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James Coleman's theory regarding family social capital and Mel Kohn's ideas regarding work and personality suggest that parental work may affect child cognition. Using a sample of 1,067 9- to 12-year-old children of working and nonworking mothers from the 1992 National Longitudinal Survey of Youth's Child-Mother data set, we found that the most important determinants of children's reading and math achievement were characteristics of the children and parents themselves. Paternal work hours had some effects on math achievement, and maternal work influenced reading achievement under some conditions. Policies allowing parents of either sex to schedule work flexibly may facilitate child cognitive achievement.

The Effects of Parental Work and Maternal Nonemployment on Children's Reading and Math Achievement

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FOUNDATIONS OF THE STUDY

Researchers and parents continue to express concern that maternal employment may have deleterious effects on child well-being. Rates of maternal employment rose sharply during the 1980s, especially employment among mothers of young children. The U.S. Bureau of the Census (1987, 1993) reported that for mothers with children under 6, 54% worked in 1986 and close to 60% worked in 1992. Past studies on the effects of maternal employment on children's cognition have examined *either* the impact of employment status (Easterbrooks & Goldberg, 1985; Farel, 1980; Gold &

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Andres, 1978; Milne, Myers, Rosenthal, & Ginsburg, 1986) or the effects from different working conditions on child well-being (Parcel & Menaghan, 1994b). A particular focus in past research has been to study whether maternal employment when children are young is problematic, with several studies suggesting that dangers have been overgeneralized (see Parcel & Menaghan, 1994a, for key findings and review). Relatively neglected, however, has been analysis of the implications of maternal work for older children. In this study, we consider *both* maternal employment status and work characteristics for employed mothers as determinants of reading and math outcomes among 9- to 12-year-olds. We build on past research and incorporate theory from Kohn's (1977) work on jobs and personality and Coleman's (1988) ideas about social capital in the family.

Several strands of literature combine to suggest it is important to study the effects of maternal employment status on child well-being. In their study of nonemployed wives, Bird and Ross (1993, p. 913) conceptualize the full-time housewife as a "unique occupation." They argue that many of the negative aspects of being a housewife are associated with the lack of pay, with no opportunity to receive a raise or get a promotion except indirectly through a household member. In addition, a housewife cannot benefit from the psychological support employment can provide to buffer the effects of stress in other aspects of life (Hoffman, 1989). Bird and Ross (1993) also report that housewives felt less fulfillment and more routinization from their work, as well as a lower sense of personal control in their work than paid workers. Glass (1992) found that wives employed full-time were younger, more highly educated, had higher incomes, and had fewer children than married housewives. However, mothers who worked full-time reported more stress about not spending enough time with their children, which could offset the positive psychological effects of employment (Hoffman, 1989). These findings suggest that the effects of mothers' work may vary according to the amount of time she spends at work or the kind of work performed.

Children of nonemployed mothers will likely spend more time at home instead of in child care and so may have more opportunities to be influenced by the home environment and their mothers' background characteristics. However, Greenstein (1995) found that, compared to children of nonemployed mothers, the 4- to 6-year-old children of "advantaged mothers," or those with the education and income to provide cognitively stimulating home environments, did not fare worse on standardized tests of verbal ability when their mother worked in the first 4 years of their lives. Because even younger children who stand to gain the most cognitively from maternal nonemployment do not suffer adverse effects when their mothers work, we hypothesize that maternal nonemployment per se will generally not be an asset to older

children's cognitive outcomes. Because of the added earnings and the greater chance for mothers to exercise their own cognitive skills that maternal employment brings to the family, we believe children will generally benefit from having a mother who works outside the home. However, as past research suggests, the positive effects of maternal employment may depend on the complexity of the work performed by the mother and her level of work hours (Parcel & Menaghan, 1994a, 1994b).

Past studies have shown that although maternal employment status alone is insufficient to explain differences in children's cognitive achievement, it may be a contributing factor (Hoffman, 1989). Kalmijn (1994), in studying high school and college outcomes, found that children of nonemployed mothers fared about the same as children of the average employed mother but fared worse than children of managerial and professional women. However, previous research does not explicitly consider both employment status and work characteristics in their effects on cognition in older children. Our study will address this limitation and add to the understanding of how parents' employment or nonemployment affects their children. Given that past research demonstrates that employed and nonemployed mothers differ in terms of skills and resources, we examine employment status in our model. However, we also consider work characteristics for those mothers who are employed, as well as for their spouses.

SOCIAL CAPITAL IN THE FAMILY

Theory also suggests that maternal employment status is relevant to child well-being. Coleman (1988) stresses the importance of the social capital available within families as an influence on children's outcomes. Social capital is embedded in social structure and refers to relations among actors. These relations may constitute social resources upon which actors can draw. Social capital is often specific to certain activities and can take many forms, such as obligations, expectations, information channels, and norms. Within a family, social capital includes the relationships among parents, children, and other family members; its amount is influenced by the strength of the bonds among family members. Because parents build social capital with their children through their interactions, attention, and physical presence, mothers' employment outside the home may limit the development of social capital. Indeed, Coleman feels that a family in which "both parents work outside the home, can be seen as structurally deficient, lacking the social capital that comes with the presence of parents during the day" (p. S111). If a family lacks social capital, children will have reduced opportunities to benefit from

parental human capital. For instance, poorly educated and/or financially unstable parents may not possess a great deal of human capital. However, if they spend time interacting with their children, playing with them, or helping them with homework, they will establish strong bonds with their children so the children may have access to whatever human capital the parents do possess, including ties to the community or personal resources such as self-esteem. Analyses of the effects of social capital for older children are particularly compatible with work by Crane (1991a, 1991b) and Massey, Gross, and Eggers (1991), suggesting that social capital influences adolescent outcomes such as premarital pregnancy and educational attainment.

As Parcel and Menaghan's (1994a, 1994b) work has shown, maternal nonemployment during children's first few years does not have uniformly positive effects on children's cognition, thereby discounting the idea that maternal employment per se impairs social capital in families. For instance, the effect of nonemployment during the first year of a child's life only benefited those children whose mothers later worked in low complexity jobs. Early nonemployment had a negative effect on children whose mothers later worked in high complexity jobs, a near zero effect for mothers working in average complexity jobs, and a positive effect for those in low complexity jobs. Therefore, although relationships in families may be an important aid for children's cognitive achievement, maternal employment does not uniformly result in lower cognitive outcomes for children.

JOBS AND PERSONALITY

Given that many parents do work outside the home, how do their jobs influence their children? One likely mechanism is for parental work to affect parents' psychological states, which in turn affect parenting. For both men and women, occupational characteristics affect adult psychological functioning (Kohn & Schooler, 1973, 1982; Lennon & Rosenfield, 1992; Link, Lennon, & Dohrenwend, 1993; Miller, Schooler, Kohn, & Miller, 1979). Jobs that encourage self-direction at work increase ideational flexibility and encourage *personal* self-direction, but jobs that limit self-direction promote conformist values. Kohn and Schooler (1983) show that occupational complexity as well as opportunity for autonomy and self-direction are the occupational characteristics that have the greatest influence on adult men's personalities. Miller et al. (1979) found that women's occupational conditions affected their intellectual flexibility as well as their general psychological functioning, but psychological functioning did not, in turn, affect working conditions.

Amount of job control also affects levels of psychological distress (Lennon & Rosenfield, 1992; Link et al., 1993). Lennon and Rosenfield found that mothers experienced less distress when they had more job control and autonomy, and that job control offsets the negative impact of high family demands even with children present in the family. Link et al. assessed direction, planning, and control over others' work and found them to be important predictors of distress levels. Thus perceptions of control over one's job play an important role in the psychological well-being of individuals, which may link to parenting and child well-being.

Some researchers have investigated how job conditions indirectly influence parental child-rearing values through personality. Kohn (1977) argued that parents of different social classes raise their children in different ways, largely due to differences in parenting values. These parental values arise from how each social class experiences life, or the social structural conditions its members face (Spade, 1991). Parcel and Menaghan (1994a) argue that parents encourage in their children those values they internalize from their own working conditions. This suggests an intergenerational link for the influence occupational conditions have on parents and ultimately on their children. Individuals who perform high complexity work are more likely to value self-direction and the internalization of this concept by their children, whereas individuals who perform low complexity work are more likely to instill values of conformity to established norms in their children. Routinized work also diminishes individuals' intellectual flexibility, which in turn affects the amount of intellectual stimulation the child experiences at home; such stimulation, in turn, could affect child cognition.

Parents who value self-direction tend to value supportive behavior toward their infants and, in turn, provide more supportive home environments in terms of maternal warmth and involvement with the child, emotional responsiveness, and time spent reading to the child (Luster, Rhoades, & Haas, 1989). Previous research suggests that parents who do complex work may encourage high cognitive achievement in their children (Parcel & Menaghan, 1990, 1994a; Piotrkowski & Katz, 1982). Therefore, we expect parents in our sample whose occupations require self-direction and intellectual flexibility to encourage greater cognitive skills in their children than parents working in highly routinized jobs.

OTHER WORK CHARACTERISTICS

As implied by Coleman's (1988) arguments, the extent of parental employment may have implications for children's cognitive outcomes. Parcel

and Menaghan (1994a) found that both mother's and father's overtime hours negatively affected young children's verbal facility. Parents who work overtime hours may not spend as much time interacting or playing with their children as do parents who work 35 to 40 hours per week. Just as overtime hours may have negative effects on children, paternal part-time hours may negatively affect children's cognitive achievement due to lower paternal self-esteem if the father cannot find steady full-time employment or was fired.

However, as Leibowitz (1977) argues, the amount of time parents spend with children is often difficult to calculate. Rather, the types of activities in which parents and children participate, not the amount of time alone, provide more reliable measures of parental time spent with children. Parental characteristics such as cognitive skills and education may largely set the tone, at least early in a child's life, for the types of activities in which children participate at home. Parents who value self-direction and independent thinking encourage these skills, which in turn encourage their children's cognitive achievement.

