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Investigating the Life Situations and Development of Teenage Mothers' Children: Evidence from the ECLS-B

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Despite recent decreases, the United States still has very high rates of teenage childbearing compared to many other industrialized countries (Darroch et al. 2001). Reducing teenage childbearing and its negative consequences for mothers and children are two important social policy goals in the U.S. today (Furstenberg 2003). Most previous research agrees that the young children of teenage mothers (generally defined as mothers who give birth before age 20) are developmentally disadvantaged, with substantially worse outcomes in their preschool years than children of older mothers in areas such as cognitive, language, physical, and social development (Luster et al. 2000). However, much of the literature on the outcomes of teenage mothers and their children reflects biases from public discourse and media portrayals by focusing only on specific subpopulations of teenagers and children (particularly racial/ethnic minorities living in urban areas) and by investigating psychological and individual-level influences without sufficiently attending to socioeconomic and structural factors. Most studies that do incorporate large national samples and social structural factors rely on older data (Geronimus and Korenman 1993; Levine et al. 2001; Moore and Snyder 1991; Turley 2003).

There is a need for national-level research that uses recent quantitative data to describe the life situations and development of teenage mothers and their young children in the United States, and our study targets this gap. A descriptive approach is vital to research and policy on teenage motherhood because it provides a more comprehensive picture of who teenage mothers are and allows us to understand the diversity of circumstances in which they live. Here, we consider a wide variety of factors potentially associated with teenage childbearing and estimate their associations with teen childbearing after adjusting for factors associated with the selection of teenage girls into motherhood. Our multivariate analyses then go a step farther, estimating associations between two particularly important aspects of young children's lives, their household composition and their mothers' involvement in paid work and schooling, and children's health and development shortly before the transition to school. We address two primary research questions. First, how do the life situations and development of children of teenage mothers compare to those of children born to all non-teenage mothers and to non-teenage mothers who were teenagers at their first birth? Second, how are household structure and mothers' work/school involvement associated with particularly successful or compromised early cognitive and behavioral development among teenage mothers' children? Identifying prevalent factors that are associated with developmental risk can help inform policies targeting vulnerable populations of children who have teenage mothers. The recently released Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) is exceptional for answering these research questions because it is the first nationally representative survey in the U.S. to track children from birth through kindergarten

(U.S. Department of Education 2007). The survey includes a wide variety of household-level and individual-level measures, as well as direct evaluations of both parents and children using highly respected assessment tools. It is one of the few national surveys with a large enough subsample of teenage mothers to allow meaningful comparisons of subgroups among teenage mothers.

The ECLS-B breaks new ground in its thorough assessments of the early years of life, which are a time of rapid physical, emotional, social, and cognitive growth that lays the groundwork for future development (Chase-Lansdale et al. 1997). Cognitive, behavioral, and verbal development measured in early childhood influence the success of children's transitions to formal schooling (Baydar et al 1993; Duncan et al. 1994). This success in turn predicts later measures of academic achievement, high school completion, and educational attainment (Luster et al. 2004). Research has increasingly recognized that policy investments in early childhood yield benefits throughout the later life course (Duncan et al. 2007). Despite its importance in determining individuals' future socioeconomic trajectories, less is known about children's development in these early years than in later periods. Most previous research agrees that the children of teenage mothers have substantially worse developmental outcomes in their preschool years than children of older mothers (Luster et al. 2000), but the exact causes of these differences are less clear.

Scholars have assessed and debated a variety of reasons why teenage mothers' children may fare worse in life. Suggested causes include biological factors associated with young maternal age, developmental immaturity in young mothers, negative interpersonal and institutional sanctions attached to violating social norms against teenage childbearing, the selection of disadvantaged girls into early motherhood, and continued disadvantage related to becoming a teenage mother (Chen et al. 2007; Geronimus et al. 1994; Marini 1984; Turley 2003). The former reasons imply a causal relationship between young maternal age and child outcomes, while the latter two suggest that the social disadvantage that is associated with young maternal age accounts for this association. Some recent analyses support causal explanations in some developmental domains (Levine et al. 2001), but others suggest that the relationship between young maternal age and at least some child outcomes is not causal (Levine et al. 2001; Turley 2003). Rather, girls whose future prospects are disadvantaged in terms of socioeconomic status, education-related factors, and other sociodemographic dimensions are disproportionately likely to become teen mothers, and it is these preexisting selection factors rather than the experience of teen childbearing that drives their children's disadvantaged outcomes.

We examine background characteristics, socioeconomic factors, home environments, and parenting behaviors that may differ between teenage and adult mothers. We also investigate several child assessments measured from birth to 2 years old, including health, behavior, and cognitive development. Analyses compare teenage (i.e., under age 20 at the study child's birth) mothers to all non-teenage (i.e., age 20 or older at the study child's birth) mothers, as well as to mothers who were not teenagers at the study child's birth but were teenagers when they first gave birth. This latter group, called prior teen mothers, provides an interesting comparison: If the development of prior teenage mothers' children is compromised compared to children whose mothers never gave birth as teenagers, it cannot be the result of developmental, biological, or age-normative differences caused by the mother's young age. Rather, other factors such as disadvantage must be at work. Analyzing the comparison group of prior teenage mothers can begin to adjudicate between these sets of explanations.

U.S. teenage childbearing rates are higher among Latinos and non-Latino Blacks and Native Americans than among Non-Hispanic Whites and Asians/Pacific Islanders (Hamilton et al. 2009). Our analyses of children of teenage mothers are sensitive to potential differences by

race and ethnicity. Focusing on African Americans, Latinos, and Whites because of available sample sizes, we identify children's most prevalent everyday experiences in terms of household composition and mothers' work and school involvement. These particular experiences are often sharply different between teenage and non-teenage mothers' families, as we see below, and they are particular targets of many policies such as the 1996 "welfare reform." Because of racial/ethnic differences in factors such as nonmarital birth (Hamilton et al. 2009), we expect that children's most common situations may differ by their race/ethnicity. We also estimate the degree to which these experiences at age 2 are associated with children's health, behavior, and cognitive development at age 4½.

These relationships have interesting implications for policy. For example, welfare reform instituted restrictions on the receipt of cash assistance that require underage mothers to live with a parent or guardian and attend secondary school until receiving a diploma or GED, then work for pay (Moffitt 2003). Are these measures associated with short-term developmental gains for children? Or is it more beneficial for children of teenage mothers to live with two biological parents and have a stay-at-home mother, as traditional norms would prescribe? Do the answers to these questions differ for children from different racial or ethnic backgrounds? Our multivariate analyses address these questions.

Methods

Data

The Early Childhood Longitudinal Study-Birth Cohort followed a sample of children born in 2001 from infancy through the start of kindergarten (U.S. Department of Education 2007). It is the first U.S. nationally representative study to track a sample of children from infancy to kindergarten, through interviews with a primary parent and direct assessments of the child. Investigators selected the sample using a clustered, list frame sampling design based on births registered in the National Center for Health Statistics vital statistics system. Births were sampled from 96 core primary sampling units, which were counties and county groups. Children whose mothers were younger than 15 years old at the birth were excluded because of state confidentiality and sensitivity concerns, so the data are not representative of children of very young mothers, who represent a very small proportion of all teenage mothers (Hamilton et al. 2009).

This study primarily uses data from the first two waves of the ECLS-B survey, collected when the children were about 9 months and 2 years old. Outcomes from the third wave, collected at 52 months, are used in multivariate analyses. Trained interviewers conducted personal interviews with the child's primary parent (overwhelmingly the mother), as well as direct observations of the primary parent and the child. Our study uses both of these data sources to paint a descriptive picture of the life situations of mothers and their children. Weighted response rates for the parent interview were 74%, 93%, and 91% at Waves 1, 2, and 3, respectively. Replication weights are used to make the analyses representative of children born in the United States in 2001. We restrict our primary analyses to children who were assessed at Waves 1 and 2 and whose biological mothers were interviewed as the primary parent at both waves. After these restrictions, about 950 children had a mother who was younger than age 20 at their birth, and there were about 250 children in each of the three racial/ethnic groups analyzed (Hispanic and non-Hispanic White and Black).[1] Approximately another 1,400 children were born to an adult mother who was a teenager at her first birth, forming a natural comparison group for some analyses. About 5,650 children had a mother who was 20 or older at her first birth. The multivariate models predicting

[1]Because of ECLS-B confidentiality restrictions, all unweighted Ns are rounded to the nearest 50.

preschool outcomes among children with a current teen mother analyze about 700 children for reading and math scores and 800 children for behavior.

Variables

Teenage childbearing—Unless otherwise indicated, all measures are based on maternal reports from Wave 1, with Wave 2 reports filling in missing data when appropriate. Children are coded as having a teenage mother if their biological mother was younger than age 20 at their birth. If birth certificate information was missing, mothers' age reports are used. Prior teenage mothers are defined as younger than 20 at their first child's birth, but not at the study child's birth.

