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Class, Race, and Gender Disparities in Behavior Problems At 24 Months of Age: Population-Based Estimates

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Abstract

We used a large, nationally representative sample of singleton children to estimate the effects of socioeconomic status, race/ethnicity, gender, additional socio-demographics, gestational and birth factors, and parenting on children's risk for learning-related behavior problems (i.e., inattention, a lack of task persistence, disinterest, non-cooperation, or frustration), at 24 months of age. Results indicated that boys are about twice as likely as girls to display learning-related behavior problems. Children from lower SES households are about twice as likely as those from high SES households to display such behavior problems. Statistically controlling for these factors, we found consistently significant patterns of elevated behavior problems for some Asian and Native American children, but not for African-American or Latino children. Only small portions of these effects are explained by variation in the children's gestational or birth characteristics. A significant portion, but still less than half of the socio-demographic effects are attributable to measured features of parenting received by children.

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A key feature of a child's readiness for schooling is the ability to self-regulate his or her behaviors while completing learning-related tasks (Foulks & Morrow, 1989; Ladd, Birch, & Buhs, 1999; McClelland, Acock, & Morrison, 2006; McClelland & Morrison, 2003). For example, a child entering school is expected to follow a teacher's directions, persist in completing activities, attend to instruction, and cooperate with his or her peers (Campbell & Stauffenberg, 2007). A child who arrives ready to meet a teacher's expectations for classroom behavior is much more likely to succeed in school (e.g., Duncan et al., 2007; Graziano, Reavis, Keane, & Calkins, 2007; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; Rimm-Kaufman, Pianta, & Cox, 2000; Trentacosta & Izard, 2007).

However, some children enter school "behaviorally unready" (Campbell & Stauffenberg, 2007; Gadow, Sprafkin, & Nolan, 2001; National Institutes of Child and Human Development's [NICHD] Early Child Care Research Network, 2003). For example, they may not yet be ready to follow a teacher's directions or to work independently (Rimm-Kaufman et al., 2000). School-aged children who fail to display learning-related behaviors, such as persisting at tasks, being attentive to instruction, self-sustaining their interest and engagement in activities, or working cooperatively with a teacher or peers are significantly less likely to succeed academically (e.g., Alexander, Entwisle, & Bauber, 1993; Ladd et al., 1999; McClelland et al., 2006; McClelland, Morrisoin, & Holmes, 2000; Tach & Farkas 2006). For example, the Early Child Care Research Network (2003) reported that preschool children who were inattentive scored significantly lower on standardized measures of their reading and mathematics skills at 54 months of age. Both Tach and Farkas (2006) and Duncan et al. (2007) both found that inattention predicted lower academic

achievement, even after statistically controlling for prior academic and cognitive ability. In contrast, Duncan et al. found that measures of externalizing and internalizing problem behaviors, as well as social skills, were generally insignificant predictors of later academic achievement. McClelland et al.'s analyses indicated that a kindergarten child's learning-related behaviors predicted his or her reading and mathematics skills in 2nd grade, even after statistically controlling for his or her reading and mathematics skills at kindergarten, as well as the child's IQ, age at school entry, preschool experiences, parent's education, ethnicity, and home literacy environment.

Young children who are unable to self-regulate their learning-related behaviors (e.g., remain attentive, persistent, or compliant while completing tasks) are also at increased risk for more serious emotional and behavioral disorders (Egger & Angold, 2006; Hill, Degnan, Calkins, & Keane, 2006; Holmes, Slaughter, & Kashani, 2001; Hughes & Ensor, 2007; Olson, Schhilling, & Bates, 1999; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Patterson, 2002). Indeed, Keenan and Shaw (2003) identified deficits in self-regulation as causal factors in the etiology of psychopathology. Empirical studies repeatedly find a link between early delays in self-regulation and the later occurrence of psychopathology (e.g., Campbell, Shaw, & Gilliom, 2000; Eisenberg et al., 1996, 2001; Essex et al., 2006; Hill et al.; Lengua, 2006; Muris & Ollendick, 2005; Southam-Gerow & Kendall, 2002; Zhou et al., 2007). This link is evident in studies of infants, toddlers, school-aged children, and adolescents (see Calkins & Fox, 2002, for a review).

Risk Factors for Learning-Related Behavior Problems

Three distinct sets of factors likely elevate a child's risk of learning-related behavior problems. The first set of factors can be characterized as the socio-demographic background of the child (e.g., the child's gender, the child's status as a racial or ethnic minority) or family (e.g.,

the family's SES, the mother's marital status). For example, low SES children and those living in poverty are also more likely to live in low-quality neighborhoods, to be exposed to domestic and neighborhood violence and environmental toxins such as lead, to encounter residential insecurity, to be spanked, and to be raised by single mothers who are depressed, who have dropped out of school, or who are teen-agers (Duncan & Magnuson, 2005; Whitaker, Orzol, & Kahn 2006). These factors likely contribute to lower self-regulation (NICHD Early Childcare Research Network, 2005; Raver, 2004). For example, Lengua (2005) recently reported that a family's income level was negatively related to a child's irritability and inattention. This same pattern held for the parent's level of education and his or her status as a married parent.

The second set of risk factors includes the conditions of the child's gestation (e.g., whether the mother smoke, drank, or otherwise put hers and the baby's health at risk during pregnancy) or birth (e.g., whether the child was born prematurely or with low birthweight, whether there were complications to the delivery). Low birthweight elevates a child's risk for inattention (e.g., Botting et al., 1997; Breslau et al, 1988; Hack et al., 1992; Hultman et al., 2007; Li-Grining, 2007; Mick et al., 2002; Scottish Low Birthweight Study Group, 1992; Sykes et al., 1997). Additional adverse events and exposures during pregnancy, delivery, and the newborn period have consistently been reported to be risk factors for cognitive delays and behavior problems. Complications during gestation and delivery can produce a gradient of brain abnormalities encompassing numerous neuropsychiatric conditions and behavioral disorders. Recent research has linked a child's inattention to the mother's use during pregnancy of tobacco (Button et al., 2005; Rodriguez & Bohlin, 2005), alcohol (Bhatara et al., 2006; Mick et al., 2002; Streissguth et al., 1994), and illicit drugs (Noland et al., 2005), as well as her own level of psychosocial stress (O'Conner et al., 2002; Rodriguez & Bohlin).

