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Children with Co-occurring Academic and Behavior Problems in First grade: Distal Outcomes in Twelfth Grade

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Abstract

The aim of the current study was to evaluate the eleven year longitudinal association between students identified in first grade as having academic and behavior problems and distal outcomes in twelfth grade. The study extends prior research that identified latent classes of academic and behavior problems in a longitudinal community sample of 678 predominately African American first-grade students. The type and number of classes identified in first grade differed by gender, but results indicated that students within the classes of behavior and academic problems had long-term negative outcomes in the twelfth grade. The class with co-occurring academic and behavior problems in first grade had the greatest risk for negative distal outcomes for both boys and girls including higher likelihood of special education placement, mental health service use, poor academic achievement, and school dropout. Implications for prevention, early intervention, and current practices in schools are discussed.

Keywords

academic problems; behavior problems; co-occurrence; longitudinal

Introduction

Studies have shown that early onset behavioral and academic problems in elementary school are associated with later negative outcomes for students including aggressive behavior (Petras, Chilcoat, Leaf, Ialongo, & Kellam, 2004; Schaeffer, Petras, Ialongo, Poduska, & Kellam, 2003), grade retention, suspension, academic failure, and school dropout (Tremblay

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et al., 1992; Wagner, 1995). Although research has documented that academic and behavior problems among children co-occur at rates greater than chance (e.g., Bradshaw, Buckley, & Ialongo, 2008; Hinshaw, 1992), it is not clear what specific long-term risk factors are associated with having both problems versus having pure behavior or academic problems. Understanding long-term outcomes associated with academic and behavior problems may lead to the development of more effective preventive and early intervention supports. Therefore, the purpose of the current study was to evaluate the longitudinal outcomes for students in twelfth grade who were identified eleven years earlier, in first grade, as having academic problems, behavior problems, or co-occurring academic and behavior problems. To provide a context for the study, the following literature review includes a theoretical framework and discussion of the importance of early identification of problems followed by the outcomes associated with children with behavior, academic, or co-occurring problems. The factors that may be associated with increased risk for both problems that were of specific interest in this study are also reviewed.

Early Identification

Life course social field theory maintains that early elementary school is a critical transition period that requires successful navigation of social task demands (Kellam & Rebok, 1992). First grade is often a critical juncture for early identification of children with problems as first grade is often the first time some children are in a setting outside of home for a full day. According to life course social field theory and systems theory, children need to be able to navigate demands across multiple contexts in order to be successful (Stormont, 2007). Children have within-child characteristics (e.g., gender, learning history, cultural background) and family characteristics (e.g., adversity) that interact with school characteristics and contribute to children's success in school. It is also clear that specific characteristics, such as living in impoverished conditions, place children at greater risk for not having specific academic and behavior skills to be successful in early elementary grades (Espinosa, 2005). As another important consideration, as early as kindergarten, teachers report that children need to already have specific social skills, including social emotional skills and the ability to self-regulate, in order to succeed in school (Lin, Lawrence, & Gorrell, 2003).

Life course social field theory underscores the need for prevention and intervention when children struggle to meet the expectations of the school environment. The importance of early identification of problems and intervention is also clear in recent educational reform and current practices in schools. Increasingly, schools are using three-tiered models of intervention, including school-wide positive behavioral interventions and supports (SW-PBIS) and response to intervention (RtI), to systematically determine which children need more support. Grounded in public health research, both RtI for literacy and SW-PBIS for social behavior require significant systems reform and have growing evidence to support their effectiveness (Stormont, Reinke, Herman, & Lembke, 2012). After evidence-based practices for literacy and social behavior are solidly in place, additional supports are provided for children who did not respond to the universal intervention. Within the context of SW-PBIS, office disciplinary referrals, teacher nomination and ratings, and direct observational data are most often utilized to determine children who need more support (Mitchell, Stormont, & Gage, 2011). Schools implementing literacy RtI often use curriculum-based measurement to screen for children who are not demonstrating expected academic growth (Stormont et al., 2012). Within the context of RtI systems, the practice of early screening for behavior and academic problems is a typical practice and professionals utilizing these systems could tailor practices according to research on the needs of children with specific types of problems.

Given the number of children who experience behavior or academic problems, it is important that more schools utilize prevention based methods for identifying children who need more support. Also, given the high prevalence of children who have both academic and behavior problems, it is critical that interventions address their individual needs.

Outcomes for Children with Early Problems

Research has shown that children exhibiting behavior problems early in life are prone to significant long-term negative outcomes (Kim-Cohen et al., 2005; Moffitt, 1993). Approximately 65% of students entering elementary school with elevated levels of aggression experience significant behavioral difficulties and associated educational problems in school two years later (Kim-Cohen et al., 2005). Further, children with elevated levels of disruptive and aggressive behavior in early elementary school are at increased risk for academic failure, peer rejection, substance abuse, and delinquency (Moffitt, 1993; Patterson, Capaldi, & Bank, 1991; Schaeffer et al., 2003; Schaeffer et al, 2006). In addition, students with externalizing problem behaviors are at an increased risk for school dropout, poverty, unemployment, and incarceration (Morgan, Farkas, & Wu, 2009), as well as, conduct disorder, anxiety, and depression (Ialongo et al., 1999).

