Kindergarten Predictors of Recurring Externalizing and Internalizing Psychopathology in 3rd and 5th grade

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Abstract

The purpose of this study was to evaluate the extent to which a range of risk factors (e.g., gender, race/ethnicity, low socioeconomic status [SES], whether the child's family had divorced or separated, low reading readiness, inattention) predicted kindergarten children's likelihood of later recurring psychopathology. Multilevel logistic regression was used to analyze teacher-ratings of frequent and recurring externalizing and internalizing problem behaviors in a longitudinal sample of 4,674 K-5th grade children participating in the Early Childhood Longitudinal Study-Kindergarten Cohort, 1998–1999. Results indicated that certain groups of kindergarten children are at higher risk. Those most at risk of displaying high levels of externalizing problem behaviors in both 3rd and 5th grade are children entering school already displaying high levels of these behaviors, as well as those displaying low reading readiness. Boys and those from low SES households are also at higher risk. Hispanics (compared to whites) are at reduced risk of such problem behaviors. Those most at risk of displaying 3rd and 5th grade recurring internalizing behavior problems are those entering kindergarten with such problems, and children displaying inattention and other learning-related behavior problems. Boys, those from low SES households, and children not being raised by both biological parents are also more likely to display recurrent internalizing behavior problems in 3rd and 5th grade. Asian children are at reduced risk of engaging in these behavior problems.

Children who frequently engage in externalizing or internalizing problem behaviors are at greater risk for a range of negative long-term outcomes (e.g., Schaeffer, Petras, Ialongo, Poduska, & Kellam, 2003; Sprague & Walker, 2000). Such children are much more likely to drop out of school, live in poverty, be unemployed, and be incarcerated or adjudicated (e.g., U.S. Department of Education, 2002). Moreover, these behaviors can quickly become resistant to intervention. Such resistance begins to occur by the end of the primary grades (Walker, Colvin, & Ramsey, 1995). Consequently, it is critical to accurately identify early risk factors for later psychopathology. Identifying these risk factors should help researchers

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and practitioners more effectively target early intervention efforts (Farrington, 2005; Farrington & West, 1993; Holmes, Slaughter, & Kashani, 2001).

Hypothesized Early Risk Factors for Later Psychopathology

Researchers have hypothesized that a range of factors elevates a child's likelihood of engaging in externalizing or internalizing problem behaviors (e.g., Farrington, 2005). Some of these factors (e.g., the child's gender, race/ethnicity) might be characterized as indicating population-based differences in the prevalence of psychopathology (Holmes et al., 2001). For example, boys are about four times as likely as girls to be diagnosed as behaviorally disordered (Russo & Beidel, 1994). Children who are Black are almost twice as likely to be identified as children who are White (Oswald & Coutinho, 2001; Oswald, Adamo, & Coutinho, 1999). Researchers have also begun to report on interactions between a child's gender and race or ethnicity. For instance, Black boys are almost four times as likely as Black girls to be identified as behaviorally disordered (Coutinho & Oswald, 2005).

Other factors (e.g., inattention, poor early reading skills, parental divorce or separation) might be characterized as more likely etiological. These factors may be causal, in that, for varying reasons, they influence the child's propensity to manifest externalizing or internalizing problem behaviors (Nelson, Stage, Duppong-Hurley, Synhorst, & Epstein, 2007; Patterson, 2002). For instance, a lack of economic or cognitive resources (which result from low educational, occupational and/or earnings attainment) can elevate a parent's stress. The parent may therefore be more likely to use coercive discipline, which his or her child may respond to with increased acting out or avoidant behaviors (Campbell, 1995; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Shaw et al., 1998). Inattention may contribute to heightened aggression or withdrawal (Giancola, Mezzich, & Tarter, 1998; Riggs, Greenberg, Kusche, & Pentz, 2006), especially because it reduces the child's capacity to manage the classroom's learning environment and, thus, leads to frustration and anxiety (Elliott & Mirsky, 2002). Early reading failure may also result in increasing feelings of frustration, anxiety, helplessness, and, subsequently, to increased task avoidance (Morgan, Farkas, Tufis, & Sperling, in press; Sutherland & Singh, 2004; Stanovich, 1986). Divorce or separation can also elevate a parent's psychological stress, as well as lessen his or her supervision of the child (Harland, Reijneveld, Brugman, Verloove-Vanhorick, & Verhulst, 2002; Patterson). Identifying those etiological factors that might be targeted by teachers and other school-based staff (e.g., the child's reading readiness, the frequency of his or her task-focused behaviors), especially after statistically controlling for the effects of both socio-demographic confounds (e.g., the child's gender, his or her race/ethnicity) and those additional factors better addressed by other social service professionals (e.g., the family's poverty, parental separation or divorce), should help schools in their efforts to more effectively deliver early interventions.

