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Family Complexity, Siblings, and Children's Aggressive Behavior at School Entry

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Abstract

As family structure in the United States has become increasingly dynamic and complex, children have become more likely to reside with step- or half-siblings through a variety of pathways. When these pathways are accounted for, more than one in six children in the United States lives with a half- or step-sibling at age 4. We use data from the Early Childhood Longitudinal Study-Birth Cohort (N~6,550) to assess the independent and joint influences of residing with a single parent or stepparent and with step or half-siblings on children's aggressive behavior at school entry. The influences of parents' union status and complex sibship status on aggressive behavior are independent. Family resources partially explain the association between residing with an unpartnered mother and aggressive behavior regardless of sibship status. However, the resource hypothesis does not explain the association of complex sibship with aggressive behavior.

Keywords

family complexity; union status; siblings; aggressive behavior; early childhood

Early childhood is increasingly recognized as a critical stage for shaping development across the life course (Duncan, Ludwig and Magnuson 2007). As the primary context in which early child development occurs, families provide access to many of the resources that shape children's first experiences of learning and socialization. Unequal distribution of household income, access to a stimulating learning environment at home, and parental engagement with children largely explain disparities in students' school readiness in terms of socioemotional behavior and cognition as early as kindergarten entry (Bradley and Corwyn 2002; Guo and Harris 2000; Hackman and Farah 2009; Yeung, Linver and Brooks-Gunn 2002).

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Family composition shapes the availability of these resources. As family structure has become increasingly dynamic and complex in the United States, a substantial literature has documented the relationship between parents' union status and children's early learning outcomes and has accounted for the mediating role of family resources in this association (Brown 2010; McLanahan 2004; Putnam 2015). The role of siblings has received less attention (Sweeney 2010). However, siblings are often a child's most important peer relationships, informing their understanding of how to interact with similarly aged children prior to school entry (Dunn 1983). Sibling relationships are also embedded within a family system of interaction that encompasses coresident adults and is shaped by the resources available in the household (Brody 1998; Conger et al. 1992).

While the majority of children reside with biological siblings only or without siblings, children may also come to reside with step- or half-siblings through a variety of pathways. These include living with one's biological parents and older half-siblings who were born in one parent's prior union; with an unpartnered parent and at least one half-sibling from that parent's earlier or later union; or with a stepparent and step- or half-siblings in a parent's new cohabiting union or marriage. We assess the prevalence of complex sibling relationships at age 4 in the 2001 U.S. birth cohort, as well as the independent and joint influences of residing with a single mother or mother and stepfather and with step or half-siblings on children's aggressive behavior at school entry.

To explain the association of complex sibship and mother's union status with young children's aggressive behavior, we draw on a resource-based perspective, considering how the availability of financial, material, temporal, and emotional resources available to children varies by family structure and sibship composition. Aggressive behavior is of interest because it is predictive of clinical diagnoses of behavior disorders as well as delinquency and risky behaviors in later childhood and adolescence (Keenan et al. 1998; Moffitt 1993) and because it occurs more frequently among children residing in stepfamilies or with single mothers (Pearson et al. 1994; Ram and Hou 2005) and when step- or half-siblings are present in a child's household (Gennetian 2005; Halpern-Meekin and Tach 2008; Tillman 2008b). Aggressive behavior is defined as disruptive behavior that is impulsive or premeditated (Zahrt and Melzer-Lange 2011), and in young children includes behaviors such as temper tantrums, physical aggression, destruction of others' property, and displays of anger. We are not aware of prior work that has considered the independent influence of parents' union status and half- or step-siblings on behavior in early childhood, nor of work that has explored whether household resources mediate these associations during this critical life stage.

Background

Prior research indicates that co-residence with half- or step-siblings is associated with behavior problems and poorer academic performance (Bernstein 1997; Dorius and Guzzo 2013; Halpern-Meekin and Tach 2008; Tillman 2008a, 2008b; Zill 1994). However, there has been relatively little theoretical development or hypothesis testing to consider *why* step- and half-sibling relationships are associated with children's elevated behavior problems. The majority of the literature subsumes these relationships into the larger framework of the

stepfamily and overlooks sibling configurations to focus on relationship dynamics between parents and their new partners, between children and their stepparents, or between children and their non-resident parents (Ganong and Coleman 2004; Ganong, Coleman and Jamison 2011). Less attention has been paid to whether and how the presence of step- and half-siblings in a child's household shapes the distribution of resources and family dynamics to potentially influence children's behavior (Sweeney 2010), a point we return to below.

A related limitation is that most work recognizes step- and half-sibling relationships *only* in the context of the stepfamily – that is, where there is a union between a child's biological parent and a partner who is not related to the child. Other complex family arrangements are often overlooked in families that may be classified as two-parent households or single-parent households where all children are assumed to be biologically related (but see Gennetian 2005; Tillman 2008a). Importantly, this classification underrepresents the prevalence of half- and step-sibling relationships in the population. A recent assessment of the prevalence of sibship complexity estimated that about 12 percent of U.S. children between 0 and 17 years resided with a step- or half-sibling in 2009 and that in about only one-quarter of these arrangements were children also residing with a married or cohabiting stepparent (Manning, Brown and Stykes 2014). Beyond underestimating prevalence, a focus on sibling relationships only in stepparent families constrains opportunities for hypothesis testing about the independent associations of stepfather presence and sibling composition with behavior outcomes and about whether the presence of step- and half-siblings is equally consequential for children across all family structures.

Finally, little research has considered the presence of step- and half-siblings in children's families early in the life course, although a significant amount of change in family composition occurs in early childhood and is more common among children born to unmarried or lower-income parents for whom household resources are more likely to be constrained compared to children with married or higher-income parents. In Wisconsin, 60 percent of children born to unmarried parents had a half-sibling through their mother or father by age 10 (Cancian, Meyer and Cook 2011). Nationally, about one-quarter of children born mostly to unpartnered mothers in U.S. urban areas had older siblings born to mothers with a prior partner (Carlson and Furstenberg 2006), establishing a half-sibling relationship in infancy from the focal child's perspective. In the same population, over half of children born to unpartnered mothers had experienced their mother's eventual repartnering by age 5 (Bzostek, McLanahan and Carlson 2012), potentially introducing step-siblings and half-siblings into a child's family prior to school entry, regardless of whether the mother's new relationship endured.

Given that the reconstitution of families through change in union status or the addition of step- or half-siblings is prevalent in early childhood and is associated with later learning outcomes, a focus on school readiness at age 5 is warranted. Policy levers manipulated early in the life course and concurrent with family change may be most effective in ameliorating the association of family change with child behavior. Here, we take a snapshot of family structure at age 4 to document the presence of step- and half-siblings. Longitudinal studies examining whether children *ever* lived with a step- or half-sibling prior to school entry

would result in higher prevalence estimates but would elide sibship influences occurring at different developmental stages from infancy through prekindergarten.[1]

Theoretical Orientation

In the United States, resources and family structure are intertwined. Resources significantly select individuals into particular family structures, with older, more-educated, and higher-income adults more likely to marry, less likely to divorce, and more likely to form cohabiting unions that transition to marriage compared to their younger or less-educated counterparts (Cherlin 2014; McLanahan 2004). The prevalence of multipartner fertility, which results in complex sibship, is also strongly associated with parents' early childbearing, employment history, and, for fathers, educational attainment (Carlson and Furstenberg 2006). But household-based resources are also a likely mechanism through which family structure shapes child well-being. For example, controlling for background factors that select teenagers into early childbearing, their ongoing economic disadvantage after a child's birth is implicated in compromised cognitive achievement at school entry among children born to a teen parent (Mollborn 2007; Mollborn et al. 2014).

