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Reexamining the Relationship Between Academic Achievement and Social Behavior

Bob Algozzine,[1] Chuang Wang,[1] and Amy S. Violette[2]

Abstract

Numerous studies have demonstrated the comorbidity of achievement and behavior problems in students identified with learning disabilities and emotional disturbance. The causal basis for this relationship has not been demonstrated, but several theories regarding the association have been posited, and potential benefits related to prevention keep interest in the connection alive. This article briefly reviews the background for original and continuing focus on behavior and achievement and sets the context for it by looking over some of the work that has been done. It also provides an empirical analysis with outcomes that are contrary to most of those previously reported. It presents findings as a base for directing attention to a fundamental goal of positive behavior interventions and supports (i.e., teaching behavior as well as academic skills in efforts to prevent learning problems and failure in school).

We have no other notion of cause and effect, but that of certain objects, which have always conjoin'd together, and which in all past instances have always been found inseparable.

David Hume (1711–1776)

Positive behavior support (PBS) is intended to improve the climate of schools using a "systems approach to enhancing the capacity . . . to adopt and sustain the use of effective practices for all students" (Lewis & Sugai, 1999, p. 4), and empirical intervention research, as well as other data and perspectives pertinent to PBS, has been published in the *Journal of Positive Behavior Interventions* since 1999 (Clarke & Dunlap, 2008). A widely held belief in fields that underlie PBS and the practices documented in this journal is that academic achievement and social behavior are connected. Interest in the relationship between behavior and achievement derives strength in continuing efforts to prevent learning problems, especially for students at risk of experiencing acute and chronic school failure (cf. Algozzine, 2002; Crews et al., 2007; Greer-Chase, Rhodes, & Kellam, 2002; Kellam, Mayer, Rebok, & Hawkins, 1998; Lassen, Steele, & Sailor, 2006; McIntosh, Horner, Chard, Boland, & Good, 2006; O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2002; Stewart, Benner, Martella, & Marchand-Martella, 2007; Vanderstaay, 2006; Vaughn et al., 2009; Wehby, Falk, Barton-Arwood, Lane, & Cooley, 2003). The logic of importance here for children is straightforward: It is difficult to learn when you are spending more time in discipline-related interactions than in those related to learning academic content (Miles & Stipek, 2006). The significance for teachers is reflected in the belief that "dual deficits of learning and behavior problems may make it difficult for practitioners to provide effective instruction" (Sutherland, Lewis-Palmer, Stichter, & Morgan, 2008, p. 223). The body of work remotely and directly related to the conjoining of behavior and achievement is large and reflects empirical and speculative perspectives. A comprehensive re-review of this literature is beyond the scope of this article and unnecessary in light of the extant summaries already published (cf. Algozzine, Horner, & Putnam, 2008; Benner, Beaudoin, Kinder, & Mooney, 2005; Dionne, 2005; Duncan et al., 2007; Gottfredson, 1981; Hawkins & Lishner, 1987; Hinshaw, 1992a, 1992b; Kauffman, Cullinan, & Epstein, 1987; Kazdin, 1987, 1993; Kellam & Hunter, 1990; Kellam et al., 1998; Kellam & Schiff, 1967; Mandel, 1997; Manguin &

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Loeber, 1996; McIntosh, Chard, Boland, & Horner, 2006; McIntosh, Horner, Chard, Boland, & Good, 2006; McIntosh, Horner, Chard, Dickey, & Braun, 2008; Nelson, Benner, Neill, & Stage, 2003a; Silberberg & Silberberg, 1971; Sutherland, et al., 2008; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006; Vanderstaay, 2006; Wehby et al., 2003). Rather, we provide a distillation focused on critical features illustrating what we believe is the basis for an altered view of the comorbidity of behavior and achievement with relevance for adoption and sustained use of effective practices for all students.

Documenting the Relationship Between Achievement and Behavior

Is there a relationship between academic achievement and social behavior? Reviews of research investigating the relationship between behavior and achievement have been published over the years with consistent conclusions; that is, there is general agreement that achievement and behavior are inversely related, that a considerable number of other variables are related to behavior and achievement, and that a variety of programs of varying orientations have been effectively implemented to improve achievement and behavior. In a common type of study in this body of knowledge, researchers report documented levels or perceptions of achievement and behavior. Very often, responses from informants on rating scales define behavior, and global indicators of performance reflected in ratings and archival records mark achievement. Researchers have also compared behavior across groups with differing levels of achievement and achievement across groups with different patterns of behavior.

The long-standing evidentiary caution in these data is that rater effects can affect the validity and reliability of ratings with at least four types of fallibility: (a) inaccuracy due to severity or leniency among raters, (b) inaccuracy due to failure to differentiate among independent aspects of a ratee's behavior, (c) inaccuracy due to unwillingness to go out on the proverbial limb in either the favorable or unfavorable direction, and (d) inaccuracy due to the extent to which obtained ratings discriminate among different ratees in terms of their respective performance levels (cf. Gresham, MacMillan, & Bocian, 1997; Harwell, 1999; Hoge & Colardarci, 1989; Saal, Downey, & Lahey, 1980). Further, documenting perceptions and ratings of achievement and behavior in varying groups of children, adolescents, and adults does not prove that behavior and achievement are functionally related. Even though the body of research demonstrating causal relationships between behavior and achievement is thin, speculation on why the relationship exists continues to fuel the belief that research on "factors associated with learning and behavior . . . should be continued" (Sutherland et al., 2008, p. 229).