Limitations of the Research on Psychopathology's Early Risk Factors

To what extent do these early risk factors predict the later occurrence of externalizing or internalizing problem behaviors? Olson, Bates, Sandy, and Lanthier (2000) characterize the answer to this question as both "complex and poorly established" (p. 119). Those factors

hypothesized to be precursors of such behaviors (e.g., low SES, inattention, poor reading ability, divorce) are also thought to be transactional, or reciprocally causative over time (e.g., Crews et al., 2007; Farrington, 2005; Sutherland & Singh, 2004). Yet relatively few empirical studies have quantified these risk factors' long-term predictive strength when measured at or near school entry (Essex et al., 2006). For example, Lipsey and Derzon's (1998) meta-analysis of predictors of adolescent delinquency included only three studies of children who were as young as six when the study's particular predictor was first measured. Little is known about the degree to which these risk factors' effects "wash out," remain stable, or vary across time.

The extant literature is limited in other ways. Substantively, the majority of investigations have focused on identifying predictors of externalizing (e.g., being disruptive, oppositional-defiant, or aggressive) behaviors (Fleming, Harachi, Cortes, Abbott, & Catalano, 2004; Hill, Degnan, Calkins, & Keane, 2006). Yet internalizing (e.g., being anxious, shy, withdrawn, phobic, or depressed) problem behaviors also represent serious child psychopathology (Krueger, Caspi, Moffitt, & Silva, 1998). Most studies have used samples of high-risk boys (e.g., Shaw et al., 2003). Thus, it is largely unknown to what extent young girls may be at risk for externalizing or internalizing problem behaviors (Campbell, Shaw, & Gilliom, 2000). Methodologically, few studies have included the "autoregressor" (i.e., whether a child was already displaying externalizing or internalizing problem behaviors at school entry) in the analyses, despite its potential as a strong confound for effects that might be attributed to other factors (e.g., Badian, 2001; Torgesen, Wagner, Rashotte, Burgess, & Hecht, 1997). No extant study has conducted analyses using a large-scale, nationally representative sample. Instead, most have used relatively small (e.g. N <200) samples (e.g., Morrison, Robertson, Laurie, & Kelly, 2002; Nelson et al., 2007; Olson, Bates, Sandy, & Shilling, 2002; Olson, Ceballo, & Park, 2002; Shaw et al., 1998; Trout, Epstein, Nelson, Reid, & Ohlund, 2006). Use of small samples limits the identification of particular sub-groups of children who may be most in need of early intervention (Bennett, Lipman, Racine, & Offord, 1998; Campbell et al., 2000).

The purpose of the current study was to investigate the extent to which a range of early risk factors predicted the later occurrence of externalizing or internalizing problem behaviors. Notably, we sought to predict recurring or chronic psychopathology (operationalized here as displaying high levels of either externalizing or internalizing problem behaviors in both 3rd and 5th grade). Doing so focused our analyses on those children who are especially likely to continue to display such psychopathology as they age and so likely be most at risk for experiencing a full range of long-term negative outcomes (e.g., school dropout, poverty, unemployment, incarceration or adjudication). We also focused on identifying risk factors measured at school entry. Such knowledge is necessary if interventions are to be effectively targeted during the primary grades. To provide a rigorously derived and precise set of estimates, we quantified a risk factor's strength of effect after statistically controlling both for the autoregressor and each of the other hypothesized risk factors.

Method

Analytical Sample

The data in the current study is a sub-sample of children participating in the Early Childhood Longitudinal Study—Kindergarten Cohort, 1998–1999 (ECLS-K; see http://nces.ed.gov/ ecls/Kindergarten.asp for additional details about the database). The ECLS-K is maintained by the U.S. Department of Education's National Center for Education Statistics (NCES). The ECLS-K is the first large scale nationally representative sample of children as they age through the elementary and middle school years. Data on the ECLS-K's sample is currently available on children up to 5th grade. Children participating in the ECLS-K were selected to be representative of all U.S. schoolchildren entering either public or private (and either full day or half day) kindergarten classrooms in the fall of 1998. The ECLS-K is a multi-source, multi-method study that uses parent interviews, teacher ratings and surveys, student records abstracts, and individually-administered and untimed academic achievement (e.g., reading, mathematics) measures (NCES, 2006), see Table 1. Data from these children were collected at the beginning and end of kindergarten, in the fall and spring of 1st grade (with a random subsample in the fall), and again in the springs of 3rd grade and 5th grade. Our study's analytical sub-sample included those 4,674 children who had complete data on each of the study's outcome measures and risk factors.

Measures

We used a range of factors measured as the child entered kindergarten to estimate his or her risk of later psychopathology. These risk factors included (a) whether the child was already displaying high levels of externalizing or internalizing problem behaviors (i.e., the "autoregressor"), (b) whether the child was displaying high levels of inattention, task avoidance, disorganization, or other types of behaviors that might negatively impact his or her learning, and (c) whether the child had low reading or pre-reading skills. Additional risk factors included (a) the child's or family's socio-demographics (e.g., the child's gender, his or her age at school entry, his or her race/ethnicity, the child's family's SES), family structure (i.e., whether the child was not being raised by both biological parents), relative residential instability (i.e., whether the child changed schools between kindergarten and 5th grade), and (b) the school's relative level of economic resources (i.e., the percentage of children attending the school who were eligible for free or reduced lunch).

Externalizing Problem Behaviors, Internalizing Problem Behaviors, or Task-Avoidant Behaviors at School Entry—We used teacher ratings to estimate whether the child was engaging in high levels of externalizing or internalizing problem behaviors or infrequently attentive or displaying low levels of other task-focused behaviors at school entry.