We work from the perspective that all sibling configurations, regardless of biological relatedness, require families to divide shared resources among children. For example, household income is apportioned to provide children with food, clothing, and shelter. Parents also invest money and time in facilitating children's activities. More abstractly, parents apply their own stock of mental and physical health to nurture children and promote positive growth. Based on extant research, we expect that a shortage of material, temporal, and emotional resources or the unequal distribution of those resources among family members will exacerbate children's aggressive behavior. Both poverty and food insecurity are associated with elevated externalizing behavior problems across childhood (Henninger and Luze 2013; Slopen et al. 2010). Much of this association is explained by maternal health, and particularly by maternal depression, which independently predicts children's early behavior problems (Cents et al. 2013; Goosby 2007; Turney 2012). The amount, quality, and structure of time that parents spend with children (Doan, Fuller-Rowell and Evans 2012; Dunifon et al. 2013) and their investments in children's early socioemotional development through structured activities (Brown and Sax 2013) are also associated with children's behavioral trajectories. Motivated by this research, we take a multidimensional approach to measuring the resources available to children.

In complex households, theory predicts and prior empirical research supports the hypothesis that step-sibling and half-sibling coresidence potentially complicates the distribution of resources. Theoretical work in psychology drawing from evolutionary biology predicts that adults are motivated to invest more in their biological children than in children to whom they have only a social relationship in order to reproduce the family line (Daly and Wilson 1987), a finding supported in research on food expenditures in stepfamilies compared to biological family households (Case, Lin and McLanahan 1999). Later research suggests, however, that

[1]Our estimates from the Early Childhood Longitudinal Study-Birth Cohort indicate that about 20 percent of children *ever* lived with a stepsibling or half-sibling by age 4.

observed disparities in temporal and emotional investments between children in stepfamilies and biological families are attributable to pre-existing stepfather characteristics that predict both his entrance into a stepfamily and his level of investment in stepchildren (Hofferth and Anderson 2003).

Role ambiguity, or the absence of normative clarity about obligations and commitments between stepparents, absent parents, and children, also potentially constrains resource investments in children by obfuscating parents' accountability (Cherlin 1978). Similarly, boundary ambiguity, or uncertainty among and inconsistency between adults and children about the individuals who compose a family unit, is more frequent in stepfamilies compared to fully biological or adoptive families (Brown and Manning 2009; Stewart 2005) and may also curtail investments in resources like time investments and informal or sporadic contributions that are not systematically quantified.

Further, role ambiguity and boundary ambiguity likely extend to nonresident parents. Nonresident fathers' child support contributions and contact with children diminish when either person in a former relationship repartners and has a child with a new partner (Berger, Cancian and Meyer 2012; Bronte-Tinkew, Horowitz and Scott 2009; Carlson and Berger 2013; Gerstel 1988; Ono 2005; Tach et al. 2014; Tach, Mincy and Edin 2010). Hence, investments in children in complex families may fall through a gap created by a lack of shared understanding between biological and social parents about roles and obligations. It is worth noting, however, that Carlson and Berger (2013) report that children receive similar investments of time from stepfathers compared to children residing with biological fathers when there is a half-sibling in the household.

Finally, emotional and health resources are also selection factors into family complexity and potential mechanisms explaining why family complexity shapes child well-being. Multipartner fertility and union instability are both an outcome of earlier maternal depression and a predictor of later maternal depression, psychological distress, parenting stress, and poorer maternal physical health (Cooper et al. 2009; Meadows, McLanahan and Brooks-Gunn 2008; Turney and Carlson 2011). These associations are partially explained by changing household resources following union status transitions, stressors associated with disruption to family systems, and negative selection into union instability. In turn, compromised maternal mental health is associated with a more detached parenting style and less emotional investment in children, and with children's eventual mental health challenges (Flykt et al. 2010; Lau et al. 2007).

In sum, we expect to observe that above and beyond parents' union status and biological relatedness to children, the presence of step- or half-siblings in a child's household will be associated with higher levels of mother-reported behavior problems at school entry compared to children residing without step- or half-siblings. Further, we expect that any observed association will be at least partially explained by systematic variation in the allocation of financial, temporal, and emotional resources in children's households if complex sibship dilutes the resources that are available or complicates their distribution. Our analytical approach to test these hypotheses includes two broad components. First, we assess whether sibship composition and parents' union status have independent associations with

children's behavior problems. We begin by measuring sibship composition and parents' union status separately and proceed to a set of categorical measures that consider sibship and union status simultaneously to assess whether sibship composition operates differently depending on parents' union status. Second, we assess whether various domains of resources available in children's households when they were 4 years old explain any observed associations of sibship composition with behavior problems at school entry.

Our hypothesized model overlooks two alternative explanations. First, parental selection into multipartner fertility may explain any association between complex sibship and children's behavior. We discuss supplemental analyses using available maternal background information to evaluate this explanation. Second, we do not account for the role of sibling relationship quality in shaping children's early aggressive behavior. Resource scarcity or the perceived unequal distribution of resources by children in complex families may exacerbate conflict between siblings, resulting in parents' reports of children's more frequent aggressive behavior. This more proximate indicator of the process through which family resource allocations affect children's behavior would potentially offer greater insight to the model we propose here. Unfortunately, the data source we used does not include information on sibling relationship quality.

Data and Methods

We used data from the restricted-use Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), a nationally-representative longitudinal study of approximately 10,600 children born in 2001.[2] All 2001 births registered in the National Center for Health Statistics vital statistics system were eligible, and the sample was drawn using a clustered, list frame design. The child's primary parent (usually the mother) was initially interviewed in person when the child was about nine months old, and again at age 2, age 4, and in the fall of the child's kindergarten school year (2006 or 2007, depending on the child's birth month; children who entered kindergarten in 2007 were observed in both years, but the outcome measure is drawn from the latter year). Because of budgetary constraints, the kindergarten wave selected a random subsample of about 85 percent of the children whose parent had completed the preschool interview, though all American Indian/Alaska Native children who completed either the 2-year or the preschool wave were included (Snow et al. 2009). The weighted response rates for the parent interview were 74, 93, 91, 92 (2006 kindergarten wave), and 93 percent (2007 kindergarten wave) respectively. The longitudinal sample included about 6850 children in the kindergarten wave. We restricted the sample to those who lived with their biological mother at birth, at age 4, and in the kindergarten wave. This exclusion eliminated about 300 children from the analytic sample, most of whom were residing with a grandparent in at least one wave. The analytic sample includes approximately 6550 children.