The third set of risk factors involves the quality of the child's parenting (e.g., Baker, McIntyre, Blacher, Crnic, Edelbrock, & Low, 2003; NICHD Early Child Care Research Network, 2005). Elevated levels of psychological, social, and economic stress, combined with a low level of family resources, has been reported to reduce a mother's or father's ability to provide high-quality parenting (Conger et al., 1992; Conger, Ge, Elder, Lorenz, & Simmons, 1994; Magnuson & Duncan, 2006; McLoyd, 1998), particularly when the child is fussy or irritable (Patterson, 2002). This, in conjunction with poor nutrition, environmental toxins, lower levels of emotional comfort and physical safety in the home and neighborhood, and lower quality childcare outside the home, can result in behavioral unreadiness, such that the child enters school as inattentive, task-avoidant, easily frustrated, or noncompliant (Qi & Kaiser, 2003; Stormshak, Bierman, McMahon, Lengua, & the Conduct Problems Prevention Research Group, 2000). In addition, children are more likely to respond with avoidant behavior when their parents practice relatively harsh or inconsistent discipline or physical aggression (Qi & Kaiser; Stormshak et al., 2000). Both Lengua (2006) and Lengua and Kovacs (2005) found that a mother's use of inconsistent discipline predicted greater irritability by her child. Inadequate parenting may also increase the negative effects of a child's socio-economic, birth, or gestational conditions (Bornstein, Hahn, Suwalsky, & Haynes, 2003; Resnick, Eyler, Nelson, Eitzman, & Bucciarelli, 1987; Whitman, Borkowski, Schellenbach, & Nath, 1987). For example, meeting the low birthweight child's greater cognitive, behavioral, and physical needs may increase a parent's stress, which, in turn, may result in the child becoming more easily frustrated (Singer et al., 1999). Family poverty also increases the child's chances of being raised by highly stressed and unhealthy parents (Duncan & Brooks-Gunn, 2004; Magnuson & Duncan). Stress and poor mental health negatively impact the quality of parent–child interaction, so that these parents

become less warm and responsive, as well as harsher and more punitive (Brown, Lourie, & Pao, 2000; Gallo et al., 2005; Hart & Risley, 1999; McLoyd).

However, the quality of a child's parenting can also bolster his or her resilience. That is, high-quality parenting may help reduce the negative effects of the child's socio-economic, gestational, or birth conditions. Smith, Landry, and Swank (2006) report that maternal warmth and responsiveness mediated the risk associated with being born preterm. Tully, Arseneault, Caspi, Moffitt, and Morgan (2004) reported that maternal warmth lessened the effects of low birth weight on the occurrence of inattention. If higher-quality parenting mitigates a child's risk, then parenting might be a potential target of early interventions efforts. Yet few studies have investigated to what extent higher-quality parenting may reduce a child's risk of behavior problems, especially after accounting for a wide range of socio-demographic, gestational, and birth factors (Olson, Ceballo, & Park, 2002).

Limitations of the Extant Research

Despite its strengths, the extant research has a set of limitations. Few studies (e.g., Stifter et al., 1999) have measured learning-related behaviors in children younger than 3 or 4 years of age. Yet such behavior problems can be expected to manifest prior to this age (Calkins & Fox, 2002; Calkins, Fox, & Marshall, 1996), and interventions designed to prevent later psychopathology may be most effective when introduced by 2 or 3 years of age (Patterson & Yoerger, 2002). In addition, most studies have focused on boys. It is unknown to what extent young girls may be at risk for these behavior problems (Campbell et al., 2000). No study has used birth certificate data to identify factors that may be exogenously related to these behaviors. Instead, most investigations rely on maternal recall of the child's gestational or birth conditions (e.g., Milberger et al., 1997). Few studies have measured the occurrence of learning-related

behavior problems while a young child is attempting to complete a series of cognitively (e.g., count, discriminate objects, communicate) or physically (e.g., grasp a pencil, write) demanding tasks being presented by a non-caregiver. This is important, since such activities more closely approximates the task demands, challenges, and frustrations that the child will later face in preschool- or school-based settings (Raikes, Robinson, Bradley, Raikes, & Ayoub, 2007). Few investigations have used large-scale, nationally representative samples. Instead, most have used relatively small (e.g. $N < 100$) convenience samples (e.g., McClelland & Morrison, 2003). For example, McClelland et al.'s (2000) analyses relied on a sample of 82 children with learning-related behavior problems. Small samples constrain the internal and external validity of the study's findings, and limit the identification of sub-groups of children who may be most in need of early intervention (Bennett, Lipman, Racine, & Offord, 1998; Campbell et al.).

Perhaps most importantly, few studies have simultaneously accounted for relations between the occurrence of learning-related behavior problems and the three sets of factors identified as elevating a child's risk for psychopathology (e.g., poverty, gestational and birth risk factors, ineffective parenting). Little is therefore known about the full range of these behaviors' risk factors and onset (Eisenberg et al., 2004). That is, prior work has not simultaneously estimated the effects of both educationally relevant factors (i.e., those factors that can be targeted through preschool- or center-based interventions, such as the quality of the child's parenting) *and* medical and socially relevant factors (i.e., those factors that might be targeted through clinic- or social service-based interventions, such as the family's poverty status and the correlates of such status, such as low birthweight). Yet estimating these effects simultaneously is required in order to provide relatively precise estimates of any one factor's effects, as well as to identify how these diverse sets of factors combine to elevate a child's risk. Such estimates address a number of

important questions. These include (a) does a child's gestational or birth characteristics mediate the risk otherwise attributable to his or her socio-economic status, and (b) does low-quality parenting fully or partially mediate the child's socio-demographic, gestational, and birth characteristics as risk factors?

Study's Purpose

We investigated to what extent a wide range of socio-demographic, gestational, and birth factors elevate a young child's risk of displaying learning-related behavior problems. We also estimated the degree to which the child's parenting may mediate his or her risk of displaying such behaviors. To provide rigorously derived population-based estimates of these risk factors, we used a large, nationally representative sample of 24-month-old children. These children were directly observed while completing a series of learning-related tasks with a non-caregiver. We estimated each factor's effects on each of five behavior problems (i.e., lack of task persistence, inattention, disinterest, frustration, non-cooperation). Our use of a large sample of very young children, many socio-demographic, gestational, birth, and parenting risk factors, and multiple indicators of learning-related behavior problems should help identify which groups of children, as toddlers, are already at elevated risk of entering school as behaviorally unready.

Method

Analytical Sample

The Early Childhood Longitudinal Study—Birth Cohort (ECLS-B) is a nationally representative, longitudinal cohort study of children born in 2001. This cohort is based on birth certificate records and includes oversamples of Asian and Pacific Islanders, Native Americans and Alaska Natives, low birthweight (1,500-2,500 grams) and very low birthweight (less than 1,500 grams) children, and twins. At approximately 9 months (2001-2002) and 24 months after

the children's births (2003), ECLS-B field staff administered measures of the children's development. Field staff also interviewed the children's parents. The ECLS-B includes 5,522 observations from singleton births with data on the socio-demographic, gestational, and birth risk factors of interest, as well as behavioral measures at 24 months of age, and the two parenting measures.