The negative outcomes for students with early academic problems has also been well-documented in the literature. Research shows that learning problems predict mental health problems, especially higher levels of general unhappiness depression, and anxiety (Herman, Lambert, Ialongo, & Ostrander, 2007; Huntington & Bender, 1993, Kistner, David, & White, 2003; Schwartz, Gorman, Duong, & Nakamoto, 2008). Moreover, students with poor academic performance in elementary school, particularly those with reading difficulties, are more likely to engage in delinquency, violence, and substance use during their adolescence (Fleming, Harachi, Cortes, Abbott, & Catalano, 2004). Learning deficits in students are quite costly—not only in terms of special education expenses but also in the personal suffering and frustration of students and their families (Horn, O'Donnell, & Vitulano, 1983; Spreen, 1988).

Outcomes for Children with Co-occurring Academic and Behavior Problems

While children with behavior problems or academic dificulties have negative outcomes, children with co-occurring problems have particularly negative outcomes. Although academic and behavior problems in children are often treated as separate entities, the co-occurrence of externalizing behavior problems and academic underachievement has been estimated to range from 10 percent to over 50 percent (Hinshaw, 1992). Arnold (1997) wrote that both academic and behavior problems in children are "prevalent, stable, resistant to treatment, and cause great suffering to their victims and society" (p. 317). Although for decades researchers have posited that the impact of having both academic and behavioral problems is profound, little research has systematically examined different types of outcomes for children with early difficulties in both academic and behavior areas.

Early work focused on both academic and behavioral concerns included a study by McKinney (1989), which found that students with learning disabilities who also displayed externalizing problem behaviors (e.g., attentional difficulties, conduct problems, or both) were at greater risk for continuing academic difficulties during the gradeschool years than students with internalizing tendencies or those students without coexisting problem behavior. In more recent research, the Conduct Problems Prevention Group found early childhood behavior problems and early academic problems were two of the strongest predictors of later adolescent conduct problems (Dodge, Greenberg, Malone, & the Conduct Problems Prevention Research Group, 2008). McIntosh and colleagues (2006) investigated the interactions between reading skills and problem behavior in kindergarten students and

whether they could predict future behavior problems in the fifth grade using school-wide screening measures. Both behavior and reading measures significantly predicted the number of office discipline referrals received in the fifth grade. Similarly, a recent study found that children most at risk for externalizing disruptive problems in the third and fifth grade were those students entering kindergarten already displaying increased levels of problem behaviors and low reading readiness (Morgan et al., 2009).

Thus, the literature to date provides support for the premise that childen with early behavior and academic problems have negative outcomes. However, more research is needed to understand thespecific demographic factors associated with co-occurring problems and how early problems predict longer term outcomes. According to life course social field theory, it is important to understand additional characteristics that are associated with risk for co-occurring problems to inform prevention and intervention efforts. The limited literature in this area has underscored the importance of gender and cultural background.

Prior studies have found gender differences in the co-occurrence of academic and behavior problems. For example, although both boys and girls with reading problems displayed more aggressive and delinquent behaviors than students without reading difficulties, boys exhibited more aggressive behaviorsthan girls (Wilcutt & Pennington, 2000). Williams and McGee (1994) found that boys, but not girls, with reading difficulties in elementary school were at increased risk for conduct disorder. Other research has found that girls with academic problems may also develop behavior problems later in life (Maughan, Pickles, Hagell, Rutter, & Yule, 1996). Overall, research has shown that girls tend to have a lower prevalence rate of behavior problems than boys; however, when the probability of comorbidity is taken into account, disruptive behavior problems are actually more severe for girls when compared to boys (Loeber & Keenan, 1994). Based on the findings of this research it is important to consider possible differences in gender when investigating the co-occurrence of academic and behavior problems in children.

Poverty is another important variable to consider. Children from low-income families do not fare as well academically as children from more advantaged families (Bradley & Corwyn, 2002; Hart & Risley, 1995). Brooks-Gunn and Duncan (1997) concluded from analysis of multiple longitudinal data sets that poverty, especially when experienced during early childhood, has a large effect on future educational achievement. In public school settings, the effects of poverty interacting with children's skills can be seen as early as kindergarten. Specifically, children from low income backgrounds with academic achievement and social adjustment problems were the most likely to be retained in kindergarten (Mantzicopoulos, 2003). Most studies that examine the influence of socioeconomic disadvantage are based on the perspective that the effects are mediated by school (e.g., ineffective classroom management) and family processes (e.g., parenting practices and cognitive stimulation in the home; Brooks-Gunn, Klebanov, & Liaw, 1995; Stormshak, Bierman, McMahon, Lengua, & Conduct Problems Prevention Research Group, 2000). One group of individuals that are particularly at risk for being low income is African American children. African American children are also at greater risk than other children for having low academic achievement, as well as having teachers' who rate them higher on inattention relative to children who are Hispanic or White (DuPaul et al., 1997). Given African American children are also at increased risk for behavior problems, including receiving an educational diagnosis of emotional disturbance, it is critical more research is conducted with samples of young African American children (Kauffman, 2005).

