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Family Structure and Children's Behavioral and Cognitive Outcomes

We used data from the National Longitudinal Survey of Youth to examine the effect of various family structures on behavioral and cognitive outcomes for children aged 7 to 10. We extended previous research by using a longitudinal definition of family structure and by exploring multiple mechanisms through which family structure may affect children in 2 outcome domains. We found that family income, mother's psychological functioning, and the quality of the home environment are particularly important for children's behavior, whereas family income and mother's aptitude have notable effects on children's cognitive test scores.

Changes in marriage, divorce, and fertility since the 1960s have led to a striking increase in the number of families headed by a single parent (McLanahan & Casper, 1995). As family structure has changed, so has the likelihood that children will spend time in a "nontraditional" family. Of children born in the 1980s, about half will spend some time in a single-parent family before they reach age 18 (Bumpass & Raley, 1995; Castro-Martin & Bumpass, 1989). As fewer children spend most or all of their childhood living with two biological parents, concern has risen about the consequences of various family structures for children's development and well-being. Research shows that children reared in single-parent families do not fare as well as those reared in two-parent families, on average, regardless of race, education, or parental remarriage (McLanahan & Sandefur, 1994); they are more likely to experience increased academic difficulties and higher levels of emotional, psychological, and behavioral problems (see, for example, Amato, 1994; Dawson, 1991; McLanahan, 1997).

Although family trajectories have become increasingly diverse in recent decades, researchers are only beginning to include more complex specifications of family structure in their models. Many studies have used mother's marital status—often at one point in time—as the primary indicator of family structure, and few have included longitudinal data in the specification of family structure (exceptions include Aquilino, 1996; Cooksey, 1997; Hill, Yeung, & Duncan, 2001). Also, research that does examine the effects of a broader range of family types typically focuses on only one category of outcomes. Cooksey, for instance, examined only cognitive outcomes; Hill et al. focused on schooling and nonmarital childbearing. Effects of family structure on child outcomes likely differ depending on the domain of

outcomes examined (Kalil, Rosenblum, Eccles, & Sameroff, 1998; Musick & Bumpass, 1997).

We used data from the National Longitudinal Survey of Youth (NLSY) to examine the effect of various longitudinally defined family structures on both behavioral and cognitive outcomes for children aged 7 to 10. We explored four possible mechanisms through which family structure might influence children's outcomes—economic resources, parental socialization, childhood stress, and maternal psychological functioning. This study extends past research in four respects. First, we used a more rich and full definition of family structure than most past researchers have used. Second, we replicated the research of Cooksey (1997) on cognitive outcomes using more recent data from the NLSY child subsample; this allowed us to include children of women who became mothers at older ages, so we had a more representative sample of mother-child pairs. Third, we explored multiple mechanisms by which family structure might affect child outcomes. Fourth, we examined how family structure affects behavioral as well as cognitive outcomes; this permitted us to compare and contrast effects of family structure in two domains.

Previous Research and Theoretical Framework

The link between family structure and young adult outcomes is no longer questioned (McLanahan & Sandefur, 1994; Wu, Cherlin, & Bumpass, 1997). Single-parent families have been associated with delinquent behavior (Dornbusch et al.,1985; Steinberg, 1987), use of drugs, alcohol and tobacco (Covey & Tam, 1990; Stern, Northman, & Van Slyck, 1984), lower self-esteem (Parish, 1991), dropping out of high school (Astone & McLanahan, 1991), younger age at leaving home (Goldscheider & Goldscheider, 1993), and early sexual activity (Thornton & Camburn, 1987; Wu, 1996).

Because parents influence their children in many and multifaceted ways, the theoretical mechanisms that may explain the effect of family structure on child outcomes are numerous. Four primary causal mechanisms that have been discussed in the literature are economic status, parental socialization, childhood stress, and maternal psychological well-being (Amato, 1993; Aquilino, 1996; McLanahan & Bumpass, 1988; Wu et al., 1997). These mechanisms are neither exclusive

nor exhaustive, and several could be operating simultaneously or interactively.

Economic Status

Economic status is an important mediator of the effect of family structure on young adult outcomes because family structure and economic status are correlated, and low income has proven negative consequences for children (Duncan & Brooks-Gunn, 1997). Although fathers living away from their children are expected to make regular payments to support them, almost two thirds of single mothers receive no child support (Sorensen, 1997). Female-headed families with children are more than 5 times as likely to be poor as married-couple families with children—44.8% compared with 8.7% (Baugher & Lamison-White, 1996), and their average family income is about one third that of their married-couple counterparts, $15,400 compared with $44,600 (in 1989 dollars; Committee on Ways and Means, 1996).