Measures

We analyzed interviewers' behavioral ratings of the children as the children completed tasks designed to measure their cognitive functioning, as well as their physical skills. Specifically, we analyzed ratings on the Behavior Rating Scale-Research Edition (BRS-R). ECLS-B field staff used the BRS-R to rate children's behaviors as they worked to complete the Bayley Short Form—Research Edition (BSF-R), a modified version of the Bayley Scales of Infant Development, Second Edition (BSID-II; Bayley, 1993). The Bayley's items "challenge young children cognitively and require focused attention, persistence, and cooperation with an examiner" (Raikes et al., 2007, p. 134). The BSF-R includes both a mental and a motor scale. The mental scale measures the child's performance on tasks requiring memory, problem solving, and language skills. The motor scale measures a child's gross and fine motor skills, such as his or her ability to grasp, stand, walk, run, and write. Example BSF-R mental scale items used for 24-month old children include "uses a three-word utterance," "uses pronouns," "counts," "discriminates book, cube, and key," and "uses past tense." Example motor scale items used for 24-month-old children included "grasps pencil at nearest end," "manipulates pencil in hand," "tactiley discriminates shapes," and "copies circle."

NCES field staff received extensive training in the administration of the BSF-R. This included two days of instruction, directed practice role plays, practice exams, and a certification

exam in which the trainee administered the BSR-R to a child aged 21-30 months while videotaped. The staff's certification exam scores averaged 93% for administration accuracy, and 97% and 96% for scoring accuracy of the mental and motor scales, respectively. The BSF-R's standard errors indicated a reliability of above .80 for both the mental and motor scales. The R^2 between BSF-R and BSID-II scores was .99. This and root mean squared errors indicated that "under clinical conditions, the BSF-R item subsets were capable of predicting BSID-II ability estimates with considerable precision across a broad range of ability" (Andreassen & Fletcher, 2007, p. 4-8).

Interviewers used the BRS to rate a child's self-regulation (Bayley, 1993). At the 24 month ECLS-B assessment, NCES included 11 interviewer-rated items from the full BRS in the BRS-R. These items measured developmentally appropriate behaviors for 24-month-old children (Nord et al., 2006). Interviewers were trained on observing the targeted behaviors. These trainings included the use of 2-hour videotapes depicting the full range of behaviors for each item, each of which was followed by a "quiz videoclip." Every interviewer satisfactorily completed the training. Zero-order correlations between the ECLS-B's full sample of 24 month-old children (N = 8,550) on the BSF-R and their ratings on the BRS were, .57 for "pays attention," .54 for "persistent in tasks," .53 for "shows interest in materials," .52 for "displays cooperation," and .21 for "displays frustration." Raikes et al. (2007) report a Cronbach alpha of .92 for the BRS's self-regulatory (e.g., attention to task, persistence, cooperation) items. Our own analyses yielded a Cronbach alpha of .90. Scores on the BRS moderately-to-highly correlate with scores on other measures of young children's socio-emotional adjustment (Buck, 1997).

We used five items on the BRS-R that measured learning-related behaviors. Each behavior was measured as the child completed the BSF-R's cognitive and physical tasks. We

dichotomized these ratings to indicate a low, deficient, or problematic level of the particular learning-related behavior. These behaviors were:

1) Not Persistent. Children were rated on a five-point scale where 1 represented "consistently lacks persistence" and 5 represented "consistently persistent in tasks." We used a dichotomous variable, such that scores of 1 and 2 were recoded equal to 1, and others were coded equal to 0.
2) Not Attentive. Children were rated along a five-point scale where 1 represented "constantly off task, does not attend" and 5 represented "constantly attends." We dichotomized these ratings, such that we coded ratings in the two least attentive categories as 1 and others were coded 0.
3) No Interest. Children's interest in the testing material was rated from a 1 of "no interest" to a 5 of "constant interest." We dichotomized these scores, such that scores of 1 and 2 were coded 1, and others were coded 0.
4) Not Cooperative. Children's reactions to suggestions or requests during test administration were rated on a five-point scale from a 1 of "consistently resists suggestions or requests" to a 5 of "consistently cooperates." Our recoded variable grouped the two lowest categories of cooperation in a category equal to 1. All other categories were coded 0.
5) Frustrated. Children's frustration with tasks during testing was rated from a 1 of "consistently becomes frustrated" to a 5 of "never becomes frustrated." We used a dichotomous variable, such that ratings of 1 and 2 were recoded 1 and others were recoded 0.

The BRS completed by the ECLS-B interviewers also contained 6 additional items (i.e., displays positive affect, displays negative affect, adapts to change in test materials, shows control of movements, fearful, not social). We did not include these items in our analyses because we did not consider the behaviors as directly related to a child's learning, operationalized here as engagement in the Bayley's tasks.

Home Score. The ECLS-B contains items from the Home Observation for Measurement of the Environment (HOME) score (Caldwell & Bradley, 1984), a widely used measure of the quality of the child's parenting and the home environment (e.g., NICHD Early Childcare Research Network, 1997, 2005). The ECLS-B modified the measure, retaining 12 of the original measure's 21 items. The HOME score is constructed as a count of items measuring (a) parental activities including reading to the child, telling stories, singing, and taking the child on errands or to public places; (b) having toys, records, books, and audiotapes available in the home; and (c) having a safe and supportive home environment. Some of the HOME score's items were observational. Example include "respondent spoke spontaneously to the child," "respondent responded verbally to the child," "respondent caressed, kissed, or hugged the child," "respondent slapped or spanked the child," "respondent kept child in view." The interviewer directly asked the parent to respond to other items. Examples include "How often do you read to the child?" "How often do you tell the child stories?" and "How often do you all sing songs?" Training procedures followed those used to certify field staff for the National Longitudinal Study of Youth and NICHD's Study of Early Child Care. The Cronbach alpha for the HOME score was .46, and so relatively low. NCES subsequently factor analyzed the scores. Their analyses identified four relatively distinct factors, three of which NCES characterized as "the child's home environment and cognitive stimulation," "the parent's literacy-oriented activities with the

child," and "physical methods of managing the child's behavior" (Andreassen & Fletcher, 2007, p. 9-11). Because (and despite the scale's relatively low internal inconsistency) we considered each of these factors as key aspects of the child's parenting and home environment, we used the total HOME score in our analyses. We also created a dichotomized measure of relatively low-quality parenting/home environment by assigning the lowest 14% of HOME scores to a dichotomous score of 1 for having a low HOME score (<=8 points).

