This research examines the effects of early maternal employment on the cognitive ability of 2,040 4- to 6-year-old children drawn from the National Longitudinal Survey of Youth. Some scholars have hypothesized that it is the "most advantaged" of society's children who are disadvantaged or negatively affected by early maternal employment. If this hypothesis is true, the findings should be that advantages such as high levels of cognitive stimulation in the home or household income do not affect cognitive ability as strongly for children of mothers who were employed during early childhood as they do for children whose mothers were not employed. Of 24 possible interaction effects that would confirm this hypothesis, only one is statistically significant (and the nature of that interaction is not completely consistent with the hypothesis). In terms of effects on cognitive outcomes, the most advantaged children are not disproportionately disadvantaged by early maternal employment.

Are the "Most Advantaged" Children Truly Disadvantaged by Early Maternal Employment?

Effects on Child Cognitive Outcomes*

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The labor force participation of mothers of young children is currently at a historical high. In the United States today over 60% of mothers of preschoolers are employed, more than double the rate of just two decades earlier. This dramatic movement of mothers out of the home and into the labor force suggests a crucial question: What, if any, are the effects of early maternal employment on child well-being?

In terms of effects on child *behavioral* outcomes, the research literature is somewhat equivocal. Some researchers find that early maternal employ-

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ment has negative implications for child social and behavioral outcomes (e.g., Baydar & Brooks-Gunn, 1991; Belsky & Eggebeen, 1991). Others argue that the effects of maternal employment on child behavior, if any, are minimal (e.g., Greenstein, 1993; Mott, 1991; Parcel & Menaghan, 1994).

On the other hand, the literature in this area strongly suggests that there are no net effects of early maternal employment on child *cognitive* outcomes. However, some researchers find that there are interactions of maternal employment with other factors in terms of their effects on cognitive outcomes (e.g., Desai, Chase-Lansdale, & Michael, 1989; Milne, Myers, Rosenthal, & Ginsburg, 1986). In particular, these studies suggest that maternal employment has the most harmful effects on the most advantaged of society's children (e.g., children from households with high incomes or high levels of cognitive stimulation). The purpose of this article is to determine whether early maternal employment interacts with indicators of family advantages to produce differential effects on child cognitive outcomes.

This is an important issue for study, because if the most advantaged children really *are* disproportionately disadvantaged by early maternal employment, it creates yet another difficult decision for parents. Should mothers in high-income households pursue careers if it means adversely affecting their children's cognitive ability? Should mothers who can provide high levels of cognitive stimulation for their children stay out of the labor force (or work fewer hours) so that their children can reap the full benefit of this advantage? Or are children from households of varying resource levels uniformly affected by maternal employment?

RELEVANT LITERATURE

The empirical literature on the effects of early maternal employment on child cognitive outcomes is quite extensive and includes research conducted by psychologists, educators, sociologists, and economists. Results of these studies have been mixed, although none of the studies find across-the-board negative effects. Some studies—especially those of children from disadvantaged families—suggest that early maternal employment may enhance cognitive development (e.g., Andersson, 1989; Clarke-Stewart, 1989; Mott, 1991; Ramey & Campbell, 1984; Vandell & Ramanan, 1992).

Most studies have suggested that there is no net effect of early maternal employment on child cognitive development. Liebowitz (1977), for ex-

ample, found no effect of maternal employment on the child's score on the Peabody Picture Vocabulary Test (PPVT), and Hock (1980) found no differences in cognitive development between infants of employed and nonemployed mothers. Reviewing the literature to that point in time, Heyns (1982) concluded that there was little difference in terms of cognitive achievement between children of employed mothers and those of nonemployed mothers.

In more recent studies, Datcher-Loury (1988) found no overall effect of maternal employment on the educational attainment of 20- to 26-year-olds, whereas Mott (1991) found no overall effect of early maternal employment on the PPVT score but did observe significant differences in PPVT scores between children in different types of substitute care. Finally, Blau and Grossberg (1992) found no net effect of early maternal employment on PPVT scores of preschoolers.

