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Classroom Engagement Mediates the Relationship Between Internalizing Behavior and Academic Outcomes in Head Start Children

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UNIVERSITY OF MIAMI

CLASSROOM ENGAGEMENT MEDIATES THE RELATIONSHIP BETWEEN
INTERNALIZING BEHAVIOR AND ACADEMIC OUTCOMES IN HEAD START
CHILDREN

By

Krystal M. Bichay

A THESIS

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Master of Science

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Classroom Engagement Mediates the Relationship
Between Internalizing Behavior and Academic
Outcomes in Head Start Children

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Internalizing behavior in preschool children from low-income households is consistently negatively associated with academic outcomes, specifically in language/literacy and mathematics. To understand these associations, it is important to identify different mechanisms that might explain the relationship between internalizing behavior and academic outcomes. Classroom engagement is a domain-general skill that may explain this relationship. The purpose of the current study was to examine whether classroom engagement across different contexts--including peers, teachers, and tasks--mediated the relationship between internalizing behavior at the beginning of the year and language/literacy and mathematics skills at the end of the year. Structural equation modeling was used to examine this relationship in a sample of 655 Head Start preschoolers across 71 classrooms. Internalizing behavior was negatively associated with the three dimensions of classroom engagement, and language/literacy and mathematics outcomes. Additionally, classroom engagement with tasks mediated the relationship between internalizing behavior and language/literacy and mathematics skills. Findings demonstrated that engagement with tasks serves as a mechanism explaining the relationship between internalizing behavior and academic outcomes. These findings

emphasize the importance of children displaying internalizing behavior to be engaged with tasks in the classroom in order to improve their academic readiness skills.

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CHAPTER 1 INTRODUCTION

Accumulating evidence suggests that children who display internalizing behavior, including shy and withdrawn behavior within preschool classrooms, often show poor social and academic outcomes (Bulotsky-Shearer, Bell, Romero, & Carter, 2012a; Fantuzzo, Bulotsky, McDermott, Mosca, & Lutz, 2003; Kaiser, Cai, Hancock, & Foster, 2002; Tan & Dobbs-Oates, 2013). Within low-income samples of children, such as those served by Head Start, prevalence rates of behavior problems are especially high (Anthony, Anthony, Morrell, & Acosta, 2005; Barbarin et al., 2006; Brooks-Gunn & Duncan, 1997; Kaiser et al., 2002). In addition, negative associations between internalizing behavior and language and literacy skills (Bulotsky-Shearer & Fantuzzo, 2011; Fantuzzo et al., 2003), as well as mathematics skills (Bulotsky-Shearer, Dominguez, & Bell, 2012b; Dobbs, Doctoroff, Fisher, & Arnold, 2006) are well established. For programs such as Head Start to intervene early and effectively, we must better understand this association and examine whether other factors play a role in explaining this relationship. Some research has focused on examining the underlying mechanisms that may explain the relationship between behavior problems and learning (Bulotsky-Shearer et al., 2012a; Dominguez & Greenfield, 2009; McWayne & Cheung, 2009). The present study added to this literature and examined whether classroom engagement, a domain-general, multidimensional construct, mediated the relationship between internalizing behavior and language/literacy and mathematics skills.

Preschool Behavior Problems

Children with social, emotional, and regulatory difficulties often display behavior problems upon preschool entry that are negatively associated with social and academic outcomes (Bulotsky-Shearer et al., 2012b; McWayne & Cheung, 2009). In fact, behavior

problems are one of the greatest concerns of both teachers and parents in preschool (Barbarin, 2007). Preschool behavior problems can be distinguished into two types: internalizing and externalizing. Internalizing behavior is characterized by shy, socially reticent, or withdrawn behaviors (Campbell, 1995). Externalizing behavior is characterized by aggressive, hyperactive, inattentive, and noncompliant behaviors (Campbell, 1995). Children from low-income households are more at risk for developing behavior problems with research studies estimating the prevalence rates at 30% for externalizing and 31% for internalizing behavior in low-income preschool samples as compared to about 8-10% in the general population (Feil, Walker, Severson, & Ball, 2000; Feil et al., 2005; Raver & Knitzer, 2002). Additionally, research with low-income children consistently documents negative associations between behavior problems and academic skills (Bulotsky-Shearer, Fernandez, Dominguez, & Rouse, 2011; Bulotsky-Shearer et al., 2012b; Dobbs et al., 2006; Dominguez & Greenfield, 2009; McWayne & Cheung, 2009).

Preschool internalizing behavior and academic outcomes. Internalizing behavior is negatively associated with academic outcomes, including reading and mathematics, in national samples, as well as in low-income preschool samples (Grimm, Steele, Mashburn, Burchinal, & Pianta, 2010; Hughes & Coplan, 2010; Kaiser et al., 2002; Tan & Dobbs-Oates, 2013). In a latent profile analysis of behavior problems in low-income preschoolers, Bulotsky-Shearer et al. (2012b), found that children in profile groups that showed higher socially reticent and withdrawn behavior within the preschool classroom displayed the lowest mathematics and literacy skills of any profile group of children at the beginning of the year, and this gap persisted through the end of the year.

Other research with Head Start children has found that internalizing behavior was differentially associated with lower receptive and expressive vocabulary (Fantuzzo et al., 2003). Similar results were found for mathematics skills in research with low-income preschoolers (Dobbs et al., 2006; Fantuzzo et al., 2007).

This set of findings emphasizes the need to study internalizing behavior as it relates to children's academic learning within preschool settings, particularly for children living in low-income households. Most research to date has focused on externalizing behavior because these behaviors are more noticeable in the classroom and tend to disrupt classroom routines (Fantuzzo et al., 2003). The current study will focus on children with internalizing behavior as findings suggest that, while they tend to be missed by preschool teachers within the classroom (Fantuzzo et al., 2003), they may also be more at risk for lower academic skill gains. More research is needed to understand the factors that contribute to the negative relationship between internalizing behavior and academic readiness skills, particularly for language/literacy and mathematics, since these skills are essential for later reading and mathematics achievement, and in turn, future school success.

Academic Skills as Key Contributors to Academic Readiness

Language/literacy skills in preschool include expressive and receptive vocabulary, alphabet knowledge, and listening comprehension. Early language and literacy skills are predictive of later reading ability (Hindman, Skibbe, Miller, & Zimmerman, 2010; Lonigan et al., 1999; Lonigan, Burgess, & Anthony, 2000), which is critical for future academic achievement. For example, a study conducted with Head Start children showed that children with higher vocabulary skills in preschool demonstrated better reading skills

in kindergarten (Hammer, Farkas, & Maczuga, 2010). However, research with children from low-income households shows an achievement gap in early language and literacy skills prior to kindergarten entry, with children from low-income households scoring up to one standard deviation below their more advantaged peers on standardized tests of early language and literacy skills (Hammer et al., 2010; Hindman et al., 2010; Magnuson & Duncan, 2006), making this an important domain to target in preschool.

In addition to language and literacy, mathematics skills are also a critical component of school readiness (Head Start Early Learning Outcomes Framework; Administration for Children and Families, 2015). Mathematics in preschool includes skills such as counting, reading and writing numbers, calculation, and number facts. Acquiring mathematics skills in preschool is important because it is associated with future mathematics achievement and general academic success (Duncan et al., 2007). In fact, mathematics skills are found to be one of the strongest predictors of later school achievement (Duncan et al., 2007). Children from low-income households also show lower mathematics skills at kindergarten entry when compared to their more privileged peers (National Mathematics Advisory Panel, 2008; Rathbun, West, & Hausken, 2004). Language/literacy and mathematics skills are therefore some of the most important skills to foster in preschool to promote future school success for low-income children. For children entering preschool classrooms displaying internalizing behavior it is important to identify the developmental mechanism through which internalizing behavior influences lower academic learning outcomes, particularly for children from low-income households who are more at risk for academic difficulties. Findings will help to identify ways in

which early interventions can best support the learning experiences of children displaying internalizing behavior from low-income households.

