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How do Parent Expectations Promote Child Academic Achievement in Early Elementary School? A Test of Three Mediators

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Abstract

Using a longitudinal mediation framework and a low-income sample, this study had two aims: 1) to model bi-directional associations between parent academic expectations and child academic outcomes from first through fifth grade, and 2) to explore three mediators of parental influence: parent involvement in child schooling, child learning behaviors, and child perceived academic competence. Participants included 356 children and their caregivers (89% mothers) recruited from Head Start centers (58% European American; 25% African American; 17% Latino). At each time point (grades 1, 2, 3, 5), parents rated their academic expectations, teachers rated parent involvement and child learning behaviors, and children rated their self-perceptions of their academic competence. Bi-directional longitudinal associations emerged between parent academic expectations and child academic outcomes. Child learning behaviors mediated this association from first to third grade, whereas child perceived academic competence mediated from second to fifth grade. Parallel cross-lagged models replicated these findings with child academic outcomes assessed using a test of reading achievement and teacher ratings of academic performance.

Keywords

academic expectations; academic performance; parent support; self-perception

As far back as the 1960s, researchers noted that parent academic expectations (e.g., how far parents thought their child would go in school; what grades they anticipated their child would receive) were correlated with the child's future academic attainment (Douglas, 1964). Subsequent research has confirmed that parent expectations are a robust predictor of child academic achievement (Child Trends, 2015). The link emerges early; for example, parent expectations at kindergarten entry predict child reading and math achievement in first grade (Sy & Schulenberg, 2005) and grade point averages three years later (Gut, Reimann, & Gob, 2013). The influence persists over time; for example, after controlling for child achievement in early elementary school, parent expectations in the third grade predict incremental variance in standardized achievement tests one year later (Halle, Kurtz-Costes, & Mahoney, 1997). In addition, the association is long-lasting; a recent longitudinal analysis revealed a correlation of $r = .25$ between parent academic expectations in first grade and the number of

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years of education children attained by age 22, controlling for gender, race, family socio-economic status (SES), and neighborhood (Entwisle, Alexander, & Olson, 2005).

The link between parent academic expectations and child achievement is of particular interest in low-SES families (Froiland, Peterson, & Davidson, 2013; Tynkkynen, Tolvaned, & Salmela-Aro, 2012). Fewer than half of parents making $30,000 or less a year expect their children to complete a college Bachelor's degree, compared to 70% of parents with an annual income of $75,000 or more (Child Trends, 2015). Yet, obtaining a Bachelor's degree has significant benefits, boosting lifetime net earnings by 43–52% on average, and promoting improved lifelong health and well-being (Adler & Newman, 2002; Kim, Tamborini, & Sakamoto, 2015; Tamorini, Kim, & Sakamoto, 2015). Pursuing education beyond a Bachelor's degree also boosts lifetime earnings, but by just 22–28% (Tamorini et al., 2015), suggesting that increasing academic expectations and attainment in low-SES families where expectations are the lowest might meaningfully narrow the income gap. Indeed, empirical work bears this out, with low-income students gaining the most in economic benefits from attending college, relative to their upper-income peers (Brand & Xie, 2010). For this reason, this study focuses on understanding links between parent academic expectations and child academic performance within a sample of low-income families.

In general, family SES and its components (parent education and income) are robust predictors of parent academic expectations (Child Trends, 2015; Davis-Kean, 2005; Englund, Luckner, Whaley, & Egeland, 2004; Neuenschwander, Vida, Garrett & Eccles, 2007; Sy & Schulenberg, 2005; Tynkkynen et al., 2012; but for an exception, see Hill, 2001). Relative to their higher-SES counterparts, low-SES parents typically have less positive past experience with schools, feel less effective supporting their child's learning, have fewer resources and less social capital to invest in child learning, and limited access to high-quality schools and teachers – all factors likely contributing to diminished expectations for their child's academic success (Davis-Kean, 2005; Hill & Taylor, 2004; Neuenschwander et al., 2007).

Researchers have speculated that more intensive study in low-income families might clarify the pathways that link parent academic expectations with child achievement, enriching developmental understanding of these links and potentially informing the design of intervention strategies aimed at reducing educational disparities (Child Trends, 2015; Entwisle et al., 2005; Loughlin-Presnal & Bierman, in press; Purtell & McLoyd, 2013; Tynkkynen et al., 2012). One hypothesis is that high academic expectations motivate parent involvement in child learning at home and at school, thereby promoting child achievement (Chao, 2000; Sy & Schulenburg, 2005). Alternatively, high academic expectations may shape child attitudes and motivations, reinforcing effortful learning behaviors (Briley, Harden, & Tucker-Drob, 2014) and boosting child academic aspirations and self-perceptions of their academic competence (Froiland et al., 2013; Neuenschwander et al., 2007). Emerging research suggests that the influence of various mediators may change developmentally (Briley et al. 2014), creating a need for systematic study of their influence across the elementary years. This study had two aims: 1) to model bidirectional associations between parent academic expectations and child academic performance from first through

fifth grade, and 2) to explore three mediators of parental influence (parent involvement, child learning behaviors, and child perceived academic competence), examining potential developmental shifts over the course of elementary school. Prior research has identified social class differences in the pathways linking parent beliefs, behaviors, and child achievement (Davis-Kean, 2005; Hill, 2001). This study focused on low-income families, to better understand the processes the might account for variations in child achievement in a segment of the population at risk for educational disparities.

Parent Academic Expectations and Child Academic Performance: Bi-directional Links

Multiple developmental studies have shown that parent academic expectations in early elementary school predict later child academic achievement (Entwisle et al., 2005; Gut et al., 2013; Sy & Schulenberg, 2005). Most of these studies controlled for confounding factors, such as family SES, and lend credence to the hypothesis that parental expectations influence child academic outcomes over time (Child Trends, 2015). In a recent study, Briley et al. (2014) tested a rigorous cross-lagged, longitudinal model to explore the reciprocal effects of child achievement on parent academic expectations during elementary school. In the large, nationally-representative sample (ECLS-K), small but statistically-significant bi-directional effects emerged at each time point. These findings reflect a dynamic, reciprocal pattern of influence, and suggest that parent expectations contributing to change over time in child achievement even when actual achievement and other confounders are well-controlled in a cross-lagged model. One aim of the present study was to replicate these bi-directional effects in a low-income sample at elevated risk for underachievement and educational disparities.

Proposed Mediators between Parent Expectations and Child cademic Performance

A second study aim was to better understand the processes by which parent academic expectations influence child achievement, testing three of the most promising potential mediators: parent involvement in child schooling, child learning behaviors, child self-perceived academic competence. Relative to prior studies that tested mediation in the context of cross-sectional or simple prediction designs, this study examined mediation using rigorous cross-lagged longitudinal models, providing robust tests of the hypothesized developmental pathways (Little, 2013). The following sections describe the theoretical rationale and empirical evidence supporting the focus on these three mediators.

Parent academic expectations and involvement in children's schooling

Parent involvement in children's schooling is multi-faceted, including behaviors such as attending parent-teacher conferences, volunteering in the classroom, and working with children on learning activities at home (Pomerantz, Moorman, & Litwack, 2007). Relative to high-SES parents, low-SES parents are less likely to get involved at their children's schools, and instead prioritize other types of at-home involvement, such as helping with homework (Chavkin & Williams Jr., 1989; Hill & Taylor, 2004; Kohl, Lengua, McMahon, and the Conduct Problems Prevention Research Group, 2000; McWayne, Hampton, Fantuzzo,

Cohen, & Sekino, 2004). These SES-related differences may reflect both situational constraints (e.g., lack of transportation) and attitudinal factors (e.g., less comfort in the school setting) that shape patterns of parent involvement in the context of poverty (Hill & Taylor, 2004).