To this end, a recent longitudinal study by Reinke and colleagues (2008) investigated patterns of academic and behavior problems in children in first grade and their impact on sixth grade outcomes. The study used latent class analysis with a longitudinal sample to

identify several classes of academic and behavior problems in an urban, community sample of predominantly African American first-grade students. Gender was considered an important variable to examine and, accordingly, two latent class analyses were conducted. Four separate classes of students were identified for boys: (1) Co-occuring Academic and Behavior Problems, (2) Academic Problems Only, (3) Behavior Problems Only, and (4) No Problems. Results from this study showed that several of the identified classes, particularly the C-occurring Academic and Behavior Problems class, predicted negative long-term outcomes in sixth grade, such as academic failure, special education services, deviant peer affiliation, school suspension, and increased risk of conduct problems. Theoverall prevalence of boys within each of the three problem classes was similar (e.g., Academic Problems Only [11% of boys], Behavior Problems Only [16% of boys], Co-occurring Academic and Behavior Problems [14% of boys]). However, for girls there was not a distinct class of Behavior Problems Only, and there was an increased prevalance of girls in the Academic Problems Only class. The prevalance of girls in the Academic Problems Only class (24% of girls) was twice that of girls in the Co-occurring Academic and Behavior Problems class (11% of girls).

Purpose of Current Study

The purpose of the current study was to expand upon the findings reported by Reinke and colleagues (2008) by evaluating the twelfth grade outcomes for students in each of these previously identified classes. Examining the effects of academic and behavior problems at school entry upon student development through the end of their school career could help guide decisions about critical leverage points in preventing adverse outcomes for children. The current study utilized the distinct latent classes for boys and girls identified from the large diverse community sample fromReinke et al. (2008) to predict outcomes in twelfth grade. It was hypothesized that the subgroups of behavior and academic problems would predict long-term negative behavioral, mental health, and academic outcomes in the twelfth grade, with the co-occurring problems class exhibiting the greatest risk for having negative distal outcomes.

Method

Participants

Data were obtained from a longitudinal research study conducted by the Johns Hopkins University's Prevention Intervention Research Center (JHU PIRC; see Ialongo et al., 1999). The original study conducted in the fall of 1993, consisted of 678, representative of incoming first graders from 27 classrooms in nine urban public elementary schools. Of these 678 children, 53.4% were male, 86.4% were African American, and 13.6% were White. At entrance into first grade, the children ranged in age from 5.3 to 7.7 years with a mean age of 6.2 years. Approximately two thirds (68.3%) of the children received free or reduced lunch, an indicator of low socioeconomic status. All study procedures were approved by the Institutional Review Board of Johns Hopkins University. Written parental consent was obtained for 97% of children available for participation in the fall of first grade with the remaining 3% of parents either refusing to let their child participate or did not respond to the consent request. There were not any significant socio-demographic differences between parents that consented and parents that refused consent.

In the current study, 574 total students consented and completed the follow-up assessment in twelfth grade. There were a total of 48 (7.1%) refusals; 39 (5.7 %) parents refused consent for students under the age of 18 and 9 (1.4%) participants who were age 18 or older refused to participate. Additionally, 3 participants were deceased (0.4%). For students with available data in twelfth grade, the demographics were similar to the original sample: 53.3% were

male; 87.2% were African American, and 12.8% were White; and 69.5% received free or reduced lunch.

Design for Prevention Trial Conducted in First Grade

A group blocked randomized design with schools as the blocking factor was conducted to evaluate the impact of two prevention interventions implemented when the students were in first grade. In each of the nine elementary schools, three first-grade classrooms were randomly assigned to one of the three intervention conditions: (1) the Classroom-Centered (CC) Intervention, (2) the Family-School Partnership (FSP) Intervention, or (3) the control or usual classroom condition. Teachers and students were randomly assigned to classrooms balancing for gender. The CC and FSP interventions were implemented after pretest assessments in the early fall of first grade, and intervention impact was assessed in the spring of first and second grades. The CC intervention was a combination of the Good Behavior Game (Barrish, Saunders, & Wolfe, 1969), a class-wide strategy to decrease aggressive-disruptive behavior, and an academic intervention that consisted of reading and mathematics enhancements to address low academic achievement. The focus of the FSP intervention was to improve academic achievement and reduce early aggressive-disruptive behavior by improving parent–teacher communication and parents' behavior management strategies with their children. Following a pretest assessment in the fall of first grade, the interventions were implemented over the course of the first-grade year. Participants were followed through age 19, and periodic assessments regarding a variety of academic, behavioral, and mental health academic outcomes were conducted in grades 1 through 3, in grades 6 through 12, and at age 19. For the purpose of the current study, data from the fall of first grade and data from twelfth grade were utilized.

Measures

Predictor measures collected in the fall of first grade—In the fall of first grade, early aggressive behavior, oppositional behavior, attention problems, and standardized math and reading scores were used as indicators for academic and behavior problems. All multi-item assessments, described in more detail below, were divided into binary items to indicate those children with the most problems (e.g., the top 25% for aggressive behavior and the bottom 25% for reading) versus those children with fewer or no problems.

Teacher Observation of Classroom Adaptation-Revised (TOCA-R; Werthamer-Larsson, Kellam, & Wheeler, 1991): In the fall of first grade, the TOCA-R was used to obtain teacher's ratings of students' aggressive behavior, oppositional behavior, and attention problems. The TOCA-R was developed by the JHU PIRC in the evaluation of the first- and second-generation JHU PIRC trials. The TOCA-R consists of 43 items regarding the student's adaptation to classroom task demands in the past three weeks. Using a structured interview conducted by a trained member of the project staff, the teachers rated each child's behavior on a scale from 1 (*almost never*) to 6 (*almost always*).