Rationale for Examining Mediation

It is clear that preschool internalizing behavior is negatively related to language/literacy and mathematics skills; however, the mechanism through which behavior problems influence these skills is still unclear, particularly for children displaying internalizing behavior. Previous research on low-income preschoolers has shown that the relationship between behavior problems and academic skills may be mediated by other constructs that encompass children's classroom engagement within social interactions and learning tasks [(e.g., peer play and approaches to learning (Dominguez & Greenfield, 2009; McWayne & Cheung, 2009; Bulotsky-Shearer et al., 2012a; Bulotsky-Shearer, Bell, Romero, & Carter, 2014)]. For example, Bulotsky-Shearer et al. (2012a) showed that engagement with peers in the play context fully mediated the relationship between internalizing behavior and academic skills. In this study, children who displayed socially withdrawn behavior early in the year, displayed lower positive engagement with peers in play, and subsequently demonstrated lower language/literacy and mathematics skills at the end of the year. Other findings suggest similar pathways, in which children displaying behavior problems demonstrated difficulty engaging within learning tasks, and this explained in part lower academic outcomes, including language/literacy and mathematics skills in preschool (Dominguez & Greenfield, 2009) and through elementary school (McWayne & Cheung, 2009).

These studies provide evidence that classroom engagement across different contexts, such as with peers and tasks may be an important developmental skill that

mediates associations between internalizing behavior and academic outcomes, including language/literacy and mathematics skills for low-income children. Although these findings provide initial support that classroom engagement within specific classroom contexts may mediate associations between behavior problems and academic skills, prior studies have not (a) focused on internalizing behavior specifically, or (b) examined classroom engagement across multiple contexts in the classroom. Children displaying higher levels of internalizing behavior may show lower positive engagement within social contexts such as during interactions with peers and teachers, as well as during learning tasks that typically occur within social contexts, which may result in them missing out on important learning opportunities present within these contexts and this in turn may negatively impact their academic outcomes. Therefore, the present study will examine whether classroom engagement with teachers, peers, and learning tasks may mediate the relationship between internalizing behavior and academic readiness skills, in order to better understand which contexts matter most for learning for children displaying internalizing behavior.

Classroom Engagement

Classroom engagement is a domain-general, multidimensional construct that includes the way in which children engage positively within various contexts such as with peers, teachers, and tasks (Fredricks, Blumenfeld, & Paris, 2004). Positive engagement with peers is operationalized by children's sociability, assertiveness, and communication with peers. Positive engagement with teachers is characterized by positive engagement and communication with teachers. Positive engagement with tasks, often described as approaches to learning (Dominguez & Greenfield, 2009), is

exemplified by children's consistent, active involvement, as well as self-reliance with tasks (Downer, Booren, Lima, Luckner, & Pianta, 2010).

Classroom engagement has been linked to several social and academic readiness skills; however, a major limitation in prior research is that most studies examine "classroom engagement" broadly as a unidimensional construct (Fredricks et al., 2004), and do not consider the influence of the context in which children are engaged (i.e. with peers, teachers, or tasks). Examining children's engagement in these three contexts is particularly important in order to understand what contexts matter most for learning for children displaying internalizing behavior. For example, children displaying internalizing behavior may not feel as comfortable communicating and approaching their peers and teachers in the classroom and also may not feel as comfortable being actively and consistently engaged with tasks within the classroom during social interactions. As a result children may miss out on important learning opportunities that are present within these contexts, such as communicating and understanding language, participating in social interactions and imaginative play, and listening to academic lessons being taught in the classroom. More research is needed for children who enter preschool classrooms displaying internalizing behavior to fully understand the contexts in which engagement matters most for learning, using validated multidimensional tools that assess children's engagement within the context of peers, teachers, and tasks.

Classroom engagement and academic outcomes. Classroom engagement with peers, teachers, and learning tasks within the preschool classroom is associated with academic achievement. Research with low-income preschoolers shows that positive engagement with peers and teachers is positively associated with language/literacy skills

(Bulotsky-Shearer et al., 2012a; Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Palmero, Hanish, Martin, Fabes, & Reiser, 2007). Findings for positive engagement with tasks are similar. Research shows that positive engagement with tasks is associated with higher emergent vocabulary and literacy skills in preschool (Dominguez & Greenfield, 2009; Fantuzzo, Perry, & McDermott, 2004). Additionally, research shows that negative engagement (or problems in both the peer and task contexts) are associated with lower mathematics skills (Bulotsky-Shearer, Fantuzzo, & McDermott, 2008; Bulotsky-Shearer et al., 2011; Bulotsky-Shearer et al., 2014; Dominguez & Greenfield, 2009; Fantuzzo, Sekino, & Cohen, 2004). Also, engagement with teachers was found to be associated with mathematics skills in low-income preschool samples (Palmero et al., 2007). These results suggest that engagement in each of these contexts (peers, teachers, and tasks) is associated with academic skills during early childhood; providing evidence that these skills should be fostered early on.

Classroom engagement and internalizing behavior. Internalizing behavior is negatively related to children's classroom engagement within all three contexts (peers, teachers, and learning tasks). Research on low-income preschoolers' shows that internalizing behavior is negatively associated with positive engagement in the peer play context (Bulotsky-Shearer et al., 2008). Also, internalizing behavior was found to be negatively associated with task engagement (Bulotsky-Shearer et al., 2011; Dominguez & Greenfield, 2009; McWayne & Cheung, 2009). Finally, studies conducted in early elementary school have found negative associations between internalizing behavior and close teacher-child relationships (Arbeau, Coplan, & Weeks, 2010; Mantzicopoulos, 2005; O'Connor, Dearing, & Collins, 2011).

Taken together, these findings suggest that both internalizing behavior and classroom engagement are related to academic outcomes. Therefore, it is important to understand the relationship between all of these constructs in early childhood, particularly for children from low-income households who are more at risk for academic difficulties, in order to intervene early on in early childhood.

Theoretical Framework

Not only is the study of internalizing behavior and academic outcomes supported empirically, it is also supported by theory. Bronfenbrenner's (1999) bioecological model provides a framework to guide the study of behavior problems and learning within the preschool classroom context. First, the model highlights the importance of the proximal contexts that directly influence children's development, such as the classroom, which is an environment in which children spend much of their time during the day (Williford, Maier, Downer, Pianta, & Howes, 2013). Within the classroom, children's interactions with peers, teachers, and tasks are important contexts that provide learning opportunities (Fredricks et al., 2004).

Second, the bioecological model supports the idea that the influence of context on the developing child is bidirectional. In addition to the context providing opportunities for learning skills like language/literacy and mathematics, children's developmental capacities influence their ability to engage successfully or take advantage of the opportunities present within these learning contexts (Downer et al., 2010). Children who enter preschool classrooms displaying shy or socially withdrawn behavior may learn less academic content in part because they are not engaging successfully within the contexts of peers, teachers, and learning tasks. Research is needed to examine the associations

between internalizing behavior and the development of academic skills, and the extent to which these associations are explained by children's engagement within the peer, teacher, and task contexts. This research will help to identify which contexts (peers, teachers, tasks) may be more important in facilitating learning for children displaying internalizing behavior.