To measure the externalizing or internalizing problem behaviors and task-focused behaviors of children participating in the ECLS-K, NCES (2006) modified the Social Skills Rating System (SSRS; Grehsam & Elliott, 1990). These changes included (a) expanding the response format from a three point to a four point scale, (b) allowing for a "not observed" response, and (c) re-wording some items to reduce cultural bias (e.g., changing "Responds

appropriately when pushed or hit by other children" to "Firmly tells an aggressive peer to stop hurtful acts (e.g., "Stop hitting," "No pushing")." NCES refers to the modified scale as the Social Rating Scale (SRS; see Meisels, Atkins-Burnett, & Nicholson [1996] for details about these modifications). The psychometric data of the original Social Skills Rating System were based on 4,170 K-12 students (Gresham & Elliott). Of these, 17% attended special education classes. The test–retest correlation over 4 weeks was .85 for the teacher ratings (Gresham & Elliott). The original measure's construct validity is supported by both correlational and factor analyses (Feng & Cartledge, 1996; Furlong & Karno, 1995). The split-half reliabilities reported by NCES for the modified SRS ranged from .76 to .89 for the 3rd and 5th grade administrations (NCES, 2004, 2006).

We used three subscales from the ECLS-K's SRS. These subscales were: (a) Externalizing Problem Behaviors; (b) Internalizing Problem Behaviors; and (c) Approaches to Learning (i.e., the child's level of task-focused behaviors). Teachers used a frequency scale to rate how often the child displays a particular social skill or behavior (i.e., 1=student never exhibits this behavior; 4=student exhibits this behavior most of the time). The Externalizing Problem Behaviors subscale's items measure acting out behaviors (e.g., arguing, fighting, showing anger, acting impulsively, disturbing the classroom's ongoing activities). The Internalizing Problem Behavior subscale's items ask teachers about whether the child appears anxious, lonely, sad, or has low self-esteem. Items used for the Approaches to Learning subscale measure task-focused behaviors (e.g., displays attentiveness, task persistence, eagerness to learn, learning independence, easily adapts to changes in routine, and organization). NCES (2005) reports that the split-half reliabilities for the three scales for 3rd grade children were .89 (Externalizing Problem Behaviors), .76 (Internalizing Problem Behaviors), and .91 (Approaches to Learning). These reliabilities in 5th grade were .89 (Externalizing Problem Behaviors), .77 (Internalizing Problem Behaviors), and .91 (Approaches to Learning). Exploratory and confirmatory factor analyses confirmed the SRS's structure (NCES, 2005).

We considered the child as displaying high levels of externalizing or internalizing problem behaviors at school entry if his or her score on the Externalizing Problem Behaviors or Internalizing Problem Behavior subscales of the SRS was within the highest 15% of scores from the fall of kindergarten surveys of teachers. We considered a child entering school as displaying low levels of task-focused behaviors if his or her score was within the lowest 15% of scores from the fall of kindergarten survey of teachers, using the Approaches to Learning subscale of the ECLS-K's SRS.

Low Reading Readiness—Scores from the base year administration of the ECLS-K Reading Test were used to estimate whether a child was displaying low reading readiness at kindergarten entry. Specifically, we considered a child as not being reading ready if his or her score was one of the lowest 15% of the full sample's distribution of scores from the fall of kindergarten administration of the ECLS-K's Reading Test.

The Reading Test was designed to measure a child's level of basis skills (e.g., print familiarity, letter recognition, decoding, sight word recognition), as well as his or her receptive vocabulary and reading comprehension skills. The Reading Test was field-tested.

Items were included in the Test's final form if they displayed (a) acceptable item-level statistics, (b) good fit with maximum likelihood parameter estimates using Item Response Theory (IRT), and (c) no differential item functioning across gender or race (NCES, 2005).

NCES-trained field staff individually administered the Reading Test using an un-timed format. NCES uses a routing procedure (i.e., a child is given a different battery of test items depending on the accuracy of his or her initial responses) and IRT methods to derive scale scores that are then comparable across grade levels. NCES considers reliabilities of the Reading Test's IRT theta scores (i.e., estimates of a child's ability) to be the most appropriate internal consistency estimate. The Reading Test's fall of kindergarten theta reliability was .91 (NCES, 2005).

Socio-Demographic Information

NCES field staff interviewed each child's parent(s) during the fall of the child's kindergarten year. We used these data to identify socio-demographic factors that might function as risk factors for psychopathology.

Gender—We used responses on a parent report measure to identify a child's gender. We coded "female" as a 1 and "male" as a 0.

Socioeconomic Status—We estimated SES as a risk factor in two ways. The first was an NCES-calculated composite variable indicating the family's SES. This was computed at the household level using data for the set of parents who completed the parent interview in the kindergarten year. The SES variable estimated the household conditions on father or male guardian's education, mother or female guardian's education, father or male guardian's occupation, mother or female guardian's occupation, and household income. NCES converted each of these into Z-scores, and then averaged the scores. We used the continuous scale of the SES variable (i.e., WKSESL). This ranged from –4.75 to 2.75. The second was whether the child's family was living below the poverty line at the time the child entered kindergarten.