The TOCA-R Aggressive/Disruptive Behavior subscale has eleven items (e.g. "fights" and "harms or hurts others physically"). Prior research on the TOCA-R indicated the Aggressive/Disruptive Behavior subscale is internally consistent (coefficient alpha = .96 for first grade). Further, the predictive validity of this subscale has been investigated. For instance, higher scores on the Aggressive/Disruptive Behavior subscale in elementary school have been shown to be a strong predictor of violence among adolescents (Petras et al., 2004) and criminality in young adults (Schaeffer et al., 2006).

The TOCA-R Oppositional Behavior subscale has four items: (1) accepts responsibility for actions, (2) disobeys teacher/adults, (3) talks back to teachers/adults, and (4) breaks rules.

The coefficient alpha estimate was .77 in first grade. Regarding concurrent validity, higher scores on the Oppositional Behavior subscale in fall of first grade were significantly related to being suspended in the spring of first grade (β = 0.99, $p < .001$), in second grade (β = 0.75, $p < .001$), in third grade (β = 0.47, $p < .05$), and in twelfth grade (β = 0.53, $p < .001$).

The TOCA-R Attention/Concentration Problems subscale has nine items (e.g., "pays attention" and "easily distracted"). The coefficient alpha estimate was .91 in first grade. Regarding concurrent validity, each unit of increase in teacher-rated attention/concentration problems was associated with a two-fold increase in risk of teacher perception of the need for medication for attention/concentration problems. Furthermore, for each unit increase in TOCA-R Attention/Concentration Problems subscale scores in first grade, there was just under a 60 % increase in the likelihood of failing to graduate from high school (JHU PIRC, 2006).

Comprehensive Test of Basic Skills 4 (CTBS, 1990): The CTBS is one of the most frequently used standardized achievement batteries in the United States. The CTBS Total Math and Total Reading normal curve equivalent scores for each child collected during the fall of first grade were used in the primary analysis. Total Reading was comprised of reading vocabulary and reading comprehension subtests; Total Math was comprised of math computation, math concepts, and analysis subtests. Internal consistency coefficients for the Total Math and Total Reading scores was greater than .80.

Outcome Measures Collected in Twelfth Grade

To test for the association of these first-grade characteristics of academic and behavior problems with outcomes in the spring of twelfth grade, various measures of academic, behavioral, and mental health outcomes were utilized. Each of these measures is described in detail in the following sections.

Academic outcomes—Three academic outcome measures were utilized.

Kaufman Test of Educational Achievement (K-TEA; Kaufman & Kaufman, 1998): The K-TEA is an individually administered diagnostic battery that measures reading, mathematics, and spelling skills. The K-TEA is widely used and norms are based on a nationally representative sampling of over 3,000 children from first through twelfth grade. In the present study, the Reading Composite from the KTEA brief form in grade twelve and the Mathematics Composite from the K-TEA comprehensive form in grade twelve were used. Internal consistency coefficients for the Reading Composite and Mathematics Composite were .96 (Worthington, 1987). For the purposes of this analysis, each variable was dichotomized with 1 = bottom 25% and 0 = other 75% of students. For the Reading Composite, the mean score for students in the bottom 25% was 74.63 ($SD = 7.94$; $n = 131$) compared to a mean score of 100.46 ($SD = 12.20$; $n = 411$) for other students. For the Mathematics Composite, the mean score for students in the bottom 25% was 67.98 ($SD = 5.18$; $n = 127$) compared to 95.50 ($SD = 12.07$; $n = 414$) for other students.

Special education services: Student names, birthdates, and school identification numbers were sent to the school district. Official school records were obtained electronically from the school district to determine the presence or absence of receipt of special education services in twelfth grade. Less than 5% of the students had missing data for this variable in the district records, for these students' teachers reported via a checklist if the student received or did not receive special education services. Student receiving special education services were coded as a 1, and all others were coded as a 0.

High school graduation: Student names, birthdates, and school identification numbers were sent to the school district. Data were electronically obtained from the school district's official records to determine whether each student graduated from high school. Students who did not graduate from high school were coded as a 1, and all others were coded as a 0.

Behavioral outcomes—Three behavioral outcome measures were utilized.

Deviant peer affiliation: A subset of items from Capaldi and Patterson's (1989) youth self-report scale was used to measure deviant peer affiliation in the spring of twelfth grade. These items are based on the theory that deviant peer affiliation increases the risk of students' antisocial behavior and that antisocial behavior and substance abuse are modeled as well as reinforced by deviant peers (Patterson, Reid, & Dishion, 1992). Youth were asked in forced-choice format to indicate how many of their friends or siblings engaged in antisocial behavior (e.g., hitting or threatening someone, stealing, and damaging other's property) and substance abuse (1 = *none* to 5 = *all of them*). Coefficient alpha estimates ranged from .78 to .81 in grades 6 through 12. For the purposes of this analysis, the measure was dichotomized with 1 = top 25% and 0 = other 75% of students. An overall score of 1.67 or higher (range 1.67 to 5) was utilized to create the top 25%. The mean rating of deviant affiliation among students ranked in the top 25% was 2.10 ($SD = 0.51$; $n = 152$) compared to 1.14 ($SD = 0.17$; $n = 422$) for other students.