Several studies have suggested that early maternal employment may interact with other factors to produce effects on cognitive ability. Differential effects of maternal employment on child cognitive outcomes—by ethnicity, gender, and other factors—were observed more than two decades ago (see Hoffman, 1974, for a review). More recently, in a study of school-age children Milne, Myers, Rosenthal et al. (1986) concluded that "the significant effects of mother's employment are primarily negative" (p. 138). Heyns and Catsambis's (1986) reanalysis of the same data suggested that the negative effects existed "only for women in the labor force for the shortest period of time or for women who decreased their labor force participation as their child matured" (p. 140). Krein and Beller (1988) observed negative effects of maternal employment on the educational attainment of 26-year-old males but not for females. Desai et al. (1989) found no main effects of employment, employment continuity, or employment timing but did find interactions between family income (net of mother's income) and employment continuity and timing. Vandell and Corasaniti (1990) found lower grades among 8-year-olds and lower standardized test performances among girls (but not boys) whose mothers returned to work during infancy. Baydar and Brooks-Gunn (1991) found that both timing of reentry into the labor force and intensity of early employment were negatively related to PPVT scores of 3- and 4-year-old White children. Parcel and Menaghan (1994) concluded that early maternal employment has negative effects on child cognition only for mothers with poor occupational prospects (p. 1005).

Taken collectively, these and other studies seem to suggest that if there *are* negative effects of maternal employment on child cognitive outcomes,

these effects are most likely to appear in interactions with other factors. Milne, Myers, and Ginsburg (1986) suggest that "mother's employment has the most negative effects on the achievement of the most advantaged" (p.152). Desai et al. (1989) come to much the same conclusion, speculating that "maternal employment may reduce the resources available to children in higher income families but have a neutral or positive effect on the resources for children in low-income families" (p. 555).

As an aside, one might ask why this research has typically studied the effects of the *mother's* employment rather than the *father's*. The answer is straightforward: In the United States today, father's labor force participation is nearly a constant, whereas maternal employment is a variable factor. In one of the few studies to model the effects of both maternal *and* paternal employment, Parcel and Menaghan (1994) concluded that early paternal employment had little independent effect on child cognitive outcomes.

CONCEPTUAL RATIONALE

In the present research I adopt a view of the household as an economic unit as suggested by England and Farkas (1986) and Desai et al. (1989). This framework is consistent with that of the "household economics" perspective (sometimes referred to as the "New Home Economics," see Berk & Berk, 1983, for a critique). Within households, some system of resource allocation is established to provide for both necessities and luxuries. In households with children, a sizable portion of resources is typically allocated toward the well-being of those children. Maternal employment is one means of increasing the amount of financial resources available to the household, but although maternal employment increases the amount of market goods the family can accumulate, it may decrease the opportunity for the mother to provide nonmarket commodities—especially in the form of attention, learning activities, and, in general, cognitive stimulation—for her children.

Some theorists suggest that as employed mothers' production of these nonmarket commodities declines, cognitive ability of their children would probably decrease. Within this context, a crucial question is whether the possible decline in the production of *nonmarket* goods and services that might accompany the employment of mothers is offset by the additional *market* goods and services that the family's increased financial resources would permit. Can families counter the (presumed) effects of the mother's

absence from the home (and the resulting decline in the production of nonmarket goods and services) on the cognitive well-being of their children with increased consumption of market goods and services? Fundamentally, the model suggests that outcomes for children of employed mothers will differ from those of children whose mothers are not employed to the extent that the substitution of market for nonmarket goods and services is imperfect.

From my perspective, the main effects of household resources and advantages (e.g., level of cognitive stimulation, presence of learning materials such as books and computers, family socioeconomic status) on child cognitive outcomes are less substantively interesting than are their interactions with maternal employment. My primary concern in this research is the differential effect of maternal employment on child cognitive outcomes for families differing in resource level. Even if there is no overall effect of early maternal employment on child cognitive ability, does such employment have negative consequences for some children but not others? Specifically, does early maternal employment have negative consequences for children from homes that have a strong resource base and can provide the most advantages while having little or no effect on children from homes that are not so resource-rich?