Measures of parents' union status and siblings' biological relatedness were drawn from the household roster collected during the third wave of the study, when children were approximately 56 months old (4.5 years). With regard to union status, we considered

[2]The ECLS-B restricted-use license requires reporting analytic sample sizes rounded to the nearest 50.

whether children resided with their unpartnered mother, their mother and biological father, or their mother and a married or cohabiting stepfather/social father.[3] With regard to sibship, we distinguished children living with no siblings or full siblings only (i.e., siblings to whom they are biologically related through both their mother and father), with any half-siblings (i.e., siblings with whom they share one biological parent, assumed to be the mother although this is not specified in the household roster), or with any step-siblings (i.e., children in the household who are identified as step-siblings by the respondent and who are assumed to have no biological relationship to the focal child). Because children in the sample are living with their biological mother, step-siblings are assumed to be the biological children of the stepfather/social father in the household. We combined step- and half-siblings into a single category to maximize cell sizes. (The vast majority of complex sibship in this sample – about 95 percent - is through half-siblings, rather than step-siblings.) From these measures, we constructed a mutually-exclusive six-category indicator of family structure at age 4. Categories appear in Table 1.

Our dependent variable is a summed score of 7 items pertaining to the primary parent's report of children's aggressive behavior at school entry. These items compose a subscale derived from a 19-item parent-reported socioemotional battery. The complete battery includes 14 items from the Preschool and Kindergarten Behavior Scales-Second Edition, three items from the Social Skills Rating System, and two items developed for ECLS-B (Snow et al. 2009). The aggressive behavior subscale includes items concerning children's physically aggressive behavior, anger, impulsivity, and destruction of property (alpha=.79). Parents were asked whether children engaged in these behaviors never, rarely, sometimes, often, or very often. After rescaling the composite variables to range from 0 to 4, possible summed scores ranged from 0 (never engage in any aggressive behavior) to 28 (child engages in all behaviors very often). For the full analytic sample, the average child's score is just below 9, with a standard deviation of about 4.5 (Table 1).

We used information collected during the age 4 interview (about one year before school entry) as independent variables to assess whether household resources and parental stress explained the association between complex sibship and children's aggressive behavior.[4] Economic resources were measured by two indicators: 1.) whether household income fell above (0) or below (1) the federal poverty threshold for a household of a given size; and 2.) an indicator of child food insufficiency, scored 1 if the child's parent reported an inadequate food supply in the last year on any one of eight items from the USDA's child food sufficiency scale and 0 otherwise.

Household material learning resources were measured by three items: 1.) the number of books (including library books) in the home, dichotomized to measure 25 books or more (1)

[3]We use the term union status throughout to refer to whether a child's mother is unpartnered, partnered with the child's biological father, or partnered with another (male) adult. Because of sample size limitations, we are not able to account for marital status and the partner's biological relatedness to the focal child simultaneously (but see discussion of supplementary models). We use the word “stepfather” here to represent marital and cohabiting unions between mothers and new partners.

[4]Because selection into complex sibship preceded the focal child's birth in many cases, resource measures from after the birth are not appropriate for capturing resource-based selection into complex families. We test mediation of the family structure-aggressive behavior relationships according to Baron and Kenny (1986). Baron, R.M.and D.A. Kenny. 1986. “The Moderator–Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations.” *Journal of Personality and Social Psychology* 51:1173-1182.

vs. fewer than 25 books (0, approximately the bottom tercile of the distribution); 2.) the usual number of hours children watch television on weekdays, dichotomized at fewer than 4 (1) vs. 4 hours or more (0, the bottom decile of the distribution)[5]; and 3.) whether there is a computer in the household children can use (coded 1 vs. no computer, coded 0).

Five items captured parents' and other family members' time investments in children: frequency of 1.) reading and 2.) telling stories (each measured ordinally but treated as continuous; the measures behaved similarly when dichotomized at various cutpoints); 3.) whether the responding parent and child play together several times a week (1) vs. less often (0); and 4.) whether a parent or other family member and child visited the library in the last month (1) vs. less often (0); and 5.) whether at least some members of the child's family ate dinner together at least 5 times in a usual week (1) vs. less often (0).

Investments in enrichment activities were measured by a single indicator of whether a child was engaged in structured sport or dance lessons, drama or performing arts, or arts and crafts classes. Indicators of the individual types of activities behaved similarly to the more global indicator, and a sum score of the number of activity types a child was involved in had no greater predictive power. Two measures captured emotional and health resources. Maternal health was measured by mother's self-report of her physical health (an ordinal measure reverse-coded so that 1=poor and 5=excellent); and mother's self-report of depressive symptoms on the 12-item CES-D inventory (range=0-36).

We used negative binomial regressions in multivariate analyses predicting aggressive behavior to adjust for the positively skewed nature of dependent variable. All models were weighted to account for non-response and clustering. The jackknife estimators recommended by the National Center for Education Statistics (Nord et al. 2006) are not compatible with multiply imputed data, and so were not used here. Models controlled for child race/ethnicity (non-Hispanic black, non-Hispanic other race, and Hispanic any race vs. non-Hispanic white), child gender (male=1), child age in months at the kindergarten interview, child temperament at 9 months, a four-category measure of maternal education when the child was 9 months old, and mother's age at the child's birth. We also accounted for the focal child's birth order and, except where noted, the number of full siblings in the household at the preschool wave. These two indicators are treated categorically to account for nonlinear relationships with the dependent variable. Missing data were trivial for all covariates except maternal depression, which was missing for about 350 respondents, and mother's age at birth, which was missing for about 50 respondents. We used the *mi estimate* suite of commands in Stata version 13 to impute data for all missing values on the independent variables. The imputation model included all covariates in the full analytic model, the dependent variable, sampling weights, and variables that are excluded from the analytic model but likely to be correlated with included variables such as earlier and later measures of maternal depression, mother's self-reported prior behavior problems, parenting style, and child birth weight.

[5]The American Academy of Pediatrics recommends fewer than two hours of television viewing per day for young children. Results were similar using two hours or four hours as the cutpoint for intensive television viewing.

Results

Table 1 describes the distribution of children's living arrangements by mother's union status and the presence of step- or half-siblings in the child's household at age 4. The first column shows that just under two-thirds of children lived with both parents and no step- or half-siblings. Fifteen percent lived with an unpartnered mother, and a small share (2.9 percent) lived with a stepfather and no step- or half-siblings. About 17.2 percent of children, or over one in six, resided with a step- or half-sibling in one of the three union status categories considered. The second column of Table 1 focuses on those children living with siblings to whom they were not fully biologically related. Just over half lived with their own biological parents and older half-siblings born in a prior union, nearly one-third resided with a single mother and at least one half-sibling from an earlier or later union, and about 16 percent resided with a stepfather and step- or half-siblings. Hence, in early childhood, a relatively small share of children with step- or half-siblings resided with a cohabiting or married stepfather, implying that studies focusing on step- and half-siblings only in this group do not represent most families that include these sibling relationships.

Compared to children in two-parent households with no siblings or full siblings only, those in any other family configuration had higher aggressive behavior scores at school entry ($p<.05$). More strikingly, there is also significant variation in children's aggressive behavior among those alternative family structures. Those who resided with step- or half-siblings had higher aggressive behavior scores on average compared to children whose parents had the same union status but who had no step-or half siblings. (This difference is not statistically significant in the two stepparent groups, perhaps because of small sample sizes.) Among children who had step- or half-siblings, those residing with a single parent or a stepparent had more reported aggressive behaviors on average compared to children who reside with both biological parents.