Suspensions and school disciplinary removals: School records were used to determine disciplinary removals and suspensions in twelfth grade for each child participating in the study. Student names, birthdates, and school identification numbers were sent to the school district. Data were electronically obtained from the school district's official records. Disciplinary removals included all suspension and expulsions from school that year. Those students with one or more disciplinary removals were coded as a 1, and all others were coded were as a 0.

Criminal arrest: Criminal convictions and arrests were electronically obtained from official police and court records. Students with any juvenile or adult criminal arrest were coded as 1, and all others were coded as 0.

Mental health outcomes—Two mental health outcome measures were utilized.

School-based mental health service utilization: The Service Assessment for Children and Adolescent-Parent Report (SACA-P; Horwitz et al., 2001) is a structured interview created to obtain information on youth mental health and drug treatment service utilization from parents. Using a variant of the school-based mental health and educational services module of the SACAP, school psychologists or social workers completed a checklist for students in twelfth grade that asked whether they provided services to the participating student and if so, the nature of those services (e.g., consultation, assessment, and individual or group counseling) and the number of service hours provided over the current school year. Thus, service utilization was restricted to services provided within the school setting. The use of mental health services was coded as 1 if a child was receiving any school-based mental health services and 0 if they were not.

The Diagnostic Interview Schedule for Children-IV (DISC-IV; Shaffer et al., 2000): The DISC-IV was administered to participating students. A diagnosis of Conduct Disorder (CD) at any time in grades 9 through 12 was used as a mental health outcome for the current study. The DISC-IV is a fully structured interview that generates a Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association,

1994) diagnosis as well as the number of diagnostic criteria met and a symptom count for each disorder. Trained staff administered the assessment to students at each time point (grades 9 through12). Consistent with the DSM-IV, the DISC-IV generates impairment indices when diagnostic criteria are met for the disorder. The DISC-IV specifies the exact wording and sequence of questions and provides a complete set of categories for classifying respondents' replies.

Although the complete results of the psychometric studies of the DISC-IV have yet to be published, the data on the earlier versions of the DISC (DISC 2.1, DISC 2.3), suggest adequate evidence supporting scores' test–retest reliability (Jensen et al., 1995) and validity (Schwab-Stone et al., 1996). A computer algorithm developed byShaffer et al. (2000) was used to derive the diagnoses and the associated impairment levels. Due to the low prevalence of CD in twelfth grade (2.3%), for purposes of this analysis, students with a diagnosis of CD at any point in grades 9 through 12 were coded as a 1, and all others were coded as 0. Utilizing a diagnosis of CD in grades 9 through 12 allowed for the inclusion of any student who had met the diagnostic criteria of CD during their high school years.

Statistical Methods

Reinke et al. (2008) utilized latent class analysis (LCA) to examine the structure underlying the five indicators of academic and behavior problems in the fall of first grade, prior to implementation of the interventions. The basis of LCA is that, within each class, behavior problems are locally independent, meaning that the co-occurrence of academic and behavior problems can be explained by an underlying classification of children into classes with similar patterns of behavior. Overall, the goal of LCA is to identify the smallest number of classes that accurately describes the association between the selected first-grade indicators. The five indicators used in this analysis were TOCA-R Aggressive/Disruptive Behavior subscale, Oppositional Behavior subscale, and Attention/Concentration Problems subscale, as well as CTBS Total Reading and Total Math scores. The results for the characteristics for identified latent classes was expressed in probabilities of having high levels of academic or behavioral problems and the prevalence or proportion of children in each class. Reinke et al. (2008) identified distinct classes of academic and behavior problems for boys and girls in first grade. TheReinke et al. (2008) study provides a detailed account of the method, analysis strategy, model selection criteria, and model fit statistics. Table 1 provides a summary of the fit statistics utilized to select the latent class solutions for both boys and girls in the first grade.

The following provides a brief summary of the gender-specific latent class models identified inReinke et al. (2008) utilized by the current study to examine twelfth grade outcomes. For first-grade boys, the four class model fit the data best, and for first-grade girls, the three class model fit the data best. The classes for boys included Class 1: Co-occurring Academic and Behavior Problems (14% of boys; $n = 51$), Class 2: Academic Problems Only (11% of boys; $n = 40$), Class 3: Behavior Problems Only (16% of boys; $n = 58$), and Class 4: No Problems (59% of boys; $n = 213$). For girls the classes included Class 1: Co-occurring Academic and Behavior Problems (11% of girls; $n = 35$), Class 2: Academic Problems Only (24% of girls; $n = 76$), and Class 3: No Problems (65% of girls; $n = 205$).

To expand uponReinke et al. (2008), these unique first grade latent classes were used to predict distal outcomes in twelfth grade utilizing latent class regression analysis (Guo, Wall, & Amemiya, 2006). These analyses investigated the association between the LCA-derived academic and behavior classes and categorical distal outcomes. Using categorical outcomes in the analyses provides the odds of a poor outcome occurring for each class in comparison to the class without academic or behavior problems. Each outcome was modeled separately.

Intervention status was included in all outcome analyses to control for any associated effects.