Mothers' and fathers' earnings also influence children's outcomes. Higher earnings provide more resources for engaging in cultural events or from which parents can provide educational resources for their children. Higher earnings resulting from maternal employment tend to have positive effects on children's cognition in the second and later years of a child's life (Blau & Grossberg, 1990). Lower earnings can cause psychological distress among family members or cause them to work several jobs. This can result in a poor atmosphere for children to build social capital with their parents and gain access to parental human capital resources, ultimately impairing their cognitive achievement. We therefore predict that higher maternal and paternal hourly wages will have a positive effect on children's cognitive outcomes.

FATHERS' INVOLVEMENT

Paternal characteristics are important to consider in tandem with maternal characteristics. Paternal values and human capital likely influence children throughout the socialization process. In addition, if the spouses of employed mothers increase their share of child care, they will have greater interaction with their children and more opportunities to teach values. Paternal involvement in children's lives could offset some of the resource dilution that may occur when mothers work outside the home. Nugent (1991), in his study of Irish working-class fathers (married to both employed and nonemployed mothers), found that fathers' involvement during the first year of the child's

life had an independent positive effect on the cognitive functioning of the infants at 1 year of age.

CHILD CHARACTERISTICS

In our model, we control for low birth weight and child health problems. Severe health problems limit the extent to which children can attend school and participate in activities, whereas low birth weight may place children at a higher risk for impaired cognitive development. Because the Peabody Individual Achievement Tests (PIAT) are administered to the child by an interviewer the child does not know, the testing conditions may cause anxiety in the child. Past research supports the hypothesis that children who are shy may feel especially anxious during the tests, which could affect their performance (Parcel & Menaghan, 1990, 1994a). We expect that children who seemed shy or anxious at the time of the cognitive testing will score lower on the tests and therefore control for shyness and anxiety as observed by the interviewer. We also control for gender, because the cognitive development of boys may lag behind that of girls in reading achievement (Blake, 1989) but be accelerated in mathematics.

FAMILY CHARACTERISTICS

We control for parental age because older parents may possess personal resources or coping skills gained from their greater experience with the stresses and demands of life than younger parents possess. Older parents have had more opportunities to establish themselves in a career or strengthen their own sense of control over their lives before having children. We expect older parents of 9- to 12-year-olds to have more personal resources apart from human capital resources they already possess from which children could benefit. In addition, we expect that parents with high levels of education and cognitive skills will encourage cognitive development in their children. As Leibowitz (1977) found, more highly educated mothers were more likely to participate in activities with their children that encouraged the development of verbal skills, such as reading to their children, instead of activities such as watching television, which may not involve interaction.

We expect children in families where the mother is married to have higher cognitive skills than children from single-parent families. Having two parents present in the home provides greater opportunity for parent-child interactions

and a greater base of parental resources from which the child may draw. In addition, marital dissolution causes added emotional and often financial stress on family members, which could hamper children's cognitive development.

We predict that, following the resource dilution hypothesis, greater numbers of siblings in the family will negatively affect children's cognitive outcomes (Blake, 1989; Desai, Chase-Lansdale, & Michael, 1989; Downey, 1995; Herr, 1985). Researchers have argued that additional children dilute the amount of time (Leibowitz, 1977) and the emotional and financial resources parents can spend on each child. Blake (1989) and Herr (1985) found that having a larger number of siblings generally had a negative effect on a child's educational attainment. We therefore control for the number of siblings in 1992.

INTERACTIONS

A key finding from earlier research is that the effects of parental work on child well-being can vary depending on parental or child background or on family circumstances (Parcel & Menaghan, 1994a, 1994b). To test Parcel and Menaghan's (1994a) finding that maternal cognitive skills were more effective in encouraging children's cognitive skills when the mother reinforced her skills on the job, we evaluate whether Armed Forces Qualifying Test (AFQT) scores interact with occupational complexity. We expect complex work to increase the effect of mothers' cognitive skills. We also test for an interaction between another measure of maternal resources, education, and maternal employment status. Following Kohn's (1977) theory about how work helps individuals exercise their cognitive skills, we expect nonemployment to hinder the cognitive development of children of mothers with low levels of education more than that of children of highly educated mothers. Poorly educated mothers who do not work may not engage in activities on their own or with their children to practice their cognitive skills.

We test for an interaction between maternal work characteristics such as complexity and work hours to examine whether extent of employment has different implications for cognitive outcomes depending on the type of work the mother does. We expect higher levels of work hours to be more beneficial if the mother does complex work, because the benefits of work complexity would be reinforced via longer job hours.