Speculating on the Relationship Between Achievement and Behavior

Why might there be a relationship between behavior and achievement? In explaining observed differences in levels of problem behaviors, Patterson (1976, p. 268) *suggested* that the child is both "victim and architect" of a failing system that works in one of at least three ways:

1. The child's response may serve as a stimulus, which sets the occasion for an immediate repetition of the same response.
2. There may be specific consequences provided by family members, which serve to maintain a coercive response once it has been initiated.
3. In extended interactions, the behavior of the child and the family member may create *mutual*, or bilateral, effects, both of which maintain ongoing coercive behaviors. (p. 272, emphasis in original)

More recently, McIntosh (2005) *suggested* that a "*coercive cycle of educational failure* emerges in which students (a) experience academic demands as aversive, (b) engage in problem behavior that is maintained by escaping academic demands (e.g., being sent to the office), (c) lose access to instruction, (d) fall further behind, (e) find academic demands even more aversive, and (f) become even more likely to engage in escape-maintained problem behavior" (p. 1, emphasis in original).

In developing their case for continued study of "direction of the connection" between "social skills and the development of literacy behavior," Miles and Stipek (2006) speculated that "time spent acting out or being disciplined for aggressive behavior *could* reduce the amount of time children are engaged in meaningful learning activities" (p. 104, emphasis added) and that "[a]ggressive children *may* also develop negative relationships with teachers and peers or negative feelings about school, and as a consequence be less inclined to exert effort on academic work" (p. 104, emphasis added). They also argued that academic skills *could* affect behavior when "[c]hildren who have difficulty learning to read . . . *may* become frustrated or unhappy in school and express their frustration and unhappiness by acting aggressively toward the teacher or classmates" (p. 104, emphasis added). They studied the relationship between teacher ratings of behavior and literacy achievement in a sample of low-income children in elementary school and found that "social development and academic development are inextricably connected" (p. 114).

Trzesniewski et al. (2006) studied the association between reading achievement and antisocial behavior in a sample of twins born in England and Wales. They found that the relationship they observed was primarily the result of environmental factors common to both reading and antisocial behavior

and that it was stronger in boys. They argued that "common developmental antecedents" (e.g., home environment and care, parental income and education, and social class) may be the cause of reading and behavior problems over time. From this general background and body of knowledge, we undertook an empirical investigation grounded in what was known about the relationship between behavior and achievement.

What We Know About the Relationship Between Achievement and Behavior

As with any knowledge base, what we know about the relationship between behavior and achievement is a function of the type of research that has been done. In most of it, ratings by teachers and other informants were compared for individuals with identified disabilities or dysfunctions (cf. Hinshaw, 1992a, 1992b). For example, in a study often cited as evidence of the co-occurrence of academic failure and problem behavior, Kauffman, Cullinan, and Epstein (1987) used special education teachers' "*estimates* of academic performance" and *ratings* of "social-emotional adjustment problems" for 249 students 7 to 19 years old identified with serious emotional disturbance to describe and analyze the relationships between and among these "characteristics" (pp. 176, 177, emphasis added). In more recent research, Nelson, Benner, and Rogers-Adkinson (2003) detailed "the academic and social adjustment characteristics of students with an IQ/language skill discrepancy" (p. 25), Nelson, Benner, Lane, and Smith (2004) documented "the extent to which students with emotional/behavioral disorders (E/BD) experience academic achievement deficits" (p. 59), Nelson, Benner, and Cheney (2005) reported "the extent to which students with [emotional disturbance] ED served in public school settings experience language skill deficits" (p. 97), and Benner, Allor, and Mooney (2008) investigated the academic processing speed of students with emotional and behavioral disorders. The question answered by this type of research focuses on the extent to which *raters believe and report* that individuals with a known problem (e.g., emotional disturbance) exhibit other problems (e.g., inadequate academic performance, language problems, social maladjustment, conduct or personality disorders, inadequacy-immaturity, socialized delinquency). The consistent finding in this type of research is that teachers and other professionals report that behavior problems and achievement problems coexist in groups experiencing social or academic problems. Since criteria for identification with emotional disturbance (and other disabilities) generally require that students show a deficit in academic achievement (cf. Kauffman & Landrum, 2009), findings such as these should be expected and actually do little to clarify, confirm, or advance the link between achievement and behavior or the causes for it despite their widespread use (cf. Miles & Stipek, 2006; Reid, Gonzalez,

Nordness, Trout, & Epstein, 2004) in reports professing the relationship.

A slightly different iteration in the search illustrating that "[l]ow academic performance and maladaptive behavior patterns are highly related" is evident in descriptive, epidemiological studies documenting the academic status of students with emotional disturbance, in which one or more of the ratings are replaced with *performance* on tests or other indicators (Reid et al., 2004, p. 130). For example, in another frequently cited study of the co-occurrence of academic failure and problem behavior, Fessler, Rosenberg, and Rosenberg (1991) compared parent or guardian ratings (from interviews and checklists) and performance on measures of aptitude and achievement for 124 children (5–15 years old) "referred for diagnostic evaluation because they had exhibited severe behavioral/emotional problems which impaired their abilities to function at home and/or at school" (p. 99). More recently, Nelson et al. (2003a) documented interrelationships among language skills, ratings of behavior, and academic performance, and Benner et al. (2005) reported correlations between beginning reading and social adjustment ratings. In both cases, academic skills were highly related to academic skills, ratings of behavior were good predictors of ratings of behavior, and the weakest relationships were evident between achievement and behavior markers.

A finding that "slightly over one-half" of children referred for behavior problems "had some degree of academic difficulty" (Fessler et al., 1991, p. 101), while interesting, bears little prescriptive strength because one cannot determine whether the achievement problems caused the behavior problems or whether the behavior problems caused the achievement problems. Finding that delinquent behavior "accounted for approximately 8% of the variance" in both total and receptive language scores (Nelson et al., 2003b, p. 31), while interesting, bears little prescriptive strength because one cannot determine whether the behavior problems caused the achievement problems or whether the achievement problems caused the behavior problems. Perhaps more interesting in these studies are the converse findings that about half the children referred for behavior problems did *not* have the same degree of academic difficulty or that more than 90% of the variance in achievement scores was not accounted for by ratings of behavior, both of which limit greatly the generalizability, usefulness, and practical value of the observed relationship and point to the possibility that a critical and powerful third factor (e.g., lack of sufficient teaching) caused the academic achievement and social behavior problems to coexist.