Parent Support. The quality of a parent's interactive support of their child was coded from videotaped interactions during the Two Bags Task. This is a simplified version of the Three Bags Task, which was used in the Early Head Start Research and Evaluation Project and the NICHD Study of Early Child Care (Nord et al., 2006). Interviewers read a script to the child's parents, after which, over the next 10 minutes, parents were asked to play with their children. Parents were first asked to interact with their child over a children's picture book (i.e., *Goodnight Gorilla*). They were then asked to interact with their child with a set of toy dishes. Interviewers used handheld video cameras to film the parent and child as they interacted during these two activities. Coding of the videotaped interactions was the same as that for the original Three Bags Task developed for the Early Head Start Research and Evaluation Project and obtained from the authors (Brady-Smith, O'Brien, Berlin, & Ware, 1999). A composite variable measuring parent support of the child was created for the ECLS-B representing the mean of 3 characteristics of parent interaction with the child. Each was scored on a 7 point scale, ranging from 1 = very low to 7 = very high (this was the same scoring method used by Brady-Smith et al.). These three characteristics were:

1) Parental Sensitivity: This scale measures how the parent observed and responded to cues indicating whether or not the child was distressed. A parent who was observed to be

sensitive interacted in ways that were child-centered, and was focused on responding to the child's needs, moods, interests, and capabilities.

2) Parental Stimulation of Cognitive Development: This scale rated the parent's effortful teaching to enhance the child's perceptual, cognitive, and language development. Parents observed as stimulating a child's cognitive development interacted in ways that furthered the child's cognitive development, typically by using behaviors that were matched or slightly above the child's developmental level or interest.

3) Parental Positive Regard: This scale measured the parent's warmth and responsiveness towards the child. Parent showing positive regard were observed as listening to the child, watching attentively, looking into the child's face when talking to him or her, as well as giving praise.

Coders of the Two Bags Task received 5 days of training. The first 3 days were spent going over the Two Bags Task's scales. Video clips of the mother-child interactions were shown to demonstrate the target behaviors, and to provide practice. The 4th day was spent coding all of the Two Bags Task's scales simultaneously. The 5th day was spent completing reliability videotapes. All coders displayed inter-rater reliability agreements of 90% or more. All coders were required to code weekly reliability videotapes with a minimum of 85% inter-rater agreement. Mean inter-rater reliability for the parent rating scales was 97%, with mean reliabilities of 97%, 93%, and 94% for Sensitivity, Cognitive Stimulation, and Positive Regard, respectively (Andreassen & Fletcher, 2007). The composite parent support variable could range in value from 1 to 7. We used a dichotomous composite variable, such that the three lowest categories of parental support were coded 1 (i.e., relatively low support) and the remaining higher categories were coded 0.

Child Age. Although the ECLS-B study design specified that the measures of children's development should be administered when the children were 24 months of age, in practice children's ages varied. We therefore included the child's age in months when the measures were administered to account for age-related variation in children's BSR-R's scores at this time point.

Child Sex. Females were the reference category, with male children coded as 1.

Socioeconomic Status (SES). ECLS-B project staff calculated a household's SES using the following information, as reported by the child's parents: father or male guardian's education; mother or female guardian's education; father or male guardian's occupation; mother or female guardian's occupation; and household income. We used a five-category SES variable representing the quintile of the distribution for the value of the composite SES of each child. The first quintile represented the lowest SES, and the fifth quintile represented the highest SES. In cases where only one parent was raising the child, not all the aforementioned information was defined. In these cases, we computed the household's SES by averaging the available information. In our logistic regression modeling, we used four dummy variables to represent increasingly lower SES, with the highest quintile designated as the reference category. Doing so allowed use to evaluate for possible nonlinear effects of SES.

Older Mother. We used a dichotomous variable with a value equal to 1 for mothers aged 35 years or older at the time of the child's birth.

Marital Status. We used an indicator of the mother's marital status at the child's birth. We used married mothers as the reference category and coded unmarried mothers as 1.

Race Ethnicity. Race/ethnicity of the mother of the child was used to classify the child's race or ethnicity on his or her birth certificate, in accordance with National Center for Health Statistics procedures. We used Non-Hispanic White as the reference category. The other

categories were as follows: (a) African American; (b) Korean, Chinese, Indian, or Japanese; (c) Other Asian (Filipino, Samoan, Vietnamese, Guamanian, Other Asian/Pacific Islander, and combined Asian/Pacific Islander); (d) Hispanic; and (e) Native American. Infants who were Korean, Chinese, Indian, and Japanese were considered separately from other Asians because children from these more economically developed Asian countries often score higher on cognitive tests (Goyette & Xie, 1999).

Medical Risk Factors. We used a count of the medical risk factors present during pregnancy from the following list: incompetent cervix, acute or chronic lung disease, chronic hypertension, pregnancy-induced hypertension, eclampsia, diabetes, hemoglobinopathy, cardiac disease, anemia, renal disease, genital herpes, oligohydramnios, uterine bleeding, Rh sensitization, previous birth weighing 4000+ grams, or previous preterm birth.

Behavioral Risk Factors. We used a count of maternal behavioral risk factors occurring during pregnancy, as recorded on the birth certificate. Behavioral risks include any maternal use of alcohol and/or tobacco during pregnancy.

Obstetric Procedures. We used a count of the following obstetric procedures occurring during pregnancy, labor and/or delivery: induction of labor, stimulation of labor, tocolysis, amniocentesis, and cesarean section.

Labor Complications: We used a count of the number of labor complications experienced from the following list: abruptio placenta, anesthetic complications, dysfunctional labor, breech/malpresentation, cephalopelvic disproportion, cord prolapse, fetal distress, excessive bleeding, fever of >100 degrees, moderate/heavy meconium, precipitous labor (<3 hours), prolonged labor (>20 hours), placenta previa, or seizures during labor.

Preterm Delivery. We used two indicators of preterm delivery. The first indicates very preterm births. This was equal to 1 for births occurring at ≤32 weeks completed gestation. The second indicates moderately preterm births. This was equal to 1 for birth occurring between 33 and 36 weeks completed gestation.

Birthweight. We used two indicators for the child's birthweight. Very low birthweight was a dichotomous variable equal to 1 for births weighing ≤1500 grams. Moderately low birthweight was a dichotomous variable equal to 1 for births weighing 1,501-2,500 grams.

Congenital Anomaly. We dichotomized this variable, so that a 1 was coded if any congenital anomaly was present at birth.