Parents with high academic expectations for their children may be particularly motivated to get involved in their child's schooling (Simpkins, Frederick, & Eccles, 2015), both by participating in school events (Hill, 2001) as well as by supporting learning at home (Englund et al., 2004; Halle et al., 1997). In turn, parent involvement is associated with child achievement, with cross-sectional links emerging as early as the prekindergarten years (Culp, Hubbs-Tait, Culp, & Starost, 2000; Marcon, 1999) and still evident in later elementary school (Englund et al. 2004). Predictive associations are consistent with a causal association; for example, prekindergarten parent involvement predicts child achievement after the transition into kindergarten (Culp et al., 2000; McWayne et al., 2004), and parent involvement in second grade predicts incremental child achievement in third grade (Reynolds, 1992). Despite SES-based differences in preferred types of parent involvement, both school- and home-based involvement are linked with the academic performance of young children from low-income families (Arnold, Zeljo, Doctoroff, & Oriz, 2008; Fantuzzo, McWayne, Perry, & Childs, 2004). Chao (2000) interprets these links within an education niche theoretical framework, in which parents with high expectations indirectly influence child achievement by engaging in activities that provide children with learning opportunities and encouragement, such as reading and teaching at home, and attending school events. Sy and Schulenburg (2005) validated these links in the context of a transactional model, in which parent involvement (along with parent education and academic expectations) influenced (and were influenced by) the reading and math skills of their kindergarten children. Briley et al. (2014) tested a cross-sectional model that suggested a very small percentage of the association between parent academic expectations and child academic performance was mediated by parent involvement. However, two other cross-sectional studies found no evidence for such mediation (Froiland et al., 2013; Phillipson & Phillipson, 2007).

Parent academic expectations and child learning behaviors

Learning behaviors refer to the set of effortful behaviors that support and promote learning, including paying attention, persisting with tasks, managing frustrations, and enjoying learning challenges (Yen, Konold, McDermott, 2004). Controlling for cognitive ability, learning behaviors predict early academic success (McWayne, Fantuzzo, McDermott, 2004), including social and behavioral adjustment after school entry (McDermott, Rikoon, & Fantuzzo, 2016) and growth in math and reading skills across the elementary school years (Li-Grining, Votruba-Drzal, Maldonado-Carreño, & Haas, 2010; McClelland, Acock, & Morrison, 2006).

Parent academic expectations are correlated with child learning behaviors (Bandura, Barbaranelli, Caprara & Pastorelli, 2001; Briley et al., 2014). Theorists have suggested that parents with high expectations model and reinforce learning efforts in their children, encouraging children to take on learning challenges and supporting child persistence and

problem-solving efforts, based on their beliefs that their children are capable of mastering learning tasks (Bandura et al., 2001). In this social learning theory framework, parent confidence in their child's learning capabilities shape child learning motivation and behaviors both via behavioral mechanisms (e.g., modeling and selective reinforcement for attention and persistence) and via cognitive mechanisms (e.g., building child intrinsic motivation and self-efficacy) (Ardelt & Eccles, 2001; Bandura et al., 2001). Consistent with this framework, Bandura and colleagues (2001) found that parent academic expectations were significantly associated with optimal child learning strategies and parents' beliefs that they could promote their child's learning.

Briley et al. (2014) included child learning behaviors in their longitudinal model, documenting significant correlations between parent academic expectations at Kindergarten and first grade and child learning behaviors at subsequent time points (first and third grade). In turn, first-grade learning behaviors were correlated with third grade math and reading performance. Briley et al. (2014) did not test for mediation, but the pattern of correlations suggest that child learning behaviors may represent an indirect pathway linking parent expectations to child achievement during the early elementary years.

Parent academic expectations and child self-perceived academic competence

A third conceptual framework that has been invoked to explain the positive impact of parent academic expectations on child achievement is the expectancy-value (E-V) model (Eccles & Wigfield, 2002; Nagengast et al., 2011; Simpkins et al., 2015), which posits that motivation is fueled by expectations of efficacy (beliefs that a task can be completed) along with beliefs regarding the value of the task. High parent academic expectations may promote child beliefs that academic success is of value and feelings of perceived competence to complete academic tasks. In this model, parent academic expectations influence child outcomes when they become internalized in the form of child perceptions of their own academic ability.

In support of this model, several studies of older elementary students have documented links between parent academic expectations and child self-perceptions of their academic competence (Cole, Maxwell, & Martin, 1997). When Parsons, Adler, and Kaczala (1982) followed students from late elementary school through high school, they demonstrated that parent academic expectations were better predictors of child perceptions of their own academic competence than their actual academic performance, a finding which was subsequently replicated in separate samples of third graders (Phillips, 1987) and sixth graders (Frome & Eccles, 1998). In turn, child self-perceived academic competence is associated with academic performance in the later elementary years, concurrently in fourth grade, and prospectively from fourth to fifth grade (see review by Marsh & Martin, 2011).

Evidence that child academic self-perceptions mediate the association between parent academic expectations and child achievement has emerged for older elementary students in cross-sectional (Benner & Mistry, 2007) and prospective longitudinal studies (Rutchik, Smyth, Lopoo, & Dusek, 2009), and also for preadolescents (Neuenschwander et al., 2007) and adolescents (Gonzalez-Pienda et al., 2002). However, it is unclear whether this association exists for younger students and whether it holds in low-income families.

Developmental Shifts

In general, there are reasons to anticipate that there will be developmental shifts in the role played by child self-perceptions in children's academic adjustment, which might alter the nature of mediation linking parent academic expectations with child achievement. Developmental psychologists have long recognized that substantial changes occur in the early elementary years in children's abilities to integrate information and use deductive reasoning – dubbed the "5 to 7" shift (Sameroff & Haith, 1966). Central to this shift is a movement away from fragmentary and impressionistic thinking to reasoned deduction based upon the integration of relevant pieces of information. Accordingly, child self-perceptions tend to be global and optimistic in the early elementary years. They transform in the later elementary years, as children begin to incorporate informational feedback from adults and make social comparisons with their peers, developing more differentiated self-assessments (Helmke, 1999). In addition, children's beliefs about themselves begin to influence their behavior in more substantial ways during the later elementary years (Davis-Kean et al., 2008). The expectancy-value (E-V) model (Eccles & Wigfield, 2002) predicts that these developmental shifts alter the ways in which parent expectations influence child achievement, suggesting that parents exert influence of child behaviors in the early school years, which then, over time, become internalized as child self-perceptions and expectations in the later elementary years. A few studies suggest that child self-perceptions mediate the impact of parent academic expectations on child achievement in older students; however, we were unable to find a test of this indirect pathway in younger elementary students. Hence, it remains unclear whether the impact of parent expectations on child academic performance is mediated initially through child learning behaviors and then later by internalized child self-perceptions.

The Present Study

The present study had two aims. The first aim was to examine dynamic developmental associations between parent academic expectations and child academic performance across the elementary grades in a low-income sample using fully cross-lagged longitudinal models. Based on existing research (Briley et al., 2014; Simpkins et al., 2015), we anticipated bi-directional effects, with parent academic expectations prospectively predicting child academic achievement and child achievement predicting parent expectations over time. The second aim was to explore three potential mediators of these associations over the course of elementary school, in order to better understand the mechanisms by which parental academic expectations influence child performance in a low-income sample. We examined mediation longitudinally with both change and time-order built into all models (Little, 2013). Mediation effects were tested across two distinct developmental periods: early elementary school (grade 1 to grade 3) and late elementary school (grade 2 to grade 5). Guided by the expectancy-value (E-V) model (Eccles & Wigfield, 2002; Simpkins et al., 2015), we hypothesized that child learning behaviors might emerge as a mediator in the early elementary years and child self-perceptions of academic competence might emerge as a mediator in the later elementary years.

Method

Participants

Participants were 356 children and their caregivers (89% mothers) recruited from Head Start centers (58% European American; 25% African American; 17% Latino). Reflecting the eligibility requirements of Head Start, families were low-income (median household income of $15,000; average income-to-needs ratio = .88), with 37% married, 24% living with a partner, 39% single-parent. About one-third of the parents (31%) had not completed high school, and a small number (2%) had college degrees; most had a high-school education.