HYPOTHESES

A naive household economics model might expect household resources to be positively related to cognitive outcomes among young children, because increased income allows the purchase of additional market goods and services to enhance the well-being of the family in general and the children in particular. However, when these resources are obtained (wholly or in part) as a result of maternal employment, there are two plausible yet contradictory effects. First, as the extent of maternal employment increases, household production of nonmarket goods and services decreases, with the possibility of negative effects on child outcomes. On the other hand, the additional market goods and services made available by the mother's earnings should have positive effects on child well-being and may serve to offset any negative effects caused by a decline in nonmarket production at home. If the "most advantaged" children are disadvantaged by maternal employment, one expects to find interactions between household income and indicators of maternal employment in terms of their joint effects on child cognitive outcomes. Specifically, one

expects to find that the effects of early family income on cognitive outcomes would be strongest (most positive) for children whose mothers did not work outside the home during early childhood.

This argument is consistent with Desai et al.'s (1989) "net of resources" hypothesis. Studying the effects of maternal employment on cognitive development, Desai et al. hypothesized that "there may be a stronger negative net effect of maternal employment on the child in high SES families" (p. 547). Their findings confirm this hypothesis, although interpretation of the Desai et al. findings is complicated by the fact that their measure of family socioeconomic status (SES) is family income *net of maternal earnings*.

For children who receive high levels of cognitive stimulation in the home, the mother's absence due to employment certainly has the potential to reduce the amount of cognitive developmental activity that is likely to take place. High-quality substitute care may fill this gap; however, given the current state of substitute care in the United States, it seems more likely that the child from a home with high levels of cognitive stimulation will not see this gap bridged by market goods and services. On the other hand, children from less supportive homes would not, in relative terms, be as strongly affected by the mother's absence. Thus, if the most advantaged children—in this case, defined as those who receive relatively high levels of cognitive stimulation at home—are disproportionately disadvantaged by maternal employment, one expects to find interactions between indicators of these advantages and various measures of maternal employment in terms of their effects on child cognitive outcomes. More specifically, one expects to find that the effects of these advantages on cognitive outcomes are strongest (most positive) for children whose mothers did not work outside the home during early childhood.

The presence of these interaction effects would support the argument that the most advantaged children are indeed disadvantaged by early maternal employment. Such interactions suggest that maternal employment during early childhood has its most negative effects on those children who are the most advantaged: those from high-income households and those from households where they receive high levels of cognitive stimulation. The failure to observe such effects empirically implies that the effects of early maternal employment on child cognitive outcomes are more or less uniform across groups of children whose households vary in SES or level of cognitive stimulation.

METHOD

DATA SET AND SAMPLE

The base sample for this study is the set of children born to 5,828 civilian women between the ages of 14 and 21 years when first interviewed for the National Longitudinal Survey of Youth (NLSY) in 1979. Of the 4,510 women who were still being interviewed in 1990 (about 91% of those eligible), 3,336 were known to have had at least 1 child, for a total of 6,427 children. Of these children, 5,803 were administered a battery of cognitive, socioemotional, and physiological assessments in 1986, 1988, 1990, or all. The analyses focus on the 2,040 children between 48 and 83 months of age at either the 1986, 1988, or 1990 interview who had codable responses to all of the variables under study. The data from the earlier (i.e., younger) observation were used for children who were assessed at more than one date.

It is important to note that the children under study are not, themselves, the results of a probability sampling procedure. Rather, they are approximately typical of children who have been born to a nationally representative sample of American women who were 25 to 32 years old on January 1, 1990. As a result, the full sample somewhat overrepresents children of relatively younger, less educated and disadvantaged mothers and also overrepresents minority children. However, the subsample under study here is considerably less tainted by the initial sampling frame of the NLSY because only the younger children are studied and because data from all three child assessments are included. The analyses reported here are performed separately by gender and ethnicity and include measures of mother's age and education and of family income.

PROCEDURE

The mothers and children were interviewed in their own homes; the main interview took approximately 1 hour, and the child assessments added about 30 minutes. Spanish-language versions of the interviews and assessments were provided as requested at the 1988 and 1990 assessments.

MEASUREMENT

Dependent Variable

The dependent variable in this study is the child's standardized score on the Peabody Picture Vocabulary Test-Revised (PPVT-R), one of the most widely used and often cited indicators of verbal intelligence and scholastic aptitude. The instrument consists of 175 vocabulary items of increasing difficulty; