The Joint Influence of Mother and Father Parenting on Child Cognitive Outcomes at Age 5

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Abstract

Few studies of parenting have considered the possibility that the association between one parent's supportive parenting and a child's early cognition is moderated by the other parent's supportiveness. We test this proposition using a low-income sample of coresident couples. In addition, we cross-classify parents within couples according to their parenting behaviors to test for homogamy. Mothers and fathers were videotaped during separate free-play dyadic interactions with their two-year-old child, and each parent's behavior was coded according to six scales. K-means cluster analysis was used to describe each parent's pattern of parenting behaviors. Parents were then cross-classified within couples by pattern. There was mixed evidence of homogamous parenting styles within couples. After parents were consolidated into four primary pairings, children in each of these pairings were compared on age five math and language scores. Children with two supportive parents scored highest, while those with two unsupportive parents scored lowest. Among children with one supportive parent, the sex of that parent was inconsequential. There were no significant interactions between maternal and paternal supportiveness on either math or language. Thus it appears that in this low-income sample the combined effects of maternal and paternal supportiveness are additive.

The Joint Influence of Mother and Father Parenting on Child Cognitive Outcomes at Age 5

The overwhelming majority of studies on the influence of parenting practices on young children's cognitive development have focused exclusively on mothers. A substantive body of literature now demonstrates the link between maternal supportiveness – defined variously as acceptance, warmth, responsiveness (or contingency), and stimulation – and positive early child outcomes (e.g., Cowan, Cowan, Heming, & Miller, 1991; Landry, Smith, Swank, Assel, & Vellet, 2001; NICHD Early Child Care Research Network, 1999; Pettit, Bates, & Dodge, 1997; Tamis-LeMonda, Bornstein, & Baumwell, 2001). Although fewer studies have focused on fathers' influence on young children's cognitive development, those that have been conducted have found that as with mothers, responsiveness, sensitivity, and stimulation from fathers predict superior outcomes (e.g., Black, Dubowitz, & Starr, 1999; Kelley, Smith, Green, Berndt, & Rogers, 1998; Lamb, 1997; NICHD Early Child Care Research Network, 2004; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004).

Despite increasing interest in fathers' parenting, surprisingly little attention has been paid to the combined effects of mother and father parenting practices. The studies establishing the relevance of father parenting to child outcomes have typically done so without considering the mother's concurrent influence (e.g., Black et al., 1999; Kelley et al., 1998) or have adjusted for that influence in order to isolate the independent contribution of fathers (e.g., NICHD Early Child Care Research Network, 2004; Tamis-LeMonda et al., 2004). However, children in two-parent families experience a single home environment that blends both parents' influences. Both life course theory (Elder, 1998) and family systems theory (Minuchin, 1985) have enriched our understanding of human development by emphasizing the interdependence of family members. An analysis of parental influence that accounts for both parents' behavior should more closely

approximate children's lived experiences than one that attempts to measure each parent's influence net of the other. Therefore, one advantage to the concurrent study of both parents is that it should allow for a richer understanding of young children's developmental context.

A second advantage to studying parents in combination is that it may be possible to identify interactions between the effects of mothers' and fathers' parenting that are not visible in studies of main effects. For example, based on the literature linking maternal and paternal supportiveness to early child cognition, it might be expected that the effects of a supportive mother and a supportive father are additive. However, there may be a synergistic dynamic between two supportive parents that produces a multiplicative effect. In this scenario, the increase in outcome score associated with two supportive parents would exceed the sum of the increases associated with each parent separately. Parents who are supportive may have more refined interpersonal skills than other parents and hence have higher-quality relationships. They may also have fewer disagreements over child-rearing and thus less marital conflict. Brody, Pillegrini, and Sigel (1986) found that couples with fewer marital problems had more similar parenting behaviors during teaching tasks than couples with greater marital problems. Although the direction of this association is indiscernible, it suggests that parents with concordant styles may have greater relationship harmony, which in turn predicts more optimal parenting practices (for a review see Krishnakumar & Buehler, 2000), better parent-child relationships (for a review see Erel & Burman, 1995), and higher cognitive test scores in young children (van Bakel & Riksen-Walraven, 2002).

Alternatively, non-linear effects of supportiveness may operate in the opposite direction, such that the increase in outcome score associated with two supportive parents is smaller than the sum of the increases associated with each individually. In this case, a supportive parent would

confer a smaller advantage than expected when the other parent was also supportive. This scenario might arise if there were a ceiling on potential increases in the outcome. Yet a third possibility is that the increase in outcome score associated with a supportive parent added to an unsupportive parent is larger than the sum of the increases associated with each individually. In this scenario, a supportive parent would be particularly beneficial in the presence of a non-supportive one. Finally, it is possible that the increase associated with a supportive parent is diminished when the other parent is not supportive because a non-supportive parent undermines or even offsets the benefits conferred by the supportive parent. For example, a child with a highly supportive parent whose other parent is extremely harsh and punitive may be unable to fully benefit from the first parent's support. Indeed, the extent to which a child benefits from a single supportive parent may depend on the particular style of the unsupportive parent, with some negative practices serving as stronger counterweights than others.

In short, the benefits to the child of a supportive parent may be moderated – by being either enhanced or eroded – by the second parent's parenting behaviors. The likelihood that parents' parenting behaviors interact is suggested by several studies showing that the influence of a parent's mental health turns on the mental health of the other parent. These studies find that the children of mothers with a mental health problem are at far greater risk of exhibiting behavior problems when their father also has a mental health problem (Dierker, Merikangas, & Szatmari, 1999; Goodman, Brogan, Lynch, & Fielding, 1993; Kahn, Brandt, & Whitaker, 2004). Given the close association between mental health and parenting (for reviews see Goodman & Gotlib, 1999; Lovejoy, Graczyk, O'Hare, & Neuman, 2000), it is likely that similar contingencies apply to parenting style, and that each mother-father combination has a unique influence on children.

One of the studies on the combined effects of maternal and paternal mental health found that when only one parent was highly distressed, the child developed more behavior problems if that parent was the mother (Kahn et al., 2004). This finding points to the potential relevance of parent sex to the investigation of parental supportiveness. To our knowledge, no studies to date have examined whether the combination of a supportive mother and unsupportive father exerts a different influence on young children's cognition than the combination of a supportive father and unsupportive mother. The literature suggests divergent hypotheses. The benefits of a supportive mother may outweigh those of a supportive father because mothers generally play a more central caregiving role (Pleck, 1997). However, mothers' and fathers' parenting practices tend to have more similar than dissimilar influences on child outcomes (Lamb, 1997). Therefore, there may be no differences between the effects of a supportive mother and a supportive father.

