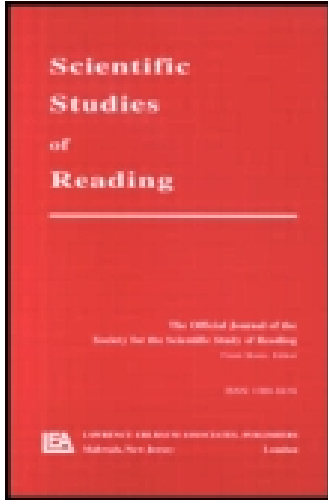


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Do Poor Readers Feel Angry, Sad, and Unpopular?

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We investigated whether being poorly skilled in reading contributes to children's reported feelings of anger, distractibility, anxiety, sadness, loneliness, and social isolation. Data were analyzed from a longitudinal subsample of children ($N = 3,308$) participating in the Early Childhood Longitudinal Study–Kindergarten Cohort. Multilevel logistic regression analyses indicated that poor readers in third grade were about twice as likely to consider themselves as angry, distractible, sad, lonely, and unpopular in fifth grade as those who had not been poor readers in third grade. Being poorly skilled in mathematics increased children's risk of feeling sad or lonely but not of feeling angry, distractible, or unpopular. The results provide additional empirical evidence that reading failure contributes to generalized socioemotional maladjustment in young children.

Poor reading performance has been repeatedly theorized to negatively impact children's socioemotional adjustment (e.g., Spear-Swerling & Sternberg, 1994; Spira & Fischel, 2005). Stanovich (1986) hypothesized that early reading failure results in increasingly more generalized “behavioral/cognitive/motivational spinoffs” (p. 389) that further constrain children's cognitive growth and academic

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achievement. These spinoffs constitute “poor-get-poorer” or negative Matthew effects, in that poor reading performance initiates and then reciprocally interacts with negative emotions (e.g., frustration, anxiety) and behaviors (e.g., task avoidance, withdrawal) to further reduce children’s involvement in reading activities. Thus, early reading failure may initiate “a causal chain of escalating negative side effects” (Stanovich, 1986, p. 364) that can become increasingly more generalized.

To date, most empirical studies have examined whether poor reading negatively impacts “proximal” feelings and behaviors that are closely related to reading activities (e.g., Chapman, Tunmer, & Prochnow, 2000; Viljaranta, Lerkkanen, Poikkeus, Aunola, & Nurmi, 2009). For instance, poor readers have been reported to feel less competent in reading, consider it to be difficult, feel less motivated to read, and generally hold more negative attitudes toward learning to read (Chapman & Tunmer, 1997; Gottfried, 1990; Lepola, Salonen, & Vauras, 2000). The strength of the relationship between poor reading performance and negative reading-related perceptions steadily increases as children age (Chapman & Tunmer, 1995). Poor readers are also less likely to complete reading activities in classrooms (e.g., Morgan, Fuchs, Compton, Cordray, & Fuchs, 2008) and independently practice reading at home (Juel, 1988).

A few studies have evaluated whether poor reading performance negatively impacts “distal” feelings and behaviors that are not specific to reading activities. In these studies, poor readers have been reported to be more likely to act out or be aggressive (e.g., Morgan, Farkas, & Wu, 2009; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006), distractible and inattentive (Goldston et al., 2007; Morgan, Farkas, Tufis, & Sperling, 2008), and anxious and depressed (Arnold et al., 2005; Carroll, Maughan, Goodman, & Meltzer, 2005). Older poor readers have been reported to be more likely to consider or attempt suicide (Daniel et al., 2006).

The increasingly generalized Matthew effects are more likely to occur as children age (Stanovich, 1986) if they begin to avoid reading activities both at home and in school, thereby further constraining growth in their basic reading skills, comprehension, and, eventually, cognitive functioning (Cunningham & Stanovich, 1991; Echols, West, Stanovich, & Zehr, 1996; Griffiths & Snowling, 2002; Guthrie, Schafer, & Huang, 2001; Senechal, LeFevre, Hudson, & Lawson, 1996). The children’s resulting inability to meet their classroom’s academic demands can lead to increasingly frequent feelings of frustration, agitation, withdrawal, and social isolation (e.g., Fleming, Harachi, Cortes, Abbott, & Catalano, 2004; Kellam, Mayer, Rebok, & Hawkins, 1998; Lane, Beebe-Frankenberger, Lambros, & Pierson, 2001; Wehby, Falk, Barton-Arwood, Lane, & Cooley, 2003). These feelings and behaviors may in turn further interfere with children’s learning.