Families were recruited initially from 44 classrooms in 25 Head Start centers by a letter inviting them to participate in a developmental study. The families of 86% of the eligible children agreed to participate. Half of the centers were randomly assigned and received a school readiness intervention in Head Start. This study used data for the whole sample, starting two years after the intervention post-test. Although intervention did not influence parent expectations or child academic performance in elementary school, all models controlled for intervention.

Head Start centers were organized at the county level rather than by school district, leading to wide dispersion of study participants at the transition into elementary school. In 1st grade, the 356 participants were in over 200 first-grade classrooms in 82 elementary schools in 33 school districts. For most cases, children were the only study participants in their classrooms (70% in 1st grade, 72% in 2nd grade, 73% in 3rd grade, 78% in 5th grade).

Sample attrition was generally low, declining slightly each wave, from 333 (1st grade) to 314 (2nd grade) to 299 (3rd grade) to 284 (5th grade). Almost all loss was due to family mobility and difficulty locating participants and their current school. Fifteen participants who had no data for study variables beyond first grade were dropped from the present analyses. Demographically, those who dropped out of the study tended to have lower household incomes relative to those who remained beyond 1st grade; however, attrition was not systematically related to any other variable in the present study. Full Information Maximum Likelihood was used to estimate missing data in all analyses.

Data Collection Procedures

Assessments were conducted when children were in Grades 1, 2, 3, and 5. In the spring of each year, parents were interviewed in their homes and asked about their academic expectations. A trained interviewer read questions aloud and recorded parent responses. For families with limited English language skills, a trained bi-lingual research assistant conducted the interviews. Parents were compensated $20 for each interview. Child assessments were conducted individually at school by trained research assistants in the spring of each academic year and included reading achievement tests and ratings of child self-perceived academic competence. At the same time, trained research assistants delivered and explained the teacher ratings, which included ratings of parent involvement in child education, child learning behaviors, and child academic performance, and then teachers completed the ratings on their own and returned them to the project. Teachers were compensated financially for the ratings.

Measures

Parent academic expectations—Parent academic expectations are typically assessed by asking parents how far they expect their child to go in school (see review by Yamamoto & Holloway, 2010). In addition, some researchers have asked parents what grades they expect their children to get (Phillipson & Phillipson, 2007). In this study, parents were asked both questions: "Knowing your child as you do, how far do you think she or he will go in school?" and "Knowing your child as you do, what is the average grade you expect him/her to receive in school?" Each item was rated on a 7-point rating scale, with higher values indicating more positive academic expectations (1 = 0–8th grade/ lower than Cs; 7 = more than four years of college/receive As). Across waves of data, correlations between the two items ranged from r = .56 to .58. Items were averaged.

Child academic performance—Two measures of child academic performance were available across the years of study. The *Test of Word Reading Efficiency* (TOWRE; Torgesen, Wagner, & Rashotte, 1999) provided a brief direct assessment of child reading fluency. On the TOWRE, the Sight Word Efficiency subscale measured the number of words read accurately within 45 seconds, and the Phonemic Decoding Efficiency subscale measured the number of non-words sounded out accurately within 45 seconds (test-retest reliability reported by the developers of .85 – .90; current study α = .83 and α = .85, respectively). Children's TOWRE scores were computed as age-normed, standardized scores, averaged across the two subscales.

In addition, teachers provided ratings of child academic performance using the Academic Success subscale of the *Academic Performance Rating Scale* (APRS; DuPaul & Rapport, 1991). Teachers rated the grade level and quality of student reading/language arts skills, speaking skills, and written language arts work on 4 items (α = .90), and they rated the grade level and accuracy of student mathematics skills on 2 items (α = .75). Items were rated on a 5-point rating scale and averaged to represent a composite teacher rating of each child's academic performance (reliability for this composite ranged from .82 to .91 across waves).

Mediators—Teachers rated parent involvement using a 7-item subscale from the *Parent-Teacher Involvement Questionnaire* (PTIQ; Kohl et al., 2000). Subscale items reflected the quality of the parent's relationship with the teacher and the school in general (e.g., How well do you feel you can talk to and be heard by this child's parents? How important is education in this family?) as well as the parent's support of their child's education (e.g., How involved are the parents of this child in his or her education? To the best of your knowledge, how much do this child's parents do things to encourage a positive attitude toward education, such as reading to him/her and trying to teach him/her new things?). Items were rated on a 5-point rating scale with response options ranging from *Not at all* to *A great deal.* Two additional items were omitted based on prior research suggesting that they have reduced relevance in low-income samples (Chavkin & Williams Jr., 1989; Kohl et al., 2000) along with evidence of very low means in this low-income sample (below 2 or "*A Little*"). These included volunteering in the classroom and interest in getting to know the teacher. Included

items were averaged (α = .88–.94). Parents also completed a parallel version of this scale (Kohl et al., 2000).

Teachers rated 5 items from the *Learning Behaviors Scale* (McDermott, Green, Francis, & Stott, 1999) to describe each child's effortful learning (e.g., responds in a manner that shows attention, accepts new tasks without resistance). Items were rated on a 3-point rating scale (1 = *does not apply* to 3 = *most often applies;* sample α = .83–.91).

Children's academic self-perceptions were assessed in 1st through 3rd grade using the 6-item *Perceptions of Difficulty with Reading* subscale from the *Reading Self-Concept Scale* (Chapman & Tunmer, 1995), describing their perceptions of difficulties they experience as a reader (e.g., Do the other kids in your class read better than you? Do you make lots of mistakes in reading? Do you need extra help in reading?). Each item was rated on a 4-point scale (1= *almost never* to 4 = *almost always*). The total scale score was used for analyses (α = .72–.81). In 5th grade, academic self-perceptions were measured using the *Cognitive Competence* subscale of the *Perceived Competence Scale for Children* (Harter, 1982). The 7 items were rated using a 4-point scale (1 = not at all like me, 4 = a lot like me) and described general feelings of academic competence (e.g., some kids do very well at their classwork; some kids have trouble figuring out the answers in school). Items were averaged (α = .70).

Additional covariates—Primary caregivers reported on family SES (education and income), single-parent status, child age, race, and sex, which were included as covariates in analyses.

Analytic Plan

Path analyses were conducted in MPlus, using Full Information Maximum Likelihood to address missing data. As data was collected at more than two time points, we were able to examine true longitudinal mediation, with both change and time-order built into all models (Little, 2013). Mediation effects were tested across two distinct developmental periods (see Figure 1): early elementary school (grade 1 to grade 3) and later elementary school (grade 2 to grade 5). Although children were widely dispersed across classrooms and schools, for all models we used the CLUSTER option in MPlus in order to account for potential effects associated with nesting of children within their original Head Start classrooms. For each model, we report the overall chi-square test (χ^2), which is ideally non-significant; however, this statistic is sensitive to sample size and is not generally used as a stand-alone indicator of model fit (Brown, 2006). Following recommendations by Hu and Bentler (1998), we also report the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR), using CFI ≥ .95, RMSEA ≤ .06, and SRMR values ≤ .08 as cutoff values to indicate a reasonable fit of the data to the specified model. Model fit was evaluated using multiple indices, given the complex array of influences that affect each index, and the ongoing debate regarding absolute cutoff thresholds (e.g., Chen, Curran, Bollen, Kirby, & Paxton, 2008).

Results

Preliminary Analyses

Means and standard deviations of study variables at each time point are presented in Table 1. Zero-order correlations were computed for all study variables across all time-points. As patterns of correlations were largely consistent across time, Table 2 presents an abridged version of these correlations, showing the associations among study variables at 1st grade and 5th grade (full correlation table is available in the online supplemental materials). Variables showed mild to moderate levels of stability across time, ranging from $r = .69$ for reading achievement (TOWRE) to $r = .20$ for academic self-perceptions, all $p < .01$. In first grade (time 1), parent academic expectations were positively associated with all other study variables, ranging from $r = .46$ with teacher-rated academic performance to $r = .12$ with parent involvement, all $p < .05$. Predictive associations were similar, with correlations between first-grade parent academic expectations and fifth grade variables ranging from $r = .43$ with reading achievement to $r = .25$ with learning behaviors, all $p < .01$. The predictive association between first grade academic expectations and fifth grade parent-teacher involvement was non-significant.