The question of whether one parent's parenting behavior pattern moderates the other's takes on extra significance if there are certain pairings of parenting patterns that occur with greater frequency than others among couples. To date, there is no literature on the combination of preschool children's mothers and fathers with respect to observed parenting practices. With one exception (Belsky & Fearon, 2004), none of the studies with observational data on parenting practices for both parents of young children has cross-classified parents within couples (e.g., Belsky, Gilstrap, & Rovine, 1984; Brachfield-Child, 1986; Brody et al., 1986; Conner, Knight, & Cross, 1997; Kerig, Cowan, & Cowan, 1993; Power & Parke, 1983; Stevenson, Leavitt, Thompson, & Roach, 1988; Tamis-LeMonda et al., 2004). Gauvain, Fagot, Leve, and Kavanagh (2002) compared five-year-old children's performance on a parent-child instructional task according to whether neither, one, or both parents scored high on task information, but did not report the size of these groups.

It is reasonable to expect similarity within couples, both because of assortative mating and because of mutual influence. Indeed, Belsky and Fearon (2004) found that mothers' and fathers' scores on sensitivity toward their child in the first four years of life were moderately correlated. On the other hand, one might expect sex differences to outweigh similarities if gendered parenting practices tend to recur across couples (Lovas, 2005). In addition, couples may adopt different but complementary parenting behaviors to capitalize on each parent's strengths and compensate for each one's weaknesses.

The present study assesses the association between maternal and paternal supportiveness during toddlerhood and young children's subsequent cognitive development in low-income two-parent homes. The advantage of the dataset selected for this analysis is that observational measures of parenting are available for both mothers and fathers, based on mother-child and father-child interactions videotaped when children were approximately two years old. Practical constraints did not allow for the mother, father and child to be videotaped together in a single interaction. While observations of triadic interactions would have been optimal, the available parenting measures based on dyadic interactions are still meaningful, given that children in two-parent families typically spend some time alone with each parent.

Our dependent variables are measures of math and language achievement at age five. This study extends an earlier analysis which found associations between maternal and paternal supportiveness, as measured by the videotaped interactions when children were two, and children's scores on the Bayley Mental Development Index (MDI; Bayley, 1993) at two and three years of age (Ryan, Martin, & Brooks-Gunn, 2006). We use the age two classifications of mother and father parenting to enable comparisons of findings at age five with those at ages two and three. These classifications characterize mothers and fathers by their membership in groups

generated by cluster analysis of parenting behavior scales from the dyadic interactions. Associations between cluster membership and child MDI were evident both when each parent was analyzed separately and when parents were analyzed jointly as a couple according to the cross-classification of their clusters. The present study extends this analysis with the next wave of data by testing for sustained associations between parental supportiveness and children's math and language scores at age five. First, we examine associations between cluster membership and child outcomes separately for mothers and fathers. Next, mothers and fathers are cross-classified within pairs. These cross-classifications are then used to predict child outcomes, net of family background characteristics and the child's earlier outcome score.

This study is a useful complement to our last study because supportive parenting during early childhood appears to have a cumulative beneficial effect over time. Landry et al. (2001) found that children whose mothers were supportive in the first four years of life demonstrated higher cognitive scores than children whose mothers were supportive in the first two years alone. It is possible that in our sample the gap between children whose parents were supportive at age two and those whose parents were not may be larger at age five than it was at ages two and three.

In addition, by examining child outcomes three years after parenting was measured, while controlling for outcomes measured at the same time as parenting, this study strengthens our confidence that what we are labeling effects of parenting behaviors on child cognition are not actually attributable to reverse causality (child cognition causing parenting behaviors) or confounding (a third variable causing both).

Our earlier paper subjected maternal and paternal parenting behavior scales to separate cluster analyses to determine if the behaviors covaried differently by parent sex (Ryan et al., 2006), which research on differences in maternal and paternal parenting styles might suggest

(Brachfeld-Child, 1986; MacDonald & Parke, 1984). We found, in fact, that they did not, and that similar classification schemes could be used to describe parenting behaviors in mothers and fathers. In this paper, we use these separate classifications to report on maternal and paternal pairings within couples, with special attention paid to the question of whether partners are homogamous with respect to parenting behaviors.

Finally, there is particular value in describing the children's cognitive status at age five, given their impending entry into school. Longitudinal data have demonstrated continuity between academic performance in pre-kindergarten, kindergarten, or first grade and later academic performance in elementary school (Duncan, Claessens, & Engel, 2005; Shaywitz et al., 1995; Williamson, Appelbaum, & Epanchin, 1991) and high school (Ensminger & Slusarcick, 1992; Stevenson & Newman, 1986).

Our research strategy addresses four research questions: (a) What are the separate associations between mothers' and fathers' parenting patterns at age two and their children's cognitive outcomes at age five? Does age two parenting predict age five cognitive outcomes even when age two cognitive outcomes are accounted for? (b) What configurations are produced by cross-classifying mothers and fathers within couples according to parenting pattern? Are couples generally concordant or discordant with respect to their pattern of parenting behaviors, and are certain combinations of parenting patterns more prevalent than others? (c) What are the associations between mother-father parenting combinations and young children's cognitive outcomes? In particular, do children with two supportive parents score significantly higher than children with only one? Do children with one supportive parent score significantly higher than children with none? Are the benefits of two supportive parents additive or multiplicative? Do the

results vary by developmental domain (language vs. math)? (d) Among children with one supportive parent, does it matter whether it is the mother or father?

Our hypotheses are guided by our own and others' previous research. With respect to the first research question, it is expected that children with a supportive mother at age two will score higher than children without one on math and language tests at age five, and that the same will be true for children with a supportive father. We previously found that, adjusted for background characteristics, at ages two and three, children with a supportive mother scored higher on the MDI than other children, and children with a supportive father scored higher than those without one, although statistically significant contrasts obtained only for the children of the most highly supportive parents (Ryan et al., 2006). Among both mothers and fathers, the spread between the highest and lowest scoring groups widened between ages two and three. Consequently we expect that by age five these differences will widen further, such that the advantage experienced by children with a supportive parent will be pronounced.

Regarding our second research question, there is no empirical basis for the prediction of cross-classified frequencies of mother and father parenting patterns owing to a lack of evidence to date. However, in the NICHD Study of Early Child Care, mothers' and fathers' scores on sensitivity from separate dyadic interactions with the child during the first four years of life have been fairly to moderately correlated within couples (Belsky & Fearon, 2004; NICHD Early Child Care Research Network, 2004). Additional studies have found moderate-to-high correlations within pairs on self-reported parenting scales (Bentley & Fox, 1991; Hart, DeWolf, Wozniak, & Burts, 1992; Winsler, Madigan, & Aquilino, 2005). Further, the literature on within-couple homogamy demonstrates that men and women select marriage and cohabitation partners of similar race, education, and religion (Blackwell & Lichter, 2000; Kalmijn, 1998; Qian, 1997;

Schoen & Weinick, 1993). Population studies also suggest a high degree of assortative mating for psychosocial characteristics such as antisocial behavior and depression (Galbaud du Fort, Bland, Newman, & Boothroyd, 1998; Krueger, Moffitt, Caspi, Bleske, & Silva, 1998). Because demographic and psychological characteristics are highly associated with parenting behaviors (McLeod & Nonnemaker, 2000; McLoyd, 1990, 1998; McLoyd, Jayaratne, Ceballo, & Borquez, 1994), there is reason to suspect that couples also exhibit similar parenting patterns.