Current Study

In order to address these gaps in the field, the purpose of the current study was to examine the direct and indirect relationship between internalizing behavior and language/literacy and mathematics skills in preschool children from low-income households, and to test the extent to which classroom engagement, as a multidimensional construct, mediated this relationship. Specifically, this study addressed the following research questions: (1) What is the relationship between internalizing behavior in the fall and language/literacy and mathematics skills in the spring, controlling for child demographic variables? (2) What is the relationship between internalizing behavior in the fall and children's observed positive engagement with peers, teachers, and learning tasks in the spring, controlling for child demographic variables? and (3) To what extent are the associations between internalizing behavior and language/literacy and mathematics skills mediated by children's observed positive engagement with peers, teachers, and learning tasks in the spring?

Based on developmental theory and prior research, it was hypothesized that higher levels of internalizing behavior would be negatively associated with language/literacy and mathematics skills, as well as with positive engagement with peers, teachers, and tasks in the spring. It was also hypothesized that positive engagement with

both peers and tasks would mediate the relationship between internalizing behavior and language/literacy and mathematics skills when compared to positive engagement with teachers, as indicated by previous work (Bulotsky-Shearer et al., 2012a; Dominguez & Greenfield, 2009).

CHAPTER 2 METHOD

Participants

Children. Participants included two cohorts of preschool children ($N = 655$) enrolled in a large, urban Head Start program in the Southeastern United States who were part of a larger study conducted in collaboration with the program, during the 2011-2013 school years. Centers were chosen to be geographically representative of the children served by the program, with a total of 11 centers and 71 classrooms participating in the study. Within each classroom, 6-9 children were randomly selected and stratified by age and sex to receive direct assessments of their academic readiness skills, as well as teacher ratings of their behavior problems across the year. Children ranged in age from 36 months to 60 months ($M = 48.28$, $SD = 6.77$ months), and 48% were boys. Additionally, 43.4% of the sample was African American, 55.7% was White, and .9% was Multi-Racial. Of this sample, 56.9% reported being Hispanic. All children met federal criteria to enroll in Head Start (Federal Register, 2012).

Teaching staff. The sample of Head Start lead teachers that participated ($N = 71$) were 100% female. The majority of teachers reported their race as White or Caucasian (55.7%), 24.3% African American, and 20% reported other race (such as multiracial). Among these teachers, 74.3% reported being Hispanic. With regard to highest education level, 18.7% of teachers reported having an Associate's degree, 7.1% reported having a Child Development Associate Credential, 55.7% reported having a Bachelor's degree, and 18.5% reported having a Master's degree. Teachers reported working as a preschool teacher for an average of 13.23 years ($SD = 7.30$, Range = 1-35 years).

Measures

Classroom internalizing behavior. Children's internalizing behavior was assessed by teacher report in the fall of the preschool year using the *Adjustment Scales for Preschool Intervention* (ASPI), (Bulotsky-Shearer, McDermott, Lopez, Gort et al., in preparation). This measure was used to assess emotional and behavioral problems across different classroom situations based on teacher observation. The ASPI was developed in partnership with early childhood educators and parents to ensure that the items were developmentally appropriate and that the behaviors were observable within many different classroom contexts (Lutz, Fantuzzo, & McDermott, 2002). The ASPI contains 144 items that are based on adaptive and maladaptive behaviors observed by teachers across 22 classroom situations and 2 non-situational specific behaviors. Teachers identify whether over a 6-week period they have observed the child display behaviors in each of 22 classroom situations and are asked to identify as many behaviors as possible in each situation. The ASPI was standardized on a sample of Head Start preschool children and was validated for use with this population (Lutz et al., 2002).

For the current study, an adapted and translated version of the ASPI was used that was validated and horizontally equated across Spanish and English language forms. Construct validity work conducted with this version of the ASPI in low-income preschool populations provides evidence to support two higher order dimensions of Overactivity and Underactivity (with Cronbach's alpha of .92 for the Spanish sample and .94 in the English sample for Overactivity; and .92 for the Spanish sample and .83 for the English sample for Underactivity, in the current sample). For the purposes of this study, the Underactivity scale was used, which comprises behaviors such as, Withdrawn/Low Energy, and Socially Reticent, to create a construct to identify internalizing behavior.

Convergent and divergent validity has also been established with constructs of peer play, behavior problems, temperament, emotion regulation, language skills, and learning behaviors (Bulotsky-Shearer et al., in prep).

Academic readiness. Children's language/literacy and mathematics skills were assessed in the fall and spring of the preschool year using *The Learning Express* (McDermott et al., 2009). The Learning Express is an adaptive direct assessment that is comprised of four subscales: Alphabet Knowledge, Vocabulary, Listening Comprehension, and Mathematics. This assessment contains 325 adaptive items presented in various formats, including multiple choice and oral expressive (McDermott et al., 2009). The Learning Express was developed using national and regional standards, including the National Head Start standards and Pennsylvania Early Learning Standards, for alphabet knowledge, vocabulary, listening comprehension, and mathematics and was standardized on a sample of urban Head Start children. Construct validity was established in a sample of Head Start children, with each subscale demonstrating high internal consistency: Cronbach's alpha was .98 for Alphabet Knowledge, .96 for Vocabulary, .93 for Listening Comprehension, and .96 for Mathematics. Concurrent validity was also determined through correlations between the language/literacy subscales of the Learning Express with other direct assessments of the same constructs, including the Peabody Picture Vocabulary Test and Oral and Written Language Scale (McDermott et al., 2009).

Classroom engagement. *The Individualized Classroom Assessment Scoring System* (inCLASS; Downer et al., 2010) is an observational assessment that was used to assess individual children's classroom engagement with peers, teachers, and tasks in the fall and spring of the preschool year. The inCLASS is comprised of 10 dimensions:

positive engagement with teachers, teacher communication, teacher conflict, peer sociability, peer assertiveness, peer communication, peer conflict, engagement with tasks, self-reliance, and behavior control (Downer et al., 2010). Each dimension is coded on a seven-point scale, that ranges from low, medium, and high, with higher scores showing more positive interactions and engagement for most scales, except the teacher and peer conflict scores in which higher ratings show more negative interactions. Construct validity studies established four reliable and valid domains, with high internal consistency reliability: 0.80 for Teacher Interactions, 0.92 for Peer Interactions, 0.72 for Task Orientation, and .71 for Conflict Engagement. For the purposes of this study, the three positive domains of teacher, peer, and task engagement were used. Positive engagement with peers consists of sociability, assertiveness, and communication with peers; positive engagement with teachers is characterized by positive engagement and communication with teachers; and positive engagement with tasks consists of engagement and self-reliance with tasks (Downer et al., 2010). Concurrent validity was also established through correlations of the InCLASS with teacher reports of early school readiness (Downer et al., 2010). The inCLASS has also been validated for use with low-income preschool children (Vitiello, Booren, Downer, & Williford, 2012).

English language screener. To assess children's English language proficiency, the *Preschool Language Assessment Scale* (PreLAS; Duncan & De Avila, 1998) was used. The PreLAS measures children's receptive and expressive language, vocabulary, syntax, and command of grammatical phrases. For the purposes of this study, two of the five subscales were used, "Simon Says" and "Art Show," as a screener of children's

expressive and receptive language. Each subscale showed high internal consistency with Cronbach's alphas of .88 and .90, respectively (Duncan & De Avila, 1998).

Procedure

Data collection. This study was part of a larger collaborative University-Head Start partnership research project. Approval to conduct this research project was obtained from the University's Institutional Review Board, from the Director of the Head Start programs, and from the Head Start Program's Parent Policy Council. Participants were recruited from centers that participated in the Miami-Dade County Head Start program. Consent to participate was also obtained from the Directors, teachers, and teacher assistants at each of the centers. Once the center and teachers agreed to participate, parental consent was obtained for all participating children with the assistance of the teaching staff.