Attrition and Missing Data

Data were collected on a total of 574 (84.66%) participants from the original study of 678. There were no differences on race, $\chi^2(2, N = 678) = 4.29$, $p = .12$; gender, $\chi^2(1, N = 678) = 1.33$, $p = .25$; or free or reduced lunch status, $\chi^2(1, N = 678) = 0.65$, $p = .42$ for students with missing data in twelfth grade. Similarly, there were no differences for student with missing data on twelfth-grade outcomes on first-grade study variables, Aggressive/Disruptive Behavior , $\chi^2(1, N = 678) = 0.04$, $p = .84$; Attention/Concentration Problems , $\chi^2(1, N=678) = 0.02$, $p = .88$; Oppositional Behavior, $\chi^2(1, N = 678) = 0.01$, $p = .92$; CTBS Total Reading, $\chi^2(1, N = 678) = 2.14$, $p = .14$; and CTBS Total Math, $\chi^2(2, N=678)= 4.29$, $p = .12$. The Mplus software utilizes full information maximum likelihood estimation under the assumption that the data are missing at random (Arbuckle, 1996; Little, 1995), which is a widely accepted way of handling missing data (Muthén & Shedden, 1999; Schafer & Graham, 2002). Overall, between 78% and 100% of data were available for outcome variables. The minimum covariance coverage recommended for reliable model convergence is .10 (Muthén & Muthén, 2010). In the current study coverage ranged from .52 to 1.00 for boys and .57 to 1.00 for girls; these values are well above the recommended minimal covariance coverage value.

Results

The prevalence of the twelfth grade distal outcomes for girls and boys are provided in Table 2. Boys in the sample had a larger percentage of students receiving special education services, being suspended, having a criminal arrest, and having conduct disorder than girls. Girls had a larger percentage of students who graduated from high school than boys. Other variables were relatively similar in their prevalence across genders.

Predicting Twelfth Grade Outcomes

Outcomes associated with each class for boys—Table 3 provides the odd ratios estimates (OR) for the academic and behavior classes in relation to twelfth-grade outcomes for boys as determined using longitudinal latent class multinomial logistic regression models (Guo et al., 2006). The OR specifies the estimated odds for each of the academic and behavior problem classes compared to the No Problem class. All ORs that are statistically significant ($p < .05$) are highlighted in Table 3. With regard to academic outcomes, boys in the Academic Problems Only class were 8 times more likely to have poor reading scores, 6 times more likely to have poor math scores, and 2 times less likely to graduate from high school than boys in the No Problems class. Boys in the Behavior Problems Only class were not statistically different from boys in the No problems class with regard to reading, math, or high school graduation, but were 7 times more likely to receive special education services. Boys in the Co-occurring Academic and Behavior Problem class were 4 times more likely to have poor reading scores, 13 times more likely to have poor math scores, 16 times more likely to receive special education services, and 6 times less likely to graduate from high school. When evaluating twelfth grade behavioral outcomes, none of the problems classes differed from the No Problems class with regard to deviant peer affiliation or suspensions from school. However, the Behavior Problems Only class was 3 times more likely to have a criminal arrest. Finally, boys in the Co-occurring class were 4 times more likely to receive mental health services, but were not more likely to be diagnosed with CD than the No Problems class, whereas, the Behavior Problems Only class was 3 times more likely to be diagnosed with CD between ninth and twelfth grade than the No Problems class.

Outcomes associated with each class for girls—Table 4 provides the odd ratios estimates (OR) for the academic and behavior classes in relation to twelfth grade outcomes for girls as determined using longitudinal latent class multinomial logistic regression models. The OR specifies the estimated odds for each of the academic and behavior problem classes compared to the No Problem class. Girls in the Co-occurring Academic and Behavior Problems Only class had statistically significant differences across all academic outcomes when compared to girls in the No Problems class. For instance, girls in the Co-occurring Academic and Behavior Problems class were 4 times more likely to have poor reading scores, 11 times more likely to have poor match scores, 4 times more likely to receive special education services, and 3 times less likely to graduate from high school than girls in the No Problems class. Whereas, girls in the Academic Only class were 4 times more likely to have poor reading scores, 5 times to have poor math scores (although this was not statistically significant) and 3 times more likely to receive special education services than girls in the No Problems class. Both problems classes for girls were found to be significantly more likely to be suspended from school than girls in the No Problem class. In addition, girls in the Co-occurring Academic and Behavior class were 3 times more likely to have a criminal arrest than girls in the No Problems class. Girls in the Academic Only class were not more likely to be arrested than the No Problems class. Both problems classes for girls were significantly more likely to use mental health services, but did not differ from girls in the No Problems class with regard to being diagnosed with CD.

The intervention status was not statistically significant ($p < .05$) for any of the identified classes on the distal outcomes for boys or girls. This lack of significance was likely due to the small sample size for each problem class.

Discussion

This study evaluated the eleven year longitudinal association between students identified in first grade as having academic and behavior problems and distal outcomes in twelfth grade. Results from the current study extend earlier findings fromReinke et al. (2008) by documenting the persistence of adverse effects of academic and behavior problems in first grade. Showing that patterns of academic and behavior problems at school entry were associated with much greater likelihood of negative school and social outcomes in twelfth grade provides further validation of the importance and relevance of these problem classes, indicating that such problems are life-course persistent. Overall, results supported the hypothesis that the classes of behavior and academic problems predict long-term negative outcomes in the twelfth grade, with the co-occurring academic and behavior problems class exhibiting the greatest risk for having negative distal outcomes.

