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Do Poor Readers Feel Angry, Sad, and Unpopular?

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Abstract

We investigated whether being poorly skilled in reading contributes to children's self-reported feelings of anger, distractibility, anxiety, sadness, loneliness, and social isolation. Data were analyzed from a longitudinal sub-sample of children ($N=2,751$) participating in the Early Childhood Longitudinal Study—Kindergarten Cohort. Multi-level logistic regression analyses indicated that poor readers in 3rd grade were more likely to consider themselves as angry, distractible, sad, lonely, and unpopular in 5th grade than those who had not been poor readers in 3rd grade. About 20% of 3rd grade poor readers reported feeling angry and unpopular in 5th 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 socio-emotional maladjustment in young children.

Keywords

poor readers; reading difficulties; mathematics difficulties; Matthew effect; socio-emotional maladjustment; behavior problems; self-perceptions

Poor reading ability has been repeatedly theorized to negatively impact children's socio-emotional 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 achievement. These spinoffs constitute "poor-get-poorer" or negative Matthew effects (e.g., p. 389), in that poor reading ability 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 and so maintain their reading failure. Thus, early reading failure may initiate "a

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causal chain of escalating negative side effects” (p. 364) that can become increasingly more generalized—”seeping into more and more areas of cognition and behavior” (p. 390)—as the developmental cycle continues.

To date, most empirical studies have examined if 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, be less motivated to read, and hold generally more negative attitudes towards learning to read (Chapman & Tunmer, 1997; Gottfried, 1990; Lepola, Salonen, & Vauras, 2000). The relation between poor reading ability and these 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) or independently practice reading at home (Juel, 1988).

Fewer studies have evaluated whether poor reading ability negatively impacts “distal” feelings and behaviors that are not specific to reading activities. For example, poor readers have been reported to be more likely to act out or be aggressive (e.g., Morgan, Farkas, & Qiong, 2009; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006), distractible or 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).

These increasingly generalized negative Matthew effects should occur as children age (Stanovich, 1986). This happens because children 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 social comparisons to their peers 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 become increasingly evident to their classmates, the children 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).

Do poor readers feel angry, sad, and unpopular? Evidence that reading failure increases children's risk of socio-emotional maladjustment—and as early as the elementary grades—would have far-reaching theoretical and practical implications. Theoretically, evidence of such a relation should provide additional justification that early reading failure *may* 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. Such investigations may also help identify the timing in which these negative effects begin to occur. Practically, finding that being a poor reader increases children's risk of feeling angry, distractible, anxious, and unpopular should further justify the need for interventions that experimentally evaluate whether preventing or remediating poor reading ability results in improved socio-emotional adjustment in children. That is, preventing or remediating early reading failure may help children to become academically proficient *and* socio-emotionally well adjusted. Identifying potential malleable factors that help prevent socio-emotional maladjustment—especially those that are targetable 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 relation between poor reading ability and children's socio-emotional maladjustment (Spira & Fischel, 2005). Very few studies have used experimental or quasi-experimental designs that allow for causal inferences. Results from these few studies are inconsistent (Morgan, Fuchs, Compton, Cordray, & Fuchs, 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 relation between poor reading ability and socio-emotional maladjustment. In these types of studies, the hypothesized relation 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” when estimating to what degree early reading failure predicts children's later socio-emotional maladjustment. Autoregressors constitute strongly confounding factors (Hulslander, Olson, Willcutt, & Wadsworth, 2010). Additional risk factors, such as a child's gender or the family's socio-economic status (SES), 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, & Silvia, 1986; Morgan et al., 2008). Collectively, these methodological limitations “severely constrain inferences regarding causal precedence” as to whether reading failure negatively impacts children's socio-emotional adjustment (Hinshaw, 1992, p. 146).

Most prior investigations have also been limited to quantifying the relation between poor reading ability and externalizing (e.g., being disruptive, argumentative, or aggressive) psychopathology (e.g., Fleming et al., 2004; Hinshaw, 1992). Researchers may not have adequately identified the extent to which poor reading ability's effects generalize to other aspects of children's socio-emotional maladjustment (e.g., anxiety or social isolation). In addition, researchers have not systematically contrasted whether any observed effects on children's socio-emotional maladjustment are specific to poor reading ability, 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—and so overstraining—their verbal abilities, thereby resulting in lower quality language interactions with their peers, and correspondingly increased feelings of withdrawal, anxiety, and depression (Rourke, Young, & Leenaars, 1989). This relation has some, albeit limited, empirical support (Greenham, 1999; White, Moffitt, & Silva, 1992).