Table 2 summarizes descriptive statistics for the explanatory and control variables used in multivariate models. Focusing on the measures of resources available to children, three findings emerge. First, where there were disparities in resources by sibship composition, families with step- or half-siblings were more disadvantaged on income and human capital resource indicators compared to families of the same union status with no siblings or full siblings only. Children residing with step- or half-siblings experienced higher poverty rates, more frequent food insecurity, and lower maternal education compared to children with no siblings or full siblings only. Second, though, disparities by union status or sibship status were small for indicators pertaining to other types of resources. In particular, levels of household resources like the availability of books and a home computer and time investments in children were similar across family groups.

Third, children residing with unpartnered mothers at the preschool wave had the highest level of disadvantage compared to other groups on household financial resources and maternal health, regardless of whether step- or half-siblings are in the household. Approximately 45 percent of children with unpartnered mothers and no step or half-siblings and 61 percent of those with step or half-siblings lived below the poverty level, and nearly one-quarter and one-third experienced child food insecurity in the last year respectively.

Unpartnered mothers also reported poorer physical health and more depressive symptoms on average compared to mothers partnered with the focal child's biological parent. Children residing with a stepparent were also disadvantaged compared to those residing with both biological parents, but to a lesser extent.

Table 3 presents coefficients and robust standard errors from negative binomial regression models estimating children's aggressive behavior scores as a function of mother's union status and presence of step- or half-siblings in the household at age 4. We consider complex sibship and maternal union status separately (Models 1 and 2) and jointly (Models 3 and 4) to assess whether each dimension of family structure has an independent association with the dependent variable. Model 1 accounts only for the full siblings and step/half-siblings with whom a child resides. Model 2 accounts for mother's union status only (excluding full siblings). Model 3 includes both the presence of siblings of each type and mother's union status to distinguish effects of partner complexity from those of sibling complexity. Model 4 uses the six-category measure that combines mother's union status and child's complex sibship to examine specific combinations of partner and sibling statuses. The reference category in that model is children residing with both biological or adoptive parents and no half-or stepsiblings.

Consistent with the descriptive results, Model 1 shows that the presence of half- or stepsiblings in a child's household at age 4 was associated with elevated aggressive behavior scores at age 5. The presence of step/half siblings increased a child's predicted score by approximately 13.9 percent (exp(.130)=1.139). Model 2 shows that residence in a single mother or stepfather household compared to two biological parents was also associated with higher aggressive behavior scores. A child's predicted score increased by approximately 14.7 percent in single mother households compared to households with both biological parents present, and by about 14.3 percent in stepparent households. As expected, Model 3 suggests that the influences of sibship and union status are largely independent of each other – the magnitude of the associated coefficients and their statistical significance remain mostly unchanged compared to Models 1 and 2. Interaction terms (models not shown) were not significant, confirming that these associations were additive, rather than multiplicative. Categories in Model 4 combined mother's union status and complex sibship. Residing with a stepfather but no step- or half-siblings was not associated with a higher aggressive behavior score compared to children residing with both biological/adoptive parents and no complex sibship. Residence in all other family composition types was associated with higher aggressive behavior scores, whether or not half- or step-siblings were present. Post-hoc tests indicated that children living with step- or half-siblings in single parent or stepparent households had significantly higher predicted aggressive behavior scores compared to children whose mother had the same union status but with no step- or half-siblings in the household (see notes at bottom of Table 3).

Table 4 introduces measures of family resources to explain the association of family composition with children's aggressive behavior. Model 1 includes financial resources. Accounting for poverty status and any child food insecurity in the last year explains about 16 percent of the magnitude of the coefficient associated with residing with an unpartnered mother compared to the baseline model, regardless of whether the family included step- or

half-siblings to the focal child. Accounting for poverty status also diminished the association between residing with a stepparent and half- or stepsiblings. Sobel-Goodman tests of the mediating effect of poverty status on these associations were statistically significant at p<. 05. Financial resources did less to explain the magnitude of the association of living with step- or half-siblings and both biological parents.

Model 2 excludes financial resources and considers material resources in the child's household. Access to a collection of books or a computer had a significant and negative association with children's aggressive behavior problems. Accounting for material resources generally did less to explain the association of family composition with the outcome compared to the financial resources evaluated in model 1. Model 3 includes indicators of time investments in children. Storytelling and play (but not reading, dining together, or library visits) were predictive of children's lower aggressive behavior scores. However, these factors together explained relatively little of the association of family composition with children's aggressive behavior, a finding that is consistent with the descriptive results summarized inTable 2.

Model 4 accounts for whether the focal child was engaged in any structured activities in sports or arts at age 4. While statistically significant, that factor had only a negligible attenuating effect on the association between family composition and aggressive behavior at age 5. More refined measures of structured activities were not better mediators and did not improve model fit. Model 5 accounted for emotional and health resources represented by maternal self-reported physical health and depressive symptoms. As with financial resources in Model 1, health resources were most effective in explaining the association of unpartnered mothers' union status with children's aggressive behavior, regardless of sibship composition. Accounting for these factors reduced the association of unpartnered status with no step- or half-siblings in the household by about 25 percent and, when step- or half-siblings were in the household, by nearly 20 percent. Sobel-Goodman tests confirmed that these measures of health statistically mediated the association of mother's unpartnered status with the outcome. The magnitude of the remaining association of family composition with behavior was still substantively strong and statistically significant, however. Supplemental models indicated that depressive symptomatology had greater explanatory power than physical health. Model 6 incorporated all indicators of resources simultaneously. As with Models 1 and 5, controlling for all factors in a single model had the greatest attenuating impact on unpartnered parent status when there were no step- or half-siblings in the household. Coefficients associated with the presence of step- or half-siblings in single-parent or stepparent households remained significant at p<.001. The strength of the association of step- or half-siblings' presence in a household with biological parents was reduced to p<.01. In post-hoc tests, six comparisons between family composition groups remained significantly different in Model 6 (see notes at bottom of Table 4).

Figure 1 presents predicted aggressive behavior scores from the final model in Table 4 for a hypothetical child who holds the mean value on all covariates, varying only the child's family composition. Thus, these predicted scores represent relationships between family structure and aggressive behavior after adjusting for resources. Error bars represent the 95 percent confidence interval around the point estimate. Children residing with both a

stepparent and any half- or step-siblings continue to have the highest predicted score, about 2.3 points higher (i.e., about one-half of a standard deviation higher) than children residing with both biological parents and no complex sibship in the household. Children residing with an unpartnered mother and half- or step-sibs have the next highest predicted scores. Residing with a stepfather or single mother in the absence of complex sibship or residing with a biological father in the presence of complex sibship produced statistically equivalent predicted scores, between .75 points and 1 point higher (.22 standard deviations) than residing with both biological parents in the absence of complex sibship.