Family Structure—We used parent report as to whether the child was (coded as "0") or was not (coded as "1") living with both biological parents at school entry.

Race/Ethnicity—We coded for five racial or ethnic groups, as reported by the parent. These categories were non-Hispanic white, black/African American, Hispanic, Asian, and a group labeled "other ethnicity" composed of the remaining students. We used non-Hispanic white as the reference category.

Child's Age at Kindergarten Entry—We entered the child's age at school entry as a continuous variable, as reported in the parent interview.

Study Constructed Variables

Several variables were constructed from the ECLS-K data to be used in this study's analyses.

Residential Instability—We calculated this dichotomous variable based on whether the child had changed any school between kindergarten and 5th grade.

Socioeconomic Status of School's Students—The percentage of students eligible for free lunch in each kindergarten school was used as a continuous variable and as an estimate of the level of economic resources available to that school's students. This information was reported in the school's administration questionnaire. We used the SES of the school's students as a Level 2 predictor in our Hierarchical Linear Modeling (HLM).

Recurring Psychopathology—We estimated the degree to which the aforementioned risk factors predicted recurring externalizing or internalizing problem behaviors. We used teacher ratings on the ECLS-K's modified SSRS to identify children who were displaying recurring externalizing or internalizing problem behaviors. Here, we considered a child as repeatedly displaying externalizing problem behavior if his or her (a) 3rd grade teacher score on the Externalizing Problem Behavior subscale of the SSRS were within the highest 15% of the 3rd grade score distribution *and* (b) 5th grade teacher score on this same measure was in the highest 15% of the 5th grade scores distribution. Thus, we did not consider a child whose 3rd grade score was in the highest 15% of the 3rd grade scores, but whose 5th grade scores was not in the highest of 15% of 5th grade scores as displaying recurring externalizing problem behaviors. We used the same operationalization when considering whether a child was repeatedly displaying internalizing problem behaviors. Specifically, we considered a child as repeatedly engaging in internalizing problem behaviors only if his or her 3rd and 5th grade teacher-rated scores on the Internalizing Problem Behavior subscale of the SSRS were in the highest 15% of scores from the 3rd and 5th grade surveys, respectively. Our use of a cutoff score of 15% is consistent with estimates of prevalence of emotional and behavioral disorders in preschool- and school-aged children (Egger & Angold, 2006; Feil et al., 2005; Qi & Kaiser, 2003). Cutoff scores are frequently used to identify populations at risk for emotional and behavioral disorders (EBD; e.g., Nelson et al., 2007). Gresham, MacMillian, Bocian, Ward, and Forness (1998) used cutoff scores of about 15% on the teacher-administered SSRS to identify children displaying high levels of externalizing or internalizing problem behaviors.

Analytical Strategies

Logistic regression was used to predict whether or not the student displayed recurrent psychopathology in both 3rd and 5th grade. Logistic regression is a frequently used analytical tool to identify risk factors for diseases, disorders, or conditions (Ely, Dawson, Mehr, & Burns, 1996) such as behavioral disorders (e.g., Bennett et al., 2003; Carroll, Maughan, Goodman, & Meltzer, 2005; Nelson et al., 2007). Logistic regression produces odds ratios as an estimate of effect size. An odds ratio (OR) is the odds (i.e., (the probability of an event)/(1-the probability of an event) of experiencing an event for Group A relative to that of Group B (Case, Kimmick, Paskett, Lohman, & Tucker, 2002). When an OR is used to measure the effect of a predictor variable in a multivariate logistic regression, it indicates the multiplicative factor by which the odds of the event change for a one-unit change in the predictor variable. For example, if the OR coefficient for the effect of being female on externalizing problem behavior is .305, this means that females (who are coded 1, compared

to males, who are coded 0) have odds of such an outcome that are .305 (or about 31 percent) those of males. If the OR coefficient for the effect of being Asian on externalizing behavior problems is .835, this means that Asians (who are coded 1, compared to whites, who are the base or reference category and so coded 0) have odds of such an outcome that are .835 (or about 84 percent) those of whites. A finding of "no effect" is indicated when the OR is (or is close to) 1.0. An OR that is larger than 1.0 indicates a greater risk of experiencing the outcome relative to the reference group. An OR less than 1.0 indicates a lower risk. We used HLM with a logit link function to perform regressions that statistically adjusted for the spatially clustered nature of the sample design (i.e., students within schools). We used listwise deletion to account for missing data. We report weighted estimates to adjust for sampling structure.

Results

In the comparison between the ECLS_K full sample and the analytic sample, low-SES and minority students were less likely to have complete data, see Table 2. Due to our deleting of cases with missing data from the analytic sample, the analytical sample is not fully representative of the kindergarten class of 1998–1999. The analytical sample includes a large number of both boys (n = 2,275) and girls (n = 2,399) and representation of children from a range of race/ethnic groups (i.e., White, Black, Hispanic, and Asian). Because a large number of predictors are included, and thus accounted for in our regressions, including measures of factors that increased a child's likelihood of having incomplete data, the results are likely to be generalizable to the population as a whole.