Children who experience persistent poverty face developmental deficits (Duncan, Brooks-Gunn, Klebanov, 1994; Korenman, Miller, & Sjaastad, 1995). One reason may be that low-income families are not able to afford adequate food, shelter, and other material goods that foster healthy cognitive and social development of children (Hanson, McLanahan, & Thomson, 1997; Hill et al., 2001). Family income also affects the type of neighborhood in which families can afford to live, and children in higher income communities are more likely to receive positive peer influences that encourage achievement and prosocial behavior (McLanahan & Sandefur, 1994). In addition, poverty and economic stress may lead to less effective parenting which, in turn, has adverse consequences for children's development and adjustment (Conger et al., 1992; Dodge, Petit, & Bates, 1994).

Socialization

The child's home provides a context where learning and socialization take place, and apart from other variables, the quality and characteristics of the home environment have important consequences for child outcomes. A stimulating home environment with opportunities for learning and exploration and that provides warmth and emotional support will foster healthy growth and development of children (Bradley & Rock, 1988). When two parents are present in the child's home,

they share the responsibility of monitoring the child's activities and providing encouragement and discipline as needed. When parents live apart, the residential parent often becomes the primary (or sole) provider of both economic and parental resources, and thus competing time demands necessarily entail less investment in monitoring and socializing children. The nonresidential parent is less proximate to the activities of the child and therefore has less regular interaction and involvement in day-to-day activities.

Stress

Stress theory holds that changes in family organization and circumstances cause stress in children's lives; this is because changes may lead to modifications in family dynamics, organization, and roles that yield behavior modifications for both children and adults (Elder, 1974; Hill et al., 2001). Certain family events may directly increase children's stress because of observed conflict and tension between their parents, changes in household composition, or changes in residential location. In response to difficulties at home, children may disengage from the home environment and receive less parental nurturing and socialization and may be more susceptible to negative peer influences. Some researchers have posited that the stress of family change is cumulative because any disruption requires readaption, and therefore the number of family transitions has greater negative consequences for children than any particular family structure experienced (Amato, 1993; Wu & Martinson, 1993).

Maternal Psychological Well-Being

Maternal psychological health is yet another mechanism that might account for effects of family structure on children's behavior and cognitive test scores. Single mothers report higher rates of depression and lower levels of psychological functioning then do other mothers (Kalil et al., 1998; McLanahan & Adams, 1987; McLoyd, 1990). This could be due to the stress of marital disruption or to the everyday strain of coping with family problems with limited financial and social resources. Mothers' poor mental health has been shown to adversely affect child behavior (Downey & Coyne, 1990). This may be because lower psychological well-being leads to inferior parenting practices or because a depressed mother's negative outlook about her child may increase her percep-

tion of behavior problems (Friedlander, Weiss, & Traylor, 1986).

DATA AND SAMPLE

We used the matched mother and child files from the NLSY to estimate the effects of family structure on children's behavioral and cognitive outcomes. The NLSY includes detailed measures of child development and well-being and information on family structure and household composition, family income, quality of the home environment, maternal characteristics, and other sociodemographic factors. The original NLSY sample included approximately 6,300 young women aged 14 to 21 in 1979, and reinterviews have been conducted annually through 1994 (and biennially thereafter). Children born to NLSY female respondents have been assessed every 2 years beginning in 1986 (or the 1st survey year after birth). These children are born to a sample of relatively young and disadvantaged mothers who are disproportionately Hispanic and African American (Chase-Lansdale, Mott, Brooks-Gunn, & Phillips, 1991). When weighted, the child sample represents a cross-section of children born to a nationally representative sample of women who were between the ages of 29 and 36 on January 1, 1994. These children represent approximately 70% to 75% of all children that will be born to a typical cohort of American women because women aged 19 to 36 are not at the end of their childbearing years (Center for Human Resource Research, 1997). Our sample included the 1,809 children aged 7 to 10 who were living with their mothers at the time of the 1994 interview; this age range allowed us to examine outcomes for elementary-school-aged children and is roughly comparable to the sample used by Cooksey (1997). Robust standard errors were estimated in all multivariate equations to adjust for clustering of multiple children in the same family.

VARIABLES

Dependent Variables

We examined both behavioral and cognitive outcomes. We used the Behavior Problems Index (BPI) to measure behavioral problems. Developed by Nicholas Zill and James Peterson, the BPI includes 28 measures of child adjustment and behavior problems that children aged 4 and older may have exhibited in the past 3 months, as re-

ported by the child's mother. In constructing the BPI, many items from the Achenbach Behavior Problems Checklist (Achenbach & Edlebrock, 1981) were used, as were other well-known child behavior indexes. A common response scale is used for each item (*often true, sometimes true,* or *not true*). Scores for each of the items are summed, and higher scores indicate a higher level of behavioral problems. We used the total BPI (nationally age-normed percentile scores), which reflects both externalizing and internalizing behavior problems. (We also estimated separate models for the externalizing and internalizing subscales of the BPI, although these results are not shown in the article.)

The BPI scores are based entirely on mothers' reports, which means that they reflect mothers' perceptions of their children instead of objective measurements of children's actual behavior. Research demonstrates that mothers do provide valid and reliable assessments about their children's behavior (Bird, Gould, & Staghezza, 1992) and that earlier estimates of biased reports by mothers of their children's behavior may have been overstated (Richters, 1992).