In supplemental models, we tested alternative hypotheses about why sibship composition might be robustly associated with aggressive behavior after accounting for family resources. First, we considered that mothers with a history of behavior problems themselves might be more likely to experience union instability or multipartner fertility and to report that their children demonstrated aggressive behavior (Fomby and Cherlin 2007). We controlled for a variety of mother's background experiences, including ever having been fired, expelled, or charged with driving under the influence of alcohol or drugs. These characteristics did not attenuate the association between family composition and children's behavior. We also used propensity score matching methods (*teffects psmatch* in Stata 13) to estimate the average treatment “effect” of experiencing sibling complexity by comparing the behavior scores of children with otherwise similar family and parent histories. Measures in the matching model included the mother's demographic characteristics, education, employment history, parity, birth control use, birth intendedness, family structure and welfare receipt while growing up, English language fluency and background experiences, and the father's age at the child's birth. Among children who were similar on these family characteristics, coresidence at age 4 with step- or half-siblings was associated with average aggressive behavior scores that were .75 points higher ($p<.01$).

We also considered that parents in blended families might be more likely to engage in harsh or disengaged parenting if they experienced more frequent competing obligations on their time and attention (Burnette et al. 2012; Doan et al. 2012; Reising et al. 2013). We controlled for four factors measured when children were 4 years old: mother's report that she would use spanking or hitting as a discipline strategy if her child acted out against her; mother's report of parenting stress based on her responses to four items; and two indicators of the interviewer's assessment of mother's emotional support and engaged participation during structured play activities with the child. These factors also failed to explain variation by sibship composition in children's aggressive behavior.

Another alternative explanation is that the observed association between family complexity and children's aggressive behavior is attributable to parents’ prior union instability, rather than to family composition at one point in time. A large literature has established a robust association between parents’ repeated changes in union status and various dimensions of children's behavioral development, but this association has not been thoroughly explained after taking a variety of explanatory mechanisms into account (Cavanagh and Huston 2006, 2008; Cooper et al. 2011; Fomby 2011; Fomby and Cherlin 2007; Fomby and Osborne 2010). Elsewhere, we have sought to adjudicate between union instability and family complexity as the primary driver of children's behavior problems and found that both factors

are salient in select populations (Fomby and Osborne 2013). In the current analysis, however, we did not find a strong association between repeated union status change (defined as two or more changes in mother's union status) and children's aggressive behavior after including standard demographic controls. Hence, we did not include that measure of dynamic family structure in our final models. We emphasize that one of our central findings pertains to the consistent association of coresidence with a half- or step-sibling with children's behavior across parents' union status categories, including cases where children have experienced no family structure change.

We also explored variation within complex sibship categories to determine whether parents' union status or the birth order of half- and stepsiblings conditioned the association of family complexity with children's behavior in the baseline model (equivalent to Table 3, Model 4) and in the full model. In one set of models, we restricted the analytic sample to children living with a married or cohabiting mother and biological father or social father. In both groups, the association of complex sibship with children's problem behavior was statistically significantly associated with the outcome, but coefficients were larger and achieved a higher level of statistical significance when mothers were cohabiting with rather than married to their partners in the preschool wave. However, comparable coefficients in the two samples were not significantly different from each other at $p<.05$ in post-hoc tests.

Finally, in another set of models, we considered whether half-, step- and full siblings were older or younger than the focal child. We controlled for parents' union status in these models, but did not interact union status with sibship composition as we did in our main analysis. Both older and younger half- and step-siblings' presence in children's households had a positive and significant association with children's behavior problems. In contrast, only the presence of older full siblings (i.e., not younger full siblings) was significantly associated with the outcome. These supplemental models provide guidance for future research to further elucidate the pathways through which complex family structures potentially influence children's well-being.

Discussion

We asked whether parents' union status and children's coresidence with step-or half- siblings in early childhood had independent associations with mother-reported aggressive behavior at school entry in the United States. We assessed the prevalence of residing with step- or half-siblings at age 4 in three types of households: those headed by a child's two biological/adoptive parents (whether married or cohabiting); by a child's biological mother and a step/social father; or by an unpartnered mother. We also considered whether the resources available to children varied by sibship status and whether the observed association between family composition and aggressive behavior could be explained by resource disparities.

We report three main findings. First, over one-sixth of children born in 2001 resided with a step- or half-sibling by age 4, a point that is obscured when we look only at children's relationships to household heads. In fact, only about 16 percent of children in blended families (about 6 percent of all children) resided with a stepparent. About one half of young children in blended families resided with both biological parents. The balance, one third of

children with step- or half-siblings, resided with an unpartnered mother at age 4. This highlights the complexity of children's families across union status categories. Research focused on describing children's family composition only in relation to parents' union status overlooks the extent to which children are exposed to and influenced by multipartner fertility that occurs both before and after (or as a result of) their own birth.

Our prevalence estimates diverge somewhat from a recent report by Manning et al. (2014), although the distribution of complex sibship across parents' union statuses is similar. Using data from the Survey of Income and Program Participation, those authors found that approximately 12.5 percent of children age 0 to 17 years resided in complex sibship arrangements, a difference of about 30 percent compared to the prevalence we report. We offer some possible explanations, recognizing that these are unlikely to fully account for the reported discrepancies. First, in both studies, sibship is determined from household rosters provided by the survey respondent. In the case of the ECLS-B, the respondent is the focal child's caregiver, usually the biological mother. She reports each household member's relationship to her and to the focal child. In the case of SIPP, the primary respondent in the household (usually the owner or renter of the housing unit) provides a complete relationship matrix between all household members. Because the primary respondent in SIPP is not necessarily a parent or primary caregiver to all of the children in a household, he or she may not have complete information on the biological relatedness of siblings. (This is likely to be truer of half-sibling relationships than stepsibling relationships.) Second, the prevalence of complex sibship may vary by children's age if complex families formed when children are young dissolve as children age or, conversely, if respondents become less likely to emphasize differences in biological relatedness in complex families that have stayed together for many years. Finally, the sampling units for ECLS-B and SIPP differ. SIPP is a sample of all U.S. households (with or without children), while ECLS-B is a sample of U.S. children located in households. Larger families were both more likely to have a child born in 2001 (and thus to fall into the ECLS-B sampling frame) and to include complex sibship compared to smaller families. Thus, the greater prevalence of children's complex sibship observed in ECLS-B may be partially attributable to larger families' more frequent representation in a child-based sample compared to a more general household sample.

Second, parents' union status and the presence of step- or half siblings operated independently in predicting children's aggressive behavior. As expected, children residing with step- or half-siblings had higher average aggressive behavior scores compared to their peers whose parents had the same union status with no step/half siblings in the household – about one point (or about one-fifth of a standard deviation) for children living with two biological parents. 1.5 points (one-third of a standard deviation) for children living with a stepparent, and eight-tenths of a point (about .17 standard deviations) higher for children residing with an unpartnered mother in weighted mean comparisons. Consistent with prior literature, children residing in stepparent families or with unpartnered mothers had higher levels of aggressive behavior on average compared to children residing with both biological parents, regardless of sibship status. The association of residing with half- or stepsiblings in a two biological-parent household with aggressive behavior was similar in magnitude to the association of residing with a stepfather with no half- or stepsiblings. These associations held in multivariate regressions controlling for sociodemographic characteristics, where

coefficients associated with family structures including step/half siblings predicting aggressive behavior scores were about 10 percent higher compared to those for children without siblings or with full siblings only.