Analyses

We calculated descriptive statistics of all study variables for the analytical sample. Table 1 displays these statistics. We then estimated two multiple logistic regression models predicting each of the five learning-related behavior problems. Table 2 displays the estimates resulting from these models. The first of the models estimated to what extent a child's or family's socio-demographic characteristics (i.e., age, gender, SES, marital status, maternal age over 35, race or ethnicity) functioned as risk factors for the child's display of learning-related behavior problems at 24 months. The second model evaluated the degree to which the child's gestational and birth-related characteristics fully or partially mediated the effects of his or her socio-demographic characteristics.

We then investigated the extent to which the quality of the child's parenting (as measured by the HOME score and parent support) fully or partially mediated the effects of the child's socio-demographic, gestational, and birth characteristics on each of these five learning-related behavior problems. Two conditions needed to be met for parenting to be identified as such a

mediator. First, parenting must be correlated with the risk factor variable. Second, after adding parenting as a predictor for the learning-related behavior, the risk factor's effect must decrease or become statistically non-significant. We tested for these conditions by first estimating the extent to which the child's socio-demographic, gestational, and birth-related characteristics predicted the (continuously-measured) HOME and parent support scores. The resulting regression coefficients are displayed in Table 3. Here we used the continuous version of the parenting measures in order to observe the full range of outcomes. However, we obtained similar results when we used the dichotomous version of these variables (i.e., low HOME and low parent support scores).

We then added the dichotomous measures of low HOME and low parent support to the models previously used to predict a child's learning-related behavior problems. Table 4 displays these re-estimated coefficients. We dichotomized parenting (i.e., low-quality parenting vs. not low-quality parenting) to evaluate whether low-quality parenting elevated a child's risk of displaying learning-related behavior problems. Collectively, these analyses helped establish whether such low-quality parenting mediated the effects of more exogenous risk factors on child learning-related behavior problems. In all of our regression analyses, we used sampling weights and design effects to appropriately account for oversampling and the stratified cluster design of the ECLS-B.

Results

Table 1 displays descriptive statistics of the study's variables. The sample's children averaged 24.3 months of age when their behaviors were rated. The sample was 51 percent male and approximately evenly divided among the SES quintiles. (Differential sample attrition accounts for the slightly lower proportion of children from lower SES households.) Fourteen

percent of the children were born to a mother over the age of 35, and 31 percent were born to an unmarried mother. Fourteen percent are African-American, 1 percent are Korean, Chinese, Indian, or Japanese, 2 percent are other Asian, 18 percent are Hispanic, and 1 percent are Native American. Eighteen percent experienced medical risk during the gestational period, and 12 percent experienced risk due to their mother's behaviors (i.e., smoking, drinking) during this period. Fifty eight percent had births involving obstetric procedures, and 35 percent had births with labor complications. Two percent were born very preterm and 8 percent were born moderately preterm. One percent had very low birthweight, 5 percent had moderately low birthweight and 5 percent had congenital anomalies. As measured during administration of the BSF-R, 20 percent of the children were rated as not persistent at the BSR-R's tasks, 15 percent were not attentive, 12 percent showed little interest, 18 percent were not cooperative, and 11 percent were frustrated. Fourteen percent of parents were coded as low on the HOME score; 9 percent were coded low on the parental support measure (as coded from videotapes of the parent and child interacting).

Socio-Demographic, Gestational, and Birth Characteristics as Risk Factors

Table 2 shows the results of logistic regressions using socio-demographic, gestational, and birth characteristics to predict each of the five learning-related behavior problems at 24 months. Two regression models were analyzed for each behavior. The first regression model estimates the effects of each of the socio-demographic risk factors, statistically controlling for all the other socio-demographic factors. The second model adds the child's gestational and birth characteristics as risk factors to the regression equation. The coefficients are expressed as the effect of the predictor variable on the odds that a child was rated as not (or infrequently) displaying the particular learning-related behavior.

Older children were less likely to be rated as not task persistent, inattentive, disinterested, not cooperative, or frustrated while completing the cognitive tasks; however, only the first two of these effects were statistically significant. A child's gender was consistently a statistically significant risk factor. Boys, even as toddlers, are about twice as likely as girls to display learning-related behavior problems. These odds ratios ranged from 1.7 to 1.9.

Low SES was also consistently a statistically significant risk factor. The odds that a child in the lowest SES quintile displayed a learning-related behavior problem were 1.5 to 2.7 times higher than those for a child from the highest SES quintile. The odds ratios for a lack of persistence and inattention are particularly high. This pattern is also evident for children in the low-to-mid SES quintile, with the odds ratios ranging from 1.4 to 2.7. Children in the middle SES quintile also have positive coefficients, but of smaller magnitude, in the 1.2-1.9 range, which often are not statistically significant. The strong relationship between a child's SES and his or her display of learning-related behavior problems at 24 months of age is important, as it suggests a potential additional mechanism by which low-income children's lower academic attainment may be explained. Specifically, low-income children may lag behind academically because they enter school with fewer reading or mathematics skills *and* less developed learning-related behaviors.

Contrasting Table 2's two columns of regression coefficients for each behavior, we see that a child's gestational and birth characteristics explain, at most, a small share of the effects attributable to his or her SES. Instead, the negative effects of low SES occur over and above the child's gestational and birth characteristics. Thus, after statistically controlling for a range of gestational and birth risk factors, as well as additional socio-demographics, low SES continues to

function as a risk factor for the occurrence of learning-related behavior problems in 24-month-old children.

Children of older mothers show modestly decreased, and children of unmarried mothers show modestly increased odds of displaying learning-related behavior problems. These effects are relatively uniform across each of the five behaviors. However, the effects are not large, and only occasionally reach statistical significance. The effects for African-Americans and Hispanics (compared to whites) are also modest in size, and only inconsistently reach statistical significance. The largest race and ethnicity effects occur for members of the Other Asian and Native American groups, particularly for displaying inattention or disinterest while completing the BSF-R's tasks.

The modest size and general lack of statistical significant of the effects for African-Americans and Hispanics is an important finding. Prior research (Hillemeier, Farkas, Morgan, Martin, & Maczuga, 2007) indicates that children from these racial and ethnic groups are at increased risk of displaying cognitive delay at 24 months, even after statistically controlling for the same set of gestational and birth risk factors used here. African-American children, by kindergarten, have also been previously reported (i.e., McClelland et al., 2000) as being at higher risk of displaying learning-related behavior problems. That these same children are not also at increased risk of displaying learning-related behavior problems is therefore encouraging, as it indicates that African-American and Hispanic children are "on-track" of arriving at school as behaviorally ready, at least at 24 months of age. It also suggests a lack of reporting bias by ECLS-B field staff towards these racial and ethnic groups. As with the SES effects, the race and ethnicity effects are not substantially mediated by a child's gestational or birth characteristics.