The potential and power of other factors in explaining academic and behavior problems, as well as relationships between them, was illustrated, though not interpreted as such, in the Nelson and Benner studies. For example, Nelson

et al. (2005) found that language skills were stronger than behavior skills as predictors of academic skills, and Benner et al. (2005) found that "the strength of the associations between letter-word identification and social adjustment were identified as strong for academic competence, moderate for overall social skills, cooperation, assertiveness, self-control, overall problem behaviors, and hyperactivity, and small for externalizing and internalizing problem behaviors" (p. 258). Similarly, using multilevel logistic regression modeling to analyze data from the Early Childhood Longitudinal Study—Kindergarten Class (ECLS-K), Morgan, Farkas, Tufis, and Sperline (2008) found that the best predictor of reading problems in third grade was reading problems and task-related behavior problems in first grade and that being a poor reader in first grade increased the likelihood of poor ratings of behavior (especially those related to task-focused approaches to learning) in third grade.

While there is consistent reporting in what has been shown about the relationship between academic achievement and social behavior, there is cause for reconsideration and review after a closer look at the defining features of this work and the outcomes evident in it. In general, the collection of evidence illustrates that students *with extant behavior disorders* perform 1 to 2 years below grade level and that their achievement problems are evident at an early age and persist throughout their education. While this makes sense, it does not illustrate a predictive relationship between behavior and achievement or achievement and behavior. We were interested in the relationship between social behavior and academic achievement in a sample of students at risk for academic failure and developing emotional or behavioral disorders but not previously identified with learning or behavior problems. We reasoned that evidence of covariance between social behavior and academic achievement in this group would add to the knowledge base in important ways. We used simultaneous ratings of behavior and achievement from teachers, as well as actual achievement marked at the time of the ratings, to create a previously unstudied context in our work. We addressed two research questions:

1. To what extent are levels of reading and behavior similar for young children attending elementary schools with minority enrollments and rates of poverty that place them at risk for high rates of academic failure?
2. To what extent are measures of reading and behavior related for young children attending elementary schools with minority enrollments and rates of poverty that place them at risk for high rates of academic failure?

Method

We were interested in relationships within and between academic and behavior indicators for children in elementary schools evidencing high rates of failure. Consistent with previous research, we included performance on individually administered, standardized achievement measures, as well as ratings of achievement and behavior from teachers in our analyses.

Setting, Participants, and Context

Our work was part of a 5-year longitudinal project completed in a school system enrolling approximately 120,000 students in the southeastern region of the United States. The ethnic backgrounds of children in the district were diverse: 43% Black, 40% White, 10% Hispanic, 4% Asian, and 3% American Indian and multiracial. Participants in this study were in seven schools randomly selected from a pool identified by district personnel as at risk for high rates of academic failure based on minority enrollments, poverty status, and prior behavior and achievement history. Girls (48%) and (52%) boys were similarly represented in the schools. The schools served students from diverse ethnic and cultural backgrounds, including African American students (57%), Hispanic students (24%), European American students (11%), Asian students (4%), and students who identified with other ethnic groups (4%). More than 70% of the students participated in the federally funded free or reduced-price lunch program.

We confirmed the level of risk for students in these schools with the use of oral reading fluency (ORF) at the beginning of second grade. Based on data (cf. Good, Simmons, Kame'enui, Kaminski, & Wallin, 2002) indicating that the odds of achieving an end-of-second-grade benchmark goal of ORF greater than 90 is only 10% for those scoring below 27 on ORF at the beginning of second grade, Vaughn et al. (2009) selected ORF scores below 27 in the fall of second grade as their criterion for identifying students "most at risk" (p. 170). In the context of response to intervention, these students would be referred to as "difficult-to-remediate" (cf. Vellutino et al., 1996; Vellutino, Scanlon, Small, & Fanuele, 2006) or "treatment resisters," "non-responders," or "lower responders" needing assistance because their levels of basic skills were "at such a low level that it [was] unlikely they [would] make adequate progress toward grade-level reading skills" (Vaughn et al., 2009, p. 166). In addition, 36% of the students in the schools included in our study demonstrated oral reading fluency scores at or below this level.

Three cohorts of students in these schools participated in this study: Cohort 1 started in the 1st year as kindergarteners

Table 1. WRMT-R Standard Scores, DIBELS ORF, and SSRS Academic Competence Across Studies

Measure	Sample		Vaughn et al., 2009[a]	
	M	SD	M	SD
WRMT-R Word Identification: spring Grade 2	96.90	13.47	96.43	10.39
WRMT-R Word Attack: spring Grade 2	100.63	15.24	103.79	16.03
WRMT-R Passage Comprehension: spring Grade 2	92.47	12.75	92.00	11.91
DIBELS ORF: spring Grade 2	43.86	29.27	41.57	20.97
SSRS Academic Competence: spring Grade 2	89.99	11.89	74.43	9.91
Number of students	350		48	
Free or reduced-price lunch status (%)	87		83	
Ethnicity (African American, Hispanic, and Other (%)	89		92	

DIBELS = Dynamic Indicators of Basic Early Literacy Skills; ORF = oral reading fluency; SSRS = *Social Skills Rating System*; WRMT-R = *Woodcock Reading Mastery Test–Revised*.
[a]Source. Narrative description on pp. 169-170 and Table 2, p. 171.