One possible contributing mechanism to this cycle is children’s increasing use of peer social comparisons to judge their own relative skill level. For

those children who begin to realize that their own skill level is markedly lower than their classmates, “feelings of inferiority, lack of motivation, and interpersonal hostility often result” (Chapman, 1988, p. 350). This should be especially likely to occur for elementary-aged schoolchildren who are poor readers. This is because learning to read constitutes a key academic expectation by the end of the primary grades. As these children’s reading failure becomes increasingly evident to their classmates, they may begin to hold more negative self-concepts (Chapman et al., 2000), engage in more frequent task avoidance (Morgan et al., 2009), feel depressed (Maughan, Rowe, Loeber, & Stouthamer-Loeber, 2003), and experience peer rejection and lower social status (Lopes, Cruz, & Rutherford, 2002).

Evidence that reading failure increases children’s risk of socioemotional maladjustment as early as the elementary grades would have far-reaching theoretical and practical implications. Theoretically, such evidence would suggest that early reading failure might constitute a “first-order” causal agent (or, to use Stanovich’s metaphor, the first link in a causal chain), in that its occurrence can initiate a “cascade” of negative side effects. Practically, finding that being a poor reader increases children’s risk of feeling angry, distractible, anxious, and unpopular would further justify interventions that experimentally evaluate whether preventing or remediating poor reading performance results in improved socioemotional adjustment in children. That is, preventing or remediating early reading failure may help children become academically proficient *and* socioemotionally well adjusted. Identifying potential malleable factors that help prevent socioemotional maladjustment—especially those that can be targeted by teachers and other school staff—is critical because children experiencing maladjustment are at greater risk of a range of negative long-term outcomes, including delinquency, depression, dropout, poverty, unemployment, and incarceration (e.g., Orth, Robins, Trzesniewski, Maes, & Schmitt, 2009; Schaeffer, Petras, Ialongo, Poduska, & Kellam, 2003; Sprague & Walker, 2000).

However, a number of limitations characterize the extant investigations of the relationship between poor reading performance and children’s socioemotional maladjustment (Spira & Fischel, 2005). Very few studies have used experimental or quasi-experimental designs that allow for causal inferences, and findings from these few studies are inconsistent (Morgan, Fuchs, et al., 2008; Rivera, Al-Otaiba, & Koorland, 2006). More frequently, investigators have used “causal modeling” statistical methods that control for confounding variables (e.g., gender, race/ethnicity) prior to estimating the hypothesized relationship between poor reading performance and socioemotional maladjustment. In these types of studies, the hypothesized relationship is more likely to be causal if it is evident after accounting for many confounding factors (Aneshensel, 2002; Kenny, 1979; Shadish, Cook, & Campbell, 2002; see Thun, Apicella, & Henley, 2000, for an epidemiological example). Yet both Hinshaw’s (1992) and Rowe and

Rowe's (1992) syntheses indicated that the modeling-type investigations have failed to control for the "autoregressor" (here, an earlier history of socioemotional maladjustment) when estimating to what degree earlier reading failure predicts children's later socioemotional maladjustment. Autoregressors constitute strongly confounding factors (Hulslander, Olson, Willcutt, & Wadsworth, 2010). Additional risk factors, such as a child's gender or the family's socioeconomic status, have not typically been accounted for, despite also being well established as confounds (Feil et al., 2005; Kaplan & Walpole, 2005; Landgren, Kjellman, & Gillberg, 2003; Lepola, 2004; Sanchez, Bledsoe, Sumabat, & Ye, 2004). Only a few studies have been longitudinal (McGee, Williams, Share, Anderson, & Silva, 1986; Morgan, Farkas, et al., 2008). Collectively, these methodological limitations hinder inferences as to whether early reading failure negatively impacts children's socioemotional adjustment.

Most prior investigations have also been limited to quantifying the relationship between poor reading performance and externalizing (e.g., being disruptive, argumentative, or aggressive) psychopathology (e.g., Fleming et al., 2004; Hinshaw, 1992). Researchers have not adequately investigated the extent to which the effects of poor reading performance generalize to other aspects of children's socioemotional maladjustment (e.g., anxiety or social isolation). In addition, researchers have not systematically contrasted whether any observed effects on children's socioemotional maladjustment are specific to poor reading performance, or are instead attributable to other types of learning difficulties. Yet learning difficulties in mathematics have also been theorized to contribute to maladjustment, particularly internalizing psychopathology (Rourke, 1988). For example, children with nonverbal cognitive deficits may attempt to compensate by relying on—and thus straining—their verbal abilities, resulting in lower quality language interactions with their peers and correspondingly increased social withdrawal, anxiety and depression (Rourke, Young, & Leenaars, 1989). This relationship has some, albeit limited, empirical support (Greenham, 1999; White, Moffitt, & Silva, 1992).