Demographic/background measures—A set of indicator variables constructed by ECLS-B measures children's race/ethnicity. The mother's parents' educational attainment is reported in years. Based on mothers' reports, dichotomous variables indicate whether the mother was born in the United States, whether the mother had a teenage parent, and whether the mother's family received welfare when she was between the ages of 5 and 16. A measure of pregnancy intendedness is coded as 1 if the mother wanted the baby at the time she became pregnant, if it came at the right time or came later than desired; and 0 if the mother did not want the baby, was indifferent, or the baby came sooner than she desired. A dichotomous measure of the father's readiness to have a child is based on the mother's retrospective report. Based on mothers' reports, a variable indicates whether prenatal care started in the second trimester or later versus the first trimester. Finally, mothers reported their health as excellent, very good, or good (1) versus fair or poor (0).

Household resources—Household socioeconomic status quintiles are ECLS-B constructed based on the mother's and resident partner's education and occupational prestige and household income. The mother's educational attainment at Wave 1 is recoded from degrees into years. A measure of government benefits (ranging from 0–4) counts whether the household received WIC, food stamps, Medicaid, or TANF ("welfare") since the child's birth. Another variable is coded as 1 if the parents and child have free or subsidized housing (living with family and friends and paying part or none of the housing costs, or exchanging services for housing) and 0 if they pay for their own housing. An ECLS-B constructed measure, based on Department of Food and Agriculture guidelines, indicates whether the child's household is food secure or food insecure with or without hunger. The mother's school enrollment and paid work are both measured at Wave 2. School enrollment is full-time, part-time, or none; paid work is ≥30 hours per week (full-time), 1–29 hours (part-time), or none. Household structure is coded as one of the following: single mother living alone, with at least one grandparent, or with at least one other adult; both biological parents living alone, with at least one grandparent, or with at least one other adult; or mother living with a partner other than the biological father (with or without other adults). Child care is measured using total hours per week in care (top coded at 60) and an indicator of whether the child receives any care from a relative.

Home environment—Mothers report their marital status at Wave 1, coded as married or not. ECLS-B constructed a measure of primary household language, coded into English, Spanish, or other. Breakfasts and dinners eaten together as a family per week range from 0 to 14 at Wave 2. Also at Wave 2, a measure of the child's daily hours of television exposure is constructed from maternal reports, averaging weekdays and weekends (0–20 range). A Wave 2 variable indicates whether someone smokes inside the house.

Mother's parenting behaviors—A measure of time spent with the child is the sum of the mother's reports of how often in a typical week she takes the child on errands and reads

books to, tells stories to, and sings songs with the child. Responses range from 0 to 12, coded from not at all, once or twice, 3 to 6 times, and every day. Similarly, reports of how often she played with the child (played peekaboo, tickled, and played outside) are summed, ranging from 0 to 18 coded from not at all, rarely, a few times a month, a few times a week, every day, and more than once a day.

Four direct assessments measured the quality of the parent-child relationship and the mother's parenting behaviors: The Nursing Child Assessment Teaching Scale (NCATS) at Wave 1 and the Two Bags Task, Parent Behavior Rating Scales, and Toddler Attachment Sort at Wave 2. The NCATS is designed to assess the social, emotional, and cognitive growth fostered by the parent and the child's socioemotional communication with the parent (Byrne and Keefe, 2003). We use the parent score in this analysis. The Two Bags Task, which modifies the Three Bags Task used in prior research (Love et al. 2002), is a problem-solving task involving both the child and the parent in a videotaped interaction. Parent and child play for 10 minutes with two sets of toys, a small set of dishes, and a picture book. Coders rated the quality of both parent and child behaviors. Our study uses the parent score, which assesses factors such as the mother's emotional support, negative regard, and intellectual stimulation of her child (Nord et al. 2006). Finally, interviewers observed the mother's behavior during the assessment and coded whether or not she engaged in a variety of behaviors such as smacking, kissing/hugging, ensuring a safe play environment, responding verbally to the child, providing toys to the child, and interfering with the child's actions during the task (Nord et al. 2006). Seven items are coded as 1 for "positive" and 0 for "negative" parenting behaviors, and then averaged. Finally, the Toddler Attachment Sort – 45, a modification of the Attachment Q-Sort (Nord et al. 2006), assesses the child's attachment to the primary caregiver. Coders scored the child on such behaviors as "seeks and enjoys being hugged" and "shows no fear, into everything." The child's attachment relationship with the focal caregiver is then classified as secure, insecure-avoidant, insecure-ambivalent, or disorganized (Nord et al. 2006).

Child health and development—The child measures in the descriptive analyses focus on children's health and development at birth and approximately 9 months and 2 years (Nord et al. 2006). Psychometric literature has established the advantages and limitations of various ways of measuring development at this age. The measures of child development in the ECLS-B data include 60 minutes of direct assessment, are based on widely used child development measures, and are intended to paint a comprehensive picture of a child's developmental progress.

Several health measures are included. An ECLS-B constructed measure based on birth certificate information indicates whether children were born with low birth weight (under 2500 grams) or very low birth weight (under 1500 grams). Maternal reports of the child's overall health at both waves were coded as excellent, very good, or good (1) versus fair or poor (0). The number of well-child visits is calculated as a ratio of the total number of well-child visits to the child's age in months. A count of the number of times the child has seen a medical professional or visited a clinic or emergency room for an injury ranges from 0 to 5. The child's Wave 2 Body Mass Index (BMI) is coded as low (<14.75 for boys, <14.4 for girls; CDC Growth Charts 5^{th} percentile for age 2), normal, or high (>19.3 for boys, >19.1 for girls; CDC Growth Charts 95^{th} percentile for age 2).

Three observation-based measures were used to measure child development in Waves 1 and 2 of the ECLS-B: The Bayley Short Form – Research Edition (BSF-R) motor and mental scales, and the Interviewer Observations of Child Behavior Scale. The BSF-R was developed for the ECLS-B and is based on earlier versions of the Bayley Scales of Infant Development, which provide scores on mental and motor development for children up to

age 3. The mental score measures children's expressive and receptive vocabulary, early communication skills, comprehension, and problem-solving skills (Nord et al. 2006). The motor score represents children's fine motor skills for tasks such as grasping, reaching, and manipulating small objects, and gross motor skills such as standing, sitting, walking, and balance. We use the t-scores for these measures, which standardize children's raw scores compared to others at the same age at assessment, in this study. Other variables calculate change in the raw mental and motor scores between Waves 1 and 2. When administering the BSF-R, interviewers also conducted the Interviewer Observations of Child Behavior, a subset of the Behavior Rating Scale that is a supplement to the BSID-II. Interviewers rated 10 child behaviors they observed such as attentiveness, affect, and interest. We standardized each item (e.g., mean of 0 and standard deviation of 1) and averaged the items (Cronbach's alpha = 0.94). Higher scores reflect more positive behavioral adjustment. A final set of variables identifies children in the top and bottom weighted quartiles of mental and behavior scores at Wave 2.

Finally, multivariate analyses predicted children's outcomes at Wave 3 (age 4½). Two measures come from direct child assessments adapted from several reputable batteries developed for other large studies of preschoolers, such as the Peabody Picture Vocabulary Test, the Preschool Comprehensive Test of Phonological and Print Processing, the PreLAS® 2000, the Test of Early Mathematics Ability-3, and sister study Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K). These items are not released to data users, so we relied on ECLS-B constructed scores that used item response theory (IRT) modeling. Children's early reading scores were assessed using a 35-item test covering phonological awareness, letter sound knowledge, letter recognition, print conventions, and word recognition (ECLS-B-reported reliability=0.84). Early math scores involved a two-stage assessment covering number sense, counting, operations, geometry, pattern understanding, and measurement (ECLS-B-reported reliability=0.89). Children's behavior was measured by a standardized index of 24 items in which the parent was asked how frequently the child acted in certain ways, using a 5-point scale ranging from "never" to "very often" (Cronbach's alpha=0.86). The items were drawn from the Preschool and Kindergarten Behavior Scales—Second Edition, the Social Skills Rating System, and the Family and Child Experiences Study, as well as questions unique to the survey. Example questions include how often the child shares belongings or volunteers to help other children, how often the child is physically aggressive or acts impulsively, and how well the child pays attention. Our initial analyses included parent-reported child health status at age 4½, but none of the focal predictors was significant so it is not discussed here.

Analysis Plan

Our study describes the life situations of teenage mothers and their children when the children were 9 months and 2 years old and predicts cognitive and behavioral outcomes at age 4½. Accounting for weights and complex survey design using Stata, four analyses include both means-based bivariate comparisons and multivariate linear and logistic regression analyses. The first set of analyses compares teenage mothers to other subpopulations of mothers. Table 1 compares characteristics and assessments of children who have teenage mothers to those born to mothers aged 20 or older (referred to here as "current non-teen mothers"). The current non-teen mothers are then further split between those who were under age 20 at first birth but who were 20 or older at the birth of the focal child for this study ("prior teen mothers") and those who were 20 or older at their first birth ("never teen mothers"). In order to keep as much data as possible in each bivariate analysis, missing cases are deleted listwise within each individual bivariate comparison, resulting in varying Ns for each row of the tables. Table 2 predicts each of the factors from Table 1 (except for sociodemographic background factors that preceded pregnancy) while

controlling for variables that might influence the selection of disadvantaged teens into motherhood, and in some cases, further controlling for current socioeconomic status. The remaining analyses examine variation *among* teenage mothers and their children. Table 3 displays teenage mothers' household structures and any involvement in school or paid work, split by three predominant racial/ethnic categories. Table 4 introduces multivariate analyses that estimate the associations of these factors (teenage mothers' household structures and work and school involvement) with children's reading, math, and behavior scores at age 4½, then interact these factors with race/ethnicity. We discuss findings that are significant at $p<.05$ in the text, but for readers' reference the tables also include marginally significant ($p<.10$) findings.