and were followed for the following 3 years. Cohort 2 also started in the 1st year but as first graders and was followed for the 2nd and 3rd years only. Cohort 3 started in the second year as kindergartners and was followed through the 3rd and 4th years. We used the 2nd- and 3rd-year data in this study because they included all three cohorts of students and maximized the sample size for our analyses. The three cohorts of students were not statistically significantly different from each other with respect to demographic characteristics, such as ethnicity (African American vs. non–African American), $\chi^2(2) = 4.75$, $p > .05$; gender, $\chi^2(2) = 3.58$, $p > .05$; or the number of free/reduced-price lunch children, $\chi^2(2) = 1.06$, $p > .05$. Because of attrition, Cohort 1 had 103 students in the 2nd year and 85 students in the 3rd year; Cohort 2 had 108 students in the 2nd year and 87 students in the 3rd year; Cohort 3 had 237 students in the 2nd year and 160 students in the 3rd year. After students with missing values were removed, the sample size was 350; data loss at these levels is common in schools experiencing high levels of mobility evident in the participating district and was not viewed as cause for concern regarding the diversity of the 203 (58%) boys and 147 (42%) girls in our study. The ethnicity was reflective of children at risk for school failure: 196 (56%) Black, 37 (11%) White, 95 (27%) Latino, 11 (3%) Asian/Pacific Islander, and 10 (3%) identified as Other. Participants' primary language was 245 (70%) English, 95 (27%) Spanish, and 10 (3%) other. In addition, the students' lunch status was represented by 269 (77%) free, 36 (10%) reduced, and 45 (13%) regular. These levels of minority enrollments and poverty status are typical of those in schools enrolling large numbers of students at risk for school failure (cf. Jenner & Jenner, 2007; Scott-Little, Hamann, & Jurs, 2002). Scores and characteristics for participating students were comparable to those of children included in similarly focused research with smaller samples at high risk for failure (see Table 1).

Procedures

We compiled scores for all students on a set of reading measures (*Woodcock Reading Mastery Test–Revised* (WRMT-R); Woodcock, 1998) and a set of behavior measures (*Social Skills Rating System* (SSRS); Gresham & Elliott, 1990) at the end of each school year. Both measures have been widely used in similar research focused on students at risk for school failure. The achievement measures were administered by research assistants trained to deliver them in a consistent and accurate manner. During professional development workshops prior to data collection, a certified school psychologist demonstrated proper administration of subtest items and provided corrective and supportive feedback during carefully structured guided-practice activities. After training, the research assistants were told to conduct a practice testing session, and opportunities were provided for discussion and review before they tested any students participating in the project. All assessments occurred in a 2-week period near the end of the school year. Achievement testing was conducted in quiet areas of the schools (e.g., vacant media centers), and the total time was about 45 minutes per child. Classroom teachers completed the SSRS after receiving verbal and written instructions and no information about the purpose of the data collection. They completed the forms and returned them to the research team shortly after the achievement testing was finished for children in their classroom. Scoring accuracy and data entry checks were completed by dividing agreements by agreements plus disagreements and multiplying by 100. Initial agreement in scoring achievement test and rating scale protocols was greater than 90%, and inconsistencies were corrected prior to data entry. Final agreement after all data were entered and checked was 100%.

Woodcock Reading Mastery Test–Revised (WRMT-R). The WRMT-R is a norm-referenced collection of tests designed to measure reading achievement (Woodcock, 1998). Although

the WRMT-R includes six subtests, only three were used for this project. Specifically, the WRMT-R subtests administered were Word Attack (WA), Word Identification (WI), and Passage Comprehension (PC).

The WA subtest requires the examinee to read nonsense words (i.e., letter combinations that are not actual words) or low-frequency words from English. This subtest is intended to provide a measure of students' ability to use phonic and structural analysis skills and knowledge to pronounce unfamiliar words. Each form of the WA subtest includes 45 items arranged in order of difficulty. Grade-based standardized scores were used.

The WI subtest requires students to identify isolated words that appear in large type on the test stimulus book. As examinees proceed through the items, they are asked to identify words that are increasingly less frequent in usage. Each form of the WI test has 108 items. Grade-based standardized scores were used.

The PC subtest measures students' ability to read a short selection of connected text (approximately two to three sentences) and identify the key word missing from the passage. To produce the correct response, the student needs to understand not only the sentence in which the word is missing, but also the entire passage. Each form of the PC subtest includes 68 items arranged in order of difficulty. Grade-based standardized scores were used.

Concurrent validity of WRMT-R as a complete set of reading measures was .85 (Williams & Eaves, 2001). The concurrent validities for the three subtests used in this study were .69 for WA, .76 for WI, and .63 for PC (Woodcock & Johnson, 1990). The reliabilities for these three subtests were .89 for WA, .97 for WI, and .92 for PC (Woodock, 1998).

SSRS. The SSRS (Gresham & Elliott, 1990) is a norm-referenced behavior rating scale that measures the frequency of children's (ages 3–18) social skills and problem behaviors. It includes the social skills subdomains of cooperation, assertion, and self-control and the problem behavior subdomains of externalizing, internalizing, and hyperactive. Item ratings are provided on a 3-point frequency scale (0 = *never*, 1 = *sometimes*, 2 = *very often*). Higher total scores on the Social Skills scale indicate more frequent exhibition of desired or acceptable behaviors, whereas higher total scores on the Problem Behavior scale suggest more frequent displays of undesired or unacceptable behaviors at school. This instrument yields standard scores for total social skills and total problem behavior with a mean of 100 and standard deviation of 15.