To represent children's cognitive ability, we used two subtests of the Peabody Individual Achievement Test (PIAT), math and reading recognition. (We also estimated models for the PIAT reading comprehension subtest scores, which are highly correlated with reading recognition scores ($r = .77$). We report results only for reading recognition because there is greater variance and fewer missing cases within our sample for this subtest.) The PIAT is a widely used measure of academic achievement for children aged 5 and older, and it is generally considered to be a highly reliable and valid assessment (Center for Human Resource Research, 1997). Each subtest includes numerous questions that increase in difficulty. The reading recognition test measures word recognition and pronunciation ability, and the math test measures basic math skills and concepts. We used age-normed percentile scores.

Independent Variables

Family Structure. We constructed dummy variables to represent five possible family types based on mothers' annual marital status from the year of the child's birth through 1994: two-parent all years (omitted category), single-parent all years, single-parent to two-parent, two-parent to single-parent, and multiple transitions in family structure.

The definition of single parents included never-married, divorced, widowed, and separated mothers; although these categories of single parenthood are not identical, we combined them because of sample-size limitations, to be consistent with previous research, and to focus on dynamics between the single- and two-parent state. The male parent in a two-parent home can be either the biological father or a stepfather.

Economic status. We operationalized economic status as family income over time. It was specified as the natural log of the inflation-adjusted mean in 1994 dollars of all years available from the child's first survey year through 1994. The average was taken over all nonmissing income values, and income was assigned as missing for an observation if there were less than three valid income values.

Socialization. We represented socialization by the Home Observation and Measurement of the Environment (HOME). In the NLSY, a shortened version of the HOME scale developed by Caldwell and Bradley (1984), was included to measure the quality of the child's home environment. The HOME includes interviewer observations and maternal reports related to cognitive stimulation and emotional support in the home. Ideally, one would want direct measures of parental involvement and interaction with children to evaluate the effect of socialization for children. Because direct information on the quality of the parent-child relationship is not available in the NLSY for children aged 7 to 10, we used the HOME score to represent the quality of the child's home environment, including both emotional support and cognitive stimulation.

Stress. Any family transition may be stressful for children, and more transitions may lead to greater stress (Aquilino, 1996; Wu & Martinson, 1993). Therefore, one measure of children's stress is the number of family transitions experienced since birth. Clearly, family transitions represent only one possible source of stress for children, and other transitions such as moving or changing schools might also induce stress; we used family transitions because it is consistent with other literature on how stress may mediate family structure effects (e.g. Wu & Martinson). In our analysis, the stress hypothesis was evaluated by examining whether children who experience more than one family transition fare worse on the outcome mea-

sures than children in stable family types (either two parent or single parent).

Characteristics of the child. We included race, gender, birth order (whether first born), number of siblings, and whether the child was of low birth weight (less than 5.5 pounds).

Mothers' demographic characteristics. We included age at first birth, educational attainment (years of schooling), and aptitude as measured by the Armed Forces Qualifications Test (AFQT; we divided the total score by 10 to yield a range of 1 to 100).

Mothers' psychological well-being. This was represented by two indicators. Risk of depression was measured using the Center for Epidemiologic Studies Depression (CES-D) scale. The CES-D was designed to measure the frequency of depressive symptoms that have been identified in the clinical literature on depression (Radloff, 1977). For a set of 20 items that correspond to six emotional components (depressed mood, guilt and worthlessness, helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance), respondents indicate the frequency that each symptom occurred in the previous week, from 0 (*less than 1 day*) to 3 (*5 to 7 days*). Responses are summed across items, with a score of 16 or higher indicating risk of depression and a score of 24 or more indicating high risk (Radloff).

The second indicator of mothers' mental health was level of mastery, measured using the Pearlin scale (Pearlin & Schooler, 1978). Mastery reflects the extent to which a person feels his or her life is under his or her own control, and it has been shown to mediate the relationship between negative life events and actual stress (Pearlin, Lieberman, Menaghan, & Mullan, 1981). Respondents evaluate the extent to which seven statements describe themselves (such as "there is no way I can solve some of the problems I have" and "I feel that I am being pushed around in life"). For each statement, respondents can choose one of three choices (*not at all like me, somewhat like me,* or *a lot like me*). Scores for each question are summed, and higher scores on the Pearlin scale indicate a higher level of mastery.

Sample Description

More than half of our sample (58%) lived in two-parent families for all years observed; 12% lived in mother-only families; 6% began in a single-parent home and were in a two-parent home at the end of the observation period; 13% began in a two-parent home and made a transition to a single-parent home; and 12% experienced more than one family transition. Average family income was approximately $38,500 per year. About half of the children were girls, and more than three fourths were White (non-Black, non-Hispanic); 44% were first born, and 7% had low birth weight. The mothers of children in the sample were on average 22 years of age at first birth and had a mean AFQT score of 677, a mean CES-D score of 9.7, and a mean Pearlin mastery score of 21.9.