Data collection was conducted for the two cohorts of children during the 2011-12 and the 2012-13 school years. Procedures for data collection were the same across both years. Demographic information was collected through center records and verified by the children's teachers. In the fall, children were administered a language screener, the PreLAS, in order to determine if they were proficient enough in English to receive the direct assessments in English. The cutoff score for children used for the present study was a score of 2, which was a liberal cutoff score based on previous national studies with low-income children (Head Start Impact Study, Puma, Bell, Cook, & Heid, 2010; Vogel et al., 2008) and local samples of Head Start children (Rainelli, Bulotsky-Shearer, Fernandez, & Greenfield, under review). In the present study sample, 98% of children passed the English language screener and were administered direct assessments in

English. Teachers completed the ASPI in the fall based on children's observed behaviors in the classroom after the first 45 days of school. In the fall and spring of the Head Start year, children's academic readiness skills were directly assessed using the Learning Express. Trained undergraduate and graduate student research assistants administered the direct assessments to children in a quiet place outside of the classroom. Verbal assent was obtained from children and each received stickers for their participation. Trained research assistants observed children individually using the inCLASS in the fall and spring. The inCLASS observers completed a two-day training in which they passed reliability by coding multiple videos with 80% reliability. Throughout data collection, inter-rater reliability was assessed for 20% of the classrooms through double coding to ensure that there was no observation drift from the observers.

Data Analysis

In order to answer the research questions for the current study, structural equation modeling (SEM) in Mplus Version 7 (Muthen & Muthen, 1998-2011) was used. First, confirmatory factor analysis was used to test the measurement model and examine the extent to which the three Learning Express subscales (Alphabet Knowledge, Listening Comprehension, and Vocabulary) were explained by an underlying latent construct of language/literacy skills. Following the confirmation of this measurement model, two structural models examined the direct relationship between internalizing behavior in the fall and language/literacy, and mathematics skills in the spring, controlling for child demographic variables. Child demographic covariates included the following variables: age (dummy coded into two groups including three and four year olds), sex (dummy coded as female and male), and ethnicity (dummy coded as Hispanic or Non-Hispanic).

The significance, magnitude, and direction of the beta coefficients were examined to determine the unique relationship between internalizing behavior in the fall and language/literacy and mathematics skills in the spring. Three additional structural models examined the direct relationship between internalizing behavior in the fall and children's observed positive engagement with teachers, peers, and learning tasks in the spring, while controlling for child demographic variables.

Finally, SEM was used in order to test the extent to which direct associations between fall internalizing behavior and language/literacy and mathematics outcomes were mediated through observed positive engagement with peers, teachers, and tasks. Positive engagement with peers, teachers, and tasks were each entered individually as indirect effects in six different path models. Indirect effects were examined to determine how much variance the three dimensions of classroom engagement accounted for in the relationship between fall internalizing behavior and spring language/literacy and mathematics skills. Covariates of age, sex, and ethnicity were included in the model. See Figures 1-6 for the structural equation models that were examined for this study. For these models, the lack of significance ($p < .05$) of the chi-square test of model fit was used to assess whether the model fit these data (Kline, 2005). The Bentler comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA; Steiger & Lind, 1980), and the Standardized Root Mean Square Residual (SRMR; Bentler, 1995) were also used to assess closeness of model fit. CFI values greater than .90 (Hu & Bentler, 1995), values of .10 or less for the RMSEA (Browne & Cudek, 1993), and SRMR values less than .10 (Bentler, 1995) were used as cutoff points for acceptable model fit.

SEM was chosen as the most appropriate analytic method for several reasons. First, SEM accounts for measurement error through the creation of latent variables (Kline, 2005). SEM also accounts for missing data using Full Information Maximum Likelihood (FIML; Kline, 2005). FIML uses the data available for each observation and estimates parameters based on this information and has been found to be unbiased if the data that is missing is completely at random (MCAR; Enders & Bandalos, 2001). Although the children in this sample were nested within classrooms, nesting was not controlled for because the outcome variables were observational and direct assessments with little variability attributed directly to teachers or classrooms (e.g., with ICCs between 1 and 8% in this sample).

CHAPTER 3 RESULTS

Descriptive Statistics

To examine whether the data were normally distributed, the variables included in the study were analyzed for outliers, homoscedasticity, and kurtosis. Results showed that none of the assumptions of normality were violated. Table 1 includes descriptive statistics for all of the variables in the study, including means and standard deviations for this sample. Additionally, Table 2 includes bivariate correlations between the variables included in the study.

Latent Variable of Language/Literacy Skills

The confirmatory factor analysis for the latent measurement model of Alphabet Knowledge, Vocabulary, and Listening Comprehension was just identified indicating that it had the same number of free parameters and observations, resulting in the model perfectly fitting the data (Kline, 2015). The three factor loadings were above 0.50 and were statistically significant in this model (See Figure 1). Overall, these results show that the three factors, Alphabet Knowledge, Vocabulary, and Listening Comprehension, were explained by an underlying latent construct of language/literacy skills. This latent variable was used in subsequent analyses with language/literacy skills as one of the main dependent variables.

Direct Associations between Internalizing Behavior and Language/Literacy Skills

Direct relationships between internalizing behavior and academic outcomes were examined using a structural model in SEM. Age and sex were positively associated with language/literacy skills, showing that older children and girls had higher language/literacy skills. Ethnicity was not associated with language/literacy skills.

Internalizing behavior in the fall was negatively associated with language/literacy skills in the spring at a trend level ($p=0.081$), indicating that higher internalizing behavior in the fall was associated with lower language/literacy skills in the spring. See Table 3 for parameter estimates and significance values for the direct relationships between internalizing behavior and all outcome variables included in this study.

Direct Associations between Internalizing Behavior and Mathematics Skills

Age and ethnicity were associated with mathematics skills, indicating that both older and Hispanic children had higher mathematics scores. Sex was not associated with mathematics skills in this model. Additionally, the results showed that internalizing behavior was negatively associated with mathematics skills in the spring.

Direct Associations between Internalizing Behavior and Classroom Engagement

Positive engagement with peers. Age and ethnicity were associated with engagement with peers, however sex was not. Additionally, internalizing behavior was negatively associated with engagement with peers, indicating that higher internalizing behavior in the fall was associated with lower engagement with peers in the spring.

Positive engagement with teachers. Internalizing behavior was negatively associated with engagement with teachers. Age, sex, and ethnicity were not associated with engagement with teachers.

Positive engagement with tasks. Age was significantly associated with engagement with tasks, however sex and ethnicity were not. Additionally, internalizing behavior was negatively related to engagement with tasks.

Language/Literacy Mediation Model

Three structural regression models were created to test the hypothesis that spring classroom engagement across peers, teachers, and tasks mediated associations between fall internalizing behavior and spring language/literacy skills, controlling for age, sex, and ethnicity. Models tested mediation separately for each indicator.

The model that included spring classroom engagement with peers as a mediator between fall internalizing behavior and spring language/literacy skills, controlling for age, sex, and ethnicity, fit the data well, $\chi^2(12) = 72.543$, $p < .001$; CFI = 0.907; RMSEA = 0.090; SRMR = 0.037. However, the indirect effect through engagement with peers was not significant. These results indicated that engagement with peers did not mediate the relationship between internalizing behavior in the fall and language/literacy skills in the spring. See Figure 1 for the model results. Additionally, the model that included engagement with teachers as a mediator fit the data adequately; $\chi^2(12) = 71.902$, $p < .001$; CFI = 0.896; RMSEA = 0.090; SRMR = 0.036. The indirect effect through engagement with teachers was also not significant. See Figure 2 for model results.