The SSRS also has a nine-item scale designed to identify students' relative level of academic competence within their classrooms. Items are rated 1 to indicate a student is performing in the *lowest 10% of his or her class*, 2 to indicate performing in the *next lowest 20%*, 3 to indicated functioning in the *middle 40% of the class*, 4 to indicate performing in

the *next highest 20% of the class*, and finally 5 to indicate performing in the *highest 10% of the class*. Raw scores on the Academic Competence scale range from 9 to 45 and are transformed to standard scores with a mean of 100 and a standard deviation of 15. Internal consistency estimates was .84 for Social Skills, .88 for Problem Behavior, and .95 for Academic Competence (Gresham & Elliott, 1990). Criterion-related validity was .73 for Social Skills, .57 for Problem Behavior, and .72 for Academic Competence (Stephens, 1979).

Design and Data Analysis

Descriptive statistics were employed to document the participants' reading levels (average of all three subtests of WRMT-R), as well as behavior and academic competence rated by their teachers during the 2nd and 3rd years. Pearson correlation coefficients were used to examine the relationships between achievement and behavior. We evaluated the statistical significance of these relationships at the .05 level and used coefficients of determination to assess their practical value. Structural equation modeling was used to examine relationships and the goodness of fit of the data to the hypothesized model between reading and behavior constructs with LISREL 8.72 (Jöreskog & Sörbom, 2005). A covariance matrix was analyzed, and the parameters were estimated with the maximum likelihood method. The model fit indices were evaluated via χ^2 statistic, goodness of fit, normed fit index, non-normed fit index (NNFI), comparative fit index (CFI), standardized root mean square error residual (SRMR), root mean square error of approximation (RMSEA), and the 90% confidence interval of RMSEA. The joint criteria suggested by Hu and Bentler (1999) that NNFI and CFI were both at least .96 and SRMR was at most .09 were used to decide whether the data fit the model. The suggestions provided by LISREL to add analyses from the observable variables to latent variables or to add error covariance between observable variables were not followed because of the concern of mechanically fitting the model (MacCallum, Roznowski, & Necowitz, 1992).

Post Hoc Analyses

In response to reviewer requests for a "deeper analysis" of a subset of our data for the most-at-risk students, we completed two additional analyses. We reviewed third-grade academic data for students who were one standard deviation or more below average in social skills and problem behavior in second grade, and we correlated teacher-rated social skills for these students with their third-grade reading performance. We also reviewed third-grade behavior data for students who were one standard deviation or more below average in academic skills in second grade, and we correlated their reading

Table 2. Means, Standard Deviations, and Correlations of Reading and Behavior Measurements ($N = 350$)

Variable	2nd Year				3rd Year			
	Social Skills	Problem Behaviors	Academic Competence	Reading Achievement	Social Skills	Problem Behaviors	Academic Competence	Reading Achievement
2nd year								
Social skills		−.72*	.55*	.25*	.51*	−.52*	.44*	.21*
Problem behaviors			−.39*	−.12*	−.47*	.59*	−.33*	−.13*
Academic competence				.54*	.40*	−.32*	.61*	.47*
Reading achievement					.18*	−.11*	.48*	.65*
3rd year								
Social skills						−.73*	.56*	.32*
Problem behaviors							−.45*	−.25*
Academic competence								.60*
M	97.52	102.60	89.99	97.12	97.48	102.66	91.09	99.39
SD	15.76	14.41	11.89	11.58	16.04	15.08	12.32	11.35
Range	49 to 130	85 to 138	60 to 115	59 to 136	40 to 130	85 to 144	60 to 115	60 to 127

*$p < .05$.

scores in second grade with teacher ratings of social skills in third grade.

Results

We were interested in the relationship between behavior and achievement. We documented similarities and differences in levels of performance, as well as associations within and between indicators. We also compared social skills and achievement of students most at-risk in reading and behavior.

Levels of Achievement and Behavior

Means, standard deviations, and ranges for participants' reading achievement and levels of behavior and academic competence rated by teachers are reported in Table 2. In general, across 2 years, ratings of students' social skills of were slightly below average, ratings of problem behaviors were slightly above average, academic competence was rated approximately one standard deviation below average, and actual reading achievement was slightly below average. Ranges evident in the performances of participating students were large. Given our selection criteria for schools, we believe these descriptive statistics provide a reasonable picture of children historically at risk for trouble in school, and they were comparable to those of children who participated in similar recent research (cf. Benner et al., 2005; Vaughn et al., 2009).

Relationships Between Achievement and Behavior

Pearson correlation coefficients are also presented in Table 2. Across 2 years, ratings of social skills were negatively related to ratings of problem behaviors. Moderate positive relationships were evident between ratings of social skills and academic competence ($r = .55$ for the 2nd year and $r = .56$ for the 3rd year), and academic competence was negatively related to problem behavior ($r = −.39$ for the 2nd year and $r = −.45$ for the 3rd year). While statistically significant, correlations between ratings of social skills and actual reading achievement ($r = .25$ and .21) and ratings of problem behaviors and actual reading achievement ($r = −.12$ and −.13) were low. Correlations between ratings of academic competence and actual reading achievement and correlations between 2nd and 3rd year actual reading achievement were moderate.

In general, higher ratings were evident within domains than between them (see Table 2 entries in bold). For example, social skills and problem behaviors ($r = −.72, −.73$) and reading achievement ($r = .65$) were highly correlated whereas lower relationships were indicated for social skills and reading achievement ($r = .25, .21$) or reading achievement and problem behaviors ($r = −.12, −.13$). Further, ratings of social skills and problem behavior were more strongly related to ratings for academic competence (absolute values of rs ranged from .39 to .73) than they were to the reading measures (absolute values of rs ranged from .12 to .32); however, ratings of academic competence were related to reading measures ($r = .54$ for the 2nd year and $r = .60$ for the 3rd year). Again, academic competence was measured by teachers' ratings of students' academic achievement relative to classmates whereas each reading proficiency score was measured by nationally recognized standardized tests, which represent students' current reading proficiency when taking these tests. These results suggested that the teacher ratings of students' academic competence only partially reflected (an average of 32% for the 2nd- and

**Table 3.** Model Fit Indices for Relationships Between Reading and Behavior

Model	χ^2	df	GFI	AGFI	NFI	NNFI	CFI	SRMR	RMSEA	90% LL	90% UL
Social skills	110.12	43	.95	.90	.96	.96	.97	.06	.07	.06	.09
Problem behaviors	100.24	43	.95	.92	.96	.97	.98	.06	.06	.05	.08

Note. GFI = goodness of fit, AGFI = adjusted goodness of fit, NFI = normed fit index, NNFI = nonnormed fit index, CFI = comparative fit index, SRMR = standardized root mean square residual, RMSEA = root mean square error of approximation; LL = lower limit of the confidence interval for RMSEA; UL = upper limit of the confidence interval for RMSEA.