Expectations about the associations between mother-father supportiveness combinations and children's math and language scores at age five are based on our earlier findings. At ages two and three, children with two supportive parents scored higher than all other children, while children with two unsupportive parents scored lowest (Ryan et al., 2006). At both timepoints children with two supportive parents scored higher than children with one, although this difference was only significant at age three. Children with one supportive parent scored higher, though not significantly so, than those with none at both timepoints. We expect children with one supportive parent to continue to score higher than those with no supportive parents at age five. We also expect children with two supportive parents to continue to score higher than those with one.

It is difficult to predict whether the combined effects of two supportive parents on child cognition will be additive or multiplicative, given the absence of previous tests of this question. The literature on parental mental health, however, suggests that maternal and paternal supportiveness may have a negative multiplicative effect. Past findings that children with one mentally healthy parent are behaviorally comparable to those with two mentally healthy parents indicate that parental mental health may have a threshold effect on children. Because parents' mental health and parenting behaviors are closely associated (Goodman & Gotlib, 1999; Lovejoy

et al., 2000), supportive parenting may also have a threshold effect on children. In such a scenario, once a certain level of supportive parenting is met, there would be diminishing returns to the child. In point of fact, the suggestion of diminishing returns was present in our sample at age two, when the first supportive parent was associated with a greater increase in MDI score than was the second supportive parent (although this differential did not achieve statistical significance; Ryan et al., 2006). Therefore, it is reasonable to expect that at age five, the advantage experienced by children with two supportive parents may be smaller than expected, based on the increase in outcome associated with each supportive parent individually.

With respect to the question about whether the sex of a sole supportive parent matters, our earlier study found that children with one supportive parent scored similarly at ages two and three regardless of whether that parent was the mother or father (Ryan et al., 2006). Therefore we expect similar findings when the children reach five years of age.

Method

Sample

The data are drawn from the Early Head Start Research and Evaluation Project, an ongoing evaluation of 17 Early Head Start (EHS) programs nationwide. EHS is a federally funded program for low-income infants and toddlers and their families designed to improve young children's school readiness and their caregivers' parenting skills. All families seeking enrollment at the programs selected for the evaluation between February 1996 and October 1998 were eligible for inclusion in the study. Families were randomly assigned to treatment and control groups; the former were offered EHS services and the latter were not.

Children were visited in their homes by trained assessors when they were 14, 24, 36 and 60 months old. At each timepoint, videotaped observations were made of mother-child

interactions. The present study analyzes video data from the 24-month observation, along with data from a substudy conducted by eight of the sites which also collected videotape data on fathers. During the 24-month home visit, mothers were asked permission to contact the child's father. Fathers who agreed to participate in the study were videotaped in a dyadic interaction with their child.

All fathers interviewed at 24-months in the eight sites participating in the substudy who reported coresiding with the child's mother were eligible for inclusion in the present study (n = 343). The father's report of residency status was used instead of the mother's because fathers were less likely to report coresidence; therefore, their reports were more conservative. However, the mother's report of coresidence was used to test for selection bias in the sample of fathers who were interviewed at 24 months because we lacked father report of residency for men who were not interviewed. Of the 665 fathers whom mothers reported as coresident, 322 (49%) were not interviewed at 24 months. Fathers with interview data (n = 343) and fathers without (n = 322) were compared on maternal race, age, education level, poverty level, and employment status, as well as child sex and birth order. The samples only differed on maternal race; mothers with father interview data were significantly more likely to be White or Black and less likely to be Hispanic or other race ($p < .001$, $\chi^2 = 20.23$).

Of the 343 mothers and fathers interviewed at 24 months, only 237 had video data for both parents. Of those couples, 200 had at least one child cognitive outcome score at age five. These cases constituted our final sample. They were compared to the excluded 143 cases on the maternal and child characteristics listed above, as well as paternal education, race, age, and child cognitive scores. There were no significant differences on any maternal or paternal demographic

characteristics. Children included in our sample had slightly higher Woodcock-Johnson Applied Problems scores ($p < .10$, $F = 3.7$).

Because our sample was drawn from applicants to the EHS program, which targets low-income families, it was economically disadvantaged. The vast majority (82%) lived below the federal poverty threshold at baseline (before treatment group assignment). Although the sample was economically homogeneous, it was ethnically diverse. Sixty-six percent of the mothers were White, 19% were African-American, 13% were Hispanic, and 3% were of other race/ethnicity. Sixty percent of the fathers were White, 19% were African-American, 16% were Hispanic, and 5% were of other race/ethnicity. Two-thirds (67%) of mothers and three-fourths (75%) of fathers had a high school degree or GED at baseline. None of these characteristics was associated with program status (intervention vs. control group).

Although the term parents is used throughout this article, in rare cases there were alternative caregivers. Six of the mothers were actually grandmothers ($n = 4$), an aunt ($n = 1$), or a foster mother ($n = 1$). Fourteen of the fathers were in fact grandfathers ($n = 13$) or an uncle ($n = 1$). The remaining children were living with their biological father (81%), adoptive father (9%), or father figure (4%).

The mean age of the children was 25 months (Range: 23 – 33) during the mother-child interaction visit and 27 months (Range: 23 – 33) during the father-child interaction visit. Children's mean age at the five-year visit was 62 months (Range: 50 – 74). Half the children (48%) were male, and 55% were first-borns. Exactly half of the children were assigned to the intervention group and thus received EHS services. All analyses controlled for program status.

Procedures

Maternal and paternal parenting behaviors were assessed at separate home visits scheduled as close to the child's second birthday as possible. The protocol used to record parent-child interactions was adapted from Vandell (1979) and the NICHD Study of Early Child Care's (NICHD Early Child Care Research Network, 1999) "Three Box" free play assessment. At each visit, a trained home visitor videotaped the parent and child playing with toys contained in three pillow cases. For mothers, these toys included a book, a set of pots and pans, and a Noah's ark and animals set. For fathers, these toys included a book, a pizza delivery set of toys, and a farm set. (For details on the protocol, see Love et al., 2002.) Parents were given intentionally vague instructions so as to elicit naturally occurring parenting behaviors.

Both the parent's and child's behavior were coded; only the parent's behavior is considered here. The coding scheme (Brady-Smith, O'Brien, Berlin, & Ware, 1999), adapted from the NICHD Study of Early Child Care's "Three Box" coding scheme (NICHD Early Child Care Research Network, 1999), was guided by theory about the importance of attachment (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1982) and scaffolding (Berk & Winsler, 1995; Pratt, Kerig, Cowan, & Cowan, 1988; Rogoff, Mistry, Goncu, & Mosier, 1993; Vygotsky, 1978) to children's early cognitive development. It included the following six scales of parent behavior: *sensitivity* (taking the child's perspective, accurate perception of the child's signals, and prompt and appropriate responses to these signals), *positive regard* (demonstration of love, respect, and admiration), *cognitive stimulation* (teaching or actively trying to expand the child's abilities), *detachment* (lack of attention to and awareness of the child's cues and absence of engagement in the child), *negative regard* (hostility towards or rejection of the child) and *intrusiveness* (physical or verbal overcontrol of the child's play). All scales had seven points,

ranging from very low (one) to very high (seven). Intercorrelations among the scales are presented in Table 1.