Task mediation model. The model that included engagement with tasks as the mediator, fit the data well; $\chi^2(12) = 73.185$, $p < .001$; CFI = 0.902; RMSEA = 0.091; SRMR = 0.037. See Figure 3 for model results.

Direct effects. Internalizing behavior was negatively associated with engagement with tasks and engagement with tasks was positively associated with language/literacy skills. Also, internalizing behavior was not related to language/literacy skills in this mediation model.

Indirect effects. The indirect effect was significant in this model and therefore suggested that engagement with tasks mediated the relationship between internalizing

behavior and language/literacy skills. Positive engagement with tasks fully explained the relationship between internalizing behavior and language/literacy skills, such that higher internalizing behavior was associated with lower engagement with tasks, which in turn predicted lower language/literacy skills. The direct effect between internalizing behavior and language/literacy skills was no longer significant with the mediator included in the model.

Mathematics Mediation Model

Three structural regression models were created to test the hypothesis that spring classroom engagement across peers, teachers, and tasks mediated associations between fall internalizing behavior and spring mathematics skills, controlling for age, sex, and ethnicity. Models tested mediation separately for engagement with peers, teachers, and tasks.

The model that included classroom engagement with peers as a mediator, fit the data perfectly. This model was just identified, indicating that it had the same number of free parameters and observations, resulting in the model perfectly fitting the data (Kline, 2015). The indirect effect of internalizing behavior and mathematics skills through engagement with peers was not significant, indicating that engagement with peers did not mediate the relationship between internalizing behavior and mathematics skills. See Figure 4 for the model results. The model with engagement with teachers as a mediator was also just identified and fit the data perfectly. The indirect effect through engagement with teachers was also not significant in this model. See Figure 5 for model results.

Task mediation model. The model that included spring classroom engagement with tasks as a mediator was also just identified and fit the data perfectly. See Figure 6 for the model results.

Direct effects. Internalizing behavior was negatively related to engagement with tasks and there was a significant positive relationship between engagement with tasks and mathematics skills. The direct relationship between internalizing behavior and mathematics skills was not significant in this mediation model.

Indirect effects. The indirect effect through engagement with tasks was significant and suggested that engagement with tasks mediated the relationship between internalizing behavior and mathematics skills. These results can be interpreted to show that positive engagement with tasks fully explained the relationship between internalizing behavior and mathematics skills, such that higher internalizing behavior was associated with lower engagement with tasks, which in turn predicted lower mathematics skills. The direct effect between internalizing behavior and mathematics skills was no longer significant with the mediator included in the model.

CHAPTER 4 DISCUSSION

Children who enter preschool classrooms displaying higher levels of internalizing behavior show lower academic readiness skills at the end of the year. This may be a result of these children not engaging in important classroom learning contexts that promote the development of academic skills. Within early childhood programs, it is important to identify domain-general constructs, like classroom engagement, as opportunities to intervene early on. These constructs are important to ensure that children displaying higher levels of internalizing behavior from low-income households are acquiring the skills necessary for future school success. The present research study added to the literature by examining whether classroom engagement in different contexts, with peers, teachers, and learning tasks, mediated the relationship between internalizing behavior and academic skills in a sample of children attending Head Start. We hypothesized that engagement with peers and tasks would mediate the association between internalizing behavior and language/literacy and mathematics skills. Our hypotheses were partially supported. Findings provided support for children's classroom engagement with tasks as an important mechanism through which internalizing behavior influences academic outcomes in this sample of low-income preschool children.

Direct Effect of Internalizing Behavior on Academic Readiness Outcomes

As hypothesized, internalizing behavior was negatively associated with language/literacy and mathematics outcomes. Children who were rated by teachers as having higher levels of shy and withdrawn behavior in the fall showed lower academic readiness skills, including language/literacy and mathematics outcomes in the spring. In accord with our theoretical model, children displaying higher levels of internalizing

behavior in the classroom may not have learned as much academically in these areas because they were too shy and withdrawn to take advantage of the learning opportunities present within the classroom. These results are supported by prior early childhood research conducted with low-income children that suggests that internalizing behavior is negatively related to lower academic readiness outcomes, including language/literacy (Fantuzzo et al., 2003; Grimm et al., 2010; Kaiser et al., 2002) and mathematics skills (Dobbs et al., 2006). The present study findings add to the growing body of literature by examining this relationship in a culturally and linguistically diverse sample.

Direct Effect of Internalizing Behavior on Classroom Engagement

Findings also provide evidence for a negative relationship between internalizing behavior and engagement with peers, teachers, and tasks, supporting the proposed hypothesis. Children who were rated by their teachers as having higher internalizing behavior in the fall also showed lower positive engagement in important classrooms contexts, including interactions with peers and teachers, as well as during learning tasks observed in the spring. These findings are similar to what has been found in the literature previously showing that behavior problems are associated with lower positive engagement within important contexts, such as with peers, teachers, and tasks (Bulotsky-Shearer et al., 2008; Bulotsky-Shearer et al., 2011; Mantzicopoulos, 2005).

These results extend previous research in several important ways. First, the study focused specifically on children displaying internalizing behavior. To date, prior studies that included a multidimensional observational assessment of engagement, such as the inCLASS, have only focused on children displaying disruptive behavior from higher income homes (Vitiello & Williford, 2016). Second, the study examined differential

indirect effects of engagement in three different classroom contexts, which is important because the developmental demands to engage successfully (both socially and cognitively) differ across teachers, peers, and learning tasks. Some contexts may be more challenging for children with shy or socially withdrawn behavior. For example, in the teacher context where children are expected to communicate and approach the teacher (Downer et al., 2010), children displaying higher levels of internalizing behavior may not feel as comfortable approaching and communicating with the teacher. This may result in lower engagement with the teacher and the child missing out on important learning opportunities. Additionally, in the peer context where children are expected to socialize with their peers and initiate interactions and communications with them (Downer et al., 2010), children displaying more internalizing behaviors may not feel comfortable interacting or initiating conversations, resulting in these children missing out on important social exchanges and learning in this context. Developmental skills that are required to be successfully engaged in the task context include initiative, independence, and enthusiasm about focused learning activities in the classroom (Downer et al., 2010). In addition, preschool learning tasks typically involve social interactions with children or teachers in the classroom. Children who are shy or withdrawn may find it more difficult to engage in the task context because they may not feel comfortable interacting and communicating with their peers and teachers around classroom tasks.

Third, these results add to the literature by using a multidimensional observational measure of engagement in the classroom across different contexts in a sample of low-income preschool children. Most studies in the field use teacher-reported measures of engagement, which are not as objective as observational assessments, and do not consider

engagement across multiple contexts in the classroom. Therefore, the present study adds to the literature by examining two important constructs, internalizing behavior and a multidimensional construct of classroom engagement, that have been generally understudied in this population of children.

Classroom Engagement Mediation Models

Overall, findings partially supported our initial hypothesis. We had expected that both engagement with tasks and peers would mediate the relationship between internalizing behavior and language/literacy and mathematics skills, however, we found that only engagement with tasks mediated this relationship. Findings suggest that engagement with tasks may be an underlying mechanism that explains the negative relationship between internalizing behavior and language/literacy and mathematics skills in this sample of Head Start children. Children rated by teachers as having higher internalizing behavior in the fall were observed with lower positive engagement with tasks in the classroom and this in turn predicted lower language/literacy and mathematics skills. The direct relationship between internalizing behavior and language/literacy and mathematics skills was no longer significant when engagement with tasks was included as a mediator in the model, suggesting full mediation. These findings suggest that children entering the classroom displaying shy and withdrawn behavior may not be as engaged in learning tasks and this in turn predicted their lower language/literacy and mathematics skills at the end of the school year. These results are consistent with prior research with Head Start preschoolers that show that engagement with tasks mediated the relationship between behavior problems and school readiness outcomes (Dominguez & Greenfield, 2009; McWayne & Cheung, 2009).