Table 1 reports the means of the family characteristics, mothers' characteristics, and outcome variables for each of the five family types we examined, as well as the overall sample means. Consistent with past research, we found that children reared in two-parent families since birth are better off in terms of family income and home environment, maternal characteristics, and cognitive and behavioral outcomes compared with children who spent some time in a single-parent home. For instance, the average family income in continuous two-parent families is $48,000 per year and ranges from $16,500 to $29,500 in nonintact families. The average HOME score is 64 in continuous two-parent families and ranges from 28 to 44 for the other four family types.

Among nonintact family types, children raised in single-parent homes since birth are more disadvantaged on every dimension we examined compared with children raised in the three other family types (single-parent to two-parent, two-parent to single-parent, and multiple transitions). Continuous single-parent families, on average, have the lowest incomes, the lowest scores on the HOME scale, and the lowest mothers' AFQT scores and years of education; mothers in these families are also at higher risk of depression than are mothers in the three other nonintact family types. Also, children raised in mother-only families continuously since birth have higher average levels of behavioral problems and lower cognitive test scores than children in the other three types of nonintact families. (We also examined differences by family type within the three major racial and ethnic groups—Black, Hispanic and non-Black, non-Hispanic. We found that although the general pattern of results is the same for family and maternal characteristics within all three groups [continuous two-parent families have "better" scores across indicators], child outcome

TABLE 1. DESCRIPTIVE CHARACTERISTICS BY FAMILY TYPE (MEANS)[a]

	Overall		Two-Parent All Years (a)	Single-Parent All Years[c] (b)	Single- to Two-Parent (c)	Two- to Single-Parent (d)	Multiple Transitions (e)	Significant Differences[b]
	M	(SD)						
Family characteristics								
Average income[c]	$38,502	($23,958)	$48,061	$16,533	$25,937	$28,541	$29,498	a > b, c, d, e; c, d, e > b
HOME score	53.26	(28.33)	63.60	28.44	43.75	39.39	43.22	a > b, c, d, e; c, d, e > b; e > d
Mother characteristics								
Age at first birth	21.97	(3.19)	22.83	20.41	20.84	21.14	20.67	a > b, c, d, e; d > b
AFQT score	676.84	(211.01)	735.82	514.92	574.31	660.13	618.56	a > b, c, d, e; c, d, e > b; d > c, e
Years of education	12.66	(2.15)	13.07	11.79	11.93	12.47	12.02	a > b, c, d, e; d > b, c, e
CES-D scores, 1992	9.68	(9.01)	7.99	13.68	9.92	12.67	11.00	a < b, c, d, e; c < b, d; e < b, d
Pearlin mastery, 1992	21.92	(3.12)	22.10	21.13	21.11	21.92	22.13	a > b, c; d > b, c; e > b, c
Outcome variables								
BPI total score	55.73	(26.98)	51.17	66.24	57.03	61.18	61.94	a < b, c, d, e; c < b
PIAT								
Math	54.97	(26.15)	59.37	42.58	46.11	54.09	50.71	a > b, c, d, e; d > b, c; e > b
Reading Recognition	60.06	(27.60)	64.78	47.50	52.53	57.75	55.32	a > b, c, d, e; d, e > b
Number of cases (n)	1,809		881	316	133	241	238	

Note: AFQT = Armed Forces Qualification Test; BPI = Behavior Problems Index; CES-D = Center for Epidemiologic Studies—Depression; HOME = Home Observation and Measurement of the Environment; PIAT = Peabody Individual Achievement Tests.

[a] All means are weighted by the 1994 child sampling weight; numbers of cases (*n*) are unweighted. All items were measured in 1994 unless indicated otherwise. [b] Computed using the least significant differences multiple comparison test ($p < .05$). [c] Income is averaged over all years from child's birth through 1994, in constant 1994 dollars.

scores for Blacks and Hispanics did not follow this pattern; also, there is less overall variation by family type within the Black and Hispanic groups compared with the non-Black, non-Hispanic group.)

REGRESSION RESULTS

Table 2 presents results for the BPI score, and Tables 3 and 4 present results for the PIAT reading recognition and math scores, respectively. In each table, we estimated five models using ordinary least squares regression; missing data are treated with listwise deletion. In Model 1, we regressed the child outcome measure on the child's characteristics and four dummy variables representing the five family structure categories—two-parent all years (omitted category), single-parent all years, single-parent to two-parent, two-parent to single-parent, and multiple transitions. This allowed us to compare the effects of growing up in different kinds of nonintact families.

The second and third models add maternal characteristics. In Model 2, we controlled for mothers' age at first birth, years of schooling, and AFQT score; and in Model 3, we controlled for mothers' risk of depression and level of mastery; these models enabled us to estimate the extent to which the negative effects of growing up in a nonintact family on children's behavioral and cognitive outcomes are due to mothers' aptitude and psychological distress, respectively. In Model 4, we included a measure of family income to examine the extent to which family structure effects are due to economic status. In the final model, we added a measure of the quality of the child's home environment that serves as a proxy for parental socialization.