Videotapes were scored by the National Center for Children and Families (NCCF) at Teachers College, Columbia University. A research scientist trained a team of coders and was the "gold standard" for all reliability tests. Coders were trained using sample interactions selected to exemplify high, medium, and low scores on each scale for mothers and fathers. The coders achieved reliability (exact agreement within one point) to a criterion of 85% with the researcher, after which 15% of tapes were drawn randomly from the coders' weekly assignment and checked for interrater reliability (again at 85%). Coders' average agreement for parenting scales ranged from 89% to 98% for mother tapes and from 94% to 96% for father tapes. All coders were unaware of the treatment status and any other identifying information about the videotaped families.

As close as possible to the time of the child's fifth birthday, interviewers visited the home and conducted a parent interview, videotaped the mother and child engaging in semi-structured tasks, and administered a range of child cognitive and socioemotional assessments. The child cognitive outcomes at age five examined in the present analysis are drawn from this home visit. Parents were given $20 and a small gift for the child after the 2-year and 5-year visits.

Measures

Mother and father parenting clusters. Parenting clusters were generated separately for mothers and fathers based on their scores on the parenting scales from the videotaped dyadic interactions. A non-hierarchical method of cluster analysis such as K-means was preferable to a hierarchical method because the clusters were assumed to be discrete rather than nested groups (Henry, Tolan, & Gorman-Smith, 2005). To theorize that the groups were nested would have

assumed that parents' scores on the six scales fell along a single continuum of supportiveness. In point of fact, the parenting literature recognizes multiple dimensions of supportiveness, which has given rise to the use of typologies to describe combinations of parenting behaviors (Baumrind, 1967; Darling & Steinberg, 1993; Maccoby & Martin 1983; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994).

In accordance with Aldenderfer and Blashfield (1984), the criteria used to select the number of clusters included their interpretability, size, and ability to differentiate the outcome measures. Solutions with two, three, and four groups were attempted for both mothers and fathers. The four-group solution was ultimately selected for both parents because it yielded the clearest distinctions among the within-cluster patterns of parenting scales and thus maximized our ability to characterize each cluster's pattern of behaviors. For example, although the three-group solution yielded Unsupportive-Negative and Unsupportive-Detached clusters for mothers, their means on the scales of negative regard and detachment, respectively, were lower than the smaller and more selective clusters of the same names produced by the four-group solution.

Mothers and fathers generated similar parenting pattern clusters (Table 2). Because the clusters were comparable across parent sex, they were given the same names. Clusters were described according to the pattern of their scale means relative to one another, as well as relative to those of other clusters.' In other words, the highest and lowest scoring scales both within and across clusters were of interest.

The first cluster was called Highly Supportive because it had the highest mean scores on the positive scales (sensitivity, positive regard, and cognitive stimulation) and the lowest mean scores on the negative scales (negative regard, intrusiveness, and detachment) among both parents. The second cluster, called Somewhat Supportive, scored next highest on the positive

scales and next lowest on the negative ones among both parents. For both sexes, the positive scale scores were higher than the negative scale scores. The third cluster, called Unsupportive-Negative, scored higher than the other three clusters on both negative regard and intrusiveness among both parents, and the fourth, called Unsupportive-Detached, scored highest on detachment among both parents. Fathers in the Unsupportive-Negative cluster scored higher on intrusiveness than any of the positive scales, while mothers in the Unsupportive-Negative cluster scored higher on intrusiveness than positive regard alone. Mothers in the Unsupportive-Detached cluster scored higher on detachment than any of the other scales except sensitivity, while Unsupportive-Detached fathers scored higher on sensitivity and cognitive stimulation than detachment.

Although mothers' and fathers' clusters resembled each other, they did not share the same distribution. Of the 200 families, the clusters in order of size among mothers were Highly Supportive (41%), Somewhat Supportive (35%), Unsupportive-Negative (15%), and Unsupportive-Detached (10%). Their order among fathers was Somewhat Supportive (42%), Highly Supportive (34%), Unsupportive-Detached (15%), and Unsupportive-Negative (9%).

Children's cognitive outcomes. Children's math achievement at age five was assessed by trained assessors with the Woodcock-Johnson-Revised Applied Problems subtest (Woodcock & Johnson, 1989). Children's receptive language ability was assessed at age five with the Peabody Picture Vocabulary Test-III (Dunn & Dunn, 1997). Both measures are age-standardized (M = 100, SD = 15). In the present sample, the mean of the Applied Problems subtest was 92.6 (SD = 18.7), and the mean of the PPVT-III was 95.0 (SD = 16.9).

Covariates. Demographic variables were added as covariates to all models of child outcomes to increase the precision of estimated parenting effects, after sensitivity analyses (not

shown) revealed that their inclusion did not substantively alter the study's conclusions. Demographic information was collected from mothers at baseline and from fathers at the two-year visit. Maternal race was coded as non-Hispanic White, non-Hispanic African-American, and Hispanic. Highest parental education was a trichotomous variable indicating whether at least one parent had more than a high school degree or GED, at least one parent had a high school degree or GED, or neither parent had a high school degree or GED. Paternal biological status is an indicator variable denoting whether the father was the child's biological father. Poverty status is an indicator variable denoting whether the mother was above the poverty threshold at baseline. Program status is coded 1 if the child was in the EHS intervention group.

Because of the likelihood that the child's cognitive status at age two covaried with both parenting at age two (our independent variable) and cognitive status at age five (our dependent variable), it was included as a control in all models. It was not possible to include scores on the precise math and language assessments from age 5 because they were not administered at age two. Instead, at age two children were assessed with the MDI (Bayley, 1993), a broad measure of cognitive ability (M = 100, SD = 15). In our sample, the mean MDI score was 91.8 (SD = 14.2). The correlation between the MDI at age 2 and the Woodcock-Johnson at age 5 was .53 ($p < .01$), and the correlation between the MDI at age 2 and the Peabody Picture Vocabulary Test – III at age five was .60 ($p < .01$).

Models were also run with mother and father parenting at age five as covariates so that the effects of contemporaneous parenting on age five outcomes was not mistakenly attributed to age two parenting. The protocol used to observe the parent-child interactions at age five differed from the one at age two in that instead of using three bags of toys, it relied on a single activity involving Play-doh, a rolling pin, and a cookie cutter. As at age two, mothers and fathers were

videotaped separately with their child. The coding scheme was revised at age five, such that the sensitivity and positive regard scales were replaced with a single scale called supportiveness. The process used to generate clusters based on the age two parenting data was repeated with the age five parenting data. Clusters similar to those from age two emerged.

The study findings did not change substantively when age five parenting clusters were added to models predicting child cognitive outcomes. Moreover, age five parenting itself did not predict child outcomes once age two parenting was accounted for. The most likely explanation for the absence of a cross-sectional association between child outcomes and parenting at age five once age two parenting was accounted for is measurement error in the parenting scales at age five. The Play-doh activity may not have lent itself to joint participation and reciprocity as much as the age two activity, which used toys requiring adult assistance. It also involved one toy instead of three, and therefore may have elicited a smaller range of parental behaviors. Finally, the consolidation of two scales into one may have further constrained potential variability in parenting behaviors. Collinearity between age two and five parenting is not a likely explanation for the lack of predictive value of age five parenting, given the lack of comparability in both the task and the scales. Cluster assignments at ages two and five showed a degree of consistency that was greater than chance but still only moderate ($r = .21$, $p < .05$).