The present study extends prior research in several ways. First, most prior research has focused on an overall construct of behavior problems or solely externalizing behavior, rather than internalizing behavior. Second, we examined classroom engagement using a multidimensional observational measure across three different contexts: teachers, peers, and learning tasks. Third, this study examined the underlying mechanism that might explain the relationship between internalizing behavior and language/literacy and mathematics skills in a sample of low-income preschool children from culturally and linguistically diverse backgrounds.

Contrary to our hypotheses, engagement with peers was not found to mediate the relationship between internalizing behavior and language/literacy and mathematics skills as predicted. Previous research with Head Start samples indicates that positive engagement with peers mediates this relationship (Bulotsky-Shearer et al., 2012a; McWayne & Cheung, 2009). It is possible that we did not find this relationship in our study due to differences in how engagement in the peer context was measured. For example, the study conducted by Bulotsky-Shearer et al., 2012a, used a measure of peer engagement that included engagement with peers in the play context. The current study included engagement with peers across multiple activity settings, including child-directed, unstructured play but also during more structured activities, like small and whole group. Another reason for these discrepant findings may be that these studies assessed peer engagement through teacher report and the current study used an observational measure, which is a more objective measure, of classroom engagement. Future studies should focus on the peer context in larger samples to try and understand

why this context did not mediate the relationship between internalizing behavior and language/literacy and mathematics skills.

Most importantly, it is not to say that peer engagement in the classroom is not important for children displaying higher levels of internalizing behavior. Although in the present study, we did not find peer engagement as a mediating construct, the task context within preschool classrooms is highly social. Within preschool classrooms, children's engagement in task contexts that support academic skills typically occur within a social context, such as during free play where children are engaging with each other during pretend play or with different hands-on materials, such as puzzles and blocks. For instance, within the task context, the InCLASS measures sustained attention and active engagement as well as personal initiative, independence, and persistence (Downer et al., 2010). These indicators of positive engagement within tasks could be observed within a child-initiated social context in which children are interacting with their peers during a task, such as a shared puzzle, building a block structure, and sand or water table exploration. In fact, in our study sample, positive engagement as measured by the inCLASS in the peer and task context were highly correlated. Children displaying higher levels of internalizing behavior may not feel as comfortable interacting with their peers around the task context and this may in turn impact their opportunities to learn academic concepts, such as mathematics, vocabulary, or listening comprehension skills.

Limitations and Future Directions

Although this study was one of the first to look at the mediating effect of classroom engagement for children displaying higher levels of internalizing behavior from low-income families, there were a number of limitations. First, this study was

conducted on a specific sample of culturally and linguistically diverse children from low-income households and findings may not be generalizable to other populations of children, such as children from higher income families. Future research should be conducted to replicate these findings in other samples of children, both from low and high-income families.

Second, internalizing behavior was measured through teacher report and although teachers can be reliable observers of their students, their reports alone are not always reliable when observing children. Studies with Head Start preschool children show that teacher reports on assessments are usually attributed to overall classroom differences or differences attributed to the teacher, rather than individual differences of children (Waterman, McDermott, Fantuzzo, & Gadsden, 2012). Best practices in assessment call for the use of multiple assessors as well as methods when assessing children in preschool. Although this is the case, the ASPI was chosen because it was the best measure that was available to us, that was developed and validated for use with a low-income population. Future studies should include observational assessments of children's internalizing behavior, as well as parent reports, in order to use a more comprehensive approach to assessment, like a multi-method, multi-informant approach in assessing internalizing behavior (Standards; American Educational Research Association [AERA], American Psychological Association [APA] & the National Council on Measurement in Education [NCME], 1999; Vitiello & Williford, 2016).

Third, causal relationships could not be assumed from our data because of the temporal sequence. There was no middle time point in this data, making it hard to assume

causality in the mediation model. Future studies should include a middle time point of classroom engagement in order to examine the causality of this relationship.

Finally, there was a restricted range of scores on the ASPI for children displaying internalizing behavior in this sample. It is not clear why there was such restricted range in these scores. Future studies could incorporate the use of measures that show sensitivity to detect a greater range of behaviors for children displaying internalizing behavior. There is a general lack of measures in the early childhood field to identify preschool internalizing behaviors within the classroom setting (Fantuzzo et al., 2003). Future measurement development studies are needed to increase the item pools that tap into these behaviors as well as teachers' ability to observe and record these behaviors in the classroom setting.

Future studies should also examine the relationship between internalizing behavior and language/literacy and mathematics skills in order to understand whether there is a quadratic rather than linear relationship between these two constructs. This would allow us to examine whether there are different levels of internalizing behavior that are hindering academic achievement. For example, this relationship could look different for a child who is actually disengaged or disconnected when compared to a child who has a shy temperament but is still engaged in learning; there could be a threshold point at which internalizing behavior is problematic for classroom engagement which in turn may affect academic skills. Future studies could also take a more person-centered approach and conduct a latent class analysis to understand whether there are different groups of children with various levels of internalizing behavior that may affect academic achievement (Bulotsky-Shearer et al., 2012b). Finally, researchers should conduct studies to understand whether this relationship is the same across different groups of children

through a multiple group comparison approach in SEM, such as between boys and girls or children from different ethnic backgrounds. There may be differences in the way that internalizing behavior affects engagement for different groups of children. For example, girls may not feel as comfortable in different contexts when compared to boys and this may cause a different mediating effect when explaining the relationship between internalizing behavior and academic readiness skills.

Implications for Policy and Practice

This study stresses the importance of identifying behavior problems early on in preschool and promoting engagement with tasks for preschool children displaying higher levels of internalizing behavior early in the school year. Children displaying internalizing behavior may be too shy and withdrawn to engage in both social and academic contexts, which may hinder their development of important academic skills, such as language/literacy and mathematics. An important implication of these findings is that teachers should be aware of the importance of engagement in the task context for children displaying higher levels of internalizing behavior. Typically in preschool, learning contexts include more developmentally appropriate, engaging, and hands on learning activities that include peers working together within a social context. Teachers should try to encourage children displaying higher levels of internalizing behavior to be more engaged within these important learning contexts to ensure that they are taking advantage of the learning opportunities present within this context. Additionally, it is important to train teachers to use observation in the classroom in order to “notice” children who are displaying higher levels of internalizing behavior and who are not engaging in important learning contexts.

This study also emphasizes the importance of early identification and intervention for children within Head Start programs who display more internalizing behaviors. These results showed that preschool children displaying higher levels of internalizing behavior had lower language/literacy and mathematics skills, as well as lower positive engagement across important learning contexts, with peers, teachers and tasks. Additionally, children showing higher levels of internalizing behavior showed lower positive engagement with tasks, which in turn predicted lower academic readiness skills, including language/literacy and mathematics outcomes. Researchers should use their resources to develop interventions for children displaying higher levels of internalizing behavior to ensure that they are engaged in the task context and consider the importance of social interactions around these tasks that may hinder the development of academic skills in the classroom, like language/literacy or mathematics skills. By focusing on the task context for children displaying higher levels of internalizing behavior and ensuring that these children are engaged in this context, children displaying internalizing behavior may not show as many difficulties with academic outcomes.

In summary, for children entering preschool classrooms from low-income households who are at risk both socially and academically, it may be especially important for them to be engaged in various contexts that are important for learning, such as during learning tasks, in order for them to succeed academically. Overall, this study stresses the importance of identifying domain-general constructs, like classroom engagement, to address the negative relationship seen between behavior problems and academic readiness skills in children from low-income households and in turn to close the achievement gap found for this population of children in preschool.