3rd-year coefficients of determination) students' actual reading proficiency. Therefore, we further examined how students' behavior was related to their reading proficiency. Although social skills and problem behaviors were measured by a single instrument (SSRS), they represent opposite (positive vs. negative) student behavior. As a result, these two constructs were used separately, and two models were fit. A similar method was used by Miles and Stipek (2006) when treating aggressive behaviors and prosocial behaviors separately with literacy achievement. Another construct named "reading" was created to include all reading measures from WRMT-R.

The relationship model for reading and social skills is illustrated in Figure 1, and that for reading and problem behavior is in Figure 2. The model fit indices are presented in Table 3. According to the joint criteria suggested by Hu and Bentler (1999), all three models fit very well with the data (the minimum NNFI or CFI value was .97, and the maximum SRMR value was .07). The standardized parameter estimates for the relationship between 2nd-year reading and 3rd-year social skills was .02, and that for 2nd-year social skills and 3rd-year reading was .09. The *t*-values for the path between 2nd-year reading and 3rd-year social skills was 0.33, and that between 2nd-year social skills and 3rd-year reading was 1.91, neither of which was statistically significant from zero. As for the relationships between problem behaviors and reading, the standardized parameter estimates were −.03 and −.10, respectively, and the *t*-values for the paths were −0.71 and −2.06. Although the *t*-value of −2.06 was statistically significantly different from zero with 43 degrees of freedom and an alpha level of 0.05, the negative relationship between second-grade problem behaviors and third-grade reading was weak ($r = -.10$). The coefficient of determination (r^2) was minimal (Gravetter & Wallnau, 2008), suggesting that only 1% of variability in third-grade reading can be determined from the relationship with second-grade problem behaviors.

Our final results suggest that our data supported the model across reading and behavior but did not provide enough evidence to support the significant relationship between reading and behavior measures. The strong links in the models were mainly between 2nd- and 3rd-year
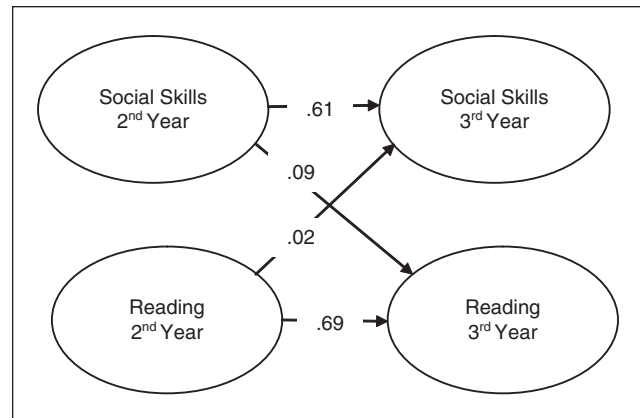
Figure 1. Standardized parameter estimates from path analysis of reading measures and social skill measures. Individual items that contribute to the latent constructs (depicted as ovals) and all error terms and correlations were excluded from the figure for the sake of clarity.
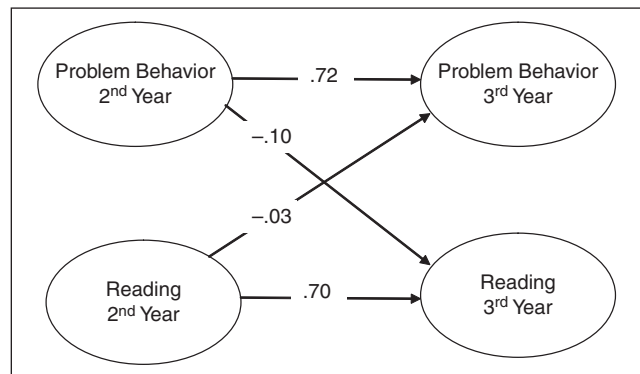
Figure 2. Standardized parameter estimates from path analysis of reading measures and problem behavior measures.
Note: Individual items that contribute to the latent constructs (depicted as ovals) and all error terms and correlations were excluded from the figure for the sake of clarity.

behavior measures as well as between 2nd- and 3rd-year reading measures. Put another way, ratings of academic competence were related to ratings of behavior and actual achievement, reading performance was related to reading

performance, and ratings of behavior were related to ratings of behavior, but the causal connection between academic achievement and social behavior in our data was weak.

Post Hoc Analysis Outcomes

The social skills and problem behavior of 73 students (21%) were one standard deviation or more below average in second grade; the third-grade reading performance for these students ($M = 97.03$, $SD = 12.98$) was not statistically significantly different ($t = -1.95$, $df = 72$, $p > .05$, 95% CI = -6.00 to 0.06) from average ($M = 100$). The relationship between second-grade cooperation raw score ($r = .14$, $p > .05$), assertion raw score ($r = .10$, $p > .05$), self-control raw score ($r = -0.04$, $p > .05$), total social skills standard score ($r = .08$, $p > .05$), externalizing raw score ($r = .03$, $p > .05$), internalizing raw score ($r = .09$, $p > .05$), hyperactivity raw score ($r = -.18$, $p > .05$), and problem behavior standard score ($r = .01$, $p > .05$) on the SSRS and third-grade Total Reading Standard Score on the WRMT-R was not statistically significant for these students.