Most of the extant work has relied exclusively on teacher ratings of children's behavior (Morgan 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 in 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 of the classroom (e.g., recess). Teacher ratings may also be biased against particular groups (e.g., boys, those of minority racial/ethnic heritage) of children (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 studies that have not been restricted to relying only on teacher report of children's externalizing problem behaviors. These investigators used student self-report data to investigate whether and to what extent a prior history of reading difficulties elevated children's likelihood of more frequently experiencing depressed moods. Some indication of this relation was observed, but this was less evident after a prior history of depressed moods was statistically controlled.

The purpose of this study was to evaluate the hypothesis that poor reading ability negatively impacts children's socio-emotional adjustment. To more rigorously estimate these more generalized negative Matthew effects, we used (a) a large sample, (b) a longitudinal research design (i.e., data collected at both 3rd and 5th grade), (c) multiple self-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 were already perceiving themselves as angry, distractible, sad, lonely, or anxious, or socially isolated. To better evaluate whether and to extent any observed effects were specific to early reading failure, we also included being poorly skilled in mathematics as a potentially alternative dependent variable. Including whether a child was poorly skilled in mathematics should also have functioned as an additional statistical control of children's nonverbal cognitive functioning and of their mathematics-related self-perceptions (Chiu & Klassen, 2010; Deary, Strand,

Smith, & Fernandes, 2007). Using extensive statistical control while analyzing to what extent children who are poor readers in 3rd grade self-report being angry or distractible, lonely or sad, or unpopular in 5th grade should better estimate the hypothesized relation. These analyses should 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 socio-emotional adjustment. Collectively, the study's analyses should help provide additional empirical evidence for theoretical accounts that reading failure contributes to generalized socio-emotional maladjustment in young children.

Method

Sample

We analyzed data from 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 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). The ECLS-K consists of a large-scale and longitudinal 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.

We identified an analytical sample of ECLS-K participants who had complete 3rd and 5th 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 analytical sub-sample consisted of 2,751 children. These children attended 791 schools. Table 1 displays descriptive statistics of the participants. The sample is socio-demographically diverse. It consists of about equal percentages of girls and boys. Most of the children's parents had high school diplomas or a college or advanced degree. About 20% of the children were being raised in families living in poverty. The majority of participating children were White, non-Hispanic. The next largest percentages of children by their racial/ethnic minority status were Hispanics and Black, non-Hispanics. Most of the children were being raised by both their biological parents. About 20% of the children were being raised in households where the language spoken at home was not English. Sixteen and 26% of the children were attending schools where more than 25% of the students were Black or Hispanic, respectively. The average percentage of students who were receiving free or reduced lunch in the sample's schools was 37%. This percentage ranged substantially. The participants were fairly well distributed across U.S. region and urbanicity.

Measures

Feelings of anger, sadness, or social isolation—We used children’s self-ratings on the Self-Description Questionnaire-I (SDQ-I) to identify those who reported themselves as feeling angry or distractible, lonely or sad, or socially isolated in 3rd and 5th grade. NCES evaluated children’s feelings using a modified version of the SDQ-I. The SDQ-I is a well-validated measure of children’s self-perceptions. It 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 to the analytical sub-sample in 3rd and 5th grade.

We analyzed children’s responses to three specific SDQ-I subscales. The Angry/Distractibility subscale’s 6 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 8 items queried children about internalizing problem behaviors such as “feeling sad a lot of the time,” feeling frustrated, ashamed of mistakes, and worrying about school and friendships, and feeling anxious. The Peer Relations subscale’s 6 items asked children about how easily they made friends, get along with peers, and their perception of their popularity. NCES (2005a, b) reported that the 3rd and 5th grade alpha coefficients for the Angry/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 self-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 socio-emotional maladjustment (e.g., Gresham, MacMillian, Bocian, Ward, & Forness, 1998; Nelson, Stage, Duppong-Hurley, Synhorst, & Epstein, 2007). We applied this criterion at both 3rd (to establish autoregressors for the multi-level logistic regression analyses) and 5th grade (so as to identify the analyses criterion variables, which we dichotomized as “yes/no” to self-reporting feeling angry or distractible, sad or lonely, or unpopular). 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 ability—We used children’s scores on the spring 3rd 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

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).