We also test for interactions between work and family variables. Because the number of siblings a child has dilutes the child's access to the parent's human capital resources, maternal employment may have a more negative

effect on cognition with larger numbers of children in a family. To determine whether spouse's work characteristics have more positive effects when mothers are not employed, we test for an interaction between spouse's occupational complexity and maternal employment status. Conversely, mother's work characteristics may be more important for children's cognitive outcomes when the mother is not married and she is the sole breadwinner, so we test for an interaction between marital status and maternal employment. If children of nonemployed mothers fare better on average on cognitive tests than children of employed mothers, regardless of work characteristics, then mothers' time out of the home may, as Coleman (1988) suggests, hinder children's access to social capital. However, we expect children of mothers who are employed to fare better than children of nonemployed mothers on cognitive tests if their mother performs complex work and does not work overtime hours.

In addition, we test for interactions between child gender and maternal work characteristics. Because research shows that boys lag behind girls in reading achievement (Blake, 1989), maternal employment may prove an additional hindrance to boys' reading achievement. To test this hypothesis, we test an interaction between extent of maternal employment and child gender. We expect higher levels of work hours to have a more negative effect on boys' reading achievement than lower levels. Because boys might be more negatively affected by maternal employment than girls, we test for an interaction between child gender and maternal nonemployment. Finally, we also test for an interaction between child gender and maternal occupational substantive complexity to determine whether working in a more complex occupation has more positive effects for boys than for girls.

SAMPLE, MEASUREMENT, AND METHODS

We use the Merged Child-Mother Data from the 1992 wave of the National Longitudinal Survey of Youth (NLSY). The NLSY is an ongoing national survey begun in 1979 by the National Opinion Research Center in Chicago and the Center for Human Resource Research at Ohio State University. The original multistage stratified area probability sample of 12,686 youths who were 14 to 21 years old in 1979 (the Youth cohort) overrepresents Blacks and Hispanics. Reinterviews occurred each year, and in 1986, new funding allowed data collection on the children of the mothers in this cohort, including assessments of the children's cognitive outcomes (*NLS Handbook 1994*). For the NLSY Child-Mother Data, the unit of observation is each of the biological children born between 1979 and 1992 of NLSY cohort women. The Child-

Mother Data links information about the mother's background, health, attitudes, and occupational conditions to information about the child's health, child care situation, family history and composition, and scores on assessment tests. The longitudinal nature of the NLSY, as well as the 91.8% retention rate of respondents, make the data set ideal for studying intergenerational linkages between family behaviors and child outcomes (*NLS Handbook 1994*).

Our sampling frame consists of 9- to 12-year-old children of employed and nonemployed mothers in 1992. This age group is particularly important to study because at this age, children have had some formal schooling but have not yet entered the often tumultuous adolescent years. Children of these ages are learning how to compare their abilities with those of other children in school and also how to measure the amount of their efforts, skills, and motivation necessary to achieve rewards. Entwisle, Alexander, Pallas, and Cadigan (1987) describe this as "developing an academic self-image," a process that begins when children enter first grade and presumably continues throughout the rest of their formal schooling. Kagan (1978, p. 103) argues that during the few years before a child enters puberty, the child gains "several new and profound intellectual capacities," such as the ability to deal with hypothetical situations. Children ages 9 to 12 have more experience with formal school than do first graders, but they are still learning how to manage teachers' requirements as well as their own strengths and shortcomings. Children's patterns of academic achievement during these years may set the tone for achievement during adolescence and beyond, which emphasizes the importance of understanding how parents' work and absence from the home can affect children's cognition.

If a mother had more than one child aged 9 to 12 in 1992, we randomly selected one child for our sample to avoid overrepresenting mothers with high fertility. Our sample includes only those children who resided with their mother in 1992, because maternal employment or nonemployment may not affect a child as strongly if the child does not reside with the mother. Children who reside with guardians other than their mothers face additional barriers to building social capital with their mothers that are beyond the scope of this study.

The NLSY sample of mothers in 1992 ($N = 3,326$), when weighted, is representative of American mothers ages 27 to 34 on January 1, 1992, and their children are representative of American children born to such a sample of women (Baker, Keck, Mott, & Quinlan, 1993). Our analyses use sampling weights to make the original sample of mothers generalizable to a nationally representative sample. Our sample ($N = 1,067$), however, is limited in its representativeness by the fact that the mothers who had children ages 9 to 12 in

1992 were early and on-time childbearers who had their children when they were 15 to 25 years old. They likely have fewer educational and occupational skills than later childbearers.

Table 1 presents a description of variables and their measurement. We will briefly highlight some of the main variables of interest. We use the Mathematics and Reading Recognition assessments from the PIAT as measures of children's reading and math achievement in 1992. The PIATs measure academic achievement and were given to all children whose age on the PPVT-R (a test of verbal ability administered to all children) was 5 and older. The math portion of the PIAT taps the child's math achievement from recognizing numerals to advanced trigonometry concepts. The test is widely used because of its high test-retest reliability and concurrent validity. The reading recognition test correlates moderately well with the math test and has fairly high test-retest reliability. It measures word recognition and pronunciation skills from the preschool to high school levels; word recognition and pronunciation are crucial skills for reading achievement (Baker, Keck, Mott, & Quinlan, 1993).