The reading performance of 33 students (9%) was one standard deviation or more below average in second grade; the ratings of third grade social skills of these students ($M = 91.36$, $SD = 14.79$) were statistically significantly different ($t = -3.35$, $df = 32$, $p < 05$, 95% CI = -13.88 to -3.39) from average ($M = 100$). The relationship between second-grade WI ($r = .19$, $p > .05$), WA ($r = -.05$, $p > .05$), PC ($r = .28$, $p > .05$), and Total Reading ($r = .17$, $p > .05$) Standard Scores on the WRMT-R and third-grade social skills was not statistically significant.

Discussion

Interest in the relationship between academics and social behavior has a long history, and the "research literature consistently supports a co-occurrence between academic failure and problem behavior" (Sutherland et al., 2008, p. 224). When ratings of achievement and behavior are correlated, the correlations are consistently high. When achievement and behavior are cross-tabulated in comorbidity studies, the coexistence of dysfunction, disability, and distress is consistently high. When multiple measures of achievement and behavior are included in the research, the correlations within sets of achievement and behavior indicators are generally higher than the cross-correlation for any of the achievement or behavior scores. With a longitudinal design, we examined ratings of positive and negative behavior and academic competence and actual achievement of young children, many of whom were "nonresponders" in elementary schools with histories of high rates of failure. Our study confirms, challenges, and extends what is known about the relationship between achievement and behavior.

Some of our outcomes were similar to those in other studies. Teachers provided higher ratings of academic competence for students they rated higher in social skills and lower ratings of academic competence for students they rated higher in problem behaviors. Consistent with the work of other researchers, *ratings from teachers* reflected the widely held belief that behavior and achievement are related. This finding bears little weight in efforts to establish a causal link between academic achievement and social behavior.

Also, consistent with prior research, we found that correlations between academic achievement and ratings of social skills and problem behaviors were statistically significant, but lower than those based solely on ratings. Similarly, the variance accounted for within domains (i.e., achievement with achievement, behavior with behavior) was greater than that accounted for between domains (i.e., achievement with behavior). Consistent with the work of other researchers, adding academic *performance* to the covariance equation for achievement and behavior reduced the magnitude of the observed relationship. Again, this finding bears little weight in efforts to establish a causal link between academic achievement and social behavior.

Finally, the results of our analysis were comparable to those of other researchers using multivariate approaches appropriate (cf. Jöreborg, 1978; Thompson, 2000; Thompson, Diamond, McWilliam, Snyder, & Snyder, 2005; Vaughn et al., 2009) to inform causal inferences regarding the relationship between social behavior and academic achievement. Ratings of social skills predicted subsequent ratings of social skills. Ratings of problem behaviors predicted subsequent ratings of problem behaviors. Ratings of academic competence were related to ratings of social behavior as well as to actual academic performance. Reading performance predicted subsequent reading performance. Unlike the findings reported in other research, ratings of social skills and problem behaviors did not predict reading performance and reading performance did not predict ratings of problem behavior and social skills.

The results of our post hoc analyses of "extreme" subgroups (i.e., students one standard deviation or more below the mean in social skills or academic skills) did not strongly support a relationship between achievement and behavior. In general, teachers' ratings of students' social skills in second grade were unrelated to the students' reading performance in third grade, and students' reading performance in second grade was unrelated to teachers' ratings of social skills in third grade.

Implications for Changes in Research and Practice

The term "black swan" has come to be used as an indication of an improbable event or an *exception to the rule* that provides great opportunity for change (cf. Taleb, 2007). Our

findings were similar to those of others (cf. Benner et al., 2005; Miles & Stipek, 2006; Nelson et al., 2003a; Trzesniewski et al., 2006) guided by the same historical evidence and different theoretical perspectives, participants, and method; but, like the witnesses who provide different accounts of the same event in the classic 1950 film *Rashomon* by Akira Kurosawa (1969), we see what we have found as a indication of *little or no causal relationship* between academics and social behavior (i.e., *a black swan*). We do this because a striking feature in previous research on covariation of achievement and behavior is not the strength of the association but the remarkable consistency with which the relationship is accepted from studies of very different approaches and findings. The story here, that academics and behavior are related, has become almost a canon and universal truth. As suggested by the following, the frequency with which the story is shared has resulted in almost mythical qualities being imputed to it:

> Nonetheless, researchers have demonstrated that academic failure is one of the *most powerful predictors* of problem behavior and social failure (Manguin & Loeber, 1996; Morrison & D'Incau, 1997). Conversely, researchers have also demonstrated that academic success *is associated with* a decrease in problem behavior (Gottfredson, Gottfredson, & Skroban, 1996). (Reid et al., pp. 130–131, 141, emphasis added)

> This study helps move the field forward by showing that the *association* between young boys' reading achievement and their antisocial behavior is primarily environmentally mediated and probably explained by a reciprocal process that unfolds over time. If replicated, these findings may help guide interventions by showing that *targeting either reading achievement or antisocial behavior* during the preschool and early primary school years is likely to produce changes in both behaviors. (Trzesniewski et al., 2006, p. 85, emphasis added)

> Without a more complete understanding [of the covariation of achievement and behavior], little progress will be made in efforts to effectively prevent the development of significant behavioral and academic problems later on. (Spira & Fischel, 2005, p. 770)

We take the different view by not accepting such a powerful and predictive relationship between academics and behavior because we believe, as others (cf. Heider, 1988) do, that disagreements are often of greater value in moving science forward than widely accepted agreements (as in *all swans are white*).