Cross-lagged Longitudinal Models

To examine bi-directional influences between parent academic expectations and child academic performance across time, two autoregressive longitudinal cross-lagged path analytic models were computed, one using the direct assessment of reading achievement (TOWRE) and one using teacher ratings (APRS) to index child academic performance. All models controlled for family SES and intervention status as well as child age, sex, and race.

The top half of Figure 2 depicts the cross-lagged associations between parent academic expectations and direct assessments of child reading achievement. The model showed a good fit, with χ^2 (10) = 13.56, $p = .19$, RMSEA = .03, 90% Confidence Interval [.00, .07], CFI: .99, and SRMR= .01. Accounting for stability of the variables across time and within time-point associations, first grade parent academic expectations significantly contributed to second grade reading achievement, $\beta = .15$, $p < .001$, and third grade academic expectations marginally predicted fifth grade reading achievement, $\beta = .06$, $p = .06$. No significant cross-lagged predictions emerged between second and third grade time-points. Bi-directional paths also emerged between child reading achievement in first and second grade and parent academic expectations in second and third grade, both $\beta = .13$, $p < .01$, but this path was not significant between third and fifth grades.

The bottom half of Figure 2 depicts the cross-lagged associations between parent academic expectations and teacher-rated child academic performance. This model also fit the data well, χ^2 (8) = 8.72, $p = .37$, RMSEA = .02, 90% CI [.00, .07], CFI = .99, SRMR = .01. Parallel to the first model, first grade academic expectations significantly predicted second grade academic performance ratings, $\beta = .15$, $p < .01$, and third grade academic expectations significantly predicted fifth grade academic performance ratings, $\beta = .15$, $p < .01$. The link between second grade academic expectations and academic performance was not significant. Bidirectional links also paralleled the first model, with first-grade child academic

performance contributing significantly to second grade parent academic expectations, β = .15, $p < .01$, and second-grade child academic performance contributing significantly to third grade parent academic expectations, β = .20, $p < .01$. Thus, similar cross-lagged associations emerged for the two independently-assessed measures of child academic performance, with parent academic expectations influencing child academic performance in early elementary school and incrementally in later elementary school, and child academic performance influencing parent expectations in early elementary school.

Tests of Mediation

The next set of models examined the degree to which significant links between parent academic expectations and child academic performance were mediated by parent involvement in child schooling, teacher-rated learning behavior, or children's academic self-perceptions. Where significant longitudinal indirect paths emerged, follow-up tests of the indirect effect were conducted using bias-corrected bootstrapped confidence intervals, with 1000 bootstrap samples (Williams & MacKinnon, 2008). Six models were run, examining each of the three hypothesized mediators with each of the two academic outcomes (directly-assessed reading achievement, teacher-rated academic performance).

Parent involvement in child schooling—Figure 3 displays the model that includes parent involvement as a mediator between parent academic expectations and child academic outcomes (indexed by reading achievement in the top half and by teacher-rated academic performance in the bottom half). Both models had a satisfactory fit, for reading achievement, χ^2 (31) = 50.87, $p < .05$, RMSEA = .04, 90% Confidence Interval [.02, .07], CFI = .99, SRMR = .04, for teacher-rated academic performance, χ^2 (31) = 61.11, $p < .01$, RMSEA = .05, 90% CI [.03, .07], CFI = .98, SRMR = .04. In both models, academic expectations predicted subsequent parent involvement in the early (grade 1 to 2) and later (grade 3 to 5) elementary years. In addition, although not shown in the model, parent involvement was significantly correlated with child academic functioning (both reading achievement and teacher-rated academic performance) at each time-point. However, in these fully-controlled cross-lagged model, parent involvement did not emerge as a significant longitudinal mediator between parent academic expectations and child academic outcomes at any time point, for either measure of child academic functioning.

The use of teacher-rated parent involvement had the advantage of independence from parent-rated academic expectations. However, teachers may have reduced knowledge and/or biases regarding the educational involvement of low-income parents. For this reason, this model was re-run using parent ratings of their involvement (a parallel version of the teacher-rated scale). Findings were similar for both reporters; the additional analyses with parent ratings are available in the online supplemental materials.

Child learning behaviors—Figure 4 displays the model that includes child learning behaviors as a mediator between parent academic expectations and child academic outcomes (indexed by reading achievement in the top half and by teacher-rated academic performance in the bottom half). Both models had a satisfactory fit, for reading achievement, χ^2 (33) = 98.43, $p < .01$, RMSEA = .08, 90% CI [.06, .10], CFI = .97, SRMR = .05, for teacher-rated

academic performance, χ^2 (33) = 104.08, $p < .01$, RMSEA = .08, 90% CI [.06, .10], CFI = .97, SRMR = .06. Parent academic expectations significantly predicted child learning behaviors at each time point. In the first model predicting reading achievement scores, child learning behaviors significantly predicted child achievement from second to third grade. Although a significant indirect path emerged in the early elementary years, with parent expectations in grade 1 influencing child achievement in grade 3 via child learning behaviors in grade 2, a formal test for mediation showed this pathway to be only marginally significant,, μ = .010, $p = .089$, 95% CI for the mediated effect [− .002, .022]. A similar pattern of findings emerged when teacher-rated academic performance was used to index child academic functioning in the second model. In this model, however, child learning behaviors in second grade significantly mediated the association between first grade parent academic expectations and third grade academic functioning, μ = .014, $p < .05$, 95% CI [.002, .035]. For neither index of child academic functioning did child learning behaviors mediate the effects of parent academic expectations in the later elementary years.

Child academic self-perceptions—Figure 5 displays the model that includes child academic self-perceptions as a mediator between parent academic expectations and child academic outcomes indexed by reading achievement in the top half and by teacher-rated academic performance in the bottom half. Both models had a satisfactory fit, for reading achievement, χ^2 (33) = 97.74, $p < .01$, RMSEA = .07, 90% CI [.06, .09], CFI = .97, SRMR = .06, for teacher-rated academic performance, χ^2 (33) = 91.51, $p < .01$, RMSEA = .07, 90% CI [.06, .09], CFI = .96, SRMR = .06. Parent academic expectations predicted child academic self-perceptions significantly and incrementally at each time point. In both models, child academic self-perceptions were significantly predictive of academic functioning only in the later elementary years (from grades 3–5) and not in the earlier elementary years. Formal tests showed significant mediation in the late elementary pathway, with third grade child academic self-perceptions significantly mediating the longitudinal association between second grade parent academic expectations and fifth grade reading achievement, μ = .025, $p < .05$, 95% CI [.001, .048], as well as fifth grade teacher-rated academic performance, μ = .029, $p < .05$, 95% CI [.001, .058].

Discussion

As educators, policy makers, and researchers continue working to address the poverty-related achievement gap, there is ongoing interest in understanding how parents may best contribute to their children's academic success, particularly in low-SES samples where children are at elevated risk for school difficulties. Focusing on a low-income sample, this study provides rigorous evidence from cross-lagged longitudinal models documenting bi-directional influences between parent academic expectations and child academic performance over the course of elementary school, replicating across two measures of child academic functioning. The findings also show that the mediators of parent influence shift developmentally, from child learning behaviors in the early years to self-perceived academic competence in the later years.

Bi-directional Influences between Parent Expectations and Child Academic Performance

In models estimating child academic outcomes using both direct achievement tests and teacher ratings, parent academic expectations significantly contributed to child achievement in early elementary school (grade 1 to 2) and incrementally in later elementary school (grade 3 to 5). Bi-directional paths also emerged, with child achievement influencing parent academic expectations in early but not later elementary school. These findings replicate the existing literature by demonstrating that parent academic expectations prospectively predict child academic performance, but also extend it by testing for bidirectional links over the course of elementary school. The findings are similar to Briley et al. (2014) who also examined bidirectional links, and document generalizability of those findings to this low income sample. One difference from the Briley et al. (2014) findings is that the reciprocal influence of child academic performance on parent expectations was significant only during the early elementary year, a pattern evident across both measures of child academic functioning.