We use a 19-item-based occupational complexity scale (see also Parcel, 1989) that taps the direction, control, and planning of jobs, the education and training required by a job, and the complexity of working with people and data, including verbal and numeric aptitude. This scale ($\alpha = .94$) ranges from -26.56 to 27.34 for our sample. Examples of occupations with high complexity scores include foreign language teacher (27.34) and computer systems analyst (18.39). Occupations with low substantive complexity include waitress (-12.85) and maid (-23.48). Nonemployed mothers receive a missing value for occupational complexity.

Regarding work hours, we contrast nonemployed mothers with all mothers who were employed (the reference group) in 1992. For the mothers who were employed, we distinguished between low part-time hours (1 to 20), high part-time hours (21 to 34), full-time hours (34 to 40, the reference group), and overtime hours (more than 40 hours per week). Nonemployed mothers received missing values for the work hours variables. For spouses, we distinguished between part-time hours (less than or equal to 34), full-time hours (35 to 40, the reference group), and overtime hours (greater than 40 hours per week.) Unmarried mothers received missing values for all spouse work variables and married mothers with unemployed spouses received missing values for spouse's occupational complexity and 1991 hourly wages.

The NLSY only gathered data about *maternal* resources such as locus of control, self-esteem, and cognitive ability. We measure maternal cognitive skills by the percentile score on the Armed Forces Qualifying Test given in 1980, which assesses paragraph comprehension, word knowledge, arithmetic reasoning, and numeric operations. Our measure of maternal 1992 education

TABLE 1: List of Variables

<i>Variable</i>	<i>Description</i>
PIAT Math	Measured in 1992. This test taps math achievement from recognizing numerals to trigonometry concepts.
PIAT Reading	Measured in 1992. This portion of the test taps reading using measures of reading recognition and pronunciation ability from preschool to high school levels.
Occupational complexity	Measured in 1992 for mothers and 1991 for spouses. This 19-item scale ($\alpha = .94$) was developed by Parcel by first matching data from the <i>Dictionary of Occupational Titles</i> (U.S. Department of Labor, 1977) to 1970 U.S. Census occupational codes and then performing factor analysis on the data. The scale measures three aspects of jobs including the education/training levels required for the work; the direction, control, and planning of activities; and the complexity of working with people and data. Our scale uses 1980 census occupational codes for mothers and 1970 codes for spouses. Nonemployed mothers received a missing value for this variable.
Usual work hours per week	Measured in 1992 for mothers and 1991 for spouses. For mothers, dummy variables capture no work hours, low part-time hours (1 to 20), high part-time hours (21 to 34), full-time hours (35 to 40), and overtime hours (41+). For spouses, a dummy variable represents part-time (1 to 34), full-time (35 to 40), and overtime (40+) hours. For both parents, full-time hours are the reference group.
Maternal nonemployment	Measured in 1992. Mothers who reported no work hours were coded 1 and all employed mothers were the reference group.
Hourly wages	Measured in 1992 for mothers and 1991 for spouses. For both parents, this is captured by average hourly wage. For fathers, this measure was constructed by dividing average annual earnings by average hours worked.
Marital status	A dummy variable measuring mothers who were married or not married in 1992. Not married is the reference group.
Parental education	Measured in 1992 for mother and spouse. Mother's education level is captured by years of education minus the mean maternal education level to get a deviation from the mean. Spouse's education is measured by number of years.
Parental age	Measured in 1992 for mother and mother's spouse.
Maternal cognitive skills	Measured by the mother's percentile score on the Armed Forces Qualifying Test (AFQT) given in 1980. This test measures paragraph comprehension, word knowledge, arithmetic ability, and numeric operational skills.
Maternal self-esteem	Measured in 1987 using a 10-item Rosenberg self-esteem scale ($\alpha = .78$).

TABLE 1: List of Variables

<i>Variable</i>	<i>Description</i>
Maternal ethnicity/race	Measured as a dummy variable capturing Black, White, Mexican Hispanic, and other Hispanic groups.
Additional siblings	This is measured in 1992 as the number of siblings the child had.
Child gender	A dummy variable with female as the reference group.
Child health problems	Measured in 1992. A dummy variable with no health problems that limit the child's participation in activities and school as the reference group.
Shyness and anxiety	Assessed by the interviewer at the start of the 1992 interview. The scale ranges from 1 = <i>not at all shy/anxious</i> to 5 = <i>extremely shy/anxious</i> .
Low birth weight	A dummy variable distinguishing between children whose birth weight was below 5.5 pounds and weight of 5.5 pounds or more as the reference group.
Grandmother's education	The child's maternal grandmother's level of education.

NOTE: PIAT = Peabody Individual Achievement Test.

is the number of years of education minus the mean level of education for our sample, which centers our measure of education on the mean.

Our study uses regression analysis to test our hypotheses. Missing data are handled using the mean substitution method, which assigns the mean value for a variable to cases that have missing data for that variable. This strategy provides a more conservative test and reduces the number of missing cases in a regression.