Table 3 displays relative sample sizes and descriptive statistics of the sample of children whose scores were in the "worse" 15% of the distribution of scores on the ECLS-K's Reading Test and the Approaches to Learning, Externalizing Problem Behaviors, or Internalizing Problem Behaviors subscales of the SRS at three time period (i.e., fall of kindergarten, spring of 3rd grade, and spring of 5th grade). Sample sizes for those identified as scoring in the worse 15% on these behavioral measures averaged n = 661 and ranged from n =460 (i.e., for those rated as frequently displaying internalizing problem behaviors in the fall of kindergarten) to n = 813 (i.e., for those rated as frequently displaying externalizing problem behaviors in the spring of 5th grade). The table's top panels indicate that, for two measures, "worse" scores were those in the lowest 15% of the each measure's distributions. The table's bottom panel indicates that, for three of the measures, "worse" scores were those in the upper 15% of each measure's distributions. The table's top panel and bottom panels both indicate that those children we classified as at risk or not at risk indeed displayed unlike levels of reading skill or behavior. For example, the mean reading scores of those children in the lower 15% and upper 85% of the distribution of scores from the fall of kindergarten administration of the Reading Test were 17.40 and 30.28, respectively. The two groups of children's ranges in score also vary substantially. The at risk and non-at risk children's scores at all three time points on the Approaches to Learning, Externalizing Problem Behaviors, and Internalizing Problem Behaviors also display the same pattern of large mean differences and variations in range.

Recurring Externalizing Problem Behaviors

When examining the risk factors for recurring externalizing problem behaviors, girls were found to be much less likely (OR=.305, $p < .001$) to repeatedly engage in externalizing problem behaviors, as are children from higher-SES households (OR = .642, $p < .01$). Children not being raised by both biological parents are more likely (OR = 1.465, $p < .05$) to display externalizing problem behaviors. Children are slightly more likely to display recurring externalizing problem behaviors if they are attending schools where a greater percentage of students receiving free or reduced lunch, see Table 4 that displays the logistic regression results predicting recurring externalizing problem behaviors. The table's first column displays effect estimates for the socio-demographic risk factors.

The table's second column displays these estimates after statistically controlling for whether the child was already displaying high levels of externalizing problem behaviors at school entry. The estimates slightly change in magnitude, but continue to display the same pattern of statistically significant effects. This is the case despite the autoregressor's very strong effect (i.e., OR = 3.970, $p < .001$). Those children who entered kindergarten already displaying high levels of externalizing problem behaviors are four times as likely as those who did not to be displaying high levels of externalizing problem behaviors in both 3rd and 5th grade. Including this control reduces the effects of not living with both biological parents or attending a low-SES school to statistical non-significance. (That is, this control accounts for, or explains, the effects of these variables.)

The table's third column displays estimates of these factors after statistically controlling for whether the child was already displaying high levels of externalizing problem behaviors in kindergarten (OR = 3.513, $p < .001$), as well as whether he or she was displaying low levels of task-focused behaviors (OR = 1.378, $p > .05$) or reading or pre-reading skills (OR = 1.524, $p < .05$). Entering kindergarten already displaying frequent externalizing problem behaviors continues to place a child at higher risk for recurring externalizing problem behaviors in 3rd and 5th grade. Entering kindergarten with relatively low reading skills also elevates a child's risk, even after statistically controlling for the autoregressor. However, frequently being inattentive or displaying other types of non-task-focused behaviors does not elevate a child's risk. The socio-demographic factors continue to display the same general pattern of statistically significant effects (the exceptions being Black or being older at school entry). Girls remain less likely (OR=.319, $p < .001$) to engage in externalizing problem behaviors, as are children from higher-SES households (OR = .697, $p < .05$). Hispanics are less likely than Whites (OR=.527, $p< .05$) to engage in externalizing problem behaviors. Thus, and after statistically correcting for whether the children had entered school already displaying high levels of externalizing problem behaviors, low-levels of task-focused behaviors, and low reading readiness, young boys and those from lower-SES households are much more likely, and Hispanics (by comparison with Whites) are less likely to be engaging in high levels of externalizing problem behaviors in both 3rd and 5th grade.

Recurring Internalizing Problem Behaviors

When examining the risk factors for recurring internalizing problem behaviors, young girls were found to be much less likely (OR = .484, $p < .001$) to be engaging in high levels of

internalizing problem behaviors in both 3rd and 5th grade, as are children from higher-SES households (OR = .662, p < .01). Kindergarten children who are not being raised by both biological parents are more likely (OR = 1.878, p < .01) to persistently engage in such behaviors. Asians (OR = .063, p < .001) and the Other race/ethnicity group (OR = .349, p < .01) are much less likely to later engage in internalizing problem behaviors. Attending a school where a greater percentage of students receive free or reduced lunch is not a statistically significant predictor of displaying recurring internalizing problem behavior in 3rd and 5th grade, see Table 5 that displays the logistic regression results predicting recurring internalizing problem behaviors. The table's first column displays the estimates of a set of socio-demographic risk factors.