Replication in other low-income samples is needed, but this finding suggests that parent academic expectations may crystallize over the elementary years, for better or for worse, becoming less responsive to performance feedback from the teacher in the later elementary years. If so, interventions designed to promote positive change in parent beliefs about their children's future academic potential may have particular impact when they occur in the early learning years. Further longitudinal study would be helpful to explore these bi-directional influences as children progress through middle and high school.

Mediators of the Link between Parent Expectations and Child Academic Performance

In examining potential mediators of the link between parent academic expectations and child academic performance, we found an important developmental shift, with child learning behaviors mediating the predictive association in the early elementary years, and child academic self-perceptions mediating the predictive association in the later elementary years. While the significant indirect effects were consistent across both direct assessments of reading achievement and teacher-rated academic performance, it is important to note that, for the early elementary years, follow-up tests of formal mediation were only significant for the teacher-rated academic performance outcome. Taking into account the complete set of findings, however, they suggest that parent expectations affect children's developing learning behaviors in the preschool and early elementary years, when children are first learning how to approach and manage learning challenges (McClelland et al., 2006). As children approach school age, parents with higher academic expectations may cultivate early learning behaviors by encouraging children to keep trying and praising their efforts to master new skills, thereby increasing their behavioral engagement with challenging tasks as they progress through elementary school (Gunderson et al., 2013). In turn, these positive learning behaviors foster accelerated growth in math and reading skills during the initial elementary years (Li-Grining et al., 2010; McClelland et al., 2006), as well as enhanced social and behavioral adjustment (McDermott et al., 2016).

In the later elementary school years, we found that the predictive association between prior parent academic expectations and subsequent child academic performance was mediated by

children's self-perceived academic competence. This shift in mediation, from learning behaviors earlier in elementary school to self-perceived academic competence later in elementary school, may partially reflect a calibration process associated with the development of children's self-perceptions (Davis-Kean et al., 2008). During the early elementary years, children's academic self-perceptions tend to be overly optimistic and less reflective of parent and teacher perceptions (e.g., Benenson & Dweck, 1986; Pesu, Viljaranta, & Aunola, 2016). As they progress through elementary school, however, children's academic self-perceptions undergo a normative decline and are increasingly aligned with objective achievement measures (Helmke, 1999). As children become more able developmentally to consider input from different sources and integrate this information in their self-perceptions, their parent's beliefs about their academic competence may become increasingly influential (Gniewosz, Eccles, & Noack, 2015). In addition, over this same developmental period, children's beliefs about their ability increasingly influence their behaviors (Simpkins et al., 2015).

The developmental shift in mediators suggests a process in which parent expectations first operate as external supports that shape child learning behaviors. However over time, parent expectations are filtered through an increasingly complex sense of self which, in turn, plays a more functional role in determining behavior (Simpkins et al., 2015). Further, peer feedback takes on an increasingly complex and influential role in children's ability self-perceptions as they progress through elementary school (e.g., Altermatt, Pomerantz, Ruble, Frey, & Greulich, 2002; Gest, Rulison, Davidson, & Welsh, 2008). Consistent with a developmental shift in which the more complex sense of self acquired by older elementary children begins to influence their academic performance (Chamorro-Premuzic, Harlaar, Greven, & Plomin, 2010; Skaalvik & Hagtvet, 1990), the present findings suggest that their perceived competence also begins to mediate the impact of parent academic expectations on their academic performance in the later elementary years.

Although prior research demonstrates that parent involvement in child schooling is associated with child academic success (Pomerantz et al., 2007), involvement did not mediate between parent academic expectations and child academic performance in the present analyses. This finding is consistent with findings reported by Froiland et al. (2013) and Phillipson and Phillipson (2007). In contextual models of children's academic achievement, children's own behaviors and beliefs are considered more proximal determinants of their performance outcomes than parent behaviors (Sacker, Schoon, & Bartley, 2002; Simpkins, Fredricks, & Eccles, 2015). This may be why child learning behaviors and academic self-perceptions emerged as more powerful mediators linking parent expectations with child performance than parent involvement. This interpretation is consistent with empirical analyses showing proximal child-level factors accounting for more variance in academic performance than parenting behaviors, including school involvement (e.g., Hindman, Skibbe, Miller, & Zimmerman, 2010).

In the present study, the expected cross-sectional associations emerged at each measurement wave, with parent academic expectations significantly correlated with involvement which, in turn, was significantly correlated with child academic performance. However, in the well-controlled cross-lagged model, there was no evidence that expectations influenced the

developmental course of parent involvement, nor that parent involvement influenced the developmental course of child academic performance. This finding does not diminish the value of parent involvement, per se, but suggests that it cannot account for the ongoing influence of parent expectations on child academic performance over time; rather, more proximal child-level processes appear to be central to this development.

Strengths and Limitations

The present study findings are strengthened by the rigor of the analytic approach, which used multiple time points, enabling correct time-ordering of the hypothesized predictors, outcomes, and mediators, thereby allowing for a test of true longitudinal mediation (Little, 2013). Models further controlled for prior levels and bi-directional influences of all variables across time, as well as family SES, child sex, race, age, and preschool intervention status. The consistency of the pattern of results across both teacher-report and independent assessment of child academic performance is also a strength of this study.

There are also a number of limitations to note. First, the measure used to assess reading achievement was limited in scope. Although the TOWRE is a psychometrically sound measure, it tests specifically for reading fluency, and not the broader domain of reading or academic competence. However, this limitation is partly remediated by the replication of the pattern of findings using teacher ratings of child academic performance, which assessed child performance in both reading and mathematical domains. Another limitation of this study is the brief nature of most of the measures included. The measure of parent academic expectations used only two items, making it difficult to confidently conclude precisely what these two questions may represent to parents. Although a one or two-item measure of academic expectations is standard within this field of research, clearly more work is needed to understand the underlying construct being measured by these expectation questions.

Implications

The results of this study have implications for both developmental theory and for parent-focused interventions targeting child academic performance. Prior theory and empirical evidence has supported a link between parent academic expectations and development of children's learning behaviors (Ardelt & Eccles, 2001; Bandura et al., 2001), a finding that was supported in a low-income sample by the present study; however, these results further suggest that, as children mature and develop an increased capacity for self-awareness, particularly with respect to their academic capabilities (Davis-Kean et al., 2008), academic self-perceptions take on an increasingly large role in supporting academic success. Thus, while parent academic expectations continue to have an influence on children's academic performance throughout childhood, as children mature, there is a developmental shift in how the expectations function, from an initial influence on children's learning behaviors in early elementary school to a subsequent influence on academic self-perceptions in later elementary school.

Understanding these processes may be highly relevant in the creation of interventions aimed at closing the SES-based achievement gap. A handful of studies have demonstrated that it is possible to positively influence beliefs and expectations of parents living in poverty

regarding their children's academic performance, and that this may mediate intervention effects (Loughlin-Presnal & Bierman, in press; Purtell & McLoyd, 2013). For example, in an intervention study that was conducted subsequent to this study, Head Start parents were provided with a home learning curriculum and home learning supports that produced increases in parent academic expectations that mediated the intervention impact on child academic outcomes (Loughlin-Presnal & Bierman, in press). A second example is the New Hope intervention, which provided low-income families with earnings supplements, job search assistance, and child and health care subsidies for three years. In this intervention, parent perceptions of child reading performance and child academic expectations mediated long-term intervention effects on child employment attitudes (Purtell & McLoyd, 2013). It is important to note that neither of these interventions tried to change parent expectations and beliefs by direct persuasion or simple exhortations encouraging parents to believe in their child's potential. Parent beliefs and expectations for their children are multiply determined, reflecting parents' personal experiences and circumstances, sociocultural context, and child characteristics and performance (Simpkins et al., 2015). Hence, it is unlikely that simple exhortations would alter expectations and beliefs. However, these studies suggest that interventions designed to build new skills, offer new opportunities, and improve the contextual support for parent and child attainment may, in some cases, derive benefits for children by improving parent expectations and beliefs about the child's future. Recognizing the potential importance of these parent academic expectations, and understanding more about how they influence development may help inform intervention design.

The developmental shift demonstrated in this study suggests that, in the preschool and early elementary years, it may be particularly beneficial to work with parents to help set expectations—and associated parenting strategies—that will promote a general positive attitude toward learning as children enter elementary school. As children proceed through school, however, it may become more effective for parents to focus on fostering academic self-perception by helping their children discover and cultivate specific academic strengths.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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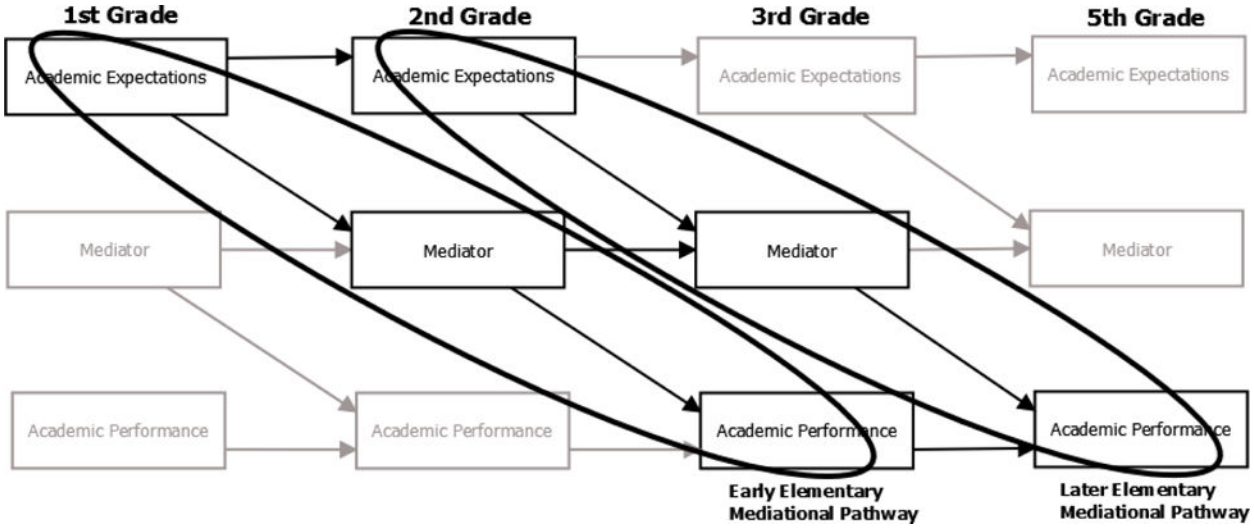

Figure 1.

Conceptual model of the two mediational pathways tested: Early Elementary (1^{st} – 3^{rd} grade) and Later Elementary (2^{nd} – 5^{th} grade). Within wave covariances are not depicted.

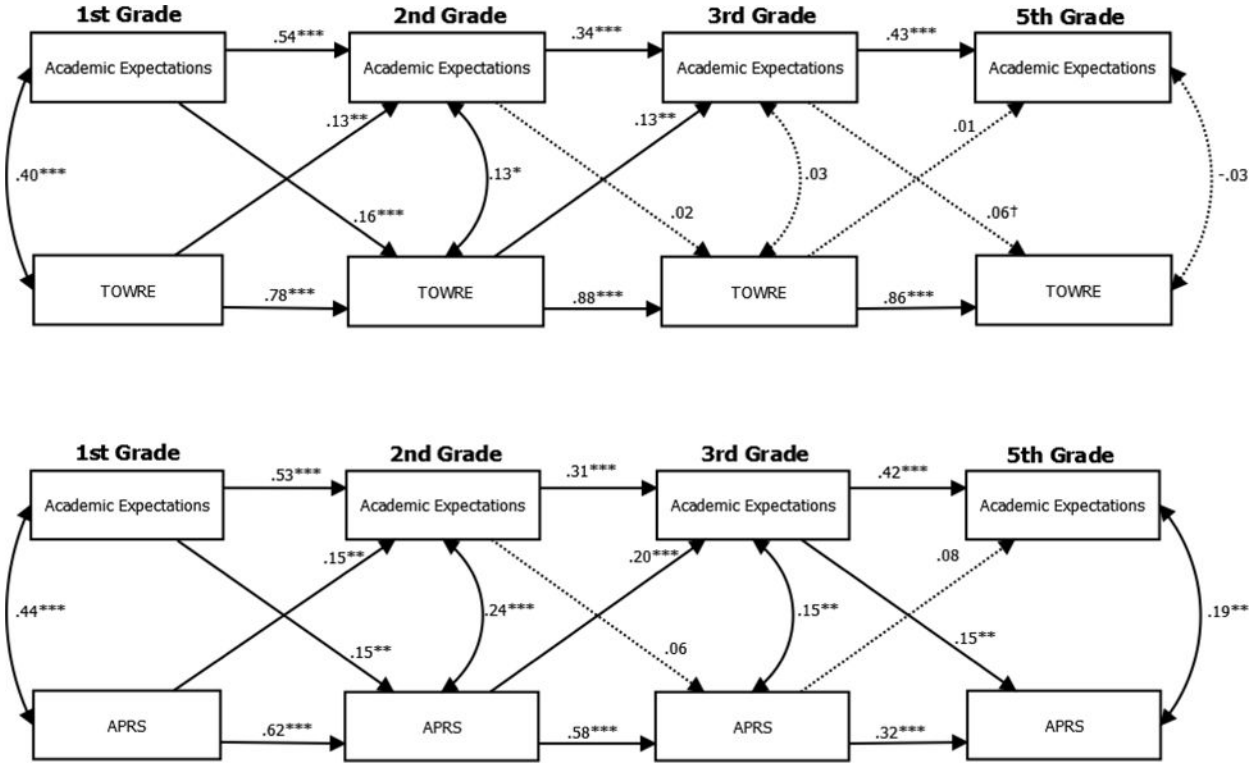

Figure 2.

Cross-lagged Path Models of Parent Academic Expectations and Child Academic Performance. Note: The TOWRE involved the direct assessment of child reading fluency; the APRS involved teacher ratings of child academic performance; dotted lines indicate non-significant paths; control variables include family SES and single-parent status as well as child age, race, and sex; † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