Results

Comparing the Life Situations and Development of Children of Teen and Adult Mothers

Table 1 presents weighted means describing the life situations of mothers and their children in terms of mothers' backgrounds, the household's socioeconomic situation, home environment, the mother's parenting behaviors, and child assessments. The first two columns report means for teenage mothers (who were under age 20 at the study child's birth) and those aged 20 or older who are referred to as adult mothers, as well as bivariate tests for significant differences in means between these two groups.

Mothers' backgrounds—A number of factors illustrate that what we know from past research on older samples persists today: Teenage mothers' children are born into a background of social disadvantage. As expected based on vital statistics data (Danoff et al. 1994), there are sizeable racial and ethnic differences between teenage and non-teenage mothers' children, with overrepresentation of some disadvantaged minority groups among teenage mothers' children. 36% of teenage mothers' children are White, 25% are African American, and 33% are Hispanic (divided about evenly between U.S.- and foreign-born), compared to 56%, 12%, and 24% of non-teenage mothers' children, respectively. A higher proportion of non-teenage mothers' children are Asian/Pacific Islander compared to teenage mothers' children. Eighty-three percent of teen mothers are U.S.-born, compared to 78% of non-teen mothers.

Previous research has documented that teenage mothers typically come from socioeconomically disadvantaged backgrounds (Coley and Chase-Lansdale 1998), a finding that is confirmed in this study's more recent survey. Teenage mothers' parents' average educational attainment is lower, with a gap of more than a year for their fathers' education. Teenage mothers were also more frequently born to a mother or father who was a teenager.

Another set of background factors concerns the parents' preparedness for the birth of the child. These variables identify an additional way in which teenage mothers' children were disadvantaged even before birth. Only 22% of teenage mothers reported being ready to have a child when they became pregnant, compared to 61% of non-teenage mothers. Similarly, teenage mothers reported a lower level of readiness on the part of the father compared to non-teenage mothers' reports, although it is noteworthy that fully 72% of teen mothers' partners were perceived as ready to have a child, compared to less than a quarter of teen mothers. Perhaps not surprisingly given the low proportion of teenage mothers who were ready to have a child, 17% of teenage mothers did not get prenatal care in the first trimester of pregnancy, compared to just 7% of adult mothers. Finally, 90% of teen mothers report good health at Wave 1, compared to 93% of non-teenage mothers.

Socioeconomic situations—As expected based on past evidence, teenage mothers' disadvantaged backgrounds translate into socioeconomic disadvantage after the child's birth.

One in every two teenage mothers is in the lowest 20% of the ECLS-B sample's distribution of socioeconomic status at Wave 1, compared to just one in six adult mothers. Eighty percent of teenage mothers fall in the lowest 40% of the overall sample's socioeconomic distribution, which speaks volumes about the diminished life chances of their children. In the top socioeconomic quintile we find 22% of non-teenage mothers, but just 0.4% of teen mothers. Not surprisingly given their socioeconomic status, teenage mothers report receiving an average of more than two types of government benefits out of a possible four, compared to just over one for non-teenage mothers.

The proportion of teenage mothers receiving government-subsidized or informally subsidized housing is double that of adult mothers, and 18% of teenage mothers report receiving welfare benefits compared to 7% of adult mothers. This significant difference in welfare receipt by maternal age is not as unexpected as is the low rate of welfare receipt among teenage mothers, a group that in public discourse is often assumed to be heavy welfare users. Future research should examine why so few teenage mothers take advantage of welfare benefits, especially when their children are young. Despite their heavier reliance on government support, teenage mothers' households report lower levels of food security, as well as higher levels of food insecurity with household members going hungry (4% of teenage mothers' households, compared to 2% of adult mothers').

Teenage mothers' lower household socioeconomic status may be partly explained by their lower levels of labor force participation. Fifty-seven percent of teenage mothers were not working for pay when their children were 2 years old, compared to 44% of non-teenage mothers. On the other hand, 27% of teenage mothers were enrolled in school full- or part-time, compared to just 11% of non-teenage mothers, which may allow some teenage mothers eventually to narrow their socioeconomic gap. Teenage mothers' children spend two more hours per week in child care at an average of 17 hours per week, and 44% of them receive care from a non-parent relative, compared to 27% of non-teenage mothers' children.

There are also important differences in the composition of teenage and adult mothers' households. Teenage mothers are overrepresented in single-mother households and those with a biological mother and a non-biological-parent partner, both household types that tend to be linked to compromised child outcomes (Biblarz and Raftery 1999; Heard 2007). They are underrepresented among households with two biological parents living either alone or with at least one grandparent. See the discussion of Table 3 below for further information about teenage mothers' household structures, schooling, and paid work.

Home environment—Children with teenage mothers grow up in different home environments than their peers, sometimes in ways that have been linked to problematic child outcomes and sometimes in ways with less clear consequences. Strikingly, just one in four teenage mothers is married when her child is 9 months old, compared to 72% of non-teenage mothers. Teenage mothers' children eat one fewer meal per week together with their parents than non-teenage mothers' children, they watch about 20 minutes more television each day, and they more frequently live in homes where someone smokes indoors. Teenage mothers' households are as likely as non-teenage moms' primarily to speak English. Among households with another primary language, teenage mothers' households are more likely than non-teenage moms' to have Spanish as their primary language (18% of households compared to 15% for non-teenage mothers), but are less likely to speak another non-English primary language.

Parenting behaviors—A variety of measures generally echo previous research by reporting lower ratings of teenage mothers' parenting behaviors compared to adult mothers', which is likely to be at least partly a consequence of their social disadvantage (Coley and

Chase-Lansdale 1998). Teenage mothers spend slightly less time than adult mothers interacting with their child in enriching activities such as reading books or singing songs, though there is no significant difference in the time they spend playing with their child. Behavior ratings based on interviewer observations, including NCATS at Wave 1, and the Two Bags Task and interviewer behavior rating scale at Wave 2, all rate adult mothers' parenting behaviors more favorably than teenage mothers'. Attachment between mother and child is also more frequently compromised for teenage mothers: Just 53% of teenage mothers' children are securely attached compared to 62% of non-teenage moms' children, and 19% of teenage mothers' children evidence insecure-disorganized attachment compared to 13% of non-teenage mothers' children.

Child development—It is not surprising that teenage mothers' children's development is frequently compromised compared to the children of non-teenage mothers', given their higher levels of prior and ongoing social disadvantage, some negative factors in their home environments, and multiple unfavorable assessments of their parenting behaviors. Teenage mothers give birth to half again as high a proportion of children with low (<2500 grams) birth weight, which is associated with negative health and developmental outcomes in childhood (Boardman et al. 2002). On the bright side, teenage mothers' children have been to slightly more well-baby visits as a ratio of their age than adult mothers' children. This finding may reflect either an increased frequency in these children's well-child visits because of their increased prevalence of health problems, or it might indicate the success of health care programs that are designed to increase providers' contact with teenage mothers and their children.

The other positive comparison for teenage mothers' children is their higher ratings on the ECLS-B motor development scale at 9 months old. This motor advantage is wiped out by age 2 because of significantly slower developmental gains on average among these children. For ratings of both child behavioral and cognitive development, there are no significant differences between the groups of children at 9 months old, but at age 2 teenage mothers' children lag significantly behind their peers. This represents a difference of about 0.18 weighted standard deviations in behavior and 0.21 standard deviations in cognitive ratings at age 2. These disparities also persist at the ends of these distributions: Teen mothers' children are overrepresented in the bottom quartile of both cognitive and behavior scores at age 2 compared to non-teenage mothers' children, and they are underrepresented in the top quartile. Research on school-aged children has found that developmental differences between teenage mothers' children and their peers start small and tend to widen over time (Brooks-Gunn and Furstenberg 1986; Jaffee et al. 2001), so we expect that this gap will widen in future waves of the survey as the children grow older. Because the expected developmental gap between teenage mothers' and adult mothers' children is nonexistent in infancy and small at age 2, early childhood is a promising time to intervene and try to reduce this disadvantage.

Comparing Children of Current and Former Teenage Mothers

The second pair of columns in Table 2 compares mothers who were teenagers at their first child's birth, but not at the birth of the current child in this study, with mothers who were at least 20 years old at their first birth. Significance tests also compare the former group to teenage mothers. These comparisons provide preliminary evidence on the relative influence of developmental, biological, or age-normative explanations on the one hand, and social disadvantage explanations on the other, on differences in mothers' and children's life situations: If current and prior teenage mothers are similar, it cannot be because of developmental, biological, or age-normative factors related to being a teenager, but is rather

because of underlying characteristics of women who become teenage mothers, such as social disadvantage.