Results for the total BPI score are shown in Table 2. (The pattern of results for the externalizing and internalizing subscales of the BPI [figures not shown] was similar to that for the total BPI score.) In the first model where we controlled only for children's characteristics, the coefficients on three of the four family structure dummy variables were positive and significant. Children who had spent some time in a single-parent home (except those who transitioned from one to two parents) had more reported behavioral problems than did children who had grown up in a two-parent home since birth. Relative to growing up in a continuous two-parent home, growing up in a continuous single-parent family increased the total BPI score by nearly 9 points, and growing up in a two-

parent to single-parent family or in a family that experiences multiple transitions increased the BPI by almost 7 points. Several child characteristics are also significantly associated with the BPI total score: girls had average scores nearly 7 points lower than boys, and first-born children had scores that were about 4 points lower than other children.

Controlling mothers' age at first birth, schooling, and test scores (Model 2) somewhat decreased the sizes of the family structure coefficients. When mothers' risk of depression and mastery were controlled (Model 3), the magnitude and significance of the family structure effects dropped further, particularly for the continuous single-parent family type and the two-to-one category. Apparently, one reason children raised in such families are more likely to have behavior problems is that their mothers have higher risks of depression (there is less variation in mastery by family type). This is consistent with the argument that the everyday stresses of single parenting reduce parenting effectiveness by negatively affecting mothers' psychological functioning (McLanahan & Adams, 1997; McLoyd, 1998).

The point estimates of family background on children's BPI scores dropped sharply when we controlled for income in Model 4; in this regression, the coefficients on the family structure measures are insignificant and mostly small in magnitude (and the set of family structure variables is no longer significant). Income itself is negatively and significantly associated with children's BPI scores: Children from low-income families exhibit greater behavioral problems on average than do children from higher income families.

The final model adds the HOME score as a proxy for parental socialization. The HOME score was significantly and negatively associated with behavioral problems, indicating that a higher quality home environment was associated with fewer behavioral problems. Other factors that were significantly associated with fewer behavioral problems after all controls were entered include being a girl, number of siblings, mothers' level of mastery, and income, whereas mothers' risk of depression was associated with greater behavioral problems among children. (Although the siblings result seems in contrast to literature showing that family size is a risk factor for children, we expect that because our measure of behavior problems is mother reported, mothers with more children in the household may be less aware of any given child's behavioral problems.)

The pattern of results changed when we ex-

Table 2. Estimated Coefficients of Ordinary Least Squares Regression Models: BPI Total Percentile Scores for Children Aged 7 to 10 in 1994

	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure					
Two-parent all years	Excluded	Excluded	Excluded	Excluded	Excluded
Single-parent all years	8.533***	6.663***	4.666*	.994	−.960
	(2.390)	(2.458)	(2.417)	(2.687)	(2.726)
Single-parent to two-parent	2.022	.659	−.138	−1.814	−2.300
	(2.920)	(3.005)	(3.000)	(3.053)	(3.006)
Two-parent to single-parent	6.676***	5.823**	3.649	1.765	−.307
	(2.322)	(2.342)	(2.330)	(2.368)	(2.416)
Multiple transitions	6.771**	5.429*	4.535*	3.096	2.044
	(2.698)	(2.822)	(2.725)	(2.758)	(2.814)
Child's characteristics					
Race					
White[a]	Excluded	Excluded	Excluded	Excluded	Excluded
Black	2.170	.681	1.770	1.509	.396
	(2.035)	(2.314)	(2.233)	(2.220)	(2.200)
Hispanic	3.876*	1.534	1.649	1.443	.681
	(2.073)	(2.221)	(2.120)	(2.111)	(2.108)
Female	−6.794***	−6.866***	−6.194***	−6.043***	−5.490***
	(1.421)	(1.414)	(1.383)	(1.378)	(1.380)
First born	−3.743**	−2.947*	−2.523	−2.453	−2.243
	(1.519)	(1.700)	(1.663)	(1.663)	(1.652)
Number of siblings	−1.289	−1.661**	−1.881**	−1.960**	−2.208***
	(.808)	(.807)	(.808)	(.803)	(.805)
Low birth weight	3.264	2.715	2.441	2.453	2.188
	(2.854)	(2.836)	(2.772)	(2.764)	(2.780)
Mother's demographic characteristics					
Age at first birth		−.056	−.094	−.042	−.060
		(.307)	(.300)	(.302)	(.300)
Years of education		−.643	−.371	−.158	−.028
		(.469)	(.453)	(.458)	(.448)
AFQT score		−.088	−.010	.032	.045
		(.057)	(.056)	(.057)	(.057)
Mother's psychological well-being					
CES-D score			.476***	.458***	.445***
			(.084)	(.084)	(.085)
Pearlin mastery score			−.172***	−1.094***	−.980***
			(.266)	(.267)	(.267)
Economic status					
Income (natural log)[b]				−4.731***	−3.713**
				(1.496)	(1.507)
Socialization					
HOME score					−.126***
					(.031)
Constant	59.441***	76.141***	89.479***	131.298***	123.846***
	(2.178)	(7.687)	(9.137)	(15.086)	(15.146)
Model *F* test	6.56***	5.92***	12.66***	12.89***	13.52***
R^2	.048	.057	.115	.122	.134

Note: Robust standard errors have been estimated to adjust for clustering of multiple children of the same mother. Number of cases in analysis is 1,418. AFQT = Armed Forces Qualification Test; BPI = Behavior Problems Index; CES-D = Center for Epidemiologic Studies—Depression; HOME = Home Observation and Measurement of the Environment.