Thus the results reported here are based on a model without age five parenting. Additional covariates (mother is other race, child's sex, either parent was a teenager at the child's birth, child's birth order, father's race) were initially included in models but later dropped due to non-significance.

Results

Associations Between Mother and Father Parenting and Child Cognitive Outcomes

Our first research question, which asks whether maternal and paternal parenting patterns are individually associated with children's cognitive outcomes, was addressed by using mother and father clusters to predict child math and language scores at age five. Estimated marginal means for each mother parenting cluster, and then for each father parenting cluster, were calculated with maternal race, highest parental education level, father's biological status, program status, maternal poverty status, and age two MDI score set to their means in all equations.

On both math and language, children with a Highly Supportive mother scored highest and children with an Unsupportive-Detached mother scored lowest, net of maternal and child covariates (Table 3). The differences between these two groups were sizable. On math, children with a Highly Supportive mother scored 9.8 points, or 65% of a standard deviation, higher than children with an Unsupportive-Detached mother ($p < .05$). On language, they scored 8.6 points higher (57% of a standard deviation, $p < .05$).

Children with a Highly Supportive mother scored higher than children with a Somewhat Supportive mother, but not with statistical significance. Similarly, children with an Unsupportive-Negative mother scored higher than children with an Unsupportive-Detached mother, but not with statistical significance. Thus it appeared that the most salient distinction among mother clusters was between the two Supportive groups (Highly and Somewhat Supportive) and the two Unsupportive groups (Negative and Detached).

Similar findings emerged for father clusters (Table 3). Children with a Highly Supportive father scored highest on math and language. Among mothers, the Unsupportive-Detached cluster had scored lowest, but among fathers, the Unsupportive-Negative cluster scored lowest. However, children with Unsupportive-Negative and Unsupportive-Detached fathers did not

differ with statistical significance from each other. The span between children with a Highly Supportive father and those with an Unsupportive-Negative one was 10.7 points, or 71% of a standard deviation, on math ($p < .05$), and 7.4 points, or 49% of a standard deviation, on language. As with mothers, children with a Somewhat Supportive father did not differ significantly from those with a Highly Supportive one. Thus, as with mothers, the clearest distinction appeared between children with a Supportive (Highly or Somewhat) father and those with an Unsupportive (Negative or Detached) father. Also, as with mothers, results were more pronounced for math than language.

Mother and Father Parenting Pairs

To answer our second research question regarding parenting homogamy we cross-classified couples according to the mother's and father's cluster assignments. A visual inspection of the table reveals whether particular combinations of parenting patterns were more common than others. A chi-square statistic was used to test formally for the presence of homogamy.

Table 4 presents the cross-classification; each cell contains the observed count, expected count, row percentage and column percentage. A cell's expected count is based on the joint probability of having a mother and father in those two clusters given the size of those clusters within the sample. For example, given that 41% of mothers and 34% of fathers are Highly Supportive, due to chance alone we should expect to find 28 couples in this sample who are both Highly Supportive (.41 * .34 * 200 = 27.9). However, the actual number of such couples is 38. Thus the population of this cell is disproportionately high. Note that the 38 mothers in this cell constitute 46.3% of all 82 mothers who are Highly Supportive, while due to chance alone only 34% of Highly Supportive mothers should be in that cell, since that is the proportion of all fathers who are Highly Supportive. Similarly, due to chance alone we would expect 12 of the 82

Highly Supportive mothers to be paired with Unsupportive-Detached fathers, since 15% of all fathers are Unsupportive-Detached (.15 * 82 = 12.3), but in fact only eight Highly Supportive mothers are paired with Unsupportive-Detached fathers. Thus the population of this cell is disproportionately low.

Overall, there was support for the hypothesis that parents would resemble each other with respect to parenting pattern, χ^2 (9, N = 200) = 20.48, $p < .05$. Highly Supportive parents were disproportionately likely to be coupled together, as were Unsupportive-Negative parents. However, Somewhat Supportive and Unsupportive-Detached parents were disproportionately likely to be coupled with each other. The most striking finding was the symmetry of partner pairings across sex. Unsupportive-Detached mothers were disproportionately likely to be paired with Somewhat Supportive fathers, and Unsupportive-Detached fathers were disproportionately likely to be paired with Somewhat Supportive mothers. Highly Supportive mothers were unlikely to be paired with Somewhat Supportive, Unsupportive-Negative, or Unsupportive-Detached fathers, while Highly Supportive fathers were unlikely to be paired with Unsupportive-Negative or Unsupportive-Detached mothers.

Note that the disproportionality of a given cell's count is based on the marginals of each sex's cluster distribution. Thus, although Somewhat Supportive mothers were disproportionately likely to pair with Unsupportive-Detached fathers, they were *most* likely to pair with Somewhat Supportive fathers, who constituted the largest group of fathers. Unsupportive (Negative and Detached) mothers were also more likely to pair with Somewhat Supportive fathers than any other cluster. However, Highly Supportive mothers were most likely to pair with Highly Supportive fathers. Interestingly, although Highly Supportive mothers were the most populous group, Unsupportive-Negative fathers were most likely to be paired with Unsupportive-Negative

mothers, and Unsupportive-Detached fathers were most likely to be paired with Somewhat Supportive mothers.

Associations Between Parenting Pairs and Child Cognitive Outcomes

To address our final two research questions, we used couples' cluster pairings to predict child math and language scores at age five. Due to small cell sizes, it was necessary to consolidate some parenting pattern combinations. Because there had been no significant differences between the children of Highly and Somewhat Supportive mothers, those two clusters were combined into a single Supportive group. The same was true of fathers, so the same consolidation was performed for father clusters. Because there had been no significant differences between children in the Unsupportive-Detached and Unsupportive-Negative mother clusters, those two clusters were combined into a single Unsupportive group. This consolidation was repeated for father clusters. The resulting typology classified children according to whether their mother and father were both Supportive (n = 121), only their mother was (n = 31), only their father was (n = 31), or neither was (n = 17). Children in these four groups were then compared according to their math and language scores. Marginal means were estimated for the groups after regressing each outcome on group membership and the covariates. All means are calculated with covariates set to their mean values (Table 5).

Children with a Supportive mother and a Supportive father scored highest, and children with no Supportive parents scored lowest. The spread between them was 16 points (107% of a standard deviation) on math and 8.9 points (59% of a standard deviation) on language.

Children whose mother and father were both Supportive also scored 7.0 points higher on math ($p < .05$) and 5.7 points higher on language ($p < .05$) than children with only a Supportive mother. Though not significant, they also scored 6.0 points higher on math and 5.2 points higher

on language than children with only a Supportive father. Children without any Supportive parents scored lower than those with either a Supportive mother or a Supportive father, although these differences did not achieve statistical significance at the $p < .05$ level.