As for the gestational and birth characteristics, being born very preterm significantly increases a child's risk of displaying a lack of task persistence or of being non-cooperative. Being born of very low birth weight increases the child's risk of displaying inattention or disinterest. However, these effects are in the range of 1.8-2.0, which are well below the odds ratios for these factors in predicting cognitive delay in children of the same age (Hillemeier et al., 2007). Thus, while these characteristics *do* function as risk factors for learning-related behaviors, their effects are much smaller in magnitude than their effects for cognitive delay at 24 months.

Low-Quality Parenting as a Risk Factor

We also investigated the extent to which parenting mediated the risks associated with the aforementioned socio-demographic, gestational, and birth characteristics. Table 3 displays regression coefficients predicting scores on the two parenting measures (here measured as continuous variables) using the same risk factors as displayed in Table 2. These analyses evaluate a necessary condition for identifying parenting as a mediator. Specifically, do parents of lower SES households or those of Other Asian or American Indian race or ethnicity score lower on ratings of parenting?

Table 3 shows a strong, significant, and quite regular relationship between a parent's SES and his or her scores on both measures of parenting quality. When compared to being in the highest SES quintile, being in the lowest quintile has the most negative relationship to parenting. This negative relationship consistently declines in magnitude for each successive SES quintile. The race/ethnicity categories are also, in general, negatively and statistically significantly related to parenting. The exception is Native Americans, whose effects are smaller than for the other groups, and are significant only in some cases. Thus, our results indicate that the first condition for parenting to function as a mediator of the SES or race/ethnicity effects indeed holds.

Table 4 re-estimates the risk associated with the socio-demographic, gestational, and birth factors, while also statistically controlling the two measures of low parenting. That is, we repeat the regressions in the second columns of Table 2, but also add scores on the two parenting measures to the model. Because we are evaluating whether low-quality parenting is a risk factor for these five learning-related behaviors, we coded the parenting measures as dichotomous. Doing so allowed us to directly evaluate low-quality parenting as a mediating risk factor.

In 9 out of 10 cases, both measures of parenting problems have statistically significant effects on a child's inability to self-regulate his or her learning-related behaviors. (The only exception occurs for the estimated effect of low parental support on whether the child was rated as being frustrated. Its effect is directionally the same, but it does not reach statistical significance.) Poor parenting *is* a risk factor for a child's inability to self-regulate his or her learning-related behaviors at 24 months of age. This is evident even after statistically controlling for a number of additional, potentially confounding risk factors.

But to what extent does poor parenting explain the effects of SES and race/ethnicity on the early onset of learning-related behavior problems? Comparing, for each outcome, the lowest SES quintile's effect in the second column of Table 2 with its effect in Table 4, we find the following decreases in magnitude: for not persistent, from 2.2 to 1.9; for not attentive, from 2.4 to 2.0; for no interest, from 2.0 to 1.6; for not cooperative, from 1.9 to 1.5, and for frustrated, from 1.5 to 1.3. We observed the same pattern for the next SES quintile. These results suggest that low-quality parenting explains a portion of the effect of very low SES on the occurrence of these behaviors, and in some cases up to half of the effect. However, our results also indicate that at least 50% of the magnitude of these effects remains unexplained by poor parenting, as well as a wide range of gestational, birth, and other socio-demographic factors.

As for the effects of race/ethnicity on the behaviors, the largest of these in Table 2 were for the Other Asian group. When we compare these effects in Table 2 and Table 4 we see the following decreases: not persistent, from 1.5 to 1.3; not attentive, from 1.9 to 1.6; no interest, from 2.0 to 1.7; not cooperative, from 1.4 to 1.2; frustrated, from 1.1 to 0.9. However, as noted in our discussion of Table 3, Native Americans, the other racial and ethnic group with significantly elevated behavior problems, are not at statistically significantly higher risk for low-quality parenting than Whites. Thus, parenting cannot explain much of this group's higher rates of behavior problems, which is what we find when we compare the results for Tables 2 and 3. Low-quality parenting explains modest shares of the elevated risks of learning-related behavior problems for Other Asians, but not for Native Americans.

Discussion

We used a large, nationally representative sample of singleton children participating in the ECLS-B to estimate how a child's SES, race/ethnicity, gender, other socio-demographics, gestational and birth characteristics, and parenting are related to his or her risk of displaying learning-related behavior problems at 24 months of age. Specifically, we investigated whether and to what extent these factors increased a child's risk of displaying one of five behaviors (i.e., a lack of task persistence, inattention, disinterest, non-cooperation, and frustration) as he or she worked with a non-caregiver to complete a set of cognitively- and physically-demanding tasks.

Identifying risk factors for learning-related behavior problems is important. Children who continue to engage in these behaviors are less likely to succeed academically (e.g., Duncan et al., 2007; McClelland et al., 2006; Tach & Farkas, 2006). These behaviors also elevate the child's risk of more serious emotional or behavioral disorders (Egger & Angold, 2006; Hill et al., 2006; Hughes & Ensor, 2007; Olson et al., 1999; Olson et al., 2005; Patterson, 2002). Rigorously

derived estimates of the risks associated with a child's socio-demographic, gestational, and birth characteristics should help identify factors that can be targeted by early intervention efforts (e.g., Shonberg & Shaw, 2007). Such interventions are more effective when delivered by the time a child is 2- or 3-years-old (Patterson & Yoerger, 2002). However, few prior studies have empirically studied children as young as this. Most of the available investigations have estimated a child's risk for learning-related behavior problems using only a limited number of risk factors and control variables, and small samples that are not nationally representative.

Our analyses of a large, nationally representative database indicate that, even as young as 24 months of age, children vary substantially in their abilities to remain attentive, persistent, and cooperative while working with non-caregiver to complete learning-related tasks. We found males and children from households in the two lowest SES quintiles were about twice as likely to display learning-related behavior problems at 24 months. We observed particularly strong effects for low SES on inattention and lack of persistence in completing the BSF-R's tasks. Even at this early age, only small portions of the SES effects were explained by the conditions of a child's gestation or birth. Regarding race or ethnicity, only the Other Asian (i.e., Filipino, Samoan, Vietnamese, Guamanian, Other Asian/Pacific Islanders, and combined Asian/Pacific Islanders) and American Indian groups showed consistently and statistically significant elevated rates of learning-related behavior problems.

We were able to evaluate parenting's role as a mediator, as this factor was measured relatively comprehensively (in addition to the HOME score, we were able to include a videotape-coded measure of parental support for the child during parent-child interaction). Regardless of the measure used, parenting was strongly and statistically significantly related to lower SES and the child's race/ethnicity, as well as to his or her display of learning-related behavior problems.

Parenting explained significant portions, but less than half, of the effects attributed to the child's SES and Other Asian race/ethnicity.