FIGURES

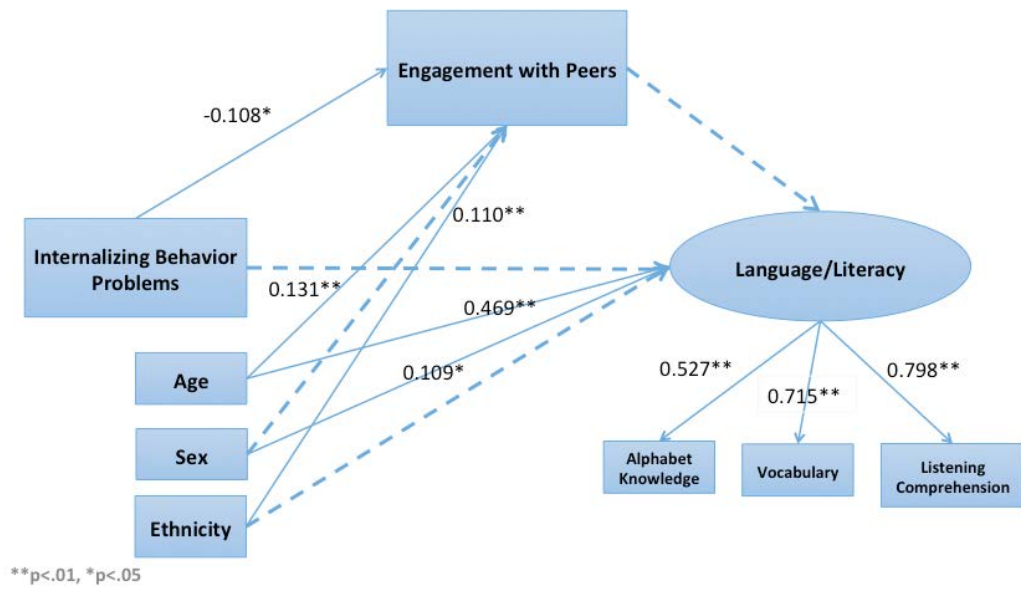


Figure 1. Path model for mediation of engagement with peers and language/literacy skills

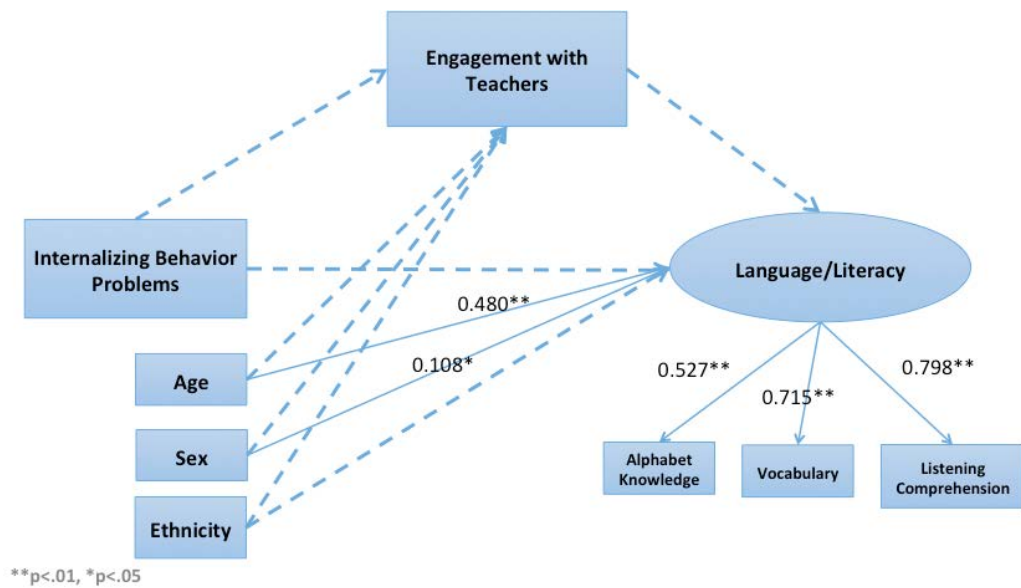


Figure 2. Path model for mediation of engagement with teachers and language/literacy skills

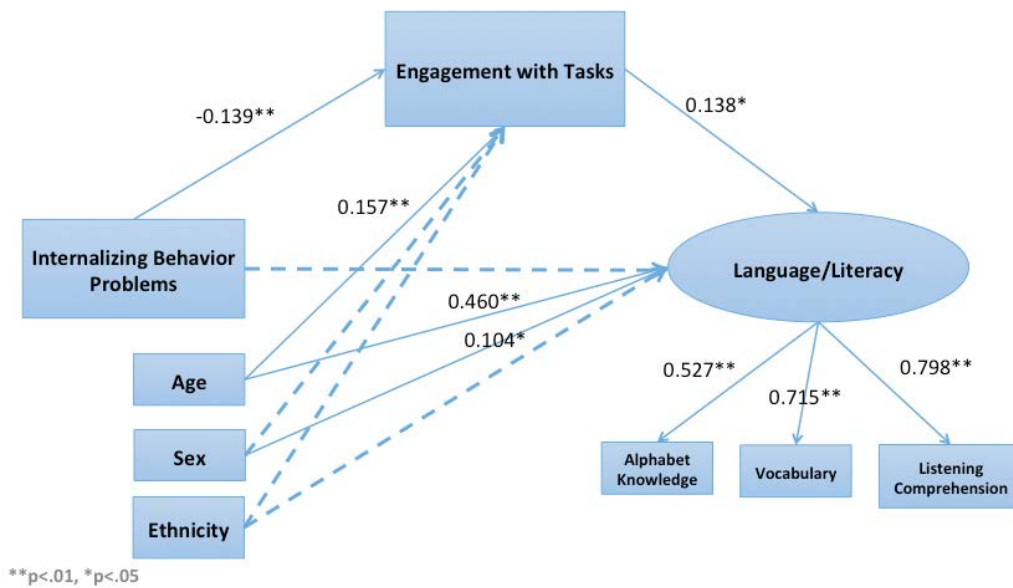


Figure 3. Path model for mediation of engagement with tasks and language/literacy skills

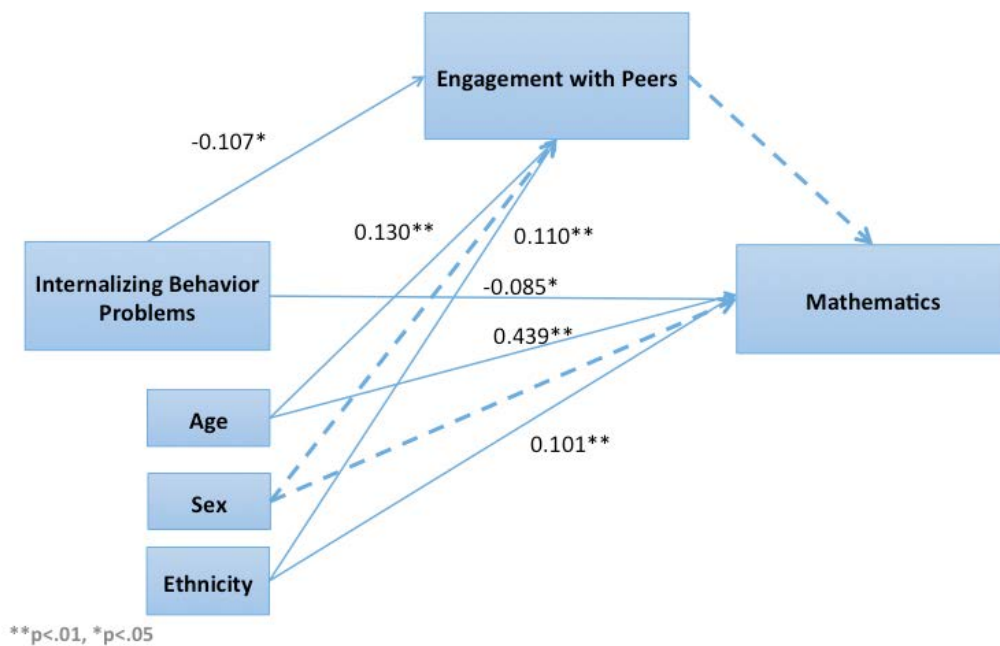


Figure 4. Path model for mediation of engagement with peers and mathematics skills