Both first-grade boys and girls in the co-occurring academic and behavior problems class were more likely to receive special education services, have poor math and reading scores, to utilize mental health services, and less likely to graduate from high school than first-grade children without academic or behavior problems. Some specific findings of interest were that only boys with behavior problems were at increased risk for receiving special education services; boys with both academic and behavior problems were almost 16 times more likely than boys without problems to receive special education services. Findings from the current study support prior research noting the need to identify students with academic and behavior problems through school-wide screening and provide an integrated approach by delivering interventions with both academic and behavior supports in an effort to improve outcomes for more students (McIntosh, et al., 2006). The study clearly found that early academic and behavior problems are fairly intractable in response to typical schooling supports. Without early identification and adequate school interventions at school entry, students with

academic and behavior problems in first grade are likely to struggle throughout their academic career.

The problem classes with only academic or only behavior problems were also associated with long-term negative outcomes. Both boys and girls in the academic-problems-only classes were more likely to have poor reading scores in twelfth grade compared to the no problems class. Additional negative academic outcomes for boys in the academic-problems-only class included being more likely to have poor math scores and being less likely to graduate from high school. For girls in the academic-problems-only class, additional negative academic outcomes included being more likely to receive special education services and more likely to be suspended from school. Furthermore, the behavior-problems-only class for boys predicted negative behavioral outcomes such as being more likely to have been diagnosed with conduct disorder in high school, more likely to receive special education services, and more likely to have been arrested as a juvenile or adult.

Several gender differences were also documented. Because girls were not characterized by a behavior-problems-only class, behavior problems in girls occurred only in combination with academic problems. Furthermore, similar to prior research which found that girls with academic problems develop behavior problems later in life (Maughan et al., 1996), girls in the academic problems- only class had significant negative outcomes for both behavioral outcomes (e.g., suspension and mental health services) and academic outcomes (e.g., special education services and poor reading scores). However, boys in the academic-problems-only class only had significant negative outcomes for academic variables such as poor reading and math scores and being less likely to graduate from high school. Similarly, the boys in the behavior-problems-only class had significant negative outcomes associated with behavior variables including being more likely to have been arrested and more likely to meet criteria for the diagnosis of CD.

Study Strengths and Limitations

The current study has several strengths. First, this research utilized a longitudinal design, which provided the opportunity to evaluate long-term outcomes related to academic and behavior problems classes into high school for students identified in first grade with academic and behavior problems. Secondly, the use of a large sample of predominantly low-income African American students living in an urban area is a strength given the limited research on this underrepresented group. Moreover, the use of multiple data sources including standardized measures, school and police records data, self-reported diagnosis, and teacher report were additional strengths.

The current study also has several limitations. First, based on the current study, factors prior to school entry (such as parent behaviors or child temperament) that led to each of the classes of early academic and behavior patterns cannot be determined. While early development issues are beyond the scope of the current study, it is an interesting and important area for future research and for identifying leverage points for preventing the school entry problems in the first place. It is important to gain more information on how early academic and behavior problems develop so that schools can identify and utilize effective interventions to support students. Second, another limitation of theReinke et al. (2008) and the current study was that first grade classes were formed from behavior and academic measures at one point in time. However, the distal outcomes associated with these specific classes in both studies provide predictive validity of the first-grade classes. Lastly, other limitations include the limited geographical area and the demographic characteristics of the participants. The inclusion of a specific sample is also a strength; however, findings may not be generalizable to children from other cultural backgrounds (e.g., rural and White).

Implications for School Psychology

The findings from the current study support prevention and early intervention efforts to identify children with academic and behavior problems in the early school years in order to prevent long- term negative outcomes. Based on the current study and the results of Reinke and colleagues (2008), early identification and intervention appears to be paramount. Early screening using both academic and behavioral assessments would be a critical tool to identify students and coordinate services to address both problem areas. Fortunately, many schools now use three-tiered prevention programs for identifying children's responsiveness to social or academic interventions; however, integrated academic and social behavior prevention systems are not as common (Stormont et al., 2012). Findings from this study support the need for schools to revise their current processes for identifying students for services based on either academic or behavioral difficulties and provide integrated services for students across both problem areas. School psychologists play an integral role in initiating school-wide screening for academic and behavior problems and underscoring the need for the development of interventions that integrate supports across both domains.

Several research studies support the focus of preventive interventions that target both poor academic achievement and aggressive and disruptive behavior problems for improving mental health, behavioral, and educational outcomes among children (Ialongo et al., 2006; Kellam, Mayer, Rebok, & Hawkins, 1998). For instance, Ialongo and colleagues (1999) found that early risk behaviors of poor achievement and the combination of concentration problems, aggression and shy behaviors are malleable in first grade, particularly for boys. Additionally, Ialongo and colleagues (1999) found that the combination of behavioral and classroom curriculum enhancements in language arts and math had a significant impact on first grade students' achievement and classroom behavior. Based on these findings, it was recommended that future research focus on both behavior and achievement in school-based, universal preventive interventions. For instance, a recent longitudinal study evaluating intervention outcomes for the overall sample (rather than subgroups of students) found that the intervention condition resulted in higher scores on standardized achievement tests, increased high school graduation and college attendance, and a reduction in special education service utilization (Bradshaw, Zmuda, Kellam, & Ialongo, 2009). These results emphasize the long-term educational outcomes of implementing preventive interventions in early elementary school.