The groups were then further consolidated by combining children with either a Supportive mother or a Supportive father to answer our third research question regarding the implications of number of Supportive parents. This consolidation allowed for a three-group comparison: children with two Supportive parents vs. children with one Supportive parent vs. children with no Supportive parents. These groups' marginal means on math and language were estimated based on regression models adjusting for all covariates.

We found significant differences on both math and language between children with two Supportive parents and those with one (Figure 1). While children with two Supportive parents had an average score of 96.0 on math, those with one Supportive parent had an average score of 89.5, a difference of 6.5 points or 43% of a standard deviation ($p < .05$). Children with two Supportive parents had an average score of 97.3 on language, compared to 91.8 among children with one Supportive parent, yielding a difference of 5.5 points or 37% of a standard deviation ($p < .05$). The comparison between children with one and no Supportive parents produced mixed results. On math, children with one Supportive parent scored 9.5 points (63% of a standard deviation) higher than children with no Supportive parents (89.5 versus 80.0, $p < .05$). However, they scored only 3.4 points higher on language (91.8 versus 88.4), which was not statistically significant.

The next issue to be addressed was whether the benefit conferred by a Supportive parent was moderated by the other parent's Supportiveness. A rough answer to this question is found by comparing the difference in points between children with one and no Supportive parents (the

benefit conferred by a Supportive parent when the other parent is not Supportive), on the one hand, with the difference in points between those with two and one Supportive parents (the benefit conferred by a Supportive parent when the other parent is also Supportive), on the other. A simple inspection of these differences suggests variation by developmental domain. The difference in math points between children with no and one Supportive parents (9.5) was greater than the difference between children with one and two Supportive parents (6.5). It therefore appeared that a Supportive parent conferred a greater increase in math points when the other parent was Unsupportive. However, on language, the difference between children with no and one Supportive parents (3.4) was *smaller* than the difference between children with one and two (5.5), which suggested that a Supportive parent conferred a greater increase in language points when the other parent was also Supportive.

Thus there appeared to be an interactive effect between two parents' Supportiveness, albeit one running in opposite directions for math and language. To formally test this possibility, regression equations with an interaction term were run. First, math scores were regressed on an indicator variable denoting the presence of a Supportive mother, an indicator variable denoting the presence of a Supportive father, and an interaction term multiplying the two. All covariates were included as controls. A second model was run for language scores.

The interaction term (Supportive mother * Supportive father) was insignificant in both models (not shown). Therefore, although it appeared at first that a Supportive parent was associated with a greater increase in math score when the other parent was Unsupportive, but a greater increase in language score when the other parent was also Supportive, neither finding was supported by tests of significance. Consequently, we cannot reject the null hypothesis that two Supportive parents have an additive or linear effect. Thus for both math and language, the

combination of a Supportive mother and a Supportive father results in an increase equivalent to the sum of the increases associated with each Supportive parent separately. Otherwise stated, we cannot conclude that the increase in points associated with a Supportive parent depends on whether the other parent is also Supportive.

Associations Between the Sex of a Sole Supportive Parent and Child Cognitive Outcomes

By comparing children with only a Supportive mother to those with only a Supportive father, we were able to answer our fourth research question regarding the significance of the sex of a single Supportive parent. As shown in Table 5, among children with only one Supportive parent, there were no significant differences in math and language according to the sex of that parent. Children whose Supportive parent was their mother scored 1.0 point lower on math and 0.5 points lower on language than those whose Supportive parent was their father.

Discussion

Previous attention to parenting in two-parent families with young children has centered on sex differences in parenting behaviors and their influence on child outcomes. For example, fathers have been found to be less sensitive and stimulating (Belsky et al., 1984), engage in more physical (MacDonald & Parke, 1984) and less instructive (Stevenson et al., 1988) play, and prohibit their children's actions more (Brachfeld-Child, 1986) than mothers. Entirely absent from the literature is a consideration of the actual parent pairings in which children are likely to find themselves, and the influence of parents' combination of parenting styles on children's development.

Studies describing maternal and paternal parenting based on sex-specific samples are of limited utility. The rigors of statistical analysis demand that a determination of the effect of one parent's parenting pattern on a child account for the other parent's pattern, due to the possibility

that the putative effects of one parent's pattern are in fact driven by the other's or by a synergistic dynamic created by a combination of the two. Studies that include mothers and fathers in a single model are an improvement over single-sex studies, but if the model attempts to isolate the effect of each parent's parenting behavior by controlling for the other's it is likely to be inadequate for two reasons. First, there may be nonrandom configurations of parent couplings. If certain parent pairings are more prevalent than others, it should be fruitful to consider a parent's parenting pattern in the context of the other parent's pattern with which it is likely to be found. Second, there may be interactive effects of couples' parenting on children that are not detectable in studies that examine each parent individually.

Additionally, the consideration of only one parent at a time can lead to inaccurate predictions for children in two-parent families. As an illustration, consider a hypothetical analysis limited to associations between maternal supportiveness and child cognition which finds that a child with a supportive mother scores five points higher on average than a child without one. However, among children with a supportive mother, those whose father is also supportive may score eight points higher than a child without a supportive mother, while those whose father is not supportive may score only three points higher. In such a scenario, the failure to account for the father's supportiveness would generate less than accurate predictions about both groups – those with and those without a supportive father.

It is incumbent upon parenting scholars to devise ways of depicting children's parenting experiences in two-parent families that reflect the full complexity of the family. This will likely require experimentation with different measures of joint parental influence. The present study classifies mothers and fathers separately into groups according to their behavior in separate dyadic interactions with their child, and then examines couples according to the cross-

classification of their groups. Future efforts to describe couples should observe both parents simultaneously in order to generate more nuanced classifications of their parenting behavior. In addition to varying the data collection procedure, future studies should try alternative variable types (e.g., continuous scales vs. categorical groups) and statistical procedures (e.g., structural equation modeling vs. regression). Finally, larger (and possibly more diverse) samples of parents than the one examined here would allow for more powerful comparisons among combinations of parenting styles within couples and their effects on child development. It will be necessary to draw on multiple samples and methodologies to substantively advance the body of knowledge about parenting processes in two-parent families.

To summarize the present study's results, our first research question asked whether maternal and paternal parenting at age two each predicted child cognitive outcomes at age five adjusting for age two cognitive outcomes. We find that both mothers' and fathers' parenting at age two predicts children's math and language at five. The most salient distinction for both mothers and fathers was between Supportiveness vs. Unsupportiveness. With respect to our second research question, our hypothesis that the coresident couples in our sample would exhibit similar parenting patterns found only mixed support. Both Highly Supportive and Negative parents were disproportionately likely to be paired with others in their cluster. However, Somewhat Supportive and Detached parents were also disproportionately likely to be paired. It is difficult to draw conclusions about this finding because the direction of the association between mating and parenting pattern is unknown. It may be that people who tend to be Somewhat Supportive and Detached parents are drawn to each other; it may also be the case that in couples in which both members have a tendency to be Detached, one is likely to evolve into a Somewhat Supportive parent for the benefit of the child. Conversely, in couples in which both members

have a tendency to be Somewhat Supportive, one may be likely to fall into a pattern of Detachment.