Overall, descriptive results provide some support for both sides of the debate, but favor social disadvantage explanations because prior teenage mothers and their children are frequently worse off than mothers age 20 or older at first childbirth and their children. Significant differences between current and prior teenage mothers are less frequent but occur with some regularity. Prior teenage mothers actually evidence greater disadvantage than current teenage mothers in a few instances, including their mothers' education levels, their households' food security, and the prevalence of single mothers living alone with their children. Similarly, prior teenage mothers' children have a few more negative measures than current teenage moms', such as less play time with their mothers, fewer well-baby visits as a ratio of their age, and lower motor scores at 9 months old. This implies that becoming a teenage mother may have some lasting negative implications that instead of being reduced, may even increase for subsequent children who are born after the mother reaches her twenties. For many other significant differences, however, prior teenage mothers and their children fare a bit better than current teenage mothers. For example, prior teenage mothers and partners were more ready to have a baby, their households have higher levels of socioeconomic status, mothers are more likely to be married and living in nuclear two-biological-parent households, and they rate slightly higher on the NCATS and Two Bags Task ratings of parenting behaviors.

For most measures in Table 1, prior teenage mothers and their children are significantly different from other adult mothers and their children, in the same direction as the differences with teenage mothers in the first two columns. This indirectly supports the idea that social disadvantage explains a substantial amount of the negative effects of teenage motherhood. Prior teenage mothers come from more disadvantaged backgrounds than other adult mothers, live in households that are currently more socioeconomically disadvantaged and have less optimal home environments, mothers' parenting behavior ratings are lower, and many of their children's developmental measures are more compromised. Perhaps most importantly, their children's cognitive and behavior scores at age 2 are significantly lower than other adult mothers', but not significantly different than current teenage mothers'.

Association Strength Accounting for Selection Factors

It has long been known that the selection of socially disadvantaged teens into motherhood accounts for a large part of many observed associations between teen childbearing and a variety of factors (Geronimus and Korenman 1993). Therefore, we expand on the descriptive analyses above by adjusting for some key factors that influence selection into teenage childbearing, in order to provide more accurate estimates of the consequences of teen motherhood. Table 2 presents multivariate regression coefficients for current and prior teen mothers (compared to never teen mothers) from models that control for several selection variables. All measures from Table 1 except for sociodemographic background variables are reported in Table 2, with ordinary least squares, binary logistic, and multinomial logistic regressions (depending on the coding of the variable of interest) controlling for child race/ethnicity, household language, maternal nativity, and maternal grandmother's educational attainment. Research on teen fathers has shown that current socioeconomic resources account for some of the remaining associations between teen parenthood and many outcomes (Mollborn and Lovegrove 2011), so additional regression models predicting home environment, parenting, and child outcome measures control for Wave 1 maternal educational attainment and household socioeconomic status.

In order to focus readers' attention on the strongest relationships, Table 2 also highlights significant teen childbearing coefficients by their effect size. Effect sizes for the OLS

regressions were calculated using Cohen's f^2 (Cohen 1988), which compares the R-squared upon introducing the two teen childbearing coefficients (current teen mother and prior teen mother, compared to never teen mother) into the regression model with the R-squared before the introduction of these variables.2 We followed Cohen's suggested cutoffs of <0.02=negligible, ≥0.02 and <0.15=small, ≥0.15 and <0.35=medium, and ≥0.35=large effects. The binary and multinomial logistic regression effect sizes were calculated using the log odds (coefficients) reported in the table, with cutoffs calibrated to the traditional cutoffs for Cohen's *d* (see Haddock 1998), so that <|0.33|=negligible, ≥|0.33| and <|0.825|=small, ≥|0.825| and <|1.32|=medium, and ≥|1.32|=large effects.3 Within each category of measures, we organize our discussion of variables by effect size, beginning with the largest.

Mothers' backgrounds—Although sociodemographic background factors could not be adjusted for selection, the measures of childbearing readiness and maternal health are included in Table 2. *Large effects:* After controlling for selection factors, teen mothers are only one sixth as likely as never teen mothers to report being ready for the pregnancy.4 This is one of the few effect sizes that that qualifies as "large." It is interesting to note that prior teen mothers are less than half as likely as never teen mothers to be ready to have a child, suggesting that teen mothers' subsequent pregnancies in adulthood are often unintended. *Medium effects:* First, in regression models, teen mothers' partners are less than half as likely to be perceived as ready to have a child compared to never teen mothers' partners. Second, regression models controlling for selection found that teen mothers are less than half as likely as never teen mothers to receive prenatal care in the first trimester. *Small effects:* After accounting for some selection factors, teen mothers are 37% less likely to report good health than never teen mothers. This health disparity is even more pronounced when comparing prior teen to never teen mothers.

Socioeconomic situations—Teenage mothers' pronounced socioeconomic disadvantage after the child's birth persists after adjusting for selection, resulting in the highest concentration of large and medium effects of any category of factors in the table. *Large effects:* First, after accounting for selection factors teen mothers are nearly 300 times as likely as never teen mothers to have households in the lowest socioeconomic quintile compared to the highest (this very strong relationship is likely due to teen mothers' extreme underrepresentation in the highest socioeconomic quintile). The corresponding odds for the other quintiles compared to the highest are 144 times for the second quintile from the bottom, 39 for the middle quintile, and 12 for the next highest. While the coefficient sizes are somewhat lower for prior compared to never teen mothers, they are still large effects. Second, teen mothers are 5 times as likely as never teen moms to be enrolled in full-time school at Wave 2, compared to no school enrollment. Third, teen mothers are 7 times as likely as never teen mothers to live with no partner and at least one of the child's grandparents, compared to other household structures. Fourth, teen mothers are less than one sixth as likely as never teen mothers to live in a nuclear two-biological-parent household compared to other household structures. *Medium effects:* Teen mothers are more than twice as likely as never teen mothers to receive TANF ("welfare") support, as well as to receive free or subsidized housing. They are about 3 times as likely as never teen mothers to live in households with the other biological parent and at least one grandparent, and 3 times as likely to live with a partner other than the biological father. *Small effects:* Teen mothers' 1.91 years lower educational attainment at Wave 1 is a "small" effect, as is their receipt of

[2]Cohen's $f^2=(R^2_{Model\ 2}-R^2_{Model\ 1})/(1-R^2_{Model\ 2})$, where Model 1 excludes the teen childbearing measures and Model 2 adds them. The effect size cannot distinguish between the effects of the current and prior teen mother indicators.

[3]These cutoffs were calculated by dividing the desired effect size by 1.65 to convert it from the standard normal metric used in most effect size calculations to the logistic metric (Haddock 1998).

[4]Odds ratios are calculated by exponentiating Table 2 logistic regression coefficients. Here, exp(−1.78)=0.169.

about one more type of government benefit than never teen mothers. Teen mothers are nearly twice as likely as never teenage mothers to attend school part-time compared to not at all, and their children are nearly twice as likely to receive care from a relative in infancy. *Negligible and non-significant relationships:* After controlling for selection factors, there are no significant differences at the $p<.05$ level in household food security, hours of child care, or several household structures (single mother alone, single mother with other adults, and biological parents with other adults).

Home environment—After accounting for selection factors, the strength of associations between teen childbearing and home environment factors varies greatly. *Large effects:* Teenage mothers are one ninth as likely as never teen mothers to be married at 9 months postpartum. This relationship is about half as strong for prior versus never teen mothers and has a medium effect size. *Medium effects:* Teenage mothers' households are nearly 3 times as likely as those of never teen moms to have smokers inside the house. However, in a subsequent model in Table 2, current socioeconomic factors (household SES and maternal educational attainment) fully account for this disparity. *Small effects:* None. *Negligible and non-significant relationships:* Teen mothers' children eat 0.7 fewer meals per week with their parents after adjusting for selection factors, a significant but negligible effect that is not altered by controlling for current SES. Selection factors account for the relationship between teen childbearing and television exposure.

Parenting behaviors—Perhaps surprisingly, after adjusting for selection the relationships between teen childbearing and parenting behaviors have quite small effect sizes, and current socioeconomic status accounts for a large part of many associations. *Large and medium effects:* None. *Small effects:* First, mothers' Two Bags Task parenting scores are significantly lower in a model accounting for selection factors, but introducing current SES makes the effect size negligible. Second, the 55% higher likelihood of disorganized attachment among teen mothers' children becomes a negligible significant relationship after adjusting for current SES. *Negligible and non-significant relationships:* Several negligible negative associations with teen childbearing in models adjusting for selection become non-significant after controlling for current SES: spending time with the child, the NCATS parent behavior rating from Wave 1, and the interviewer rating of parent behaviors from Wave 2. The association between teen childbearing and playing with the child is positive but negligible in models accounting for selection factors, as well as those introducing current SES.