Finally, most of the extant work has relied exclusively on teacher ratings of children's behavior (Morgan, Farkas, et al., 2008; Rowe & Rowe, 1992). This is problematic because teachers may be unable to accurately infer children's "inner states" or feelings. Although teachers may be able to observe and report on the frequency with which a child is inattentive or argumentative, they may be less able to observe whether the child feels sad or anxious. Teachers may also be unable to report on a child's unpopularity with his or her peers, especially as it relates to interactions occurring in settings outside the classroom (e.g., recess). Teacher ratings may also be biased against particular groups of children (e.g., boys, ethnic minorities; e.g., Pigott & Cowen, 2000; Taylor, Gunter, & Slate, 2001; Zimmerman, Khoury, Vega, Gil, & Warheit, 1995). Maughan et al.'s (2003) study is one of the relatively few that have not relied exclusively on teacher reports

of children's externalizing problem behaviors. These investigators used self-report data to investigate whether and to what extent a prior history of reading difficulties elevated children's likelihood of experiencing depressed moods. Some evidence for this relationship was initially observed, but this effect decreased to statistical nonsignificance after controlling for a prior history of depressed mood.

The purpose of the present study was to evaluate the hypothesis that poor reading performance negatively impacts children's socioemotional adjustment. To more rigorously estimate these effects, we used (a) an unusually large sample; (b) a longitudinal research design (i.e., data collected at both third and fifth grade); (c) multiple report measures that displayed strong psychometric properties; and (d) analyses that included controls for a wide range of child-, family-, school-, and community-level confounds, including the autoregressor of whether, at the prior time point, children already perceived themselves as angry, distractible, sad, lonely, anxious, or socially isolated. To better evaluate whether and to what extent any observed effects were specific to early reading failure, we also included being poorly skilled in mathematics as an alternative predictor variable. Including whether a child was poorly skilled in mathematics also functions as an additional statistical control for children's nonverbal cognitive functioning and mathematics-related self-perceptions (Chiu & Klassen, 2010; Deary, Strand, Smith, & Fernandes, 2007).

Using extensive statistical controls while analyzing to what extent children who are poor readers in third grade report being angry or distractible, lonely or sad, or unpopular in fifth grade should provide more accurate estimates of the hypothesized relationship. The current analyses also extend prior work by avoiding the limitations of relying on teacher ratings and by contributing important knowledge about the extent and timing of reading failure's generalized negative effects on children's socioemotional adjustment. Collectively, these analyses should provide additional empirical evidence for theoretical accounts that early reading failure contributes to generalized socioemotional maladjustment in young children.

METHOD

Sample

We analyzed data from a subsample 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 U.S. Department of Education's National Center for Education Statistics (NCES) maintains the ECLS-K. The ECLS-K is a multisource, multimethod study that uses parent interviews, child self-report, teacher ratings and surveys, student records abstracts, and individually administered untimed academic achievement (e.g., reading, mathematics) measures (NCES, 2006). This

database follows a large sample of children as they age through the elementary and middle school years. 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. Sample freshening was subsequently used to ensure the sample was nationally representative of children entering first grade in 2000.

We identified a sample of ECLS–K participants who had complete third- and fifth-grade data on the Angry/Distractibility, Sad/Lonely/Anxious, and Peer Relations subscales of the NCES-modified version of the Self-Description Questionnaire-I (SDQ-I; Marsh, 1990) as well as complete data on the study's child-, family-, school-, and community-level factors. This sample consisted of 3,308 children who attended 1,003 schools. Table 1 displays descriptive statistics of the participants. As is clear in Table 1, the sample is sociodemographically diverse and fairly well distributed across U.S. regional and urban/rural areas.

Measures

Feelings of anger, sadness, or social isolation. We used children's self-ratings on the SDQ-I to identify those who reported themselves as feeling angry or distractible, lonely or sad, or socially isolated in third and fifth grade. The SDQ-I has repeatedly been identified as a measure with strong psychometric and theoretical construct properties (Byrne, 1996; Gable, 1998; Isonio, 1998; Keith & Bracken, 1996). NCES modified the SDQ-I by including additional items on children's behaviors, introducing a 4-point scale, and using responses in which children rated the degree to which statements were "true" (see NCES, 2005b, for additional modification detail). Specifically, children rated the degree to which a statement (e.g., "I feel sad a lot of time") was "not at all true," "a little bit true," "mostly true," or "very true." The same version of the SDQ-I was administered in third and fifth grade.

We analyzed children's responses to three specific SDQ-I subscales. The Angry/Distractibility subscale's six items queried children about externalizing problem behaviors such as fighting or arguing, talking or disturbing others, or feeling distractible.¹ The Sad/Lonely/Anxious subscale's eight items queried children about internalizing problem behaviors such as feeling sad, feeling frustrated, ashamed of mistakes, and worrying about school and friendships, and feeling anxious. The Peer Relation subscale's six items asked children about how easily they make friends, get along with peers, and their perceptions of

¹Theoretical accounts and empirical work indicates that distractibility and other indicators of inattention and conduct problems like fighting and arguing inter-relate and often result in the most severe types of antisocial behaviors (e.g., Barkley, Fisher, Edelbrock, & Smallish, 1990; Gresham, Lane, & Lambros, 2000; Liu, 2004; Lynam, 1998; Stormont, 2000).

