of the classroom must support prosocial behavior patterns. Otherwise peer associations might reinforce negative behavior patterns over time, leading to a behavioral contagion in the classroom that threatens the academic and social development of increasing numbers of students.

Perhaps the most interesting finding of this study, particularly given the limited statistical power of the group comparisons, were the results of the teacher survey. Again, however, interpretation of these data are limited due to the small sample of teachers. Nonetheless, results indicate both some positive and negative trends in instructional practices for low achieving students, in light of research on effective practices for these students. Specifically, in a review of the literature Sutherland and Jovanovich (2004) identified explicit instruction, data-based decision making, peer tutoring, and communicating with families as having the greatest positive effect on academic achievement in reading and mathematics for low achieving students.

First, Explicit Instruction was reported by teachers in the current study as the most common instructional procedure used with low achieving students. Sutherland and Jovanovich (2004) noted that "Explicit instruction appears to be the first component in an effective instructional program for at-risk learners" (p. 30). Baker et al. (2002) found a mean effect size of 0.58 for explicit instruction in their meta-analysis of math interventions. This effect was even more pronounced when compared to the effect size of contextualized learning (0.01). The difference between these two instructional methods highlights the highly structured learning needs of children who arrive at school without the prerequisite skills to be successful in mathematics. Moreover, Torgesen et al. (1999) found that the more explicit the instruction in phonological awareness the greater the effect on various measures of reading achievement.

At the same time, Contextualized Instruction was reported as being the fourth most utilized instructional procedure, and it was reported as being used more than the factors of

Families, Data-Based Decision Making, and Peer Tutoring. In light of the negligible effect sizes noted in the literature for contextualized instruction, this finding is troubling. Further troubling is the low reported use of both Data-Based Decision Making and Peer Tutoring, which have consistently strong effect sizes in the literature for both low- and typically-achieving students. Finally, teachers reported Homework and Fluency Training as the second and third most utilized instructional procedures. While the effects of assigning homework on the academic achievement of low achieving Kindergarten and first grade students are less clear, fluency training would not appear to be an appropriate instructional procedure for students with significant phonological awareness deficits.

Limitations and Summary

The primary limitation of this study, as mentioned earlier is the small sample of both students and teachers. Interpretation of the data from this study is very difficult due to the lack of statistical power in the group comparisons, as well as making inferences about the results of the teacher survey. At the same time, results from this pilot study indicate that schools would be well advised to increase early assessment and intervention efforts in order to provide low achieving students the best opportunity to succeed academically and socially. One way to further enhance the development of our most vulnerable students is to better train teachers and provide them with the appropriate supports to use evidence-based practices as they teach basic reading and mathematics skills. Results of the survey indicate several areas of professional development for elementary teachers. Both preservice and inservice training should be provided on evidence-based practices such as data-based decision making and peer tutoring. It is troubling that teachers of low achieving students are using these two practices less than contextualized instruction and fluency training, particularly for their lowest achieving students. The unfortunate alternative for

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schools is to continue to see the achievement gap widen between low- and typically-achieving

students as they advance in school.

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