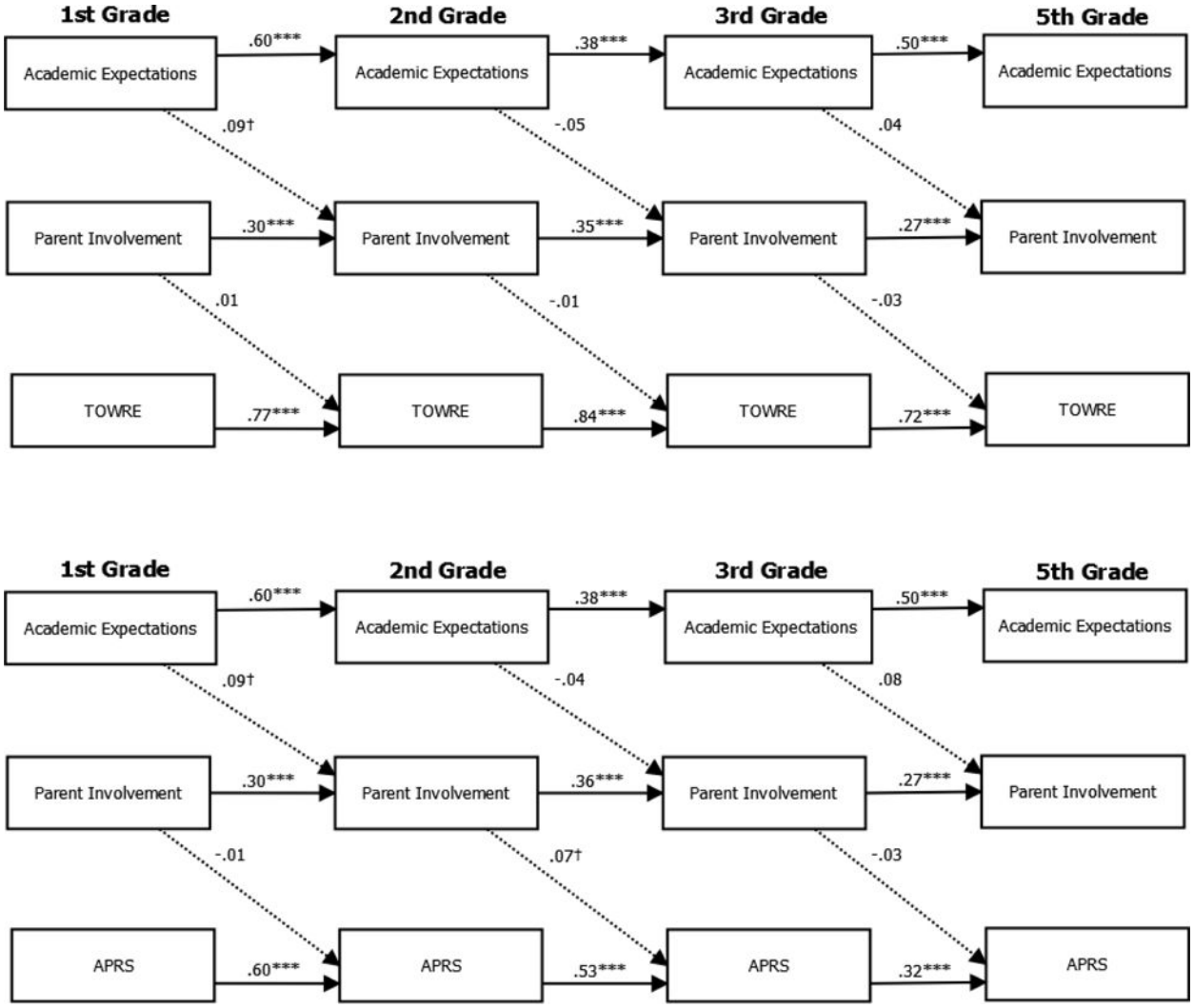

Figure 3.

Cross-lagged Path Models Testing Parent Involvement as a Mediator. Note: Dotted lines indicate non-significant paths; within wave covariances are presented in Table 3; control variables include family SES and single-parent status as well as child age, race, and sex; † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

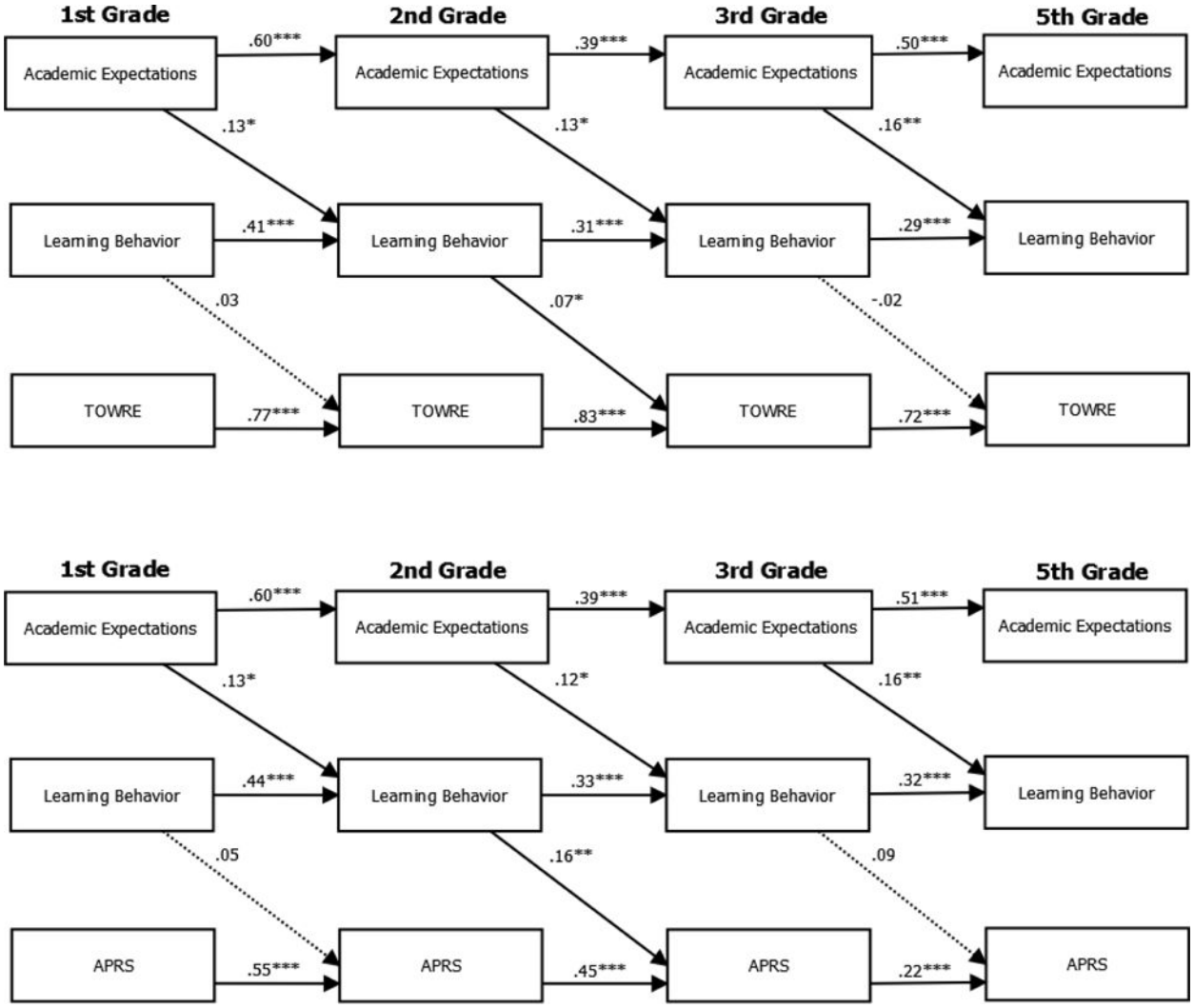

Figure 4.

Cross-lagged Path Models Testing Learning Behaviors as a Mediator. Note: Dotted lines indicate non-significant paths; within wave covariances are presented in Table 3; control variables include family SES and single-parent status as well as child age, race, and sex; † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