SAMPLE CHARACTERISTICS

Table 2 displays means and standard deviations of variables in the model. The low percentile score on the AFQT test and the low maternal occupational complexity score reflect the lower levels of skills possessed by this sample of mothers. The mean substantive complexity score for employed mothers was -3.145 . This negative score indicates that this sample of mothers held below average complexity occupations compared to a self-weighted sample of occupations. About 24% of employed mothers held occupations with above average complexity (greater than one standard deviation from the mean for this sample), and 28% held occupations with below average complexity (lower than one standard deviation from the mean score for this sample).

TABLE 2: Means, Standard Deviations, and Correlations for Variables in the Model (N = 1,067)

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
PIAT Math 1992	100.436	12.723
PIAT Reading Recognition 1992	103.885	14.418
Child characteristics		
Male	.521	.500
Low birth weight	.060	.238
Number of siblings 1992	1.455	1.035
Shy at interview 1992	1.668	.864
Health problems 1992	.056	.230
Parental characteristics		
Mother		
Grandmother's education	10.675	2.692
Non-White	.287	.453
AFQT percentile score 1980	39.597	26.558
Self-esteem 1987	.012	.563
Age 1992	31.832	2.181
Education 1992	12.136	1.721
Married 1992	.654	.476
Spouse		
Age 1992	35.025	3.997
Education 1992	12.358	2.713
Maternal work characteristics 1992		
Occupational complexity	-3.145	10.637
Hourly wages	8.35	11.185
Nonemployed	.227	.419
Employed mothers' hours		
Average hours	34.824	10.927
1 to 20	.161	.323
21 to 34	.153	.317
34 to 40	.568	.436
Over 40	.118	.284
Spouse work characteristics 1991		
Occupational complexity	-3.541	7.652
Hourly wages	13.489	6.125
Work hours		
Average hours	45.219	9.507
Under 35	.044	.156
35 to 40	.526	.381
Over 40	.430	.377

NOTE: PIAT = Peabody Individual Achievement Test; AFQT = Armed Forces Qualifying Test.

Of the entire sample, 77% of the mothers worked during 1992 and close to one half of all mothers worked full-time. Mothers' spouses worked on average 45 hours per week in 1991, with 43% working overtime hours. The average hourly wage for spouses in 1991 was \$13.49. Mothers averaged \$8.35 per hour in 1992. Mothers were between 27 and 35 years old in 1992 and averaged 12 years of education; 65.4% of the mothers were married.

In the regression models, we initially progressively entered variables as follows: (a) the most exogenous family background characteristics; (b) the most exogenous child characteristics; (c) current mother, spouse, and child characteristics; and (d) mother and spouse current working conditions. Findings suggested that the final models represented key findings well, so only those are presented here. Regression coefficients are significant for one-tailed tests $p < .10$ and $p < .05$.

PIAT MATH

Table 3, Panel 1, presents results from the PIAT Math model. We found that scores were higher when mothers had higher AFQT scores and fathers were more educated; we also found that boys scored higher than girls. Low birth weight, maternal non-White race, child health problems, and child shyness have negative effects. Spouse's part-time and overtime hours had positive effects on PIAT math when compared to full-time hours. Spouse's hourly wages also positively influenced math scores.

As noted above, we tested for interactions between maternal hours and maternal complexity, being male and maternal nonemployment, and being male and maternal hours, none of which had significant effects on math scores. The interaction between maternal nonemployment and mother being married had a positive effect on math scores, whereas the interaction between maternal nonemployment and number of siblings had a negative effect on math achievement. Below we discuss these interactions more fully.

PIAT READING RECOGNITION

Table 3, Panel 2, displays results from the PIAT Reading Recognition model. Children with mothers who had higher AFQT, whose fathers were more educated, and whose mothers were married had higher scores, whereas boys, those with low birth weights, those with more siblings, and those who had health problems and who are shy had lower scores. Contrary to expecta-

TABLE 3: 1992 PIAT Math and Reading: Impact of 1992 Family Background, Child, and Work Characteristics (N = 1,067, standard errors in parentheses)