Child development—Interestingly, effect sizes for the relationships between teen childbearing and child outcomes from birth to age 2 are quite small because the selection of disadvantaged teens into motherhood accounts for part of many relationships, and controlling for current SES often explains significant associations. *Large and medium effects:* None. *Small effects:* Teenage mothers' children are two thirds as likely as never teen mothers' children to score in the top 25% of the sample's distribution of the mental scale at age 2 compared to the middle 50%, but current SES fully accounts for this relationship. The same is true for children of prior teen mothers compared to never teen mothers. *Negligible and non-significant relationships:* Several significant but negligible disparities in the outcomes of teen mothers' children compared to those of never teen mothers are subsequently explained by introducing current SES: their increased likelihood of low birth weight, their decreased likelihood of reporting good health at age 2, their behavior ratings and mental scores at age 2, the change in mental scores from 9 months to age 2, and their increased likelihood of placing in the bottom quartile for age 2 behavior. Two negligible relationships, both favoring teen mothers' children, remain significant after accounting for current SES: their higher proportion of well-child visits relative to age, and their higher

motor scores at 9 months. Teen mothers' children's more negative change in motor scores from Wave 1 to 2 is negligible but significant compared to never teen mothers and remains significant after controlling for current SES. Other outcomes do not evidence disparities between teen mothers and never teenage mothers' children after accounting for selection factors, notably very low birth weight, placement in the bottom age 2 mental quartile, and placement in the top age 2 behavior quartile.

Teenage Mothers' Work/School Involvement and Household Structures

We now turn from comparing teenage mothers to others, to analyses that explore variation *among* teenage mothers and their children. Because of the high degree of variation in child outcomes among teen mother's children (e.g., Table 1 shows that 16% of teenage mothers' children score in the overall sample's top quartile in the age 2 mental assessment, but 30% score in the bottom quartile), it is important from both theoretical and policy standpoints to examine factors that may predict this variation. In Table 2, the large effect sizes for associations with teen childbearing were: the mother's readiness to have a child, household SES, school enrollment, and household composition (including marital status). We chose to focus on the last two of these factors, as well as involvement in paid work, for several reasons: (1) they are key facets of children's everyday experiences, (2) policies targeting teen mothers, including welfare reform, focus on controlling teens' school enrollment, paid work, and family structure, and (3) our descriptive statistics in Table 1 suggest considerable variation among teenage mothers for each of these factors. Another potentially important axis of variation among teenage mothers is race/ethnicity, and it is feasible to explore racial/ethnic differences because the teenage mothers in the sample divide roughly equally into Hispanics and non-Hispanic African Americans and Whites (about 250 teenage mothers in each group).[5] Table 3 presents weighted percentages of teenage mothers, overall and within each racial/ethnic group, by their Wave 2 household structure and combined involvement in any schooling or paid work.

Table 3 reveals striking racial/ethnic differences in teenage mothers' household structures at Wave 2. Almost 60% of both White and Hispanic children with teenage mothers are living with both biological parents, though a higher proportion of White children live in a nuclear family while a higher proportion of Hispanic children also live with other adults. In contrast, only 17% of African American children of teenage mothers live with both biological parents. Nearly 50% of Black children live with a single mother and other adults (such as a grandmother), and another 31% live with just a single mother. Only about one third of Hispanic and White children live in these two household types combined.

There are fewer racial/ethnic differences in teenage mothers' Wave 2 involvement in schooling and paid work. Between one third and one half of teenage mothers in each of the three racial/ethnic groups are nonworking, nonstudent mothers who presumably are home with their children. An even higher proportion of African American and White children's mothers are paid workers, however. In contrast, just over one third of Hispanic children's mothers are paid workers, compared to 50% who neither work for pay nor attend school. For all three racial/ethnic groups, just over one quarter of teenage mothers are enrolled in school at Wave 2.

Table 3 also lists the combinations of household structure and school/work involvement that exceed 10% of teenage mothers within each racial/ethnic group. The traditionally normative household composed of a nuclear, two-biological-parent family with a stay-at-home mother

[5]Because of small Ns when dividing Latina teen mothers into foreign- and U.S.-born, we display results for Latinas overall and briefly note some differences between the two subgroups in the text.

is the most prevalent for White and Hispanic children, but only 17% and 22% mothers are represented in this category, respectively. When U.S.-born and foreign-born Hispanic teenage mothers are considered separately in supplemental analyses, we see that the traditionally normative situation of a nuclear two-parent family with a non-working, non-student mother accounts for one third of foreign-born Hispanic teenage mothers' situations. The same situation accounts for only 14% of U.S.-born Hispanic teenage mothers, a statistic that is more similar to that of the two other racial groups. The most prevalent categories among teenage mothers with Black children involve single mothers living with other adults, with variation in their work and school involvement. Two thirds of African American children fit into the predominant categories listed in Table 3, while only about one quarter of White children and one third of Hispanic children do, which suggests that there may be particularly broad variation in the life situations of Hispanic and White teenage mothers. More than anything else, Table 3 shows that there is considerable diversity in teenage mothers' household structures and involvement with school and paid work. It is striking that even within racial/ethnic groups, there is usually little consensus in teenage mothers' prevalent household structures and work/school involvement. Policies intended to benefit teenage mothers' children should take into account this apparent lack of dominant "scripts" determining how teenage mothers organize their lives when they have young children.

The descriptive analyses have shown that teenage mothers and their children experience a diversity of household structures and work and school situations. But how are these important everyday experiences related to the development of teenage mothers' children? Table 4 reports multivariate analyses estimating the associations between these factors measured at Wave 2 (with household structure condensed to the categories of single mother only, single mother with other adults, biological parents only, and biological parents with other adults, with the few mothers living with partners other than the biological father dropped from the sample) and children's early reading and math assessment scores and parent-reported child behavior and health measured at Wave 3 (age 4½), in the fall before most of the children entered kindergarten. Because neither household structure nor school/work involvement ended up predicting children's parent-reported health, models are not shown in the table. For each dependent variable, Model 1 reports these relationships adjusting only for age at assessment. Model 2 adds a variety of control variables representing demographic and socioeconomic background factors, including the parents' age, the child's race/ethnicity and gender, the household's primary language, the teenage mother's welfare history, and the maternal grandmother's level of education. Model 3 introduces interactions between child race/ethnicity and household structure and paid work/school involvement, but these interactions are only significant for behavior so they are omitted for early math and reading scores.

The first columns in Table 4 predict children's early reading scores at age 4½. Mothers' work and school involvement are not significantly associated with household structure, but there are several interesting relationships with involvement in paid work and schooling. Both before and after accounting for selection, all types of work and school involvement are associated with higher reading scores compared to no maternal involvement. After including a variety of background controls in Model 2, children whose mothers are both workers and students have reading scores that are 2.68 points (0.4 weighted standard deviations) higher than children whose mothers stay at home. The difference for children whose mothers are workers but not students is 2.15 points (0.3 standard deviations), compared to 1.24 points (0.2 standard deviations) for children whose mothers are students but not workers. Supplemental interaction models found that the advantage of mothers' paid work and school involvement for children's reading scores does not differ significantly across racial/ethnic groups.

For children's early math scores, student status is not significantly different from homemaker status, and selection factors account for the 1.65-point advantage associated with paid worker status in Model 1. However, children whose mothers are both paid workers and students enjoy a 4.02-point (0.6 standard deviations) advantage in math scores compared to those whose mothers stay at home. Supplemental tests also find that having a mother who is both a student and a worker is also associated with significantly higher math scores compared to either student or paid worker status ($p<.05$). One household structure measure is significant in Model 1: Children of single mothers who live with other adults score 1.64 points lower on the math assessment than those living in a two-parent nuclear household. However, selection factors account for this relationship in Model 2 ($p<.10$). Supplemental interaction models did not find significant differences across racial/ethnic groups in the associations between household structure or school/work involvement and the early math scores of teenage mothers' children.

For children's parent-reported behavior, children living with a single mother and other adults (who may be grandparents or others) scored 0.3 weighted standard deviations lower in Model 2 than children living in nuclear two-parent households. Supplemental tests also show that living with a single mother and other adults also predicts lower behavior scores than living with two biological parents and other adults ($p<.05$). Accounting for selection factors actually strengthens this association compared to Model 1. The cognitive and behavioral disadvantages for children in this category are particularly important because single-mother extended households are quite prevalent, comprising 30 percent of the sample (see Table 3). Additionally, since welfare reform in 1996, underage teenage mothers have been encouraged to adopt this household type by being required to live with a parent or guardian in order to receive TANF benefits.

Introducing interactions in Model 3 shows that this particular relationship varies significantly by race/ethnicity. White children living in single-mother households with other adults have behavior scores that are nearly 0.6 standard deviations lower than those of White children in nuclear two-parent households, but for African American children these two types of family structures do not differ significantly. This relationship does not differ significantly for Hispanic compared to White children, and supplemental tests show that Hispanic children's behavior scores are 0.4 standard deviations lower when living with a single mother and other adults compared to two parents and no other adults ($p<.05$). Another interaction is also significant: Having a mother who is a paid worker (compared to the reference category of staying at home) is associated with behavior scores that are almost 0.8 standard deviations higher for Hispanic children compared to White children. For Hispanic children, having a paid worker mother predicts behavior scores that are nearly half a standard deviation higher than if their mother stays at home (supplemental tests). This difference in work status is not significant among African American or White children.