Overall, it is recommended that schools view student academic and behavior problems as potentially co-occurring issues and develop systematic school-wide practices, teams, and intervention services that integrate both academic and behavior supports to meet the needs of students with co-occurring academic and behavior problems. In order to promote and support these integrated efforts, school psychologists need to understand barriers that may occur when trying to implement certain types of assessments or interventions in specific schools or districts and collaborate with others to build structures to support the implementation of new practices. Professionals are more likely to adopt new practices if they see the value in using the practice, have the skills needed and ongoing support to use the practice, and believe it is feasible to use the practice (Domitrovich, Gest, Jones, Gill, & DeRousie, 2010; Fixsen et al., 2005; Noell et al., 2005; Stormont & Reinke, in press). School psychologists play a vital role in addressing each of these areas in order to support the increased use of prevention based assessment and intervention practices. Many school psychologists across the country are successfully fulfilling these roles and building capacity for change to be sustained over time. Given the negative outcomes for children with single and co-occurring problems the importance of initiating or sustaining prevention based efforts is clear.

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Table 1

Model Fit Indices from Reinke, Herman, Petras, and Ialongo (2008) for 1 to 5 Class Solutions of Academic and Behavior Problems for Boys and Girls in First Grade

Model by Gender	BIC	Adj BIC	Entropy
Boys (*n* = 362)			
1 class solution	2,128.790	2,112.928	-
2 class solution	1,931.917	1,897.019	0.835
3 class solution	1,889.770	1,835.837	0.857
4 class solution	**1,881.188**	**1,808.220**	**0.820**
5 class solution	1,910.248	1,818.244	0.837
Girls (*n* = 316)			
1 class solution	1,502.190	1,486.331	-
2 class solution	1,361.737	1,326.848	0.745
3 class solution	**1,293.743**	**1,239.824**	**0.860**
4 class solution	1,313.548	1,240.597	0.876

Note. Bolding indicates the best fitting models for each gender. The lowest Bayesian information criterion (BIC) and adjusted BIC values indicate the best fit. Entropy ratings closer to 1 but greater than .80 indicate acceptable fit.

Table 2

Prevalence of the Twelfth Grade Distal Outcomes for Girls and Boys

	Girls		Boys	
Variable	***n***	**%**	***n***	**%**
Academic Outcomes				
Poor Reading Scores	69	26.2	62	22.2
Poor Math Scores	56	21.5	71	25.4
Special Education Services	23	8.7	60	21.7
Did Not Graduate from High School	115	36.4	166	45.9
Behavioral Outcomes				
Suspension	27	10.0	62	21.8
Deviant Peer Affiliation	60	21.7	92	30.9
Criminal Arrest	40	12.7	82	22.7
Mental Health Outcomes				
Mental Health Service Use	33	17.0	42	19.9
Conduct Disorder	26	10.7	60	20.8

Table 3

Odd Ratios Showing Association Between Academic and Behavior Classes and Twelfth Grade Outcomes for Boys

Variable	Academic Only (11%) vs. No Problem	Behavior Only (16%) vs. No Problem	Academic & Behavior (14%) vs. No Problem
Academic Outcomes			
Poor Reading Scores	8.03* (1.56–41.26)	2.59 (0.49–13.71)	4.25* (1.30–13.90)
Poor Math Scores	5.85* (1.91–17.96)	2.12 (0.60–7.52)	12.94* (5.19–32.23)
Special Education Services	5.50 (0.86–35.27)	6.92* (1.49–32.10)	15.99* (4.14–61.74)
Did Not Graduate from High school	2.30* (1.03–5.18)	1.39 (0.70–2.76)	5.92* (2.05–17.10)
Behavioral Outcomes			
Suspension	2.84 (0.36–22.24)	2.82 (0.52–15.17)	4.49 (0.78–25.76)
Deviant Peer Affiliation	0.54 (0.12–2.41)	0.52 (0.21–1.27)	0.78 (0.29–2.09)
Criminal Arrest	0.85 (0.33–2.15)	2.63* (1.10–6.28)	1.81 (0.61–5.34)
Mental Health Outcomes			
Mental Health Service Use	0.73 (0.13–4.15)	1.74 (0.45–6.79)	4.37* (2.17–8.79)
Conduct Disorder	0.94 (0.29–3.06)	2.49* (1.15–5.37)	0.66 (0.23–1.85)

Note. Range within parentheses indicates 95% confidence interval for odds ratios.

* $p<.05$.

Table 4

Odd Ratios Showing Association Between Academic and Behavior Classes and Twelfth Grade Outcomes for Girls

	Academic Only (24%) vs. No Problem	**Academic & Behavior (11%) vs. No Problem**
Academic Outcomes		
Poor Reading Scores	4.31* (2.15–8.65)	3.85* (1.59–9.31)
Poor Math Scores	5.31 (0.86–32.79)	10.98* (3.00–40.17)
Special Education Services	3.10* (1.06–9.03)	4.01* (1.29–12.48)
Did Not Graduate from High school	1.67 (0.72–3.89)	2.78* (1.22–6.33)
Suspension	3.36* (1.12–10.11)	8.34* (2.50–27.77)
Behavioral Outcomes		
Deviant Peer Affiliation	1.00 (0.43–2.33)	0.65 (0.21–1.99)
Criminal Arrest	1.11 (0.41–2.97)	3.11* (1.15–8.42)
Mental Health Outcomes		
Mental Health Service Use	3.26* (1.01–10.52)	3.15* (1.07–9.25)
Conduct Disorder	1.84 (0.30–11.23)	1.61 (0.49–5.35)

Note. Range within parentheses indicates 95% confidence interval for odds ratios.

* $p<.05$.