The table's second column displays these estimates after statistically controlling for whether the child was already displaying high levels of internalizing problem behaviors at school entry. The autoregressor's effect is again very strong (i.e., OR = 4.412, p < .001), indicating a large degree of stability in the occurrence of internalizing problem behaviors. The other factor estimates change slightly in magnitude, but again continue to display the same pattern of statistically significant effects.

The table's third column displays estimates of the factors after statistically controlling for whether the child was already displaying high levels of internalizing problem behaviors at school entry (OR = 3.133, p < .001), as well as whether he or she was displaying low levels of task-focused behaviors (OR = 2.793, p < .001) or reading or pre-reading skills (OR = 1.226, p > .05). Like in the logistic regression models predicting recurring externalizing problem behaviors, entering kindergarten already displaying frequent internalizing problem behaviors elevates a child's risk of later displaying recurring internalizing problem behaviors in 3rd and 5th grade. However, and unlike in the aforementioned models predicting recurring externalizing problem behaviors, it is low levels of task-focused behaviors but not low reading readiness that is an additional statistically significant predictor of recurring internalizing problem behaviors. Statistically controlling for these three factors produces relatively little change in the estimates for the other risk factors.

Discussion

Our analyses sought to identify groups of kindergarten children who were likely to repeatedly engage in externalizing or internalizing problem behaviors by the later elementary grades. Such children are at greater risk of experiencing a full range of long-term negative outcomes (e.g., school dropout, poverty, unemployment, incarceration or adjudication). We attempted to quantify the strength of each risk factor's effects at school entry. Such estimates are necessary if researchers and practitioners are to more effectively screen for and target early interventions by the primary grades. To provide more rigorously derived and precise estimates, we quantified each risk factor's strength of effect after statistically controlling both for the autoregressor and each of the other hypothesized risk factors. Our estimates are based on data from children participating in a large, longitudinal, and nationally representative sample of U.S schoolchildren, and were collected using measures with known psychometric properties.

We found that certain groups of kindergarten children are highly likely to be engaging in externalizing problem behaviors as 3rd and 5th graders. The most at risk are those children entering kindergarten already displaying high levels of such behaviors. These kindergarten children are about four times more likely than their peers to be displaying externalizing problem behaviors as both 3rd and 5th graders. Yet additional groups of children are also at risk. These include those who were poor readers, boys, and children from low-income families. These latter groups of children continued to be at increased risk even after statistically controlling for whether the children had entered school already displaying high levels of externalizing problem behaviors, low levels of task-focused behaviors, or low reading readiness.

Our estimates also indicate that certain groups of kindergarten children are have an increased likelihood of engaging in internalizing problem behaviors as 3rd and 5th graders. The most at risk are those children entering kindergarten already displaying high levels of internalizing problem behaviors. These children are more than three times as likely to be displaying high levels of internalizing problem behaviors as 3rd and 5th graders. Those infrequently displaying task-focused behaviors, boys, children from low SES households, and those not being raised by both biological parents are also at elevated risk. However, children who are Asian are much less likely than children who are White to display recurring internalizing problem behaviors.

Limitations

This study has at least three limitations. First, our sample had not been formally identified as having EBD. Only a very few children are so identified in the ECLS-K (i.e., $N = 15$ in 3rd grade; $N = 27$ in 5th grade). Using such small samples would not have allowed us to reliably estimate a particular factor's effects, nor would we have been able to identify those particular sub-groups of children who may be most in need of early intervention. EBD are also often under-reported (e.g., Lopez, Forness, Bocian, MacMillan, & Gresham, 1996), thereby making reliance on formal identification problematic. Second, we used teacher ratings to identify those children frequently displaying externalizing or internalizing problem behaviors. Yet some teachers may be biased in their reporting of a child's behavior (e.g., Pigott & Cowen, 2000; Taylor, Gunter, & Slate, 2001; Zimmerman, Khoury, Vega, Gil, & Warheit, 1995). Some of our estimates, and particularly those of a child's gender and race/ethnicity, may therefore reflect a degree of teacher bias. We also did not use behavioral ratings completed by informants other than teachers (e.g., parents) to identify those children displaying recurring psychopathology. Doing so can be important when identifying children as emotionally or behaviorally disordered (Forness & Kavale, 2000; Forness & Knitzer, 1992; McConaughy & Ritter, 1995). Reliance on teacher ratings restricted our analysis to investigating the occurrence of psychopathology in one particular context (i.e., school). Third, our study does not account for all possible factors (e.g., the child's birth weight, the mother's mental health, the relative safety of the child's community) that may also impact a child's risk for later psychopathology. Accounting for a wider range of factors may have changed the strength of some of the effects we report. For example, our estimate of the impact of parental divorce or separation on a child's risk does not account for whether the child's mother was already displaying psychopathology herself, which may contribute to

both the family's divorce and separation, as well as the child's subsequent risk for psychopathology (e.g., Patterson, 2002).