By combining these multivariate findings with descriptive findings from Table 3, we can identify whether particularly prevalent household structures and maternal work/school involvement at age 2 are associated with better or worse academic or behavioral outcomes at age 4½. In the overall sample, the 3 most prevalent combinations are associated with compromised early reading and math scores, because of disparities for children whose mothers are neither students nor paid workers compared to one or more other categories. Women who are neither paid workers nor students account for 41% of the overall subsample of teenage mothers, and half of Hispanic children's mothers. The third most prevalent combination in the overall sample is additionally problematic for behavior because of the household structure of a single mother with other adults. This type of household structure accounts for 30% of the overall sample of teenage mothers and their children and 48% of African American children's households. A category that is associated with particularly high

scores in both early reading and math, combined paid worker and student status, is rare in the sample, accounting for less than 14% of teenage mothers in each racial/ethnic group.

Discussion

This study reports descriptive analyses of national data on teenage mothers and their children from the Early Childhood Longitudinal Study-Birth Cohort. This survey is particularly helpful for understanding the life situations and development of teenage mothers' children because of its rich array of household-level and individual-level measures, its direct assessments of parents and children, and the recency of the data. We find that on average as compared to children with non-teenage mothers, children of teenage mothers are disadvantaged across a variety of domains. Some factors in these children's home environments may be problematic, and their mothers' parenting behaviors are not rated as favorably. Not surprisingly given these findings, many measures of health and development among teenage mothers' children are compromised compared to those of adult mothers' children. This developmental gap begins with lower birth weight, is largely nonexistent at 9 months of age, but is established by 2 years in the cognitive and behavioral domains. Despite this bad news, it is promising that the developmental gap is fairly small at this young age. It is also auspicious that current household socioeconomic status fully accounts for many disparities among teenage mothers' children in terms of both parenting behaviors and child outcomes because socioeconomic status is more amenable to policy intervention than many other factors, and because it suggests that children of teenage mothers are not destined to have compromised development. When taken in combination with the fact that comparisons to prior teenage mothers show that young maternal age alone is not largely responsible for children's compromised outcomes, these findings suggest that effective social programs implemented soon after birth might be able to eliminate the early developmental and health disadvantages of many children of teenage mothers.

Descriptive analyses focusing only on children of teenage mothers identify considerable diversity in key everyday experiences that distinguish teenage mothers from others—household structures and mothers' school/work involvement. Multivariate analyses predicting children's early math and reading scores and parent-reported behavior at age 4½ find that teenage mothers' involvement in paid work and school often benefits their children academically, and that living with a single mother and other adults sometimes disadvantages children compared to living in nuclear two-parent families. Many of the everyday experiences that are associated with disadvantaged outcomes are unfortunately quite prevalent among teenage mothers' children.

Rigorous evaluation of randomized experimental studies is needed before implementing widespread policies, but these findings point toward some suggestions for further research focused on improving health, cognitive development, and behavior in early childhood for this vulnerable population. For example, findings suggest preliminarily that encouraging teenage mothers to continue their education or work for pay, even when their children are small, may be a promising route for improving children's long-term health and development both directly and indirectly by raising socioeconomic status. Our analyses suggest preliminarily that policies such as welfare reform that encourage young mothers to live with extended family rather than in a nuclear household with the child's father might compromise children's early cognitive and behavioral development, although the encouragement of school and paid work involvement may well be beneficial. Policymakers should also be aware that children's everyday situations that are associated with the best developmental outcomes sometimes vary by race/ethnicity. Prescriptive policy solutions that restrict teenage mothers' options to a narrow range of household structures or work/school involvement may work well for some subpopulations but not others.

These new, nationally representative descriptive statistics provide useful information about the experiences of teenage mothers and their young children in the U.S. today. Because this study focuses on early development, it provides new data to inform policymakers who are trying to close the early developmental gap between the children of teenage mothers and their peers before it widens further after children enter school. Importantly, this study provides a detailed description of not only the typical situations in which teenage mothers live but also highlights the diversity of characteristics that make up their lives. Teenage motherhood must be understood as a broad categorization that encompasses a wide array of backgrounds and circumstances. Understanding the diverse life situations faced by teenage mothers and their children, as well as the types of support that they lack and those that they already have, can inform future research on situationally appropriate interventions to improve their lives.

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Table 1

Means and proportions for household characteristics and child outcomes of current teen, prior teen, and adult mothers

Variable	Current teen mother	Current non-teen mother	Sig.	Prior teen mother		Never teen mother	Sig.
N	950	7700		1400		5650	
Overall sample proportion	0.11	0.89		0.18		0.71	
Demographics/Background							
Maternal age at birth (15–50; SD=6.2)	17.85	28.52	***	25.44	*a*	29.27	***
Child race/ethnicity							
White	0.36	0.56	***	0.38		0.62	***
Black	0.25	0.12	***	0.23		0.10	***
Hispanic, U.S.-born	0.18	0.10	***	0.14	*a*	0.09	**
Hispanic, foreign-born	0.15	0.14	NS	0.18		0.12	***
Asian/Pacific Islander	0.01	0.03	***	0.01		0.03	***
American Indian	0.01	0.004	†	0.01		0.003	***
Multiracial	0.03	0.04	NS	0.06	*a*	0.04	*
Mother U.S.-born (1=yes)	0.83	0.78	**	0.79		0.8	NS
Maternal grandmother's educ attainment (0–20; SD=3.7)	10.85	11.48	***	10.45	*a*	11.89	***
Maternal grandfather's educ attainment (0–20; SD=4.3)	10.51	11.83	***	10.33		12.32	***
Mother have a teen parent (1=yes)	0.19	0.14	**	0.22		0.12	***
Ready for child when became pregnant (1=yes)	0.22	0.61	***	0.43	*a*	0.66	***
Mom perspective of partner's readiness (1=yes)	0.72	0.87	***	0.77		0.89	***
Prenatal care start 2nd trimester or later (1=yes)	0.17	0.07	***	0.12	*a*	0.06	***
Good health - mother W1 (1=yes)	0.90	0.93	*	0.88		0.95	***
Socioeconomic Situation							
Wave 1 household SES quintile							
Lowest quintile	0.47	0.16	***	0.35	*a*	0.11	***
Second lowest quintile	0.33	0.18	***	0.32		0.14	***
Middle quintile	0.14	0.21	***	0.21	*a*	0.21	NS
Second highest quintile	0.05	0.22	***	0.10	*a*	0.26	***
Highest quintile	0.004	0.22	***	0.01	*a*	0.29	***
Mother's educational attainment (0–20; SD=3.0)	10.760	12.89	***	11.08	*a*	13.48	***

Variable	Current teen mother	Current non-teen mother	Sig.	Prior teen mother		Never teen mother	Sig.
Government benefits received (0–4; SD=1.3)	2.14	1.06	***	1.98	*a*	0.81	***
Receive welfare (1=yes)	0.18	0.07	***	0.15		0.05	***
Subsidized housing (1=yes)	0.25	0.11	***	0.21		0.08	***
Wave 1 food security							
Food secure	0.84	0.88	*	0.79	*a*	0.91	***
Food insecure w/ hunger	0.04	0.02	*	0.04		0.02	*
Wave 2 hours worked for pay							
0 hours	0.57	0.44	***	0.49	*a*	0.42	***
1–29 hours	0.12	0.15	NS	0.1		0.16	***
30+ hours	0.31	0.42	***	0.41	*a*	0.42	NS
Wave 2 school status							
Not in school	0.73	0.89	***	0.86	*a*	0.90	**
Part time school	0.11	0.07	**	0.08		0.06	†
Full time school	0.16	0.04	***	0.05	*a*	0.04	*
Wave 1 household structure							
Single mom alone	0.11	0.08	†	0.19	*a*	0.06	***
Single mom w/ grandparent(s)	0.35	0.05	***	0.07	*a*	0.05	NS
Single mom w/ other adult(s)	0.04	0.02	*	0.03		0.01	*
Biological parents alone	0.28	0.73	***	0.58	*a*	0.77	***
Biological parents w/ grandparent(s)	0.14	0.06	***	0.06	*a*	0.05	NS
Biological parents w/ other adult(s)	0.06	0.05	NS	0.07		0.04	**
Biological mom, non-biological partner	0.03	0.01	*	0.01	*a*	0.01	NS
Wave 1 - Total hours child care (0–60; SD=19.0)	17.32	15.06	**	14.59	*a*	15.1	NS
Receive care from a relative W1 (1=yes)	0.44	0.27	***	0.26	*a*	0.26	NS
Home Environment							
Married W1 (1=yes)	0.24	0.72	***	0.5	*a*	0.78	***
Wave 1 primary household language							
English	0.79	0.81	NS	0.82		0.84	NS
Spanish	0.18	0.13	**	0.16		0.11	**
Other language	0.02	0.05	***	0.02		0.05	***
Breakfasts & dinners together/wk (0–14; SD=3.4)	9.94	10.78	***	10.35	*a*	10.92	***

Variable	Current teen mother	Current non-teen mother	Sig.	Prior teen mother		Never teen mother	Sig.
Average daily hours of TV (0–20; SD=2.0)	2.58	2.23	***	2.52		2.15	***
Someone smokes inside the house (1=yes)	0.14	0.08	***	0.17		0.06	***
Mother's Parenting Behaviors							
Spend time with child (0–12; SD=2.4)	7.93	8.35	***	7.86		8.53	***
Play with child (0–18; SD=2.2)	15.12	14.97	NS	14.78	*a*	15.04	***
NCATS parent behavior rating W1 (15–49; SD=4.5)	33.22	34.86	***	33.85	*a*	35.14	***
Two Bags behavior rating W2 (1–7; SD=0.9)	3.98	4.43	***	4.13	*a*	4.53	***
Parent behavior rating W2 (0–1; SD=0.1)	0.90	0.93	***	0.90		0.93	***
Wave 2 mother-child attachment							
Secure	0.53	0.62	***	0.59		0.64	*
Avoidant	0.18	0.16	NS	0.17		0.16	NS
Ambivalent	0.10	0.09	NS	0.09		0.09	NS
Disorganized	0.19	0.13	**	0.15		0.12	NS
Child's Health Outcomes							
Birth weight							
Low birth weight (<2500 grams)	0.10	0.07	***	0.08		0.07	*
Very low birth weight (<1500 grams)	0.02	0.01	*	0.01		0.01	NS
Good health - child W1 (1=yes)	0.86	0.89	†	0.85		0.90	***
Good health - child W2 (1=yes)	0.87	0.88		0.83		0.90	***
Well baby visits: age(months) ratio (0–1.7; SD=0.1)	0.37	0.34	***	0.34	*a*	0.33	NS
Number of injuries W2 (0–5; SD=0.6)	0.25	0.24	NS	0.25		0.25	NS
Wave 2 body mass index							
Low	0.05	0.05	NS	0.06		0.05	NS
High	0.19	0.16	NS	0.18		0.15	NS
Other Child Outcomes							
Child behavior rating W1 (−3.8-2.0; SD=1.0)	0.11	0.09	NS	0.04		0.13	*
Child behavior rating W2 (−3.1-1.9; SD=1.0)	−0.09	0.11	***	−0.01		0.15	**
Standardized mental scale W1 (−18.3–99.2; SD=1.0)	50.01	50.08	NS	49.04		50.33	**
Standardized mental scale W2 (−15.1–88.8; SD=10.0)	48.04	50.27	***	47.72		51.16	***
Standardized motor scale W1 (−21.2–83.9; SD=9.8)	51.92	49.82	***	50.28	*a*	49.72	NS
Standardized motor scale W2 (−15.5–97.4; SD=9.9)	49.61	50.04	NS	49.87		50.19	NS

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Variable	Current teen mother	Current non-teen mother	Sig.	Prior teen mother	Never teen mother	Sig.
Change in raw mental scale W1-2 (2.4–110.0; SD=12.9)	48.61	50.56	***	48.30	51.46	***
Change in raw motor score W1-2 (−13.0–58.8; SD=9.9)	24.18	25.63	**	25.17	25.83	NS
Bottom 25% mental score W2 (1=yes)	0.30	0.24	**	0.32	0.21	***
Top 25% mental score W2 (1=yes)	0.16	0.26	***	0.17	0.29	***
Bottom 25% behavior rating W2 (1=yes)	0.31	0.24	**	0.29	0.23	**
Top 25% behavior rating W2 (1=yes)	0.19	0.25	**	0.22	0.26	*

Source: Early Childhood Longitudinal Study-Birth Cohort (2006). Analyses adjust for complex survey design.

†p<.10,

*p<.05,

**p<.01,

***p<.001

^{a}prior is significantly different from current teen mom at p<.05.

Continuous variables include range and weighted standard deviation (SD) in parentheses.

Table 2

Coefficients from multivariate regression models adjusted for selection, compared to never teen mothers

Variable (Reference Category)	Current Teen Mother	Sig.	Prior Teen Mother	Sig.	Current vs. Prior	N
Ready for child when became pregnant?[c]	**−1.78**	***	−0.77	***	*a*	7700
Mom perspective of partner's readiness[c]	*−0.93*	***	−0.64	***		7750
Prenatal care start 2nd trimester or later[c]	*0.97*	***	0.53	**	*a*	7900
Good health - mother W1[c]	−0.46	*	−0.74	***		7900
Socioeconomic Situation						
Wave 1 household SES quintile (highest)[c]					*a*	7900
Lowest quintile	**5.68**	***	**4.03**	***		
Second lowest quintile	**4.97**	***	**3.64**	***		
Middle quintile	**3.66**	***	**2.86**	***		
Second highest quintile	**2.49**	***	**2.01**	***		
Mother's educational attainment (years)[b]	−1.91	***	−1.61	***	*a*	7850
Government benefits received (0–4)[b]	0.98	***	0.84	***		7900
Receive welfare[c]	*0.93*	***	0.77	***		7900
Subsidized housing[c]	*0.93*	***	0.72	***		7900
Wave 1 food security (secure)[d]						7900
Food insecure without hunger	0.45	†	0.39	†		
Food insecure with hunger	0.33	†	0.77	***		
Wave 2 hours worked (none)[d]						7900
1–29 hours	−0.34	*	−0.40	**		
30+ hours	−0.69	***	−0.24	**		
Wave 2 school status (none)[d]					*a*	7900
Part time school	0.69	***	0.19			
Full time school	**1.61**	***	0.32	†		
Wave 1 household structure[c]						7900
Single mom alone	0.09		*0.90*	***	*a*	
Single mom w/ grandparent(s)	**1.97**	***	−0.10		*a*	

Variable (Reference Category)	Current Teen Mother	Sig.	Prior Teen Mother	Sig.	Current vs. Prior	N
Single mom w/ other adult(s)	0.44		0.18			
Biological parents alone	**−1.88**	***	−0.57	***	*a*	
Biological parents w/ grandparent(s)	*1.08*	***	0.19		*a*	
Biological parents w/ other adult(s)	0.22		0.50	*		
Biological mom, non-biological partner	*1.21*	**	−0.07		*a*	
Wave 1 - Total hours child care (0–60)[b]	0.82		−1.73	*	*a*	7900
Receive care from a relative W1[c]	0.63	***	−0.15		*a*	7900
Home Environment						
Married (W1)[c]	**−2.16**	***	*−0.87*	***	*a*	7900
Breakfasts & dinners together/wk (0–14)[b]	−0.71	***	−0.34	**	*a*	7850
Add current SES	−0.74	***	−0.32	*	*a*	
Average daily hours of TV[b]	0.18	†	0.14	†		7800
Add current SES	−0.02		−0.02			
Someone smokes inside the house[c]	*1.02*	***	*1.20*	***		7850
Add current SES	−0.05		0.41	*	*a*	
Mother's Parenting Behaviors						
Spend time with child (0–12)[b]	−0.30	**	−0.43	***		7850
Add current SES	−0.06		−0.22	*		
Play with child (0–18)[b]	0.25	*	−0.13	†	*a*	7850
Add current SES	0.26	*	−0.10		*a*	
NCATS parent behavior rating W1[b]	−1.36	***	−0.81	***	*a*	6750
Add current SES	−0.44	†	−0.10			
Two Bags behavior rating W2 (1–7)[b]	−0.42	***	−0.28	***	*a*	6600
Add current SES	−0.15	**	−0.09	*		
Parent behavior rating W2 (0–1) [b]	−0.02	***	−0.02	***		7750
Add current SES	−0.01	†	−0.01	*		
Wave 2 mother-child attachment (secure) [d]						7700
Insecure-avoidant	0.11		0.04			
Add current SES	−0.08		−0.11			

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Variable (Reference Category)	Current Teen Mother	Sig.	Prior Teen Mother	Sig.	Current vs. Prior	N
Insecure-ambivalent	0.32	†	0.10			
Add current SES	0.17		−0.03			
Disorganized	0.44	**	0.09			
Add current SES	0.20	*	−0.10			
Child Health Outcomes						
Birth weight[c]						
Low birth weight (<2500 grams)	0.27	*	0.04		*a*	7850
Add current SES	0.21	†	−0.04		*a*	
Very low birth weight (<1500 grams)	−0.01		−0.19	†		7850
Add current SES	−0.04		−0.25	*		
Good health - child W1[c]	−0.24	†	−0.39	***		7850
Add current SES	−0.01		−0.21	†		
Good health - child W2[c]	−0.23	*	−0.50	***		7850
Add current SES	−0.02		−0.34	**	*a*	
Well baby visits: age(months) ratio [b]	0.03	***	0.00		*a*	7800
Add current SES	0.02	***	−0.00		*a*	
Number of injuries W2 (0–5) [b]	0.02		0.01			7850
Add current SES	−0.01		−0.01			
Wave 2 body mass index [d]						7250
Low	0.16		0.17			
Add current SES	0.25		0.22			
High	0.14		0.11			
Add current SES	−0.03		−0.03			
Other Child Outcomes						
Child behavior rating W1[b]	−0.01		−0.08			7800
Add current SES	0.02		−0.07			
Child behavior rating W2[b]	−0.18	***	−0.12	*		7750
Add current SES	−0.07		−0.02			
Raw mental score W1[b]	−0.12		−0.51	*		7850