distribution of such scores. This 10% criterion is consistent with previous empirical work identifying children as having reading disabilities (Catts et al., 2001) or clinically significant reading problems (Konold, Juel, & McKinnon, 1999; Morgan et al., 2008). The Reading Test was designed to measure a child's level of basic skills (e.g., print familiarity, letter recognition, decoding, sight word recognition), as well as his or her receptive vocabulary and reading comprehension skills. The percentages of content evaluating basic reading skills, vocabulary, and reading comprehension during the 3rd grade administration of the Reading Test was about 15%, 10%, and 75%, respectively. NCES-trained field staff individually administered the Reading Test using an untimed 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 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 3rd grade administration was .93 (NCES, 2004). Third grade children's scores correlated .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 3rd grade administration of the Mathematics Test to identify those who were poorly skilled in mathematics. We used a criterion of 10% to identify children as being poorly skilled in mathematics. A 10% cut off 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 adaptive Mathematics Tests that were administered one-to-one to each child in an un-timed format. Theta reliability of the 3rd grade IRT scaled scores was .94. Third grade children's Mathematics Test's IRT scores correlated .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 3rd grade year. We used these data to identify the 3rd grade child- and family-level predictors of 5th grade children's self-report of feeling angry or distractible, sad or lonely, or unpopular, as well as statistical controls to better estimate the predicted effects of being a poor reader on these negative feelings. 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. We included the child's age in months at fall kindergarten entry, as reported in the parent interview. Parents also identified both the mother's (or female guardian's) and father's (or male guardian's) education level. This was coded in our analyses as having (a) less than high school education, (b) a high school diploma, (c) some college or an associates degree, or (d) a bachelor's degree or higher. We used having a bachelor's degree or higher as the reference category. A dichotomous variable for living below the federal poverty standard (0 for "no"; 1 for "yes") was calculated using the family's income and size. Parents also reported on their participation in federal assistance

programs for low-income families, such as Aid For Families with Dependent Children (AFDC) 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 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. 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 coded for, using “Northeast” as the reference category. The urbanicity of the child’s community was coded for, with “Central city” as the reference category.

Analyses

The study’s primary analytical strategy was multi-level logistic regression. Logistic regression estimates whether and to what extent dichotomous criterion variables (e.g., feeling sad or lonely or not) relate 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). Logistic regression is a commonly used analytical method to identify risk factors for diseases, disorders, or conditions (Ely, Dawson, Mehr, & Burns, 1996) such as socio-emotional maladjustment (e.g., Carroll et al., 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. Here, we predicted self-reporting feeling or not feeling “angry,” “sad,” or “unpopular” in 5th grade using a range of 3rd grade factors, including displaying poor reading ability. Feelings of anger, sadness, and social isolation were operationalized as having a score that was in “worse” 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

²We also evaluated the robustness of the study’s results by also using OLS regression, in which the criterion and main predictor variables (i.e., the autoregressors, poor reading ability, poor mathematics ability) were re-coded to be continuous. These OLS regression analyses (available from the study’s first author) were consistent with the reported logistic regression analyses.

All the aforementioned analyses included the autoregressor. Whether children self-reported feeling angry, sad, or unpopular in 3rd 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 self-reporting feeling angry, sad, or unpopular in 5th grade. Use of the autoregressors should have helped 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. 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 sample weight (i.e., C1_6FC0) to adjust for the ECLS-K's sampling structure.

Results

Table 2 displays the percentage of children who did or did not self-report feeling angry or distractible, lonely or sad, or unpopular in the 5th grade, by whether they were poor readers in 3rd grade. These data consistently indicate that 3rd graders who are poor readers more frequently self-report feeling angry, sad, and unpopular in 5th grade than 3rd graders who are not poor readers. For example, about a third of 5th graders who were poor readers in 3rd grade reported frequently feeling angry or distracted. About a third of 5th graders who were poor readers in 3rd grade reported frequent feelings of sadness, worry, and anxiety. In contrast, only about a tenth of 5th graders who were not poor readers in 3rd grade reported frequent feelings of anger or sadness. However, these estimates are not yet adjusted, in that they do not statistically account for a range of potential confounds, including whether these two groups of children were already reporting these negative feelings as 3rd graders.

Table 3 displays results from the multi-level logistic regression analyses, in which we use factors measured in 3rd grade to predict whether children self-reported feeling angry or distractible, sad or lonely, or unpopular in 5th grade. These analyses include the autoregressor, or whether children was already self-reporting the same type of negative feelings in 3rd grade. Each autoregressor has large predicted effects. Children who self-described themselves as feeling angry or distractible in 3rd grade are about three times more likely to self-report such feelings in 5th grade as otherwise statistically matched children who did not self-report such feelings in 3rd grade. The autoregressor ORs for feeling lonely or sad or unpopular are also large (i.e., 3.91 and 5.11, respectively).