Variable	PIAT Math		PIAT Reading	
	b	β	b	β
Grandmother's education	.124 (.144)	.026	-.038 (.162)	-.007
AFQT score 1980	.138** (.018)	.287	.177** (.020)	.326
Maternal self-esteem 1987	-.396 (.651)	-.018	-.974 (.733)	-.038
Mother's age 1992	-.180 (.175)	-.031	.049 (.196)	.007
Mother's education 1992	.218 (.241)	.030	.165 (.317)	.020
Spouse's age 1992	.059 (.091)	.019	-.031 (.102)	-.009
Spouse's education 1992	.277** (.133)	.059	.261* (.149)	.049
Non-White	-2.640** (.908)	-.094	-1.405 (1.020)	-.044
Male	1.877** (.693)	.074	-2.595** (.913)	-.090
Low birth weight	-4.174** (1.461)	-.078	-3.808** (1.647)	-.063
Married 1992	-.226 (.882)	-.008	1.886** (.879)	.062
Number of siblings 1992	-.294 (.429)	-.024	-1.384** (.387)	-.099
Child health problems 1992	-4.603** (1.509)	-.083	-3.921** (1.695)	-.063
Child shyness 1992	-1.727** (.407)	-.117	-2.053** (.457)	-.123
Mother's work 1992				
Hourly wages	-.032 (.031)	-.029	-.014 (.035)	-.011
Hours worked ^a				
Nonemployed	-1.018 (1.836)	-.034	.052 (1.380)	.002
1 to 20	1.314 (1.134)	.033	1.174 (1.269)	.026
21 to 34	.406 (1.160)	.010	-.002 (1.385)	-3.689E-5
35 to 40 ^b	—	—	—	—
Over 40	.009 (1.269)	2.087E-4	-1.266 (1.421)	-.025
Occupational complexity	.021 (.034)	.018	-.029 (.057)	-.021

TABLE 3: Continued

Variable	PIAT Math		PIAT Reading	
	b	β	b	β
Spouse's work 1991				
Hourly wages	.252** (.066)	.121	.101 (.074)	.043
Hours worked				
Less than 35	4.373* (2.287)	.054	-.773 (2.567)	-.008
35 to 40 ^b	—	—	—	—
Over 40	2.545** (.962)	.075	1.210 (1.076)	.032
Occupational complexity	-.084 (.051)	-.050	-.010 (.064)	-.005
Maternal nonemployment				
• Married	3.142* (1.713)	.085		
Nonemployed • Education			1.078** (.522)	.070
Nonemployed • Male			-3.303* (1.835)	-.072
Maternal complexity • High part-time hours			.216** (.106)	.062
Male • Maternal complexity			.137* (.073)	.076
Spouse's complexity • Maternal complexity			-.235** (.118)	-.064
Constant		93.072		99.862
Adjusted R ²		.240		.255

NOTE: Only significant interaction effects included for each model.

a. F tests showed the set of dummy variables to be insignificant at $p < .10$.

b. no data on reference group for categorical variable.

PIAT = Peabody Individual Achievement Test, AFQT = Armed Forces Qualifying Test.
* $p < .10$. ** $p < .05$, one-tailed test.

tions, there were no direct effects of either maternal or paternal work on Reading Recognition scores.

An interaction between maternal AFQT and maternal occupational complexity did not have significant effects on reading scores. The interaction between maternal nonemployment and maternal education as well as the interaction between being male and maternal complexity both had positive effects on reading achievement. In addition, the interaction between maternal

high part-time hours and maternal occupational complexity had a positive effect on reading scores. The interaction of maternal nonemployment and being male as well as the interaction between maternal nonemployment and spouse's occupational complexity had negative effects on reading scores. We now discuss these interactions more fully.

ASSESSING INTERACTIVE EFFECTS

For PIAT Reading, the interaction between being male and maternal occupational complexity had a positive effect on test scores. The more complex the mother's occupation was, the greater the benefit to male children. Because boys lag behind girls in reading achievement, they especially may need to take advantage of maternal cognitive skills reinforced by complex work. This explanation is also supported by the results from the interaction between maternal nonemployment and being male, which had a negative effect on reading scores. The mother's staying home instead of working more negatively affected boys than girls in terms of reading. In addition, maternal complexity had more positive effects on reading achievement when the mother worked 21 to 34 hours per week versus 35 to 40 hours per week. Thus children benefit in terms of reading if the mother works a moderate number of hours but performs complex tasks while at work.

We also tested for an interaction between maternal nonemployment and spouse's occupational complexity to determine if spouse's work has more positive effects on reading scores of children whose mothers are not employed. We expected spouse's work characteristics to be more important determinants of children's cognitive achievement in the absence of any maternal work characteristics. Results show that this interaction negatively affected reading achievement. As spouse's job complexity increased, maternal nonemployment had more negative effects on reading achievement compared to maternal employment. This suggests that at high levels of spouse's job complexity, mothers' work may be necessary to reinforce any positive effects children receive from having fathers who do complex work. Finally, although maternal nonemployment and maternal average education did not have direct effects on PIAT reading or math, their interaction was significant and positive for reading scores.¹

Two of the hypothesized interactions were significant in the PIAT Math model. The interaction between maternal nonemployment and being married had a positive effect on math outcomes. Children benefited more directly from living with two parents when a mother did not possess her own set of

work characteristics, and being married became less important to children's math achievement if the mother held her own job.

CONCLUSIONS

Our most important finding may be a negative one: Parental work does not have strong direct effects on cognitive outcomes of 9- to 12-year-old children. In contrast, the most important predictors of PIAT scores were the personal characteristics of children as well as maternal cognitive ability and spouse's education. The standardized coefficients in the final model show that mothers' AFQT score was the strongest predictor of PIAT scores overall. As expected, boys scored better on math tests than did girls, and non-Whites scored worse on math than Whites. Low birth weight can profoundly affect children's cognitive development, even 10 years later.