These findings are consistent with the argument that parents' union status and children's sibship status have distinct associations with children's early development. Theoretical perspectives that focus on parent-child dyads or relationship quality between parents have clearly illuminated some portion of the mechanisms that explain the relationship between family structure and child well-being. However, these perspectives may not be entirely comprehensive if they do not account for the nature and quality of sibship relationships.

Third, while important resources like household income and human capital varied by family composition, accounting for these resources did little to explain why children with step or half-siblings have higher levels of parent-reported aggressive behavior at age 5. Resource measures – particularly factors related to income and maternal mental health – were more effective in explaining why residing with an unpartnered mother at age 4 had a disadvantageous association with aggressive behavior at age 5. This finding is consistent with Thomson and colleagues (1994), who found that economic resources largely explained children's compromised well-being in single parent families, but not in stepparent families.

Why might resources be insufficient to explain the association of sibship status with children's aggressive behavior? Resources vary by parents' union status, and within union status categories, children with step- or half siblings are somewhat more disadvantaged. However, the expectation that biological relatedness, role ambiguity, or maternal stress in complex families would carry over to the unequal or overstretched distribution of resources to children was not substantiated, at least as resources were measured here. Data on the specific resources transferred to individual children in the same household would offer a more rigorous assessment of the resource hypothesis. Alternatively, data on sibling relationship quality in early childhood would provide a more proximate indicator of dynamics across sibship statuses to assess whether resource disparities in households play out at the level of sibling interactions.

This research has several limitations. First, as noted above, ECLS-B does not include a report of sibling relationship quality. Second, the analysis does not account for timing when step or half-siblings enter a child's household. The recent addition of a step- or half-sibling may be more immediately consequential for young children's behavior than an earlier entry. Because our focus was on identifying independent associations of sibship and union status with aggressive behavior at school entry, we felt that a more nuanced model that also accounted for timing was beyond the scope of the research question. However, future research can leverage the available longitudinal data to assess how the entry or departure of siblings interacts with the timing of children's early development to shape behavioral outcomes. Third, on a related point, our analyses did not account for step- or half-siblings who entered and then left a child's household before the child was 4 years old, thus not accounting fully for the dynamic nature of sibship. We found that an additional 2.5 percent of children had resided with a step- or half-sibling who had left the household. Accounting for those relationships diminished the association of complex sibship with children's

aggressive behavior at school entry somewhat, suggesting that children's behavior may be more strongly influenced by currently coresident siblings. Relatedly, ECLS-B does not include complete information about nonresident siblings (i.e., full, half or step-siblings residing in a nonresident parent's household), although these relationships may influence both parents' resource allocations and children's behavior. Fourth, our analysis combines step- and half-sibling relationships, but those relationships may be distinct in terms of children's emotional closeness and the motivations in the household for sharing resources. In these data, the vast majority of complex sibship arrangements (over 90 percent) are formed through half-sibling relationships, and results did not change significantly when step-siblings were excluded. Research on behavior in adolescence, when the prevalence of step-sibship is higher, might find more striking differences between the two types of relationships. Finally, our description of children's family structure categories is not exhaustive. To maintain a manageable number of comparisons and reasonable cell sizes, we have not distinguished cohabiting from married parents in our primary analysis, and we have not included the approximately 300 children who were not living with their biological or adoptive mother during the three waves from we draw information.

Despite these limitations, our research has documented evidence of elevated aggressive behavior problems in early childhood that are related both to parents' union status and to children's sibship status. Partitioning out the independent associations of these distinctive components of family composition with children's behavior highlights the need for theoretical development that accounts for multiple dynamics in children's families, particularly in the context of multipartner fertility and family complexity.

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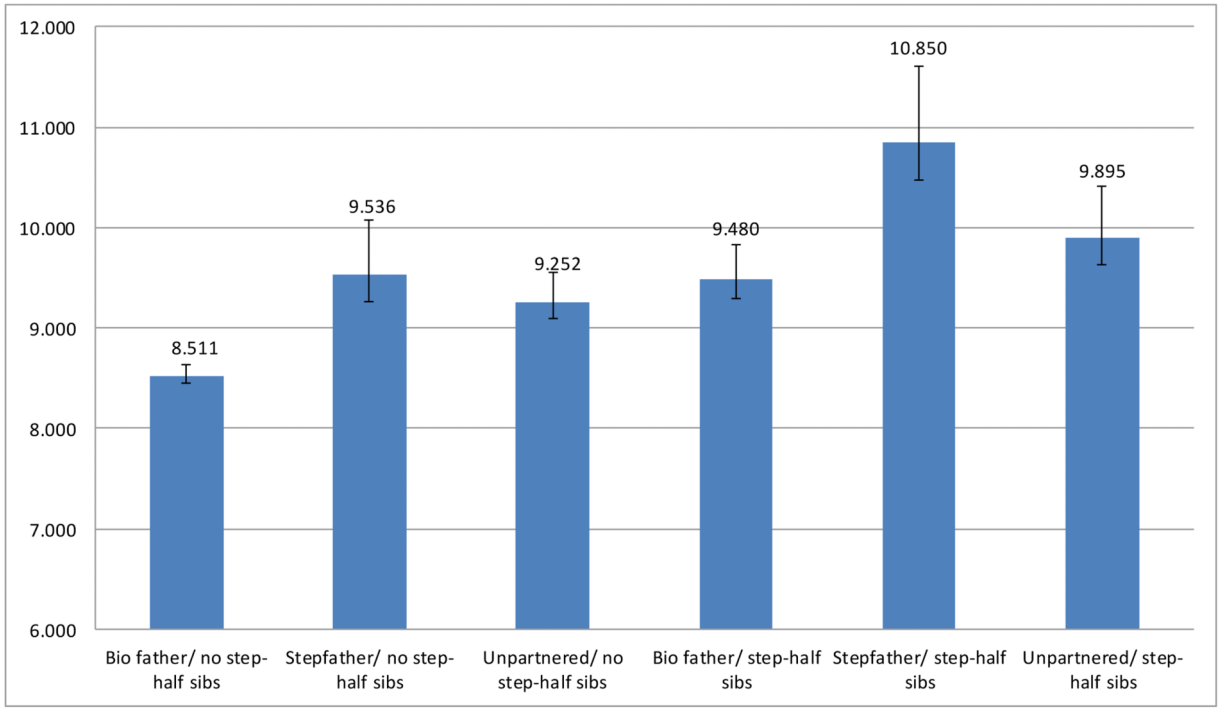

NOTE: All covariates held at their respective means.

Figure 1.