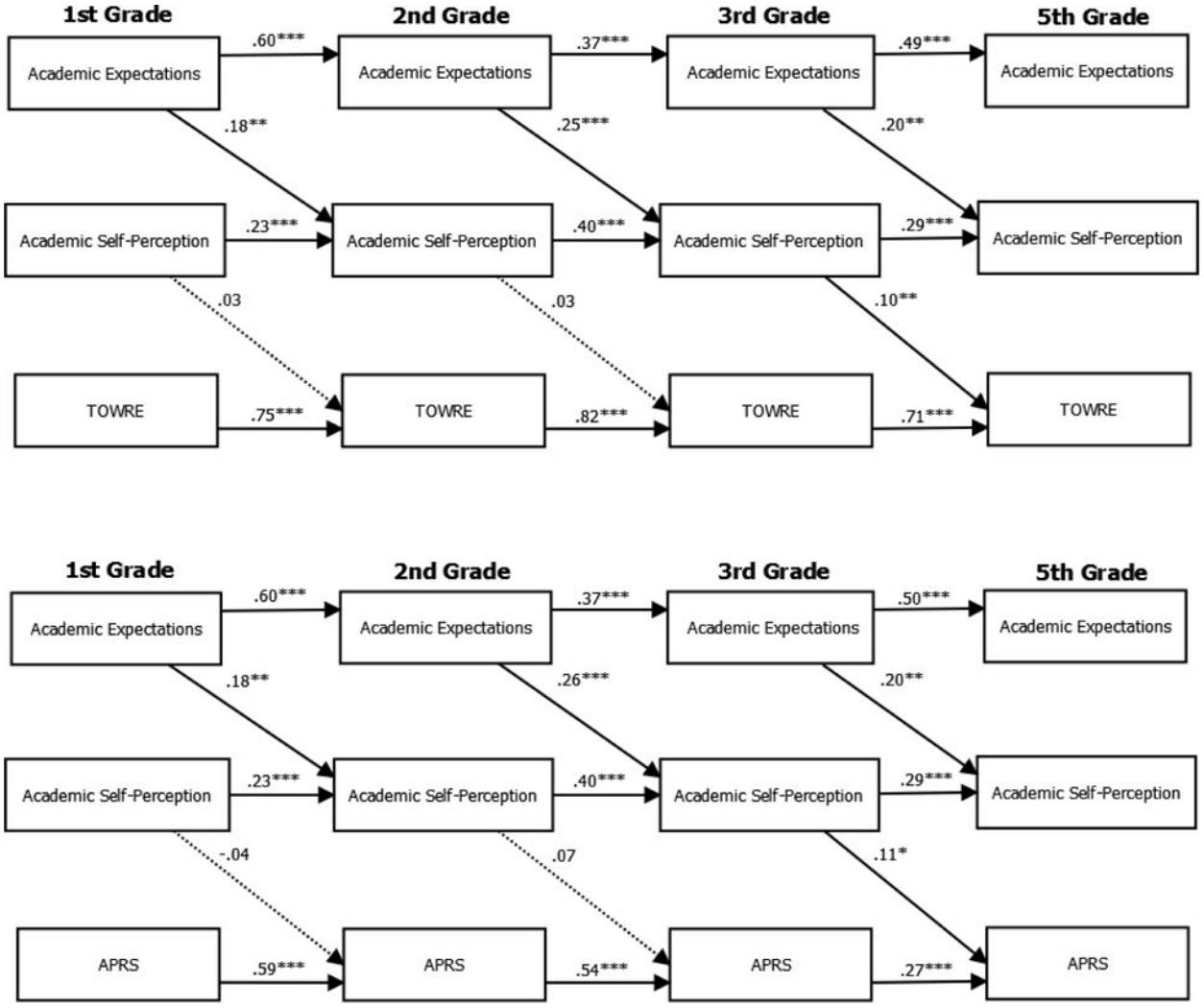

Figure 5.

Cross-lagged Path Models Testing Child Academic Self-Perceptions as a Mediator. Note: Dotted lines indicate non-significant paths; control variables include family SES and single-parent status as well as child age, race, and sex; within wave covariances are presented in Table 3; † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 1

Means and Standard Deviations of Study Variables at Each Time Point

	Grade Level			
Variables	**1st Grade (N = 330)**	**2nd Grade (N = 314)**	**3rd Grade (N = 299)**	**5th Grade (N = 284)**
Parent Academic Expectations	4.58 (1.04)	4.64 (1.04)	4.71 (1.02)	4.74 (1.06)
Parent Involvement	2.82 (1.06)	2.24 (1.05)	2.03 (1.10)	2.09 (1.18)
Learning Behavior	1.46 (.47)	1.46 (.43)	1.42 (.47)	1.47 (.47)
Academic Self-Perception	3.19 (.56)	3.19 (.56)	3.09 (.66)	1.76 (.59)
Academic Performance Ratings	3.15 (.80)	3.15 (.80)	2.99 (.76)	2.98 (.80)
Reading Achievement (TOWRE)	97.93 (10.96)	97.71 (13.44)	99.52 (13.24)	96.38 (12.77)

Note: Standard deviations are presented in parentheses under the respective means. TOWRE scores represent nationally normed scores; all other scores represent average item ratings, with parent expectations rated on a 7-point scale, parent involvement and child academic performance rated on a 5-point scale, learning behaviors rated on a 3-point scale, and academic self-perception rated on a 4-point scale.

Table 2

Correlations Among Variables in First and Fifth Grades

	1	2	3	4	5	6	7	8	9	10	11
First Grade Measures	–										
1. Parent Expectations											
2. Parent Involvement	.12*	–									
3. Learning Behaviors	.40**	.32**	–								
4. Self-Perceptions	.20**	.11*	.18**	–							
5. Academic Performance	.46**	.29**	.59**	.32**	–						
6. Reading Achievement	.42**	.13*	.36**	.35**	.55**	–					
Fifth Grade Measures											
7. Parent Expectations	.57**	.16**	.32**	.21**	.37**	.34**	–				
8. Parent Involvement	.08	.20**	.05	.14*	.04	.08	.12*	–			
9. Learning Behaviors	.25**	.16*	.37**	.17**	.26**	.23**	.39**	.37**	–		
10. Self-Perceptions	.29**	.16**	.17**	.20**	.35**	.20**	.28**	.16*	.23**	–	
11. Academic Performance	.42**	.23**	.44**	.27**	.58**	.47**	.48**	.35**	.57**	.36**	–
12. Reading Achievement	.43**	.19**	.35**	.25**	.53**	.69**	.33**	.13*	.21**	.33**	.54**

Note: Parents rated their academic expectations; teachers rated parent involvement, child learning behaviors, and child academic performance; children rated their academic self-perceptions and were tested on the TOWRE for reading achievement.

* $p < .05$;

** $p < .01$.

Table 3

Within Wave Standardized Covariance Estimates to Accompany Figures 3 - 5

Figure 3		**Figure 4**		**Figure 5**	
First Grade		First Grade		First Grade	
Expects↔Involvement	.12*	Expects↔Learning Beh	.40***	Expects↔Self-Perception	.22***
Expects↔TOWRE	.40***	Expects↔TOWRE	.40***	Expects↔TOWRE	.40***
Involvement↔TOWRE	.12*	Learning Beh↔TOWRE	.35***	Self-Perception↔TOWRE	.35***
Expects↔APRS	.44***	Expects↔APRS	.44***	Expects↔APRS	.44***
Involvement↔APRS	.27***	Learning Beh↔APRS	.59***	Self-Perception↔APRS	.32***
Second Grade		Second Grade		Second Grade	
Expects↔Involvement	.05	Expects↔Learning Beh	.07	Expects↔Self-Perception	−.03
Expects↔TOWRE	.13*	Expects↔TOWRE	.13*	Expects↔TOWRE	.14*
Involvement↔TOWRE	−.03	Learning Beh↔TOWRE	.08	Self-Perception↔TOWRE	.19**
Expects↔APRS	.26***	Expects↔APRS	.26***	Expects↔APRS	.27***
Involvement↔APRS	.10†	Learning Beh↔APRS	.42***	Self-Perception↔APRS	.11*
Third Grade		Third Grade		Third Grade	
Expects↔Involvement	.06	Expects↔Learning Beh	.17**	Expects↔Self-Perception	−.11*
Expects↔TOWRE	.03	Expects↔TOWRE	.02	Expects↔TOWRE	.04
Involvement↔TOWRE	−.07	Learning Beh↔TOWRE	.07	Self-Perception↔TOWRE	.10†
Expects↔APRS	.12*	Expects↔APRS	.14*	Expects↔APRS	.15*
Involvement↔APRS	.27***	Learning Beh↔APRS	.49***	Self-Perception↔APRS	.19**
Fifth Grade		Fifth Grade		Fifth Grade	
Expects↔Involvement	.18**	Expects↔Learning Beh	.23***	Expects↔Self-Perception	.19**
Expectations↔TOWRE	−.03	Expects↔TOWRE	−.03	Expects↔TOWRE	.13*
Involvement↔TOWRE	.06	Learning Beh↔TOWRE	.02	Self-Perception↔TOWRE	−.04
Expects↔APRS	.19**	Expects↔APRS	.18**	Expects↔APRS	.19**
Involvement↔APRS	.30***	Learning Beh↔APRS	.49***	Self-Perception↔APRS	.18**

†Note: $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$. Expects = Expectations; Beh = Behavior.