TABLE 1
 Descriptive Statistics of the Study's Early Childhood Longitudinal Study-Kindergarten
 Cohort Analytical Sample ($N = 3,308$)

<i>Variable</i>	<i>M or Proportion</i>	<i>SD</i>
Gender (female)	.48	
Age at kindergarten entry (in months)	65.50	4.21
Mother's education		
Less than high school	.06	
High school diploma	.54	
Some college	.07	
Bachelor's degree or higher	.32	
Father's education		
Less than high school	.08	
High school diploma	.55	
Some college	.06	
Bachelor's degree or higher	.31	
Family below poverty	.18	
Federal programs		
Received AFDC	.08	
Received food stamps	.16	
WIC during pregnancy and childhood	.40	
WIC during pregnancy or childhood	.07	
No WIC during pregnancy or childhood	.53	
Head Start participation	.16	
Race		
White non-Hispanic	.62	
Black non-Hispanic	.08	
Hispanic	.24	
Asian	.03	
Other	.03	
Household structure		
Two parents, both biological	.87	
Other structures	.13	
Number of siblings	1.52	1.06
Home language not English	.18	
Mother's age at first birth (in years)	23.80	5.68
School		
More than 25% Black students	.16	
More than 25% Hispanic students	.26	
Percent eligible for free lunch	36.78	27.78
Region		
Northeast	.17	
Midwest	.24	
South	.36	
West	.23	
Urbanicity		
Central city	.27	
Urban fringe and large town	.39	
Small town and rural	.25	

Note. Estimates were weighted by C1_6FC0. AFDC = Aid to Families with Dependent Children; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

their popularity. NCES (2005a, 2005b) reported that the third- and fifth-grade alpha coefficients for the Anger/Distractibility, Sad/Lonely/Anxious, and Peer Relations subscales were .77 and .78, .81 and .79, and .79 and .82, respectively.

Children were identified as feeling angry or distractible, sad or lonely, or unpopular if their reported scores on Angry/Distractibility, Sad/Lonely/Anxious, or Peer Relations subscales were in the “worst” 10% of scores on these measures. A criterion of 10% is consistent with prior work identifying populations at risk for socioemotional maladjustment (e.g., Gresham, MacMillian, Bocian, Ward, & Forness, 1998; Nelson, Stage, Duppong-Hurley, Synhorst, & Epstein, 2007). We applied this criterion at both third and fifth grade. For the Angry/Distractibility and Sad/Lonely/Anxious subscales, we applied the criterion to scores in the highest 10% of the distribution. For the Peer Relations subscale, we applied the criterion to scores in the lowest 10% of the distribution.

Poor reading performance. We used children’s scores on the spring third-grade administration of the ECLS–K Reading Test to identify those who were poor readers. We identified children as poor readers if their score on this measure was in the bottom 10% of the distribution of such scores. This 10% criterion is consistent with previous empirical work identifying children as having reading disabilities (Catts, Fey, Zhang, & Tomblin, 2001) or clinically significant reading problems (Konold, Juel, & McKinnon, 1999; Morgan, Farkas, et al., 2008). The Reading Test was designed to measure children’s level of basic skills (e.g., print familiarity, letter recognition, decoding, sight word recognition) as well as their receptive vocabulary and reading comprehension skills. The percentages of content evaluating basic reading skills, vocabulary, and reading comprehension during the third-grade administration of the Reading Test was about 15%, 10%, and 75%, respectively. NCES-trained field staff individually administered the untimed Reading Test. 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 item response theory (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 theta reliability for the end of third-grade administration was .94 (NCES, 2005a). Third grade children’s scores correlated ($r = .83$) with the Woodcock–McGrew–Werder Mini-Battery of Achievement (NCES, 2005a), indicating construct validity.

Poorly skilled in mathematics. We used children’s scores on the third-grade administration of the Mathematics Test to identify those who were poorly skilled in mathematics. We used a 10% cutoff that is consistent with previously reported prevalence rates for mathematics disabilities and is considered a relatively conservative criterion (Geary, 2004; Mazzocco & Meyers, 2003). The

Mathematics Test seeks to measure a range of age- and grade-appropriate mathematics skills (e.g., identify numbers and shapes, sequence, add or subtract or multiply or divide, use rates and measurements, use fractions, calculate area and volume). As with the Reading Test, NCES used IRT methods to construct an adaptive Mathematics Test that were administered one-to-one to each child in untimed format. Theta reliability of the third-grade IRT scaled scores was .94. Third-grade children's Mathematics Test's IRT scores correlated ($r = .84$) with their scores from the Woodcock–McGrew–Werder Mini-Battery of Achievement (Woodcock, McGrew, & Werder, 1994).