Contributions to the Field's Knowledge Base

Our results both confirm and conflict with those reported by other investigators. Like others (Moffitt, 2003; Montague, Enders, & Castro, 2005; Nelson et al., 2007; Silver, Measelle, Armstrong, & Essex, 2005), we find that young children already displaying externalizing problem behaviors are likely to continue to do so as they move through the primary and elementary grades. Our results extend prior research by demonstrating that such stability also holds for those children displaying internalizing problem behaviors. We also find, like others (e.g., Moffitt, Caspi, Rutter, & Silva, 2001; Shaw et al., 2003), that boys are especially likely to enter school displaying high levels of externalizing problem behaviors, a finding that also holds for children whose parents have divorced or separated (Juby & Farrington, 2001).

Some prior researchers have hypothesized (Nolen-Hoeksema, 2001) and reported (Galambos, Leadbeater, & Barker, 2004) that girls are more likely to display internalizing problem behaviors than boys. However, and to date, most of this research has been limited by its use of samples of adolescent youth. An exception is Bailey, Zauszniewski, Heinzer, and Hemstrom-Krainess' (2007) recent study. Their analyses of a sample of 5th and 6th graders indicated that girls were more likely to engage in internalizing problem behaviors than boys. However, methodological differences between their study and ours may account for the conflicting findings. For instance, the Bailey et al. study included use of a cross-sectional design, a small sample (i.e., $N = 121$), and child self-reports, while our study used a longitudinal design, a large sample, and teacher ratings. Some of the factors identified by our study as statistically and clinically significant (e.g., whether the child's family had divorced or separated, the child's race/ethnicity) have not been reported to be so by other investigators (e.g., Nelson et al., 2007; Trout et al., 2006). Our use of a larger sample may account for these conflicting findings. Crew et al.'s (2007) recent meta-analytic synthesis indicated that being raised by a single or divorced parent was a risk factor for externalizing but not for internalizing problem behaviors. Our analyses initially find that this factor elevates both outcomes. However, after statistical controls, we found that being single or divorced was a statistically significant predictor only of recurring internalizing behavior problems. Crews et al. also identified high SES as a protective factor for internalizing problem behaviors. Our analyses indicate that high SES is a protective factor for both internalizing and externalizing problem behaviors.

Implications

Many researchers consider it critical to introduce interventions when children are very young if the occurrence of psychopathology is to be successfully reduced or prevented (e.g., Conroy & Brown, 2004; Forness et al., 2000; Kaiser & Hester, 1997; Stormont, 2002; Walker et al., 1995). Our results should help guide these early intervention efforts. This is because our study helps identify particular groups of kindergarten children who are at elevated risk of later displaying recurring psychopathology. This information might be accounted for in a school's or preschool's screenings. For example, schools should consider

children entering school already displaying elevated levels of externalizing or internalizing problem behaviors as especially likely to require subsequent monitoring and early intervention. Collectively, our analyses indicate that kindergartener children who are boys, who are from low-SES homes, who have low levels of reading readiness, and who are already displaying high levels of externalizing problem behaviors are most likely to later to be engaging in such behaviors as 3rd and 5th graders. Those kindergarten children who are boys, who are from low-SES homes, who are not being raised by both biological parents, who are infrequently displaying task-focused behaviors, and who are already displaying high levels of internalizing problem behaviors are most likely to be frequently displaying these behaviors as 3rd and 5th graders. Information such as parental divorce, or a child's low level of reading skill or low frequency of task-focused behaviors can therefore be included as risk factors when universally screening (and then more systematically evaluating) for the early onset of behavioral disabilities.

The study's identification of early risk factors for later psychopathology should also help in the design and delivery of multi-component early intervention efforts. Teachers, paraprofessionals, and other school- or preschool-based staff should expect to intervene when a young child begins frequently displaying either externalizing or internalizing problem behaviors. Such children are unlikely to "grow out of it." Our analyses also indicate that low levels of reading readiness at school entry elevate a child's risk of later externalizing problem behaviors, and that low levels of task-focused behaviors at school entry elevate a child's risk of later internalizing problem behaviors. This was the case after statistically controlling for whether the child had entered kindergarten already displaying problem behaviors, as well as a wide range of socio-demographic confounds. Thus, intervention efforts that effectively bolster an at risk kindergarten child's reading readiness and task-focused behaviors may be an additional way to help reduce his or her risk of repeatedly displaying psychopathology in the later elementary grades.

Acknowledgments

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Table 1

Source of Data Used in the Current Study,, by Round of Data Collection, for School Years 1998–1999, 1999–2000, 2001–2002, and 2003–2004

Instruments	1998–1999		1999–2000		2001–2002	2003–04
	Fall, kindergarten	Spring, kindergarten	Fall, 1st grade[a]	Spring, 1st grade	Spring, 3rd grade	Spring, 5th grade
Child assessment (can you list the assessments?	Reading cognitive assessment	X	X	X	X	X
Teacher questionnaire						
Can you list the assessments?	Social Rating Scale	X	X	X	Social Rating Scale	Social Rating Scale
Parent interview	Parent Interview	X	X	X	X	X

[a] Only a randomly selected subsample participated in data collection during the fall of 1st grade.