That lower SES and some racial and ethnic minority children are more likely to display learning-related behavior problems prior to school entry has been reported by other investigators, at least in samples of 4- and 5-year olds (e.g., Campbell & Stauffenberg, 2007; Magnuson & Waldfogel, 2005; also see Brooks-Gunn, Rouse, & McLanahan, 2007). However, our investigation is one of the few that has used a large, nationally representative sample to examine these issues for children as young as 24 months of age (for a study with related findings using a smaller sample, see NICHD Early Child Care Research Network 1998).

Limitations

At least three limitations characterize this study. First, the ECLS-B does not collect or report inter-rater reliability data. Prior research, however, indicates that the type of behavioral rating used here has relatively strong psychometric properties (e.g., Buck, 1997; Raikes et al., 2007). ECLS-B field staff also received extensive training in completing the BRS, as well as the study's other measures. Second, our analyses are restricted to predicting the occurrence of learning-related behavior problems at 24 months. We are therefore unable to report on the extent to which the factors identified here as elevating a child's risk (e.g., low SES, low-quality parenting) continue to do so as the child ages, or whether additional factors (e.g., the child's birth conditions) begin to exert increasingly negative effects. Third, we only measured the incidence of these behaviors in one context (i.e., as the child worked at home with a non-caregiver to complete a series of tasks). Although the occurrence of these behaviors in such a context is clearly important (as such an interaction is an early approximation of the types of setting events, behavioral expectations, and task demands that the child will face in a preschool or school

classroom), we are unable to identify risk factors for the occurrence of these behaviors in other types of contexts (i.e., outside of the home).

The Study's Contributions and Implications

Our study makes both methodological and substantive contributions. Methodologically, the study extends prior research by analyzing data from a large-scale sample of children participating in a nationally representative study (i.e., the ECLS-B). Thus, our analyses use a non-high-risk sample. Prior research has typically reported on analyses of smaller, high-risk samples (e.g., McClelland et al., 2000; Raikes et al., 2007). However, such analyses can yield biased estimates, as the size of effect of any one risk factor can increase as a consequence of interactions with other risk factors (Farrington, 2005). Thus, factors that predict behavior problems in samples of children already at risk may fail to be predictive in samples that are not, or are less, at risk (Smeekens, Riksen-Walraven, & Bakel, 2007). Our analyses of the effects of a child's socio-demographic, gestational, and birth characteristics, as well as of the quality of the parenting to which he or she was exposed, extend prior research by using a large, non-high-risk sample. By doing so, our analyses provide less biased estimates of any given risk factor's effects for the population of children as a whole.

Further, the study's analyses used an extensive number of socio-demographic, gestational, birth, and parenting factors. In contrast, most studies' analyses have estimated effects for only a very limited number of socio-demographic, gestational, or birth risk factors (e.g., McClelland et al., 2000, McClelland et al., 2006). By estimating a wide range of effects simultaneously, our analyses provide relatively precise estimates of any one factor's effects, and better identify how these varying types of factors interact to elevate a child's risk. For example, our analyses indicate that toddlers who are boys and living in lower-income households, who

were born very preterm and with congenital anomalies, and who are being raised by an adult who is using low-quality parenting practices is very likely to fail to persist at completing learning-related tasks, as well as to not be cooperative with a non-caregiver who is asking the child to complete such tasks.

Substantively, the study's analyses indicate that certain socio-demographic factors, particularly whether the child's family has a low SES, considerably elevate the child's risk of displaying such behaviors. Put another way, children from low-SES households are lagging behind those from high-SES households in their behavioral readiness for school, even at the very early age of 24 months. Importantly, these socio-demographic effects were not wholly or even substantially mediated by a wide range of gestational or birth risk factors. Interventions designed to increase a child's behavioral readiness for school may therefore need to account for the negative effects that low SES has on a child's initial acquisition of learning-related behaviors. Thus, our analyses indicate that social-service interventions targeting the effects of low SES may be more effective in increasing a child's learning-related behaviors than clinic-based interventions designed to remediate the negative effects of a child's gestational or birth characteristics. Further, these interventions likely need to be introduced at very young ages if they are to effectively prevent or remediate a child from arriving at school as behaviorally unready. Even as toddlers, some groups of children are already delayed in their ability to self-regulate their behaviors while completing learning-related tasks.

It is also unlikely that preschool- or school-based interventions can fully reduce a child's risk of learning-related behavior problems if these interventions focus only on preventing or remediating an adult's use of low-quality parenting practices. This is not to say that low-quality parenting is not an important target for intervention (see, for example, Brooks-Gunn &

Markman, 2005). Rather, our analyses indicate that use of such low-quality parenting practices only explains about half of the effect otherwise attributable to the child being raised in a low-income household. Thus, effective early interventions may need to target both the quality of the adult's parenting, *and* other psychological, social, and economic stressors being experienced by infants and toddlers from low-income households. These types of multi-faceted interventions are most likely to maximize an at-risk child's behavioral readiness for school.

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Table 1. *Means and Standard Deviations of Variables used in the Analysis.*

Variable	*Mean*	*SD*
Child age (months)	24.34	1.19
Male	0.51	0.50
Lowest SES Quintile	0.17	0.38
Low to Mid SES Quintile	0.19	0.40
Mid SES Quintile	0.20	0.40
Mid to High SES Quintile	0.22	0.40
Highest SES Quintile	0.21	0.42
Older Mom	0.14	0.36
Mom Not Married	0.31	0.47
African American	0.14	0.37
Korean, Chinese, Indian or Japanese	0.01	0.27
Other Asian[1]	0.02	0.24
Hispanic	0.18	0.36
Native American	0.01	0.24
Medical risk	0.18	0.51
Behavior risk	0.12	0.33
Obstetric Procedures	0.58	0.68
Labor Complications	0.35	0.65
Very preterm	0.02	0.28
Moderately preterm	0.08	0.30
Very low birth weight	0.01	0.28
Moderately low birth weight	0.05	0.31
Congenital anomalies	0.05	0.25
Not persistent	0.20	0.41
Not attentive	0.15	0.38
No interest	0.12	0.35
Not cooperative	0.18	0.40
Frustrated	0.11	0.32
Parent Support	4.41	0.87
HOME score	10.49	1.86
Low HOME score	0.14	0.36
Low parent support	0.09	0.29

$N = 5{,}522$

[1]Filipino, Samoan, Vietnamese, Guamanian, Other Asian/Pacific Islander, and combined Asian/Pacific Islander.