Child- and family-level characteristics. NCES field staff interviewed each child's parent(s) during the spring of the child's third-grade year. We used responses on a parent report to identify a child's gender. We coded "female" as a 1 and "male" as a 0. We included the child's age in months at kindergarten entry, as reported in the parent interview. A mother's (or female guardian's) and father's (or male guardian's) education level was coded as being (a) less than high school education, (b) a high school diploma, (c) some college or an associate's degree, or (d) a bachelor's degree or higher. We used having a bachelor's degree or higher as the reference category. We included a dichotomous variable for living below the federal poverty standard (0 = *no*; 1 = *yes*) based on the family's income and size. Parents also reported on their participation in federal assistance programs for low-income families, such as Aid to Families with Dependent Children and food stamps, as well as whether their child had participated in Head Start. We coded for five racial or ethnic groups, as reported by the parent. These categories were non-Hispanic White, Black non-Hispanic, Hispanic, Asian, and a group labeled "other race or ethnicity" composed of the remaining children. We used non-Hispanic White as the reference category. Parents reported on whether the child was (coded as 1) or was not (coded as 0) living with both biological parents at school entry, as well as additional information such as the number of the child's siblings, whether the home language was English, and the mother's years of age at the child's birth.

School- and community-level characteristics. We also included school- and community-level risk factors in our analyses. We coded as dichotomous variables (0 = *no*, 1 = *yes*) whether the child's school was attended by more than 25% of either (a) Black, non-Hispanic or (b) Hispanic students, respectively. A continuous variable of the percentage of students attending the school who were receiving free or reduced lunch was also included. The regional characteristics of the community were also included as controls, using "Northeast" as the reference category. The urbanicity of the child's community was coded as one of the three categories (urban fringe and large town, small town and rural, and central city), with "central city" as the reference category.

Analyses

We used multilevel logistic regression to analyze the data. Logistic regression estimates whether and to what extent a dichotomous criterion variable (e.g., feeling sad or lonely or not) relates to categorical (e.g., boy vs. girl, living in poverty) and continuous (e.g., the percentage of a school's students receiving free lunch) predictor variables (Peng, Lee, & Ingersoll, 2002). Logistic regression does not assume normally distributed variables or homoscedasticity (Tabachnick & Fidell, 2006). This statistical technique is a commonly used analytical method to identify risk factors for diseases, disorders, or conditions (Ely, Dawson, Mehr, & Burns, 1996), such as socioemotional maladjustment (e.g., Carroll et al., 2005; Nelson et al., 2007). This method produces odds ratios (OR) as an estimate of effect size. An 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 logistic regression, it indicates the multiplicative factor by which the odds of the event change for a one-unit change in the predictor variable. Here, we predicted reporting feeling or not feeling "angry," "sad," or "unpopular" in fifth grade using a range of third-grade factors, including displaying poor reading performance. Feelings of anger, sadness, and social isolation were operationalized as having a score that was in the "worst" 10% of the distribution of the Anger/Distractibility, Sad/Lonely/Anxious, and Peer Relations subscales of the SDQ-I. We employed logistic regression because we sought to investigate the hypothesis that reading failure, specifically, contributes to children's socio-emotional maladjustment.²

All the aforementioned analyses included the autoregressor. That is, whether children reported feeling angry, sad, or unpopular in third grade was used as a statistical control when analyzing whether being a poor reader (or poorly skilled at mathematics) increased the children's risk of reporting feeling angry, sad, or unpopular in fifth grade. Use of the autoregressors helps control for omitted variables having invariant effects on children's negative self-perceptions (Kessler & Greenburg, 1981). Statistical control for a wide range of additional confounds was also used. Further, we used Hierarchical Linear Modeling 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 sample weight (i.e., C1_6FC0) to adjust for the ECLS-K's sampling structure.

²We also evaluated the robustness of the study's results by also using ordinary least squares regression, in which the criterion and main predictor variables (i.e., the autoregressors, children's relative knowledge about reading or mathematics) were continuous rather than dichotomized. These ordinary least squares regression analyses (available from the study's first author) were consistent with the reported logistic regression analyses.

RESULTS

Table 2 displays the percentage of children who did or did not report feeling angry or distractible, lonely or sad, or unpopular in the fifth grade, by whether they were poor readers in third grade. These data consistently indicate that third graders who are poor readers more frequently report feeling angry, sad, and unpopular in fifth grade than third graders who are not poor readers. Thus, about one third of fifth graders who were poor readers in third grade reported frequently feeling angry or distracted. About one third of fifth graders who were poor readers in third grade reported frequent feelings of sadness, worry, and anxiety. In contrast, only about one tenth of fifth graders who were not poor readers in third grade reported frequent feelings of anger or sadness. However, these estimates are not adjusted for a range of potential confounds, including whether these two groups of children were already reporting these negative feelings as third graders.