If we accept that achievement and behavior are related, the path is clear. As Trzesniewski et al. (2006) noted, "[m]any studies have found that "children with educational difficulties are more antisocial, *but the field has yet to reach consensus about the precise cause of this relation*" (p. 72, emphasis added). Or, as Dionne (2005) put it, "[t]he coprevalence may be high in clinical populations, but the linear association remains *modest*, with correlations ranging at best from −.17 to .33" (p. 341, emphasis added). It is interesting that the coefficient of determination (r^2) is low for the values reported by Dionne, with less than 10% of the variance in achievement (or behavior) accounted for by behavior (or achievement), and the coefficient of alienation ($1 − r^2$) reflecting the "unexplained" variance is very high (>90%). Regardless, for some the important continuing interest in accepting that behavior and achievement are related is evidently in determining the cause of the relationship. We believe reexamining the relationship between academic achievement and social behavior is important for what it tells rather than for what it continually leaves untold (i.e., the precise, possible, or projected cause of the relation). The results from our path analysis confirmed the results from the examination of correlations between behavior and reading; that is, teacher ratings of student behaviors were statistically significantly related to student reading proficiency, but this relationship was weak.

The strong positive relationship between student behavior measures and ratings of academic competence suggested that teachers are more likely to rate well-behaved students highly on academic competence and to hold higher expectations of these students. *This speaks to the importance of teaching academics **and** behavior to young children in school.*

Well-behaved students were considered "good" students and were believed to be academically competent because their teachers rated them higher on cooperating with others, asserting themselves, and displaying more self-control in class. Conversely, students who demonstrated more social problems, such as those evidenced by with externalizing, internalizing, and hyperactive behaviors, were believed to be less competent in academic study. *The importance of teaching behavior **and** academics to young children is confirmed.*

Limitations

We did not conduct a randomized control trial of the causal relationship between behavior and achievement, and such a study is unlikely in the future given the logistical improbability and impracticality of controlling academic and behavior interventions to demonstrate effects on behavior and academic outcomes. We did complete our research using multivariate approaches appropriate to inform causal inferences regarding the relationship between social behavior and academic

achievement. Both intercorrelations and structural equation modeling outcomes reflected a weak causal relationship between behavior and achievement. This suggests that not all students rated positively for behavior were "good" readers and that not all students with problem behaviors demonstrate difficulty reading. *Again, this speaks to the importance of teaching academics **and** behavior to all children in school.*

The possibility also exists that our outcomes were defined by the levels of risk demonstrated by the students participating in our study attenuating the relations that we observed. We accept this possibility but also believe that the students in our research were highly representative of the large numbers of students from diverse, at-risk backgrounds experiencing failure in many of America's schools. In a sense, this is the conceptual conundrum that was at the heart of our research. Unlike most of the studies that have demonstrated a "relationship between academic and social behavior" in groups defined by the presence of social or academic behavior problems (e.g., students with emotional disturbance, students with learning disabilities, adolescents in juvenile delinquency centers), we were interested in looking at the relationship between academic and social behavior in a group that was not "*defined*" by the presence of academic or social behavior problems but represented a diverse group of students with histories of high rates of failure in at-risk learning environments. More important, our findings were similar to those observed in previous research with similar and different groups of students. We interpreted them differently because we believe that doing so *speaks to the importance of teaching academics **and** behavior to all children in school.*

It is also possible that our findings were restricted by the "window of time" through which we documented the relationship between achievement and behavior. For example, more years of behavior problems would begin to cause decreases in academic performance, and/or more years of achievement problems would begin to cause behavioral and social problems. Clearly this possibility exists, but waiting represents precisely what active and prudent prevention efforts try to avoid. More important, waiting for problems to manifest actually creates statistical problems when evaluating correlations in restricted groups of individuals. In the end, our goal is minimizing the likelihood of several years of inappropriate behavior or low achievement with a recommendation of *teaching academics and behavior relentlessly to all children* rather than waiting for problems to occur, admiring them, and then blaming them on "the child."

Conclusion

Accepting that all swans are not white does not limit the beauty of those that are. More important, it directs that we expand our worldview to new levels of "*what* [we] *don't know*" (cf. Taleb, 2007, p. xix). There is remarkable consistency in the magnitude of the reported relationship between achievement and behavior. We chose to interpret these findings differently from others. Shifting on the relationship between behavior and achievement from cause to consequence does not limit the value of what is known and has been shown. More important, it directs that we spend more time with what we know than what we do not know.

Are achievement and behavior related? Yes and no. It's all in how you look at it. The correlation between ratings of achievement and behavior has been demonstrated, and we believe there is little to be gained from demonstrating it again. The epidemiologic relationship between behavior and achievement has been demonstrated. Individuals with documented behavior disabilities, dysfunctions, and disorders tend to exhibit disabilities, dysfunctions, and disorders of achievement, and individuals with documented achievement disabilities, dysfunctions, and disorders tend to exhibit disabilities, dysfunctions, and disorders of behavior. We believe there is little to be gained from demonstrating this again. A few studies have examined causal relationships between behavior and achievement using correlational methods, and in relation to their findings, we agree with Duncan et al.'s (2007) projection that "[g]iven evidence, albeit limited, that behavioral interventions succeed at improving behavior but not achievement, behavior would appear to play a limited role in academic success" (p. 1430). More important is acceptance of the limited causal nature of the relationship evident in the research that has been done as a basis for shifting to a new view—that teaching both academic content and behavior is better than teaching one because it *might* change the other. Viewed as outcomes, achievement and behavior are related; viewed as causes of each other, achievement and behavior are unrelated. In this context, teaching behavior as relentlessly as we teach reading or other academic content is the ultimate act of prevention, promise, and power underlying PBS and other preventive interventions in America's schools.

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