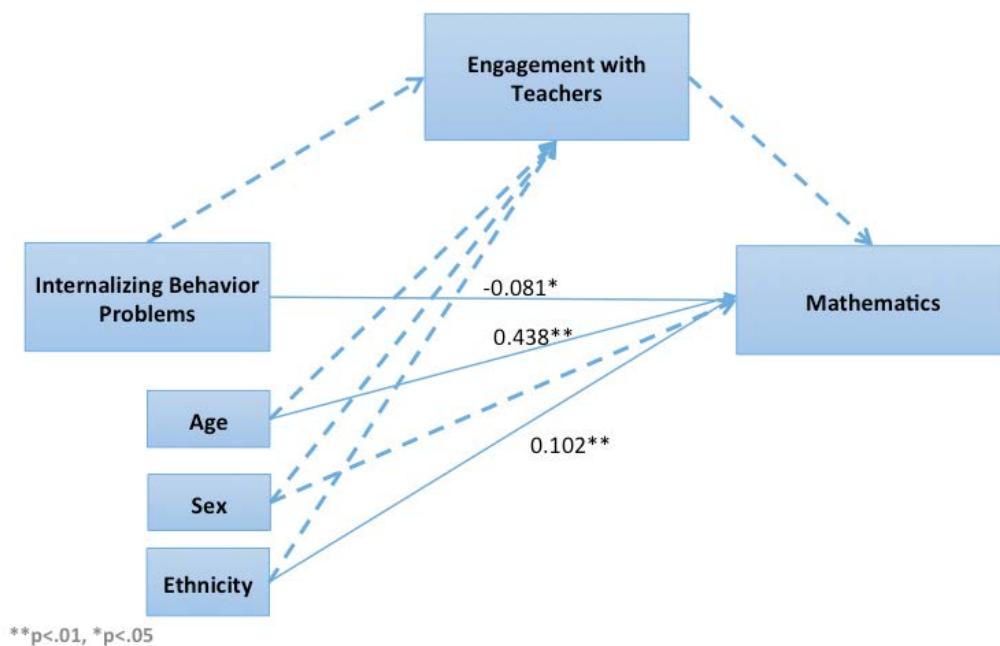


Figure 5. Path model for mediation of engagement with teachers and mathematics skills

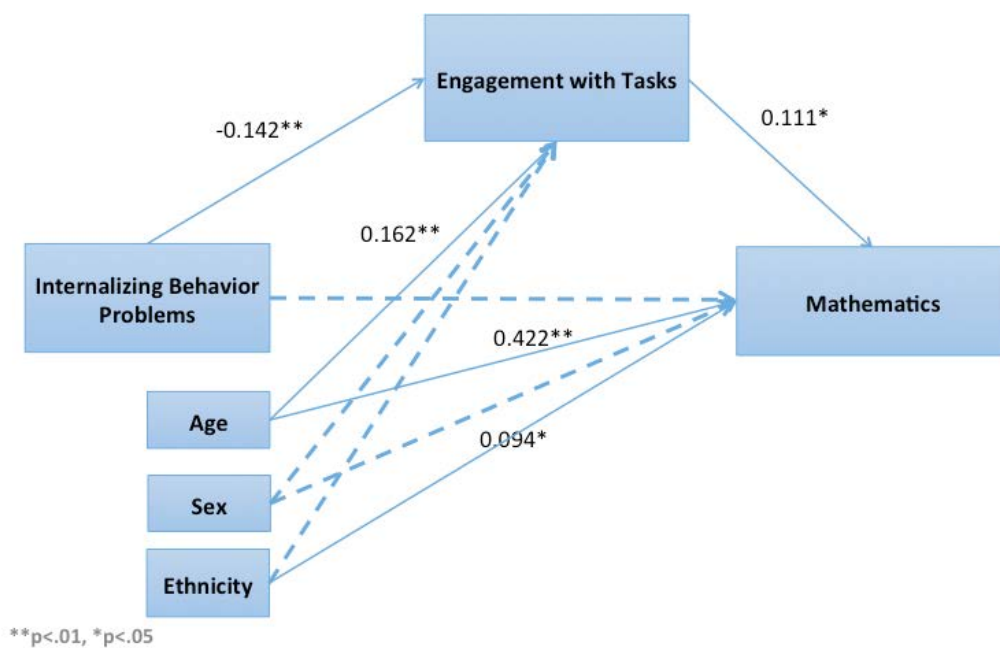


Figure 6. Path model for mediation of engagement with tasks and mathematics skills

TABLES

Table 1
Means and Standard Deviations for Child Measures

	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>Range</i>
<i>ASPI (fall)</i>				
Internalizing Behaviors	632	48.74	4.33	47-80
<i>InCLASS (spring)</i>				
Engagement with Peers	479	49.42	11.55	20-79
Engagement with Teachers	479	48.27	13.07	23-82
Engagement with Tasks	479	44.05	8.99	22-70
<i>Learning Express (spring)</i>				
Vocabulary	623	213.55	46.08	62-315
Listening Comprehension	623	210.57	40.15	76-277
Alphabet Knowledge	623	228.48	45.72	75-334
Mathematics	623	224.57	45.06	75-356

Table 2
Bivariate Correlations between Internalizing Behavior and Child Outcome Measures

	1	2	3	4	5	6	7	8
1. Internalizing Behaviors	—	-.17**	-.10*	-.19**	-.02	-.10*	-.08 ^t	-.13**
2. Engagement with Peers		—	.35**	.56**	.05	.14**	.11*	.08
3. Engagement with Teachers			—	.42**	.02	.05	.01	.07
4. Engagement with Tasks				—	.11*	.16**	.17**	.18**
5. Vocabulary					—	.57**	.38**	.52**
6. Listening Comprehension						—	.42**	.47**
7. Alphabet Knowledge							—	.65**
8. Mathematics								—

* $p < .05$, ** $p < .01$

Table 3
Direct Relationships between Internalizing Behavior and Outcome Variables

Outcome Variables	B	SE	p
Internalizing Behaviors			
Language/Literacy skills	-0.077	0.044	0.081
Age	0.481	0.039	< 0.001
Sex	0.107	0.042	0.013
Ethnicity	-0.044	0.045	0.325
Engagement with Peers	-0.151	0.045	.001
Age	0.180	0.044	< 0.001
Sex	-0.031	0.044	0.489
Ethnicity	0.103	0.045	0.024
Engagement with Teachers	-0.108	0.047	0.022
Age	0.069	0.046	0.135
Sex	-0.039	0.046	0.389
Ethnicity	-0.021	0.047	0.650
Engagement with Tasks	-0.170	0.045	< 0.001
Age	0.192	0.044	< 0.001
Sex	0.015	0.044	0.735
Ethnicity	0.061	0.046	0.180
Mathematics skills	-0.086	0.037	0.019
Age	0.440	0.033	<0.001
Sex	0.010	0.036	0.786
Ethnicity	0.102	0.037	0.006

N=655

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