In answer to our third question, we fail to find significant interactive effects between maternal and paternal supportiveness in a sample of low-income families with young children. Therefore, we cannot conclude that the advantage for a young child's cognitive development associated with having a supportive parent turns on the other parent's parenting behaviors. Our previous analysis (Ryan et al., 2006) also failed to identify a significant interaction between mothers' and fathers' supportiveness on child cognitive ability at ages two and three. At age two, it appeared that a Supportive parent was particularly beneficial when the other parent was Unsupportive; however, by age three the benefit of a Supportive parent was the same regardless of whether the other parent was Unsupportive or Supportive. Although the interpretability of the pattern of findings across ages two, three, and five is limited by the discrepancy in measures between ages two and three, on the one hand, and age five, on the other, it nonetheless seems prudent to conclude that this sample suggests an additive effect of parental supportiveness on young children's cognitive status, contrary to our hypothesis. Future research should attempt to replicate these results with other samples.

In response to our fourth and last research question, we find no evidence that the sex of a supportive parent influences math or language scores at age five. This result is consistent with those from child ages two and three (Ryan et al., 2006). However, caution must be taken in interpreting these findings in light of the selectiveness of the present sample. We estimate that the couples in this sample represent less than half of all cohabiting couples in the larger study (based on maternal report of cohabitation). Fathers who agreed to participate in the substudy of fathers may be more involved fathers in general. Their willingness to participate may signal a

greater commitment to or confidence in their role as a father, either of which is likely to influence their parenting style. Therefore, the generalizability of our finding to all low-income families may be limited.

Furthermore, the degree to which our findings with a low-income sample are generalizable to families with higher incomes is unknown, given that our study is the first to formally examine interactive effects between mothers and fathers, and to cross-classify parents within couples, in any population. However, the literatures independently establishing associations between maternal and paternal early supportiveness and favorable cognitive outcomes in young children have drawn on both low- and middle-class samples (Black et al., 1999; Cowan et al., 1991; Kelley et al., 1998; Landry et al., 2001; Zaslow et al., 2006). Further research is needed to investigate whether the joint influence of mothers' and fathers' parenting behaviors on young children's development varies according to socioeconomic status.

Despite the selective nature of the sample, these findings are relevant to a discussion of low-income families with two involved parents. Such families are often the targets, and most engaged consumers, of intervention services like Early Head Start. Our findings regarding the advantage of having a supportive parent regardless of parent gender suggest that early interventions to improve parenting should target resident fathers as vigorously as mothers, and that practitioners should address both parents' behaviors in concert. To further inform early intervention programs as well as early childhood research about the nature and consequences of children's early parenting environments, it is hoped that future studies of child development in two-parent families will continue to explore the joint contributions made by mothers and fathers.

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Table 1.

Intercorrelations Among Maternal and Paternal Parenting Scales

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Maternal sensitivity	--	.72*	.73*	-.43*	-.50*	-.45*	.32*	.21*	.26*	-.20*	-.11	-.30*
2. Maternal cognitive stimulation		--	.55*	-.18*	-.52*	-.23*	.25*	.19*	.23*	-.04	-.13	-.20*
3. Maternal positive regard			--	-.27*	-.41*	-.28*	.27*	.10	.26*	-.14	-.03	-.18*
4. Maternal intrusiveness				--	-.05	.38*	-.17*	-.16*	-.12	.25*	.05	.12
5. Maternal detachment					--	.15*	-.17*	-.09	-.12	.02	.16*	.12
6. Maternal negative regard						--	-.23*	-.18*	-.14	.25*	-.01	.35*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
7. Paternal sensitivity							--	.57*	.67*	-.48*	-.47*	-.49*
8. Paternal cognitive stimulation								--	.54*	-.10	-.41*	-.17*
9. Paternal positive regard									--	-.24*	-.37*	-.31*
10. Paternal intrusiveness										--	.04	.51*
11. Paternal detachment											--	.25*
12. Paternal negative regard												--

Table 2

Parenting Scale Scores by Mother and Father Parenting Cluster

	Mothers					Fathers				
	Highly Supportive (n = 82)	Somewhat Supportive (n = 70)	Unsupportive - Negative (n = 29)	Unsupportive - Detached (n = 19)	F	Highly Supportive (n = 68)	Somewhat Supportive (n = 84)	Unsupportive - Negative (n = 18)	Unsupportive - Detached (n = 30)	F
Sensitivity	5.7 $(0.6)_a$	4.6 $(0.5)_b$	3.7 $(0.8)_c$	3.3 $(0.7)_c$	126.0***	5.6 $(0.6)_a$	4.6 $(0.6)_b$	3.2 $(0.6)_c$	3.5 $(0.7)_c$	124.3***
Cognitive stimulation	5.0 $(0.8)_a$	3.8 $(0.8)_b$	3.7 $(0.8)_b$	2.2 $(0.6)_c$	81.5***	4.8 $(0.8)_a$	3.9 $(0.7)_b$	3.5 $(0.8)_b$	2.8 $(0.5)_c$	54.2***
Positive regard	5.1 $(0.8)_a$	3.4 $(0.7)_b$	2.9 $(1.0)_c$	2.2 $(0.7)_d$	116.7***	5.0 $(0.8)_a$	3.3 $(0.8)_b$	2.4 $(0.7)_c$	1.9 $(0.5)_c$	157.8***
Negative regard	1.1 $(0.3)_a$	1.2 $(0.5)_{ab}$	2.1 $(0.9)_c$	1.6 $(1.2)_{bc}$	18.6***	1.0 $(0.2)_a$	1.2 $(0.4)_{ab}$	2.4 $(0.7)_c$	1.4 $(0.7)_b$	43.9***
Intrusiveness	1.4 $(0.6)_a$	1.5 $(0.6)_a$	3.5 $(0.8)_b$	1.4 $(0.7)_a$	93.3***	1.5 $(0.6)_a$	1.8 $(0.7)_a$	3.9 $(0.8)_b$	1.7 $(0.8)_a$	54.4***
Detachment	1.1 $(0.2)_a$	1.2 $(0.5)_a$	1.3 $(0.5)_a$	2.8 $(1.0)_b$	74.4***	1.0 $(0.1)_a$	1.2 $(0.4)_{ab}$	1.4 $(0.8)_b$	1.9 $(0.9)_c$	23.8***

Note. Table presents M (SD) with test statistic computed via ANOVA; N = 200; Within-sex means with different subscripts differ significantly at $p < .05$ in post-hoc comparisons with Bonferroni adjustments.