[a]Non-Black, non-Hispanic. [b]Average annual family income for child's 1st survey year through 1994, in 1994 dollars.
*$p < .1$. **$p < .05$. ***$p < .01$.

TABLE 3. ESTIMATED COEFFICIENTS OF ORDINARY LEAST SQUARES REGRESSION MODELS: PIAT READING RECOGNITION PERCENTILE SCORES FOR CHILDREN AGED 7 TO 10 IN 1994

	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure					
Two-parent all years	Excluded	Excluded	Excluded	Excluded	Excluded
Single-parent all years	−12.787***	−7.003***	−6.611***	−2.974	−2.022
	(2.361)	(2.317)	(2.344)	(2.636)	(2.707)
Single-parent to two-parent	−5.888*	−1.234	−1.068	.599	.838
	(3.114)	(2.856)	(2.841)	(2.825)	(2.833)
Two-parent to single-parent	−5.311**	−3.222	−2.857	−1.061	−.111
	(2.330)	(2.142)	(2.146)	(2.221)	(2.310)
Multiple transitions	−7.768***	4.051*	−3.833	−2.380	−1.936
	(2.469)	(2.380)	(2.400)	(2.397)	(2.409)
Child's characteristics					
Race					
White[a]	Excluded	Excluded	Excluded	Excluded	Excluded
Black	−7.664***	.883	.677	.895	1.392
	(1.991)	(2.109)	(2.108)	(2.097)	(2.120)
Hispanic	−8.013***	1.205	1.192	1.347	1.710
	(1.951)	(1.953)	(1.953)	(1.939)	(1.953)
Female	6.068***	6.209***	6.096***	5.963***	5.725***
	(1.430)	(1.344)	(1.343)	(1.338)	(1.345)
First born	6.692***	5.361***	5.281***	5.264***	5.101***
	(1.511)	(1.587)	(1.588)	(1.577)	(1.575)
Number of siblings	−2.066**	−1.302*	−1.259*	−1.192	−1.100
	(.893)	(.758)	(.757)	(.751)	(.752)
Low birth weight	−5.832**	−3.675	−3.621	−3.568	−3.470
	(2.774)	(2.626)	(2.635)	(2.626)	(2.655)
Mother's demographic characteristics					
Age at first birth		−.164	−.158	−.209	−.192
		(.282)	(.283)	(.282)	(.281)
Years of education		.519	.461	.275	.211
		(.384)	(.387)	(.390)	(.388)
AFQT score		.478***	.460***	.418***	.413***
		(.047)	(.047)	(.049)	(.049)
Mother's psychological well-being					
CES-D score			−.104	−.077	−.072
			(.083)	(.082)	(.082)
Pearlin mastery score			.253	.194	.140
			(.235)	(.232)	(.235)
Economic status					
Income (natural log)[b]				4.573***	4.121***
				(1.515)	(1.526)
Socialization					
HOME score					.056*
					(.030)
Constant	62.848***	22.691***	19.959**	−21.092	−17.879
	(2.308)	(6.979)	(8.274)	(15.800)	(15.790)
Model *F* test	18.40***	32.56***	29.10***	28.22***	27.10***
R^2	.121	.221	.223	.229	.231

Note: Robust standard errors have been estimated to adjust for clustering of multiple children of the same mother. Number of cases in analysis is 1,443. AFQT = Armed Forces Qualification Test; CES-D = Center for Epidemiologic Studies—Depression; HOME = Home Observation and Measurement of the Environment; PIAT = Peabody Individual Achievement Tests.

[a]Non-Black, non-Hispanic. [b]Average annual family income for child's 1st survey year through 1994, in 1994 dollars.

*$p < .1$. **$p < .05$. ***$p < .01$.