Table 2

Demographic Characteristic for the ECLS-K Full and Analytical Samples

	Full sample (*N*=17,572)	Analytical sample (*N*=4,674)
Gender		
Male	51.2%	48.7%
Female	48.8%	51.3%
Race		
White	56.6%	70.7%
Black or African American	14.2%	9.6%
Hispanic	17.3%	10.0%
Other	12.2%	9.7%
SES (WKSESL[a])	.02 (.80)	.14 (.75)

[a]NCES-calculated, standardized (*M* = 0; *SD* = 1) measure of a family's socioeconomic status, using an NCES variable naming convention for a base year parent composite variable.

Table 3

Descriptive Statistics of Children Included in the Study's Logistic Regression Models

	Bottom 15%				Upper 85%			
	N	Min	Max	Mean	N	Min	Max	Mean
Reading test score, Fall K	704	12.94	19.33	17.40	3970	19.34	110.79	30.28
Approaches to learning, Fall K	607	1.00	2.25	1.97	4067	2.33	4.00	3.26
	Bottom 85%				**Upper 15%**			
	N	Min	Max	Mean	N	Min	Max	Mean
Externalizing problems, Fall K	3994	1.00	2.00	1.37	680	2.20	4.00	2.66
Externalizing problems, Spring 3rd	3988	1.00	2.17	1.49	686	2.20	4.00	2.76
Externalizing problems, Spring 5th	3861	1.00	2.00	1.42	813	2.17	4.00	2.58
Internalizing problems, Fall K	4214	1.00	2.00	1.37	460	2.25	4.00	2.57
Internalizing problems, Spring 3rd	3999	1.00	2.00	1.45	675	2.25	4.00	2.55
Internalizing problems, Spring 5th	3965	1.00	2.00	1.45	709	2.25	4.00	2.60

Note: K=Kindergarten; 3rd=3rd grade; 5th=5th grade

Table 4

Multilevel Logistic Regression Coefficients for Recurring Externalizing Problem Behaviors

	Fall of kindergarten	Spring 3rd & Spring 5th	
	Coefficients (Odds Ratio)	Add externalizing behavior at kindergarten entry *Coefficients (Odds Ratio)*	Add low reading readiness & low task-focused behaviors at kindergarten entry *Coefficients (Odds Ratio)*
Top 15% in externalizing behavior problem	NA	1.379(3.970)***	1.257(3.513)***
Low 15% in attention and other task-focused behaviors	NA	NA	.320(1.378)
Low reading readiness	NA	NA	.421(1.524)*
Female	-1.187(.305)***	-1.161(.313)***	-1.141(.319)***
SES at K entry	-.443(.642)**	-.390(.677)**	-.361(.697)*
Below poverty threshold	-.020(.980)	.032(1.033)	-.039(.962)
Not both biological parents	.382(1.465)*	.256(1.291)	.239(1.269)
Black	.401(1.493)	.468(1.597)*	.409(1.505)
Hispanic	-.684(.505)	-.560(.571)	-.640(.527)*
Asian	-.180(.835)**	-.0149(.862)	-.185(.831)
Other	.235(1.265)	.099(1.104)	.069(1.071)
Age at K entry	-.051(.950)*	-.047(.954)*	-.039(.963)
Child did not change school	-.086(.917)	-.036(.964)	-.065(.937)
Intercept	1.083(2.953)	.460(1.584)	-.205 (.815)
% students eligible for free lunch (level 2)	.010(1.010)*	.008(1.008)	.007(1.007)

Note: Weighted estimates.

*
p < .05;

**
p < .01;

***
p < .001. *N* for level 1=4,613, *N* for level 2=551. K=Kindergarten

Table 5

Multilevel Logistic Regression Coefficients for Recurring Internalizing Problem Behaviors

	Fall of kindergarten	Spring 3rd & Spring 5th	
	Coefficients (Odds Ratio)	Add internalizing behavior at kindergarten entry Coefficients (Odds Ratio)	Add low reading readiness & low task-focused behaviors at kindergarten entry Coefficients (Odds Ratio)
Top 15% in internalizing behavior problem (teacher rating)	NA	1.421(4.142)***	1.142(3.133)***
Low 15% in attention and other task-focused behaviors	NA	NA	1.027(2.793)***
Low reading readiness	NA	NA	.204(1.226)
Female	-.725(.484)***	-.709(.492)***	-.568(.567)***
SES at K entry	-.413(.662)**	-.405(.667)**	-.406(.666)**
Below poverty threshold	.071(1.073)	-.061(.941)	-.130(.878)
Not both biological parents	.630(1.878)**	.604(1.829)**	.514(1.672)**
Black	-.180(.835)	-.143(.867)	-.306(.736)
Hispanic	-.313(.731)	-.252(.777)	-.280(.756)
Asian	-2.758(.063)***	-2.585(.075)***	-2.543(.079)***
Other	-1.051(.349)**	-1.132(.322)**	-1.200(.301)**
Age at K entry	-.025(.976)	-.017(.983)	.001(1.001)
Child did not change school	-.124(.883)	-.164(.849)	-.143(.867)
Intercept	-.789(.454)	-1.532(.216)	-2.885(.056)*
% students eligible for free lunch (level 2)	-.007(.992)	-.007(.994)	-.010(.990)

Note. Weighted estimates.

*
$p < .05$;

**
$p < .01$;

***
$p < .001$. *N* for level 1=4,613, *N* for level 2=551. K=Kindergarten.