The effects of several characteristics differed between the reading and math models. Being non-White directly affected math scores but not reading. Being male was important for both PIATs, but the effect was positive for math scores and negative for reading scores. Mothers' being married and number of siblings were determinants of reading and math achievement. Finally, maternal work characteristics were not important for math or reading, but spouses' hours worked and hourly wages affected the math outcome.

We used Coleman's (1988) ideas about social capital in the family to consider how parents' work affects children. Our results indicate that the effects of work on 9- to 12-year-olds' cognition are conditional. In other words, we do not find support for the idea that children experience negative outcomes in terms of cognitive achievement, presumably associated with decreased social capital in a family, if both parents work outside the home. Among our sample of 9- to 12-year-olds, maternal employment status as well as occupational characteristics provide neither direct advantages nor disadvantages in terms of reading and math achievement. Building social capital may not be a result of the sheer amount of time parents spend in the home, as then maternal nonemployment should be a distinct advantage for children. A parent who spends more time in the home does not necessarily spend those hours in interactions with children, thereby limiting the chance to build social capital.

Instead, if the child is male, maternal nonemployment may actually decrease the development of social capital in the family because it results in lower reading scores for boys. In addition, mothers who perform complex work provide an advantage to their sons in terms of reading achievement,

indicating that more complex work may facilitate building social capital with boys. Our results also show, however, that if mothers do perform complex tasks at work, high part-time hours provide more benefits to 9- to 12-year-olds' reading achievement than do full-time hours, suggesting that high levels of work hours, or full-time work, at very challenging jobs may sap mothers' time or energy spent with children building social capital. This may be especially true if the mother is a single parent or if she has sole responsibility for housework and child care as well. However, what parents do with their children, the affection they show toward them, and the experiences they bring to the interaction may have more of an influence on the amount of social capital in a family than just parental presence in the home.

POLICY IMPLICATIONS

This study provides findings compatible with earlier analyses suggesting that the dangers of maternal work have been overgeneralized (Parcel & Menaghan, 1994a, 1994b). There are no consistent advantages in child cognition to maternal nonemployment. We do see advantages in children's reading achievement when their mothers are highly educated and do not work. These mothers may be spending additional time with children in ways that facilitate reading achievement. We also know that mothers with complex work who work high part-time hours have children with stronger reading achievement than those mothers who do not experience this combination of work advantages. It may be that complex work in moderation allows mothers the time and energy to transfer the benefits of their work situation to their children.

It is also useful to compare these findings with those generated in studies of younger children. Parcel and Menaghan (1994a, 1994b) found that overtime hours for both mothers and fathers were detrimental to children's vocabulary development among 3- to 6-year-old children of working mothers. We see that in this study of older children, including those of nonworking mothers, the findings differ depending on whether we consider maternal or paternal hours, and on whether we consider reading or math achievement. First, maternal work hours at any level have neither positive nor negative effects on PIAT reading scores. This means that mothers who work overtime are not disadvantaging their children in terms of reading achievement. The same is true for fathers. Thus, although parents of young children should consider the implications of parental overtime work for their children's vocabulary development, by the time children reach 9 to 12 years of age, such

concerns are no longer relevant. Second, maternal work hours appear irrelevant to children's math achievement. Third, both paternal part-time and overtime work, relative to paternal full-time work, are associated with higher levels of math achievement, findings that are also duplicated in bivariate correlations (data not shown). Clear explanations for these positive effects remain elusive. It may be that overtime work is acting as a proxy for paternal ability or motivation, concepts unmeasured in our analysis; professional fathers who work long hours may have children who score higher on tests of math achievement. Regarding low work hours, those fathers may be spending time with their children in ways that facilitate math achievement. Clearly, these hypotheses need additional research, particularly because both paternal low work hours and paternal overtime work hours have positive effects relative to paternal full-time work. It is heartening, however, to find that low paternal work hours can have some positive effects on child well-being, especially because earlier research provides contrasting evidence for younger children (Parcel & Menaghan, 1994b). Finally, children's math achievement is positively affected by paternal wage levels.

These findings also provide guidance for policy makers in firms and for lawmakers concerned with support to both parents and industry. Firms that provide opportunities for part-time work for parents during parts of the family life cycle may have a competitive advantage over firms with more rigid policies. Laws acknowledging that many workers are fulfilling both family and work roles during portions of their lives may also be important. In addition, it has been helpful that this analysis has evenhandedly considered the effects of both maternal and paternal work roles and their implications for child cognition. Just because maternal paid employment has increased in recent years does not mean that paternal working conditions are irrelevant to child well-being; indeed, Kohn and his colleagues argue for clear connections, and our evidence provides some empirical support. Accordingly, policies need to be framed in ways that allow parents of either sex to take advantage of work schedule flexibility. Under these conditions, we can be most optimistic regarding the compatibility of work and family with reference to implications for child cognition.

NOTE

1. Maternal education • maternal nonemployment is not significant for reading scores without maternal occupational complexity in the model.

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