Estimated adjusted aggressive behavior score at school entry by union status and sibship complexity (Table 4, Model 6), ECLS-B (with 95% CI)

Table 1

Weighted distribution of family composition and mean aggressive behavior at age 4 (ECLS-B, 2001-2006/7, N~6550)

	Proportion of all children	Proportion of children with step/half-siblings	Aggressive Behavior Score		
			Mean	SD	
Overall	1.000		8.807	4.446	
Bio father/no step/half-sibs	0.645		8.353	4.116	
Stepfather/no step/half-sibs	0.029		8.989	4.341	
No father/no step/half-sibs	0.154		9.500	5.040	*a*
Bio father/any step-half sibs	0.089	0.516	9.345	4.397	*a*
Stepfather/any step-half sibs	0.027	0.157	10.563	5.487	*a,b,c*
No father/any step-half sibs	0.056	0.327	10.343	5.121	*a,b,c*

[a] different from biological father, no step/half sibs, p<.05

[b] different from biological father, any step/half sibs, p<.05

[c] different from no biological father, no step/half sibs, p<.05

Table 2

Weighted descriptive statistics, overall and by family composition at age 4 (ECLS-B)

	Overall	Two biological/ adoptive parents, no step/half sibs	Step/social father, no step/half sibs		Unpartnered mother, no step/half sibs		Two biological/ adoptive parents, any step/half sibs		Step/social father, any step/half sibs		Unpartnered mother, any step/half sibs	
Mother's race/ethnicity												
Non-Hispanic White	0.537	0.608	0.587		0.306		0.525		0.684		0.266	
Non-Hispanic Black	0.139	0.066	0.137	*	0.365	*	0.121	*	0.117	*	0.395	*
Hispanic, any race	0.253	0.249	0.239		0.259		0.298		0.111	*	0.284	
Other race	0.072	0.077	0.037		0.070		0.056	*	0.088		0.056	
Male	0.512	0.520	0.452		0.515		0.495		0.442		0.515	
Child age in months	68.165	68.204	67.903		68.148		68.059		68.043		68.118	
Mother married at birth	0.672	0.840	0.397		0.271		0.643		0.288		0.211	
Mother cohabiting at birth (vs. married)	0.208	0.130	0.291	*	0.362	*	0.304	*	0.370	*	0.407	*
Mother single at birth (vs. married)	0.119	0.030	0.313	*	0.366	*	0.053	*	0.341	*	0.369	*
Child temperament at 9 months (higher=poorer self-regulation)	4.201	4.095	4.481		4.394	*	4.419	*	4.269		4.371	
Mother's age at child's birth	27.508	28.643	23.813	*	23.827	*	29.170		22.613	*	26.135	*
Mother's education at birth												
<High school	0.182	0.140	0.219	*	0.278	*	0.198	*	0.277	*	0.316	*
High school/GED	0.281	0.227	0.397	*	0.359	*	0.359	*	0.484	*	0.414	*
Some post-secondary	0.284	0.285	0.300		0.265		0.352	*	0.226		0.233	
College degree+	0.253	0.349	0.083	*	0.099	*	0.092	*	0.013	*	0.037	*
Sibship composition												
Child is first-born	0.424	0.433	0.610	*	0.627	*	0.049	*	0.492		0.219	*
Child is second-born	0.341	0.360	0.253	*	0.232	*	0.428	*	0.312		0.339	
Child is third-born or higher	0.236	0.207	0.136		0.140	*	0.523	*	0.196		0.442	*

	Overall	Two biological/ adoptive parents, no step/half sibs	Step/social father, no step/half sibs		Unpartnered mother, no step/half sibs		Two biological/ adoptive parents, any step/half sibs		Step/social father, any step/half sibs		Unpartnered mother, any step/half sibs	
Child has no full siblings	0.279	0.154	0.467	*	0.463	*	0.434	*	0.650	*	0.682	*
Child has 1 full sibling	0.438	0.494	0.362	*	0.337	*	0.416	*	0.276	*	0.222	*
Child has 2 or more full siblings	0.283	0.352	0.171	*	0.200	*	0.151	*	0.073	*	0.096	*
Household resources												
HH income<FPL	0.238	0.145	0.252	*	0.447	*	0.265	*	0.380	*	0.605	*
Any child food insecurity	0.132	0.080	0.139		0.241	*	0.144	*	0.296	*	0.330	*
Child has > 25 books	0.679	0.741	0.612		0.484	*	0.704		0.696		0.482	*
Child watches<=4 h rs TV/weekday	0.904	0.913	0.916		0.870	*	0.897		0.946		0.876	
Child has computer at home	0.605	0.664	0.490	*	0.436	*	0.642		0.547	*	0.409	*
Frequency of reading with child	3.090	3.195	3.093	*	2.900	*	2.954	*	3.055		2.641	*
Frequency of story telling	2.671	2.692	2.828		2.612		2.683		2.567		2.539	*
Family dines together>=5x/week	0.739	0.760	0.833		0.640	*	0.766		0.673		0.709	
Parent plays with child>1x/week	0.672	0.683	0.749		0.668		0.621		0.589		0.642	
Child to library>=1/month	0.393	0.429	0.401		0.355	*	0.300	*	0.335	*	0.263	*
Any structured activities	0.461	0.508	0.405	*	0.383	*	0.383	*	0.393	*	0.322	*
Maternal health (1-5, 5=excellent)	3.834	3.937	3.705	*	3.650	*	3.650	*	3.759	*	3.540	*
Maternal depression (CES-D sum score)	5.013	4.312	4.827		7.004	*	5.173	*	4.765		7.600	*
~N	6550	4250	200		1000		600		150		350	

* p<.05 compared to two biological/adoptive parents, no step/half sibs

Table 3

Negative binomial regressions predicting children's aggressive behavior scores at school entry as a function of family composition at age 4, various specifications (ECLS-B)

	Model 1			Model 2			Model 3			Model 4		
	B	SE		B	SE		B	SE		B	SE	
Race/ethnicity (vs. Non-Hispanic white)												
Non-Hispanic Black	−0.026	0.027		−0.051	0.027	†	−0.052	0.027	†	−0.052	0.027	†
Hispanic, any race	−0.014	0.022		−0.011	0.023		−0.008	0.023		−0.008	0.022	
Other race	−0.034	0.028		−0.039	0.028		−0.038	0.027		−0.038	0.027	
Male	0.189	0.017	***	0.190	0.017	***	0.191	0.017	***	0.191	0.017	***
Child age in months	−0.007	0.002	***	−0.007	0.002	***	−0.007	0.002	***	−0.007	0.002	***
Mother cohabiting at birth (vs. married)	0.031	0.024		0.009	0.024		−0.002	0.024		−0.002	0.024	
Mother single at birth (vs. married)	0.025	0.031		−0.030	0.034		−0.041	0.033		−0.042	0.033	
Child temperament at 9 months	0.028	0.004	***	0.029	0.004	***	0.029	0.004	***	0.029	0.004	***
Mother's age at child's birth	−0.005	0.002	**	−0.004	0.002	*	−0.004	0.002	*	−0.003	0.002	*
Mother's education												
Less than high school	0.021	0.028		0.028	0.028		0.024	0.027		0.024	0.027	
Some post secondary education	−0.005	0.023		−0.002	0.023		0.001	0.023		0.002	0.023	
College graduate or more	−0.037	0.027		−0.034	0.026		−0.029	0.026		−0.029	0.027	
Sibship composition												
Child is second-born	0.064	0.022	**	0.099	0.020	***	0.061	0.022	**	0.062	0.022	**
Child is third-born or higher	−0.011	0.031		0.066	0.023	**	−0.023	0.031		−0.021	0.031	
Child has 1 full sibling	−0.001	0.024					0.023	0.025		0.022	0.025	
Child has 2+ full siblings	0.062	0.030	*				0.093	0.031	**	0.091	0.031	**
Any step- or half-siblings	0.130	0.027	***				0.126	0.027	***			
Mother's union status												
Mother is unpartnered				0.137	0.026	***	0.141	0.026	***			
Stepfather/social father				0.134	0.041	**	0.108	0.042	*			
Complex sibship and union status												
Stepfather/no sibs										0.084	0.055	
No father/no sibs										0.146	0.029	***