*** $p < .001$.

Table 3

Child Math and Language Scores at Age Five by Mother and Father Parenting Cluster

	Mothers				Fathers			
	Highly Supportive	Somewhat Supportive	Unsupportive-Negative	Unsupportive-Detached	Highly Supportive	Somewhat Supportive	Unsupportive-Negative	Unsupportive-Detached
Math	95.6 $_{a}$	93.2 $_{ab}$	87.1 $_{b}$	85.8 $_{b}$	94.9 $_{a}$	94.6 $_{a}$	84.2 $_{b}$	87.3 $_{b}$
Language	97.8 $_{a}$	94.1 $_{ab}$	91.7 $_{ab}$	89.2 $_{b}$	97.8 $_{a}$	94.9 $_{ab}$	90.4 $_{ab}$	90.7 $_{b}$

Note. Means adjusted for maternal race, program status, highest parental education, paternal biological status, poverty status, and age two mental development (Bayley, 1993). Within-sex means with different subscripts differ significantly at the $p < .05$ level in Bonferroni-adjusted comparisons. Math assessed with the Woodcock-Johnson-Revised Applied Problems subtest (Woodcock & Johnson, 1990; $n = 194$). Language assessed with the Peabody Picture Vocabulary Test-III (Dunn & Dunn, 1997; $n = 191$).

Table 4

Cross-Classification of Mother and Father Parenting Clusters

	Fathers				
Mothers	Highly Supportive	Somewhat Supportive	Unsupportive-Negative	Unsupportive-Detached	Total
Highly Supportive					
Observed count	38	31	5	8	82
Expected count	28	34	8	12	82
Row percentage	46.3	37.8	6.1	9.8	100.0
Column percentage	55.9	36.9	27.8	26.7	41.0
Somewhat Supportive					
Observed count	23	29	4	14	70
Expected count	24	29	6	11	70
Row percentage	32.9	41.4	5.7	20.0	100.0
Column percentage	33.8	34.5	22.2	46.7	35.0

Unsupportive - Negative					
Observed count	5	13	6	5	29
Expected count	10	12	3	4	29
Row percentage	17.2	44.8	20.7	17.2	100.0
Column percentage	7.4	15.5	33.3	16.7	14.5
Unsupportive - Detached					
Observed count	2	11	3	3	19
Expected count	6	8	2	3	19
Row percentage	10.5	57.9	15.8	15.8	100.0
Column percentage	2.9	13.1	16.7	10.0	9.5
Total					
Observed count	68	84	18	30	200
Expected count	68	84	18	30	200
Row percentage	34.0	42.0	9.0	15.0	100.0
Column percentage	100.0	100.0	100.0	100.0	100.0

Note. Chi-square (9 *df*, $N = 200$) = 20.48, $p < .05$.

Table 5

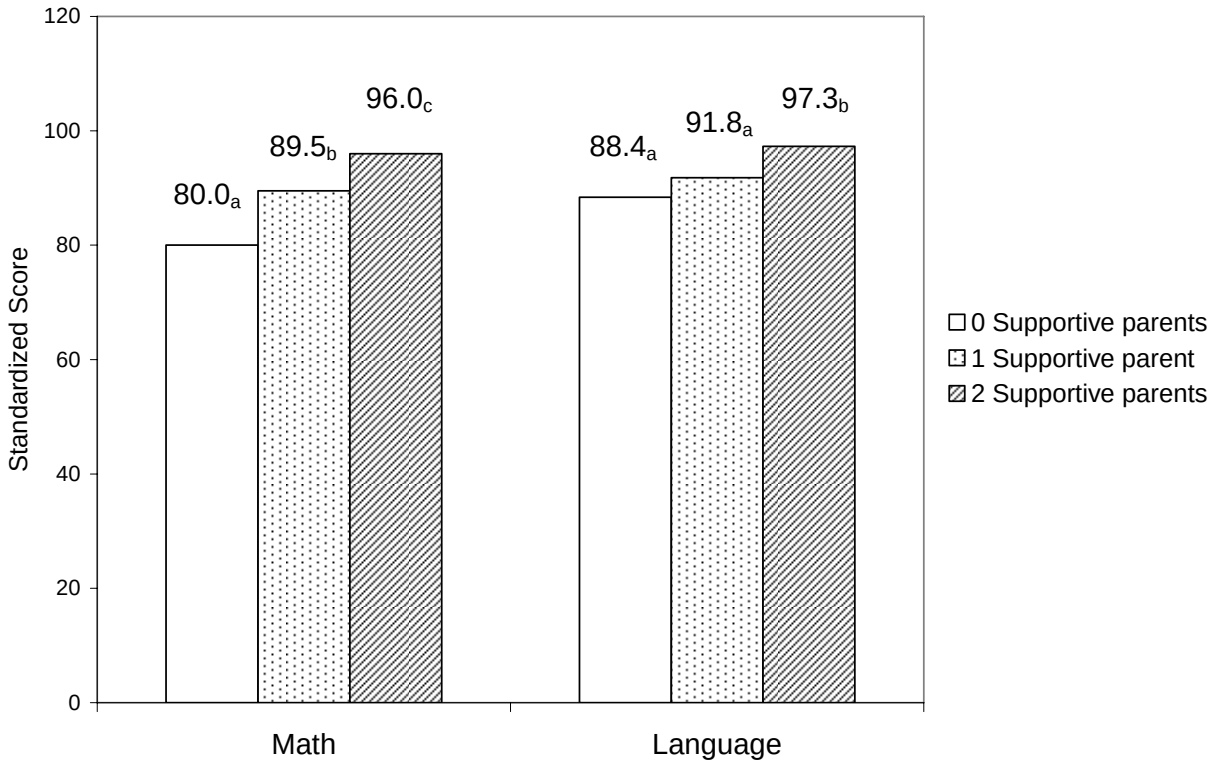
Child Math and Language Scores at Age Five by Parental Supportiveness Pairing

	Mother Supportive, Father Supportive	Mother Supportive, Father Unsupportive	Mother Unsupportive, Father Supportive	Mother Unsupportive, Father Unsupportive
Math	96.0 $_{a}$	89.0 $_{b}$	90.0 $_{ab}$	80.0 $_{bc}$
Language	97.3 $_{a}$	91.6 $_{b}$	92.1 $_{ab}$	88.4 $_{b}$

Note. Means adjusted for maternal race, program status, highest parental education, paternal biological status, poverty status, and age two mental development (Bayley, 1993). Within-row means with different subscripts differ significantly at the $p <$. 05 level in Bonferroni-adjusted comparisons. Math assessed with the Woodcock-Johnson-Revised Applied Problems subtest (Woodcock & Johnson, 1990; n = 194). Language assessed with the Peabody Picture Vocabulary Test-III (Dunn & Dunn, 1997; n = 191).

Figure Caption

Figure 1. Child Math and Language Scores at Age Five by Number of Supportive Parents. Means adjusted for maternal race, program status, highest parental education, paternal biological status, poverty status, and age two mental development (Bayley, 1993). Means with different subscripts differ significantly at the $p < .05$ level in Bonferroni-adjusted comparisons. Math assessed with the Woodcock-Johnson-Revised Applied Problems subtest (Woodcock & Johnson, 1990; $n = 194$). Language assessed with the Peabody Picture Vocabulary Test III (Dunn & Dunn, 1997; $n = 191$).


120
100
80
60
40
20
0
Standardized Score
80.0a
89.5b
96.0c
88.4a
91.8a
97.3b
Math
Language
0 Supportive parents
1 Supportive parent
2 Supportive parents