TABLE 4. ESTIMATED COEFFICIENTS OF ORDINARY LEAST SQUARES REGRESSION MODELS:
PIAT MATH PERCENTILE SCORES FOR CHILDREN AGED 7 TO 10 IN 1994

	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure					
Two-parent all years	Excluded	Excluded	Excluded	Excluded	Excluded
Single-parent all years	−8.274***	−3.271	−2.784	.229	1.517
	(2.242)	(2.217)	(2.224)	(2.518)	(2.542)
Single-parent to two-parent	−5.961**	−1.985	−1.838	−.452	−.133
	(2.711)	(2.517)	(2.503)	(2.539)	(2.562)
Two-parent to single-parent	−.998	.827	1.407	2.891	4.185*
	(2.205)	(2.041)	(2.067)	(2.122)	(2.171)
Multiple transitions	−5.458**	−2.218	−1.785	−.574	.021
	(2.358)	(2.238)	(2.244)	(2.259)	(2.254)
Child's characteristics					
Race					
White[a]	Excluded	Excluded	Excluded	Excluded	Excluded
Black	−13.865***	−7.025***	−7.158***	−6.974***	−6.299***
	(1.922)	(2.072)	(2.062)	(2.054)	(2.070)
Hispanic	−10.673***	−2.810	−2.733	−2.606	−2.107
	(1.870)	(1.883)	(1.885)	(1.875)	(1.883)
Female	−.002	.170	.043	−.067	−.387
	(1.350)	(1.292)	(1.290)	(1.283)	(1.283)
First born	3.504**	2.341	2.206	2.199	1.979
	(1.435)	(1.526)	(1.527)	(1.524)	(1.525)
Number of siblings	−1.809**	−1.133	−1.118	−1.061	−.938
	(.805)	(.691)	(.690)	(.686)	(.684)
Low birth weight	−7.662***	−5.740**	−5.707**	−5.658**	−5.528**
	(2.540)	(2.500)	(2.498)	(2.508)	(2.512)
Mother's demographic characteristics					
Age at first birth		−.185	−.173	−.215	−.193
		(.281)	(.283)	(.282)	(.282)
Years of eduction		.770**	.732*	.576	.489
		(.389)	(.390)	(.391)	(.385)
AFQT score		.389***	.371***	.337***	.330***
		(.046)	(.047)	(.048)	(.048)
Mother's psychological well-being					
CES-D score			−.151**	−.130*	−.123
			(.076)	(.076)	(.076)
Pearlin mastery score			.081	.033	−.041
			(.219)	(.218)	(.219)
Economic status					
Income (natural log)[b]				3.770***	3.163**
				(1.395)	(1.398)
Socialization					
HOME score					.076***
					(.028)
Constant	62.000**	25.855***	26.923***	−6.901	−2.569
	(2.136)	(6.540)	(7.959)	(15.042)	(15.048)
Model F test	20.46***	30.23***	27.50***	26.27***	25.70***
R^2	.129	.212	.215	.219	.223

Note: Robust standard errors have been estimated to adjust for clustering of multiple children of the same mother. Number of cases in analysis is 1,446. AFQT = Armed Forces Qualification Test; CES-D = Center for Epidemiologic Studies—Depression; HOME = Home Observation and Measurement of the Environment; PIAT = Peabody Individual Achievement Tests.

[a]Non-Black, non-Hispanic. [b]Average annual family income for child's 1st survey year through 1994, in 1994 dollars.
*$p < .1$. **$p < .05$. ***$p < .01$.

amined effects of growing up in various family structures on children's cognitive outcomes (Tables 3 and 4). Table 3 shows results for PIAT reading recognition scores. (The pattern of results for the PIAT reading comprehension subtest is similar, except that the effect of living in a continuous single-parent family remains significant in the final model [$p < .05$] and is associated with a 6-point decline in the score.) As with BPI scores, reading recognition scores varied considerably by family type. Controlling for child characteristics (Model 1), children raised in continuous single-parent families scored, on average, 13 points lower on the reading recognition test than did children raised in continuous two-parent families; children raised in families that experienced multiple changes in family structure scored 8 points lower, and children who experienced transitions from a two-parent to single-parent family or from a single-parent to two-parent family scored 5 to 6 points lower (single-to-two is marginally significant).

Test score differences by family structure dropped sharply once we controlled for mothers' age at first birth, education, and aptitude (Model 2). The coefficient for children who experience "single-parent all years" variable dropped from 13 to 7; the coefficient on the multiple transitions dummy dropped from 8 to 4 (and was marginally significant), and the coefficients on the "single-parent to two-parent" and "two-parent to single-parent" variables became smaller and insignificant. This reduction in the size of family structure effects is largely due to controlling maternal AFQT score. Adding the two measures of mothers' psychological well-being (Model 3) did not notably diminish the magnitude of the family structure coefficients, indicating that family type effects on cognitive outcomes do not operate through mothers' mental health. AFQT score was the only maternal characteristic that significantly predicted children's reading recognition scores; this is quite different from the pattern of results that we obtained when we examined children's problem behavior (Table 2), where mothers' risk of depression was most salient.

When family income was controlled (Model 4), the effect of living continuously with a single mother dropped by more than half; also, the set of family structure variables was no longer significant in this model. Income was itself a strong predictor of children's reading ability. Results in the final model show that only modest declines in family structure coefficients were noted when the

HOME score was added, and this measure had a marginally significant positive effect on reading scores. This implies that the quality of the home environment (particularly cognitive stimulation) is important to some extent for children's academic ability independent of economic well-being. Also, being a girl, being first born, the mother's AFQT score, and family income were associated with higher reading recognition scores in the final model; none of the other child or maternal measures significantly predicted reading recognition scores.