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	Model 1			Model 2			Model 3			Model 4		
	B	SE		B	SE		B	SE		B	SE	
Bio father/step-half sibs										0.126	0.034	***
Stepfather/step-half sibs										0.258	0.058	***
No father/step-half sibs										0.253	0.044	***
Intercept	2.520	0.142	***	2.492	0.140	***	2.463	0.142	***	2.461	0.141	***
/lnalpha	−2.120	0.056		−2.127	0.056		−2.142	0.057		−2.14	0.057	
N~6550												
Significant post-hoc tests in model 4												

Stepfather with no half/step sibs vs. stepfather with half/step sibs (p<.05)

Stepfather with no half/step sibs vs. unpartnered mother with half/step sibs (p<.05)

Unpartnered mother with no half/step sibs vs. stepfather with half/step sibs (p<.10)

Unpartnered mother with no half/step sibs vs. unpartnered mother with half/step sibs (p<.05)

Biological/adoptive father with half/step sibs vs. stepfather with half/step sibs (p<.05)

Biological/adoptive father with half/step sibs vs. unpartnered mother with half/step sibs (p<.01)

Table 4

Negative binomial regressions predicting children's aggressive behavior scores at school entry as a function of family composition and resources, ECLS-B

	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	B	SE		B	SE		B	SE		B	SE		B	SE		B	SE	
Race/ethnicity (vs. non-Hispanic white)																		
Black	−0.061	0.027	*	−0.078	0.028	**	−0.073	0.027	**	−0.052	0.027	†	−0.062	0.026	*	−0.090	0.028	**
Hispanic, any race	−0.013	0.023		−0.036	0.024		−0.028	0.023		−0.015	0.023		−0.007	0.022		−0.040	0.024	
Other race	−0.045	0.028		−0.051	0.028	†	−0.046	0.027	†	−0.045	0.027		−0.050	0.028	†	−0.066	0.027	*
Male	0.194	0.017	***	0.191	0.017	***	0.190	0.017	***	0.189	0.017	***	0.197	0.016	***	0.195	0.016	***
Child age in months	−0.008	0.002	***	−0.008	0.002	***	−0.008	0.002	***	−0.008	0.002	***	−0.008	0.002	***	−0.008	0.002	***
Mother cohabiting at birth (vs. married)	−0.009	0.025		−0.009	0.024		0.001	0.024		−0.007	0.024		−0.011	0.024		−0.017	0.024	
Mother single at birth (vs. married)	−0.041	0.033		−0.047	0.033		−0.042	0.033		−0.045	0.033		−0.041	0.033		−0.046	0.033	
Child temperament at 9 months	0.028	0.004	***	0.028	0.004	***	0.027	0.004	***	0.029	0.004	***	0.023	0.004	***	0.022	0.004	***
Mother's age at child's birth	−0.003	0.002	†	−0.003	0.002	†	−0.004	0.002	*	−0.003	0.002	*	−0.004	0.002	*	−0.004	0.002	*
Maternal education																		
Less than high school	0.007	0.028		0.013	0.028		0.018	0.027		0.020	0.027		0.007	0.027		−0.010	0.027	
Some post-secondary education	0.011	0.023		0.018	0.023		0.013	0.023		0.010	0.023		0.017	0.022		0.041	0.023	†
College graduate or more	−0.010	0.027		−0.004	0.027		−0.008	0.027		−0.010	0.027		0.010	0.027		0.050	0.028	†
Birth order and full sibship																		
Child is second-born	0.063	0.022	**	0.063	0.022	**	0.056	0.022	*	0.060	0.022	**	0.063	0.022	**	0.058	0.022	**
Child is third-born or higher	−0.028	0.031		−0.018	0.031		−0.026	0.031		−0.020	0.031		−0.023	0.030		−0.027	0.030	
Child has 1 full sibling	0.014	0.025		0.020	0.024		0.018	0.024		0.020	0.024		0.012	0.024		0.001	0.024	
Child has 2+ full siblings	0.078	0.031	*	0.086	0.031	**	0.087	0.031	**	0.087	0.031	**	0.089	0.030	**	0.074	0.030	*
Complex sibship and union status																		
Stepfather/no sibs	0.078	0.055		0.077	0.054		0.096	0.055	†	0.082	0.054		0.080	0.053		0.083	0.053	
No father/no sibs	0.123	0.029	***	0.138	0.029	***	0.140	0.029	***	0.145	0.029	***	0.110	0.029	***	0.095	0.029	**
Bio father/step-half sibs	0.119	0.033	***	0.130	0.033	***	0.123	0.033	***	0.122	0.033	***	0.115	0.032	***	0.110	0.032	**
Stepfather/step-half sibs	0.233	0.059	***	0.260	0.058	***	0.243	0.058	***	0.258	0.058	***	0.260	0.057	***	0.237	0.058	***
No father/step-half sibs	0.217	0.044	***	0.245	0.044	***	0.243	0.043	***	0.248	0.044	***	0.212	0.043	***	0.186	0.044	***
Household resources																		
HH income<FPL	0.046	0.024	†													0.026	0.024	

	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	B	SE		B	SE		B	SE		B	SE		B	SE		B	SE	
Any child food insecurity	0.096	0.026	***													0.034	0.025	
Child has > 25 books				−0.051	0.022	*										−0.019	0.022	
Child watches<=4 hrs TV/weekday				−0.009	0.027											−0.001	0.027	
Child has computer at home				−0.061	0.019	**										−0.030	0.019	
Frequency of reading with child							−0.014	0.012								−0.004	0.012	
Frequency of story telling							−0.046	0.010	***							−0.043	0.010	***
Family dines together>=5x/week							−0.018	0.019								−0.010	0.019	
Parent plays with child>1x/week							−0.047	0.018	**							−0.047	0.018	**
Child to library>=1/month							−0.027	0.018								−0.014	0.018	
Any structured activities										−0.063	0.018	***				−0.038	0.018	*
Maternal health (1-5, 5=excellent)													−0.036	0.010	***	−0.032	0.010	**
Maternal depression (CES-D sum score)													0.015	0.002	***	0.013	0.002	***
Intercept	2.465	0.141	***	2.565	0.145	***	2.715	0.146	***	2.500	0.141	***	2.566	0.144	***	2.822	0.152	***
lnalpha	−2.157	0.057		−2.155	0.057		−2.179	0.058		−2.151	0.057		−2.229	0.059		−2.273	0.061	
N~6550																		

Significant post-hoc tests in Model 6 (p<.05)

Stepfather with no step-half sibs vs. stepfather with step-half sibs (p<.05)

Stepfather with no step-half sibs vs. unpartnered mother with any step-half sibs (p<.10)

Unpartnered mother with no step-half sibs vs. stepfather with any step-half sibs (p<.05)

Unpartnered mother with no step-half sibs vs. unpartnered mother with any step-half sibs (p<.05)

Two bio/adoptive parents with any step-half sibs vs. stepfather with any step-half sibs (p<.10)

Stepfather with any step-half sibs vs. unpartnered mother with any step-half sibs (p<.10)