The additional child-, family-, school-, and community-level characteristics are sometimes statistically significant predictors a child's self-report feeling angry or distractible, sad, lonely, or anxious, or unpopular, thereby justifying the use of these characteristics as statistical controls. Two particularly notable of these characteristics are the observed predicted effects for being poorly skilled in mathematics and the child's gender. Being poorly skilled in mathematics 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 3rd grade, as well as the study's autoregressor and additional child-, family-, school-, and community-level characteristics. The coefficient and effect size estimate for feeling sad and lonely in 5th grade if the child was poorly skilled in mathematics in 3rd grade approximate the estimates

yielded for being a poor reader in 3rd grade. Girls are less likely to self-report feeling angry or distractible or unpopular as boys, and no more likely to report feeling sad or lonely.

Statistically controlling both for the autoregressors and many additional child-, family-, school-, and community-level confounds, children who were poor readers in 3rd grade are over twice as likely to self-report feeling angry or distractible in 5th grade. Being a poor reader in 3rd grade also increases a child's risk of self-reporting feeling lonely or sad (OR=1.59) and unpopular (OR=1.74). Thus, being a poor reader consistently increases a child's risk of generalized socio-emotional 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.

Results displayed in Table 4 help to contextualize a 3rd grade poor reader's relative risk of self-reporting negative self-perceptions in 5th grade. Statistically adjusting for the aforementioned confounding factors, 3rd grade poor readers are at consistently elevated risk of frequently feeling angry or distractible, sad or lonely, or socially isolated in 5th grade relative to those who were not poor readers. Roughly 20% of 3rd grade poor readers felt angry and unpopular by the end of 5th grade.

Discussion

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

Theoretical and Educational Implications

The study's results have both theoretical and educational implications. Theoretically, our findings provide additional empirical evidence for the hypothesis that early reading failure may result in generalized socio-emotional 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 of 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 socio-emotional maladjustment. Morgan et al. (2009) observed that 1st 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 3rd grade. This relation was observed after accounting for both autoregressors and a wide range of additional confounds. However, this 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 relation was reduced to statistical non-significance after prior report of depressed mood was accounted for in the modeling, thereby limiting support of the hypothesized relation. Our study extends the majority of studies by surveying students directly about their feelings and behaviors. Like Maughan et al., we find that poor readers are more likely to report socio-emotional maladjustment, with our results indicating that the relation continues to be evident after accounting for prior history of socio-emotional maladjustment. Our study also extends prior work by surveying a wider range of feelings.

Our findings indicate that poor reading ability's negative Matthew effects may indeed include children frequently feeling angry, lonely, sad, and socially isolated. These relations are evident at least by the end of 5th grade. Our results provide additional support for theoretical accounts that early reading failure results in generalized negative effects on children's socio-emotional adjustment. Our results also indicate some specificity to the hypothesized causal agent, in that that a prior history of poor mathematics ability did not fully account for the effects attributable to poor reading ability.

However, our results are also consistent with prior theoretical accounts in which mathematics difficulties may contribute to socio-emotional maladjustment, but that these negative effects may be limited to internalizing psychopathology (Rourke, 1988; Rourke et al., 1989). Our results are consistent with this prior theoretical work, as we observed a relation between early mathematics difficulties and feelings of sadness, withdrawal, and anxiety, but not to feelings of anger, distractibility, or social isolation. We observed this relation after statistically controlling for the autoregressor, a prior history of reading difficulties, as well as many additional confounding factors

The study's educational implications are two-fold. First, our results help to inform screening efforts to identify children who are reporting frequent socio-emotional maladjustment. Those children who self-reported feelings of anger, distractibility, sadness, loneliness, and social isolation in 3rd grade were likely to continue to self-report such negative feelings in 5th grade. Thus, negative self-perceptions are relatively stable, even during the elementary school grades, and when self-reported by 3rd grade children. Systematic monitoring,

evaluation, and psychological treatment of young children repeatedly reporting socio-emotional maladjustment by trained professionals (e.g., school psychologists, counselors) may be necessary. Our analyses also identify children's gender as an additional risk factor. The observed predicted effect for gender is somewhat counter to prior theoretical (Nolen-Hoeksema, 2001) and empirical (Galambos, Leadbeater, & Barker, 2004) work, which has indicated that girls are more likely to display internalizing psychopathology (e.g., anxiety, withdrawal, depression). Our results instead indicate that girls are less likely to report feeling either angry or unpopular, and are no more likely to report feeling sad and lonely than boys.

Our results also indicate that those children who are poor readers or who are poorly skilled in mathematics are also at increased risk of socio-emotional maladjustment. However, poor reading ability may contribute to more generalized socio-emotional maladjustment, while poor mathematics ability may contribute more specifically to internalizing psychopathology.

Second, interventions that effectively prevent or remediate poor reading ability (and, to a lesser extent, being poorly skilled in mathematics) in young children may have positive carry over 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 ability, being poorly skilled at mathematics) that, if prevented or remediated, may lessen young children's risk of later socio-emotional maladjustment. However, and as these negative Matthew effects become increasingly generalized, multi-component interventions targeting both "skill" and "will" may be necessary to best help poor readers. For example, Andreassen, Knivsberg, and Niemi (2006) recently reported that non-experimental efforts that 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 of non-experimental data. We did not manipulate the hypothesized causal factor (i.e., poor reading ability). 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 such causality (see Morgan et al., 2008, for a recent example). The study also relied on young children's self-report of socio-emotional maladjustment. Prior studies have found that children's self-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 self-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 self-report 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 age-mates. Use of reports from the same type of informants allows for the more appropriate contrast 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 are therefore currently unable to report to what degree the reported relations hold as children continue onto middle and high school.

Conclusions

Results from this study indicate that being a poor reader increases a 3rd grade child's risk of self-reporting feeling angry, sad, and unpopular by 5th grade. Consequently, the study's results provide additional empirical evidence for theoretical accounts that reading failure contributes to socio-emotional maladjustment during childhood. These negative side effects of poor reading ability can be characterized as both generalized and relatively distal. Reading failure's negative side effects can move beyond only impacting feelings and behaviors specific to the reading task. Instead, these side effects may contribute to general feelings of anger, anxiety, and social isolation. The observed timing of these negative Matthew effects is worrisome. Researchers, practitioners, and policy-makers may have a limited window of opportunity to intervene before early reading failure begins to increase children's likelihood of socio-emotional maladjustment.

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Table 1

Descriptive Statistics of the Study's ECLS-K Analytical Sample

Variable	M or Proportion	SD
Gender (female)	.48	
Age at K entry	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	23.80	5.68
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	

Variable	M or Proportion	SD
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.

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Table 2

Percentage of Students Feeling Angry, Sad, Unpopular at 5th Grade, by 3rd Grade Poor Reading Ability, ECLS-K Data

3 rd Grade		5 th Grade	
Poor Reader ^d	Percentage “Angry” ^a	Percentage “Sad” ^b	Percentage “Unpopular” ^c
Yes	32.02%	33.84%	19.64%
No	10.35%	9.81%	11.08%

Note.

^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

Table 3

Multilevel Logistic Regression Analyses (Odds Ratios) Using 3rd Grade Child-, Family-, School-, and Community-Level Factors to Predict 5th Grade Children’s Self-Reports of Feeling Angry, Sad, or Unpopular, ECLS-K Data

3 rd Grade Predictors	5 th Grade “Angry” ^a		5 th Grade “Sad” ^b		5 th Grade “Unpopular” ^c	
	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio
<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 K entry	-.02	.98	-.01	.99	-.04*	.96
Mother’s Education						
Less than high school	-.21	.81	-.16*	.85	.37	1.45
High school 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 high school	.73*	2.07	-.34	.71	.38	1.47
High school 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

3 rd Grade Predictors	5 th Grade "Angry" ^a	5 th Grade "Sad" ^b	5 th Grade "Unpopular" ^c
Asian	.09	1.09	.01
Other	-.14	.87	-.02
Household structure			
Single-parent family	-.23	.79	-.04
Number of siblings	-.12	.89	-.12
Home language not English	.38	1.46	.61
Mother's age at first birth	-.06**	.95	-.04
<i>Level 2</i>			
More than 25% Black students	.24	1.27	.13
More than 25% Hispanic students	-.06	.94	-.20
% eligible for free lunch	.01	1.01	-.00
Region			
Midwest	.51	.84	.84**
South	.14	1.15	.48
West	-.17	.84	.76*
Urbanicity			
Urban fringe and large town	.26	1.30	-.23
Small town and rural	.13	1.13	-.21

Note. Estimated are weighted by CI_6FC0. SDQ = Self-Description Questionnaire-I; 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;

^d Poor Reader as measured by lowest 10% score on Reading Test;

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

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Table 4

Predicted Percentages of Students Feeling Angry, Sad, Unpopular at 5th Grade, by 3rd Grade Poor Reading Ability, ECLS-K Data

Poor Reader ^d	3 rd Grade	5 th Grade	
	Predicted Percentage “Angry” ^a	Predicted Percentage “Sad” ^b	Predicted Percentage “Unpopular” ^c
Yes	17.62%	12.65%	21.29%
No	8.58%	7.93%	12.25%

Note. Predicted proportions were computed by fixing the value of all other covariates at their grand mean.

^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.