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Variable (Reference Category)	Current Teen Mother	Sig.	Prior Teen Mother	Sig.	Current vs. Prior	N
Add current SES	0.23		−0.25			
Raw mental score W2[b]	−1.51	***	−1.97	***		7850
Add current SES	0.30		−0.46			
Raw motor score W1[b]	1.18	***	0.02		*a*	7850
Add current SES	0.99	***	−0.17		*a*	
Raw motor score W2[b]	−0.27		−0.13			7800
Add current SES	−0.04		0.07			
Change in raw mental scale W1-2[b]	−1.40	**	−1.44	**		7850
Add current SES	0.07		−0.19			
Change in raw motor score W1-2[b]	−1.45	***	−0.12		*a*	7750
Add current SES	−1.02	**	0.28		*a*	
Mental score quartile W2 (Middle 50%)[d]						7850
Bottom 25%	0.11		0.23	*		
Add current SES	−0.09		0.06			
Top 25%	−0.42	***	−0.37	**		
Add current SES	−0.02		−0.06			
Behavior rating quartile W2 (Middle 50%)[d]						7750
Bottom 25%	0.26	*	0.21	†		
Add current SES	0.03		0.03			
Top 25%	−0.22		−0.10			
Add current SES	−0.12		−0.03			

Source: Early Childhood Longitudinal Study-Birth Cohort (2006). Analyses adjust for complex survey design.

† p<.10,

* p<.05,

** p<.01,

*** p<.001

[a] current significantly different from prior teen mom at p<.05

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[b] OLS regression coefficient

[c] binary logistic regression coefficient

[d] multinomial logistic regression coefficient

Bolded significant coefficients are “large” effects, *italicized* are “medium,” and underlined are “small” (see text). All analyses control for child race/ethnicity, household language, mother's nativity, and maternal grandmother's education, and (for raw mental and motor scores) age at the relevant assessment(s).
"Add current SES" analyses also control for Wave 1 maternal education and household SES quintiles.

Table 3

Prevalent Wave 2 household types and work/school activities among current teen mothers, by race/ethnicity

Race/Ethnicity	Weighted Cross Tabulations							Most prevalent teenage mother household types (≥10%)
		Single alone	Single w/ others	Bio parents alone	Bio parents w/ others	Bio mom, NB partner	Total	
Children of All Teenage Mothers	NW NS	5.02	**11.00**	**15.50**	6.15	3.48	41.15	1. Bio parents alone, mom not working, not in school
	NW SCH	2.53	6.81	4.04	2.60	0.97	16.94	2. Bio parents alone, mom working, not in school
	WRK NS	6.49	7.50	**11.29**	3.76	1.21	30.25	3. Single mom w/ other adults, not working, not in school
	WRK SCH	1.83	4.96	2.42	1.55	0.90	11.66	
	Total	15.87	30.28	33.26	14.05	6.55	100.00	
		Single alone	Single w/ others	Bio parents alone	Bio parents w/ others	Bio mom, NB partner	Total	
White Children of Teenage Mothers	NW NS	2.58	6.40	**17.35**	5.96	5.31	37.59	1. Bio parents alone, mom not working, not in school
	NW SCH	1.31	4.30	5.20	2.07	1.32	14.20	2. Bio parents alone, mom working, not in school
	WRK NS	6.00	6.77	**16.32**	3.11	2.51	34.71	
	WRK SCH	1.84	4.45	3.34	1.91	1.96	13.50	
	Total	11.72	21.92	42.21	13.05	11.10	100.00	
		Single alone	Single w/ others	Bio parents alone	Bio parents w/ others	Bio mom, NB partner	Total	
Black Children of Teenage Mothers	NW NS	**11.08**	**17.71**	4.97	0.71	1.29	35.76	1. Single mom w/ other adults, not working, not in school
	NW SCH	5.17	**12.07**	1.61	0.59	1.34	20.78	2. Single mom w/ other adults, in school, not working
	WRK NS	**11.62**	**12.03**	5.74	1.94	0.68	32.01	3. Single mom w/ other adults, working, not in school
	WRK SCH	3.50	5.90	1.45	0.05	0.55	11.44	4. Single mom alone, working, not in school
	Total	31.37	47.71	13.77	3.29	3.86	100.00	

Race/Ethnicity	Weighted Cross Tabulations						Most prevalent teenage mother household types (≥10%)
		Single alone	Single w/ others	Bio parents alone	Bio parents w/ others	Bio mom, NB partner	Total	
Hispanic Children of Teenage Mothers	NW NS	3.03	**12.31**	**21.80**	9.45	3.26	49.86	1. Bio parents alone, not working, not in school
	NW SCH	1.59	4.81	3.84	4.65	0.32	15.21	2. Single mom w/ other adults, not working, not in school
	WRK NS	4.02	5.20	9.31	6.05	0.00	24.58	
	WRK SCH	0.77	5.09	2.09	2.41	0.00	10.36	
	Total	9.42	27.40	37.03	22.57	3.57	100.00	

Source: Early Childhood Longitudinal Study-Birth Cohort (2006). N=900 (250 White, 250 Black, 250 Hispanic).

Legend:
NW NS - Mother does not work for pay, not in school
NW SCH - Mother does not work for pay, enrolled in school
WRK NS - Mother works for pay, not in school
WRK SCH - Mother works for pay, enrolled in school
Alone - No partner or other adults in household
W/ others - Grandparents or other adults also living in household
NB partner - Non-biological partner of mother living in household

Table 4

Linear regression models predicting current teen mothers' children's reading, math, and behavior scores at age 4½

	Reading				Math				Behavior					
Variable (Reference Category)	**1**		**2**		**1**		**2**		**1**		**2**		**3**	
Wave 3 assessment age (months)	0.30	***	0.31	***	0.62	***	0.62	***	0.01		0.01		0.01	
Mother's W2 daily activities (neither)														
Paid work, no school	1.70	**	1.24	*	1.65	*	0.76		0.1		0.03		−0.28	
School, no paid work	2.11	**	2.15	**	1.18		1.01		0.12		0.05		0.11	
Paid work and school	3.50	**	2.68	**	5.34	***	4.02	***	0.27	†	0.17		0.08	
W2 household structure (bio.parents only)														
Single mother only	0.96		0.47		0.28		−0.11		−0.09		−0.08		−0.06	
Single mother with other adults	−0.04		0.29		−1.64	*	−1.20	†	−0.19	†	−0.29	**	−0.54	**
Bio. parents with other adults	0.45		1.09		−0.29		0.01		−0.03		−0.01		−0.03	
Mother's age at child's birth (years)			0.59	**			1.05	***			0.03		0.02	
Father's age at child's birth (18–19)														
15–17			−1.79	*			−1.88	*			0.10		0.08	
20–24			−0.61				−2.45	**			−0.05		−0.05	
≥25			−0.85				−3.05	**			−0.27		−0.30	†
Father's age unknown			0.32				−2.36				0.31		0.36	
Child's race/ethnicity (non-Hispanic White)														
Non-Hispanic Black			0.29				−1.01				0.12		−0.12	
Hispanic			−0.36				−2.77	**			0.08		−0.29	
Asian/Pacific Islander			6.36	**			2.40				0.67	**		
American Indian/Alaska Native			−1.98	†			−1.51				0.01			
Multiracial			−0.08				−0.81				−0.08			
Female child (1=yes)			0.35				0.67				0.37	***	0.32	***
Mother received welfare as child (1=yes)			−1.00	†			−1.80	*			−0.27	**	−0.32	**
English primary household language (1=yes)			1.93	*			0.12				0.13		0.05	
Maternal grandmother's education (high school degree)														
Less than high school degree			−1.20	†			−2.09	**			−0.39	**	−0.38	**
Some college			0.70				−0.49				−0.09		−0.09	
≥Bachelor's degree			1.82				−0.12				0.00		−0.01	

	Reading				Math				Behavior					
Variable (Reference Category)	**1**		**2**		**1**		**2**		**1**	**2**		**3**		
Missing information			−0.65				−1.48			−0.62	**	−0.60	*	
Interactions														
Black * paid work, no school												0.33		
Black * school, no paid work												−0.32		
Black * paid work and school												−0.18		
Black * single mother only												0.00		
Black * single with other adults												0.55	*	
Black * bio. parents with other adults												−0.30		
Hispanic * paid work, no school												0.73	**	
Hispanic * school, no paid work												0.06		
Hispanic * paid work and school												0.41		
Hispanic * single mother only												0.30		
Hispanic * single with other adults												0.18		
Hispanic * bio. parents with other adults												−0.01		
Intercept	8.99	***	−2.15		18.71	***	4.35		0.06	−0.46		0.09		
Model F	12.04	***	8.25	***	11.73	***	10.66	***	1.03	3.05	***	3.05	***	
R-squared	0.10		0.22		0.19		0.31			0.13		0.16		
N	700		700		700		700			800		650		

Notes: Source: Early Childhood Longitudinal Study-Birth Cohort, 2001–2005.

Analyses account for sample design effects.

† p<.10

* p<.05

** p<.01

*** p<.001;

two-tailed tests.