Table 4 reports results for the regressions predicting PIAT math scores. When only child characteristics were controlled, there were significant associations between family structure and math scores, except for the two-to-one category. When maternal characteristics were controlled (Models 2 and 3), the sizes of the family structure coefficients dropped by more than half (except the two-to-one category, which became larger), and all coefficients became insignificant; this is primarily due to adding mothers' AFQT scores. Also, by Model 2, the set of family structure variables was no longer significant. When income was controlled (Model 4), the family structure coefficients became very small or changed sign, and each unit of logged income was associated with a 4-point increase in math scores. In the final model, being African American and having a low birth weight were negatively and significantly associated with math test scores, and mothers' AFQT score, the family income, and the quality of the home environment were positively and significantly associated with math test scores.

CONCLUSION

Children who spend some time in a single-parent home are at higher risk for poor behavioral and cognitive outcomes, and among children who spend any time in a single-parent home, children reared in single-parent homes continuously since birth are at greatest risk. There are important similarities and differences in the effects of family structure on behavioral and cognitive outcomes for children. For outcomes in both domains, family structure initially has large and significant effects when only child characteristics are controlled: Compared with children in continuous two-parent families, children in all other family types (except the single- to two-parent category for the behavioral problems score, and the two- to single-parent category for math scores), have a higher level of behavioral problems and lower

cognitive test scores. When maternal mental health measures are included, the magnitudes of the initial family structure effects drop by a third or more for the behavioral problems score. When maternal test scores are controlled, the magnitude of the family structure effects drops by about half for each of the cognitive outcome measures. Adding income further reduces the size of the family structure effects on both behavioral and cognitive outcomes, and in the final model, nearly all family structure effects become very small in size and insignificant.

For children's behavioral outcomes, gender is an important predictor—girls have fewer overall behavioral problems. Also, more siblings are associated with fewer behavioral problems. Mothers' mental health is important for children's behavior; risk of depression (CES-D score) is associated with a higher level of behavioral problems, and mastery (Pearlin score) is associated with fewer problems. Income is strongly and negatively associated with behavior problems, and the quality of the home is linked to fewer behavioral problems.

For children's cognitive outcomes, race matters only for PIAT math scores—Black children score lower than White children. Girls and first-born children perform significantly better on the reading test, although there is no difference on these two variables for the math scores. Low birth weight is associated with lower scores on the math test. Mothers' AFQT is a strong predictor of both cognitive outcomes, but mothers' education and mental health show no association. Income has a significant positive effect on math and reading scores, and the quality of the home environment has a strong effect on math ability and a marginally significant effect on reading ability.

These findings are similar in many respects to those of Cooksey (1997). She, too, found that many family structure effects are reduced or eliminated once a range of control variables are included in the models. Mothers' AFQT score is a strong predictor of all three cognitive outcomes, as is income for the two reading scores. Although Cooksey found that all family structure effects on math scores disappeared once other variables were controlled, for the two reading tests, she documented several persisting effects, some of which were not in the expected direction.

With respect to our theoretical framework, we find that family structure does operate through economic status because, once income is controlled, the family structure effects primarily disappear for both behavioral and cognitive outcomes. Average family income is much lower for the nonintact family configurations than for two-parent families and is lowest for children raised in continuous single-parent families. Family income itself strongly predicts most cognitive and behavioral outcomes. We find some support for parental socialization as an important mechanism for family structure using our home environment measure. Children with higher quality home environments (with respect to emotional support and cognitive stimulation) have fewer behavioral problems and higher cognitive test scores.

The stress hypothesis receives virtually no support from our results. Children raised in families that experience multiple transitions do not consistently have higher levels of behavioral problems or lower test scores than do children in family types with one or fewer transitions, even when only child characteristics are controlled. In fact, the family type associated with the highest levels of behavior problems and lowest cognitive test scores is the continuous single-parent family, a family where there are no transitions. Therefore, it does not appear that childhood stress (defined here as the number of family transitions experienced) is a primary mechanism by which family structure affects child outcomes.

Finally, maternal psychological well-being is shown to be an important mechanism by which family structure affects behavioral outcomes, but not cognitive ones. Results provide support for the argument that maternal psychological functioning is lower in single-parent families and that poor maternal mental health is one reason children raised in single-parent families have more behavior problems than children who are raised in two-parent homes. Children whose mothers had higher risks of depression and lower levels of mastery exhibited more behavioral problems, and when mothers' mental health is controlled, the sizes of the effects of family structure on children's problem behaviors decline.

Overall, this study highlights the importance of examining multiple categories of family structure, of analyzing effects across more than one outcome domain, and of evaluating a range of theoretical mechanisms that may mediate between family structure and child well-being. In future research, it will be important to more explicitly examine various dimensions of family processes and parenting to determine more precisely whether and how parental socialization and family stress may affect children's outcomes. In addition, it would

be useful to assess whether and how the timing and sequencing of particular family transitions affect outcomes in different domains.

NOTE

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