Table 2. *Logistic Regression Results of Learning-Related Behavior Problems at 24 Months*

	Not persistent		*Not attentive*		*No interest*		*Not cooperative*		*Frustrated*	
Child age	0.8 ***	0.8 ***	0.9 **	0.9 **	0.9	0.9	0.9	0.9	0.9	0.9
Male	1.9 ***	1.9 ***	1.8 ***	1.8 ***	1.7 ***	1.7 ***	1.7 ***	1.7 ***	1.8 ***	1.8 ***
Lowest SES Quintile	2.4 ***	2.2 ***	2.7 ***	2.4 ***	2.0 **	2.0 **	1.9 ***	1.9 ***	1.7 *	1.5
Low to Mid SES Quintile	2.2 ***	2.0 ***	2.7 ***	2.5 ***	2.1 **	2.1 **	2.3 ***	2.2 ***	1.5	1.4
Mid SES Quintile	1.5 *	1.4 *	1.9 **	1.8 **	1.5	1.4	1.4	1.3	1.2	1.2
Mid to High SES Quintile	1.2	1.2	1.5 *	1.5 *	1.2	1.2	1.3 *	1.3	1.0	1.0
Older Mom	0.8 *	0.7 *	0.7 **	0.7 *	0.9	0.9	0.9	0.8	0.8	0.8
Mom Not Married	1.2 *	1.2	1.0	1.0	1.1	1.1	1.3 *	1.3	1.2	1.1
African American	1.1	1.1	1.4 *	1.4 *	1.3	1.3	1.2	1.2	0.8	0.9
Korean, Chinese, Indian or Japanese	1.1	1.1	1.2	1.3	1.4	1.4	1.1	1.1	0.7	0.8
Other Asian	1.5 *	1.5 *	1.9 ***	1.9 ***	2.1 ***	2.0 ***	1.4 *	1.4 *	1.0	1.1
Hispanic	1.0	1.0	1.2	1.3	1.3	1.2	1.3	1.3	1.0	1.0
Native American	1.0	1.0	1.6 **	1.6 **	1.5 *	1.5 *	1.4 *	1.4 *	1.1	1.1
Medical risk		0.9		1.0		0.9		1.0		0.9
Behavior risk		1.2		1.2		0.9		1.1		1.3
Obstetric Procedures		1.0		1.0		1.0		1.0		1.0
Labor Complications		1.1		1.0		0.9		1.1		1.3 *
Very preterm		1.9 *		1.4		1.1		1.7 *		1.3
Moderately preterm		1.5 **		1.2		0.9		1.1		1.3
Very low birth weight		1.3		1.8 *		2.0 **		1.3		1.5
Moderately low birth weight		1.0		1.1		1.5 **		1.0		0.9
Congenital anomalies		1.3		1.4		1.5		1.3		1.1

N = 5,522

.*p<.05;**p<.01;***p<.001

Table 3. *Regression Results Predicting Quality of Parenting by Socio-demographic, Gestational, and Birth Variables*

	HOME Score[a]		Parent Support[a]	
Intercept	10.70 ***	10.64 ***	3.82 ***	3.79 ***
Child age	0.03	0.03	0.05 ***	0.05 ***
Male	-0.12	-0.12	-0.07 **	-0.07 **
Lowest SES Quintile	-0.92 ***	-0.91 ***	-0.85 ***	-0.86 ***
Low to Mid SES Quintile	-0.72 ***	-0.70 ***	-0.66 ***	-0.66 ***
Mid SES Quintile	-0.46 ***	-0.45 ***	-0.32 ***	-0.33 ***
Mid to High SES Quintile	-0.17 *	-0.16 *	-0.22 ***	-0.22 ***
Older Mom	0.05	0.04	0.07	0.07
Mom Not Married	-0.06	-0.06	-0.05	-0.06
African American	-1.30 ***	-1.31 ***	-0.28 ***	-0.27 ***
Korean, Chinese, Indian or Japanese	-1.00 ***	-1.00 ***	-0.48 ***	-0.48 ***
Other Asian	-1.23 ***	-1.24 ***	-0.40 ***	-0.40 ***
Hispanic	-0.81 ***	-0.82 ***	-0.25 ***	-0.24 ***
Native American	-0.21	-0.22	-0.16 **	-0.16 **
Medical risk		0.02		0.02
Behavior risk		-0.07		0.03
Obstetric Procedures		0.02		-0.01
Labor Complications		0.05		0.04 *
Very preterm		-0.11		-0.17
Moderately preterm		0.10		-0.05
Very low birth weight		-0.06		0.05
Moderately low birth weight		-0.04		0.02
Congenital anomalies		-0.04		0.07

[a]Continuous variable
$N = 5{,}522$
*p<.05;**p<.01;***p<.001

Table 4. *Logistic Regression Results Predicting Learning-Related Behavior Problems, with Statistical Controls for Low-Quality Parenting, at 24 Months.*

	Not persistent	*Not attentive*	*No interest*	*Not cooperative*	*Frustrated*
Child age	0.9 ***	0.9 **	0.9	1.0	0.9
Male	1.8 ***	1.8 ***	1.7 ***	1.7 ***	1.8 ***
Lowest SES Quintile	1.9 ***	2.0 ***	1.6 *	1.5 *	1.3
Low to Mid SES Quintile	1.8 ***	2.2 ***	1.8 *	1.9 ***	1.2
Mid SES Quintile	1.3	1.7 *	1.4	1.3	1.1
Mid to High SES Quintile	1.2	1.4 *	1.2	1.2	1.0
Older Mom	0.8 *	0.7 *	0.9	0.9	0.8
Mom Not Married	1.2	1.0	1.1	1.2	1.1
African American	1.0	1.2	1.1	1.0	0.7
Korean, Chinese, Indian or Japanese	1.0	1.1	1.2	1.0	0.7
Other Asian	1.3	1.6 **	1.7 **	1.2	0.9
Hispanic	0.9	1.1	1.1	1.1	0.9
Native American	1.0	1.5 **	1.5 *	1.4 *	1.0
Medical risk	0.9	1.0	0.9	1.0	0.9
Behavior risk	1.3	1.3	1.0	1.1	1.4
Obstetric Procedures	1.0	1.0	1.0	1.0	1.0
Labor Complications	1.1	1.0	0.9	1.1	1.3 *
Very preterm	1.9 *	1.4	1.1	1.7 *	1.3
Moderately preterm	1.5 **	1.2	0.9	1.1	1.3
Very low birth weight	1.3	1.8 *	2.0 *	1.3	1.5
Moderately low birth weight	1.0	1.1	1.5 **	1.0	0.9

Congenital anomalies	1.4 *	1.4 *	1.5 *	1.4	1.1
Low HOME score	1.7 ***	2.1 ***	1.7 ***	1.8 ***	2.4 ***
Low parent support	1.8 ***	1.8 ***	2.1 ***	1.9 ***	1.2

N = 5,522
*p<.05;**p<.01;***p<.001