Table 3 displays results from the multilevel logistic regression analyses, in which we use factors measured in third grade to predict whether children reported feeling angry or distractible, sad or lonely, or unpopular in fifth grade. These analyses include the autoregressor, or whether the child was already reporting the same type of negative feelings in third grade. Each autoregressor has large predicted effects. Children who described themselves as feeling angry or distractible in third grade are 2.74 times more likely to report such feelings in fifth grade as otherwise statistically matched children who did not report such feelings in third grade. The autoregressor ORs for feeling lonely or sad or unpopular are also large (i.e., 3.91 and 5.11, respectively).

Some of the child-, family-, school-, and community-level characteristics were also statistically significant predictors of a child's report of feeling angry or distractible, sad, lonely, or anxious, or unpopular, suggesting the importance of these characteristics as statistical controls. Two particularly notable significant

TABLE 2
Percentage of Students Feeling Angry, Sad, Unpopular at Fifth Grade, by Third Grade Poor Reading Performance, Early Childhood Longitudinal Study–Kindergarten Cohort Data

<i>Third Grade Poor Reader^a</i>	<i>Fifth Grade</i>		
	<i>% "Angry"^b</i>	<i>% "Sad"^c</i>	<i>% "Unpopular"^d</i>
Yes (<i>n</i> = 331)	32.02	33.84	19.64
No (<i>n</i> = 2,977)	10.35	9.81	11.08

^aPoor Reader as measured by lowest 10% score on Reading Test. ^b"Angry" as measured by highest 10% score on Angry/Distractibility subscale. ^c"Sad" as measured by highest 10% score on Sad/Lonely/Anxious subscale. ^d"Unpopular" as measured by lowest 10% score on Peer Relations subscale.

TABLE 3
 Multilevel Logistic Regression Analyses (Coefficients and ORs) Using Third-Grade Child-, Family-, School-, and Community-Level Factors to Predict Fifth-Grade Children's Reports of Feeling Angry, Sad, or Unpopular, Early Childhood Longitudinal Study–Kindergarten Cohort Data

<i>Third-Grade Predictors</i>	<i>Fifth-Grade "Angry"^a</i>		<i>Fifth-Grade "Sad"^b</i>		<i>Fifth-Grade "Unpopular"^c</i>	
	<i>Coefficient</i>	<i>OR</i>	<i>Coefficient</i>	<i>OR</i>	<i>Coefficient</i>	<i>OR</i>
<i>Level 1</i>						
Poor reader ^d	.82**	2.28	.47*	1.59	.55*	1.74
Poorly skilled in mathematics ^e	.36	1.43	.61*	1.84	-.35	.71
Autoregressor	1.01***	2.74	1.36***	3.91	1.63***	5.11
Gender (female)	-.91**	.40	-.15	.86	-.38**	.68
Age at kindergarten entry (in months)	-.02	.98	-.01	.99	-.04*	.96
Mother's education						
Less than HS	-.21	.81	-.16*	.85	.37	1.45
HS diploma	.01	1.01	-.19	.83	.27	1.31
Some college	.40	1.49	.06	1.06	.33	1.39
Father's education						
Less than HS	.73*	2.07	-.34	.71	.38	1.47
HS diploma	.27	1.31	-.02	.97	.15	1.17
Some college	-.38	.68	-.03	.97	.66*	1.93
Family below poverty	-.35	.71	.15	1.16	.34	1.40
Federal programs						
Received AFDC	.09	1.10	.47	1.60	-.91**	.40
Received food stamps	.41	1.51	.05	1.05	.45	1.57
WIC during pregnancy and childhood	.62**	1.86	.22	1.24	.16	1.18
WIC during pregnancy or childhood	.63*	1.88	.27	1.31	-.09	.91
Head Start participation	.05	1.05	.22	1.24	-.04	.96
Race						
Black non-Hispanic	-.10	.91	.26	1.30	-1.05**	.35
Hispanic	-.35	.71	.26	1.30	-.23	.79
Asian	.09	1.09	.01	1.01	.57	1.78
Other	-.14	.87	-.02	.98	-.35	.71
Household structure						
Single-parent family	-.23	.79	-.04	.96	.48	1.61
No. of siblings	-.12	.89	-.12	.88	.01	1.01
Home language not English	.38	1.46	.61	1.85	-.23	.79
Mother's age at first birth (in years)	-.06**	.95	-.04	.96	-.02	.98
<i>Level 2</i>						
More than 25% Black students	.24	1.27	.13	1.14	.03	1.03
More than 25% Hispanic students	-.06	.94	-.20	.82	.38	1.47

(Continued)

TABLE 3
(Continued)

Third-Grade Predictors	Fifth-Grade "Angry" ^a		Fifth-Grade "Sad" ^b		Fifth-Grade "Unpopular" ^c	
	Coefficient	OR	Coefficient	OR	Coefficient	OR
% eligible for free lunch	.01	1.01	-.00	1.00	.00	1.00
Region						
Midwest	.51	.84	.84**	2.33	-.25	.78
South	.14	1.15	.48	1.62	-.13	.87
West	-.17	.84	.76*	2.14	-1.01*	.37
Urbanicity						
Urban fringe and large town	.26	1.30	-.23	.79	-.20	.82
Small town and rural	.13	1.13	-.21	.81	-.65	.52

Note. Estimated are weighted by C1_6FC0. Level 1 $n = 3,308$. Level 2 $n = 1,003$. OR = odds ratio; K = kindergarten; HS = high school; AFDC = Aid to Families with Dependent Children; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

^a"Angry" as measured by highest 10% score on Angry/Distractibility subscale. ^b"Sad" as measured by highest 10% score on Sad/Lonely/Anxious subscale. ^c"Unpopular" as measured by lowest 10% score on Peer Relations subscale. ^dPoor Reader as measured by lowest 10% score on Reading Test.

^ePoorly Skilled in Mathematics as measured by lowest 10% score on Mathematics Test.

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

effects of these characteristics are the observed predicted effects for being poorly skilled in mathematics and the child's gender. Being poorly skilled in mathematics significantly increases a child's risk of feeling sad or lonely. This effect is evident after statistical control for whether the child was a poor reader in third grade as well as the autoregressor and additional child-, family-, school-, and community-level characteristics. The coefficient and effect size estimate for feeling sad and lonely in fifth grade if the child was poorly skilled in mathematics in third grade are similar in magnitude to the estimates yielded for being a poor reader in third grade. Girls are less likely than boys to report feeling angry or distractible or unpopular as boys and no more likely to report feeling sad or lonely.

After statistically controlling both for the autoregressors and many additional child-, family-, school-, and community-level confounds, children who were poor readers in third grade are more than twice as likely to report feeling angry or distractible in fifth grade. Being a poor reader in third grade also increases a child's risk of reporting feeling lonely or sad (OR = 1.59) and unpopular (OR = 1.74). All three of these predicted effects are statistically significant. Thus, being a poor reader consistently increases a child's risk of generalized socioemotional maladjustment. The predicted effects of poor reading are evident (a) across three measures of children's emotion and behavior; (b) using self-report, which should better evaluate children's "inner states"; and (c) despite statistical control for the

autoregressor, as well as a wide range of additional child-, family-, school-, and community-level characteristics.

DISCUSSION

We investigated whether and to what extent being a poor reader increases a child's likelihood of reporting feeling angry, distractible, sad, lonely, anxious, and unpopular. Poor reading performance has repeatedly been hypothesized to contribute to children's socioemotional maladjustment (e.g., Stanovich, 1986). Although there is some evidence indicating that poor reading performance results in "proximal" negative Matthew effects (e.g., poorer attitude toward reading, less persistence during reading tasks, less independent reading practice), less is known about the "distal" or more generalized effects on socioemotional maladjustment (e.g., frequently feeling angry, sad, or unpopular). To better estimate these predicted relationships, we statistically controlled for a range of child-, family-, school-, and community-level confounds including the autoregressor. Multilevel logistic regression analyses indicated that poor readers are at substantially greater risk of socioemotional maladjustment. This was the case across multiple self-report measures as well as after extensive statistical control of possible confounding factors.

Theoretical and Educational Implications

The study's results have both theoretical and educational implications. In terms of theory, our findings provide additional empirical evidence for the hypothesis that early reading failure may result in generalized socioemotional maladjustment in young children. Stanovich (1986) hypothesized that poor readers experience increasingly more generalized cognitive/motivational/behavioral side effects, although the timing of these negative Matthew effects remained to be established. Others have hypothesized that the resulting inability of poor readers to meet their classroom's academic demands leads to increasing feelings of frustration, anger, task avoidance, withdrawal, and social isolation (e.g., Fleming et al., 2004; Kellam et al., 1998; Wehby et al., 2003). This may occur as poor readers begin to realize that their reading skills are substantially worse than their peers. Such a realization could have particularly negative effects on the children's emotional well-being, given the expectation of attaining reading proficiency during the elementary school grades. The resulting negative effects on children's self-concept and self-esteem may contribute to increasing feelings of inferiority, hostility, and rejection (Chapman, 1988).

Prior studies have also reported that poor readers are more likely to display socioemotional maladjustment. Morgan et al. (2009) observed that first-grade

poor readers were more likely to display learning-related (e.g., inattention, a lack of task persistence) behavior problems, less self-control, and more frequent externalizing (e.g., acting out) and internalizing (e.g., withdrawal) behavior problems in third grade. This relationship was observed after accounting for both autoregressors and a wide range of additional confounds. However, that study relied on teacher ratings, and so was unable to report on how reading failure may have negatively impacted children's feelings. Maughan et al. (2003) observed that children experiencing reading difficulties were more likely to report depressed moods. However, this relationship was reduced to statistical nonsignificance after prior report of depressed mood was accounted for in the modeling, thereby limiting support of the hypothesized relationship. Our study surveyed students directly about a wider range of feelings than previous studies. Like Maughan et al., we found that poor readers were more likely to report socioemotional maladjustment, and, in contrast to their study, the relationship continued to be evident after accounting for prior history of socioemotional maladjustment. Our results provide additional support for theoretical accounts that early reading failure results in generalized negative effects on children's socioemotional adjustment. They also indicate some specificity to the hypothesized causal agent, in that our predicted effects were estimated after controlling for prior history of poor mathematics performance.

Our results are also consistent with prior theoretical accounts in which mathematics difficulties may contribute to socioemotional maladjustment but that these negative effects may be limited to internalizing psychopathology (Rourke, 1988; Rourke et al., 1989). We observed a significant relationship between early mathematics difficulties and feelings of sadness, withdrawal, and anxiety but not feelings of anger, distractibility, or social isolation. We observed this relationship after statistically controlling for the autoregressor, prior history of reading difficulties, and many additional confounding factors. Overall, we have found that children who are poor readers or who are poorly skilled in mathematics are at increased risk of socioemotional maladjustment. However, poor reading performance appears to contribute to relatively more generalized socioemotional maladjustment, whereas poor mathematics performance may contribute specifically to internalizing psychopathology.

The study's educational implications are twofold. First, our results help to inform screening efforts to identify children who are reporting frequent socioemotional maladjustment. Those children who reported feelings of anger, distractibility, sadness, loneliness, and social isolation in third grade were likely to continue to report such negative feelings in fifth grade. Thus, negative self-perceptions are relatively stable, even during the elementary school grades, and when reported by third-grade children. Systematic monitoring, evaluation, and psychological treatment of young children repeatedly reporting socioemotional maladjustment by trained professionals (e.g., school psychologists, counselors) may be necessary.

Second, interventions that effectively prevent or remediate poor reading performance (and, to a lesser extent, being poorly skilled in mathematics) in young children may have positive carryover effects, such that children who are helped to become proficient in reading may be less likely to consider themselves as angry, sad, or unpopular by the end of their elementary school years. That is, our study helps to identify potentially malleable factors (i.e., poor reading performance, being poorly skilled at mathematics) that, if prevented or remediated, may lessen young children's risk of later socioemotional maladjustment. Once these negative Matthew effects become increasingly generalized, multicomponent interventions targeting both "skill" and "will" may be necessary to best help poor readers. For example, Andreassen, Knivsberg, and Niemi (2006) recently reported that nonexperimental efforts including systematic counseling were necessary to help increase the reading abilities of poor readers.

Limitations

Our study has several limitations. The study's analyses were on nonexperimental data. We did not manipulate the hypothesized causal factor (i.e., poor reading performance). Experimental or high-quality quasi-experiments, in which reading difficulty is remediated and any resulting changes in children's self-perceptions measured, are necessary to establish causality (see Morgan, Fuchs, et al., 2008, for a recent example). The study also relied on young children's report of socioemotional maladjustment. Prior studies have found that children's reports do not correlate strongly with reports obtained from their teachers or parents, particularly for more externalizing-type psychopathology (Achenbach, McConaughy, & Howell, 1987). However, children's reports do consistently correlate with teacher ratings of more internalizing-type psychopathology. Children by age 7 can also display the capacity to "accurately report on their own symptomology" (Norwood, 2007, p. 89), and reliabilities of their reports can be higher than their parent's ratings (Silverman & Eisen, 1992). Poor readers held more negative self-perceptions when contrasted to a large sample of their agemates. Use of reports from the same type of informants allows for the more appropriate contrasts because ratings provided by these peers should better measure the same types of contexts. The analyzed data were also collected during the children's elementary school years. We do not currently know to what degree the observed relationships hold as children continue on to middle and high school.

Conclusions

Being a poor reader increases a third-grade child's risk of reporting feeling angry, sad, and unpopular by fifth grade. These effects of poor reading performance can be characterized as both generalized and relatively distal. The observed

timing of these effects is particularly worrisome. Researchers, practitioners, and policymakers may have a limited window of opportunity to intervene before early reading failure begins to increase children's likelihood of generalized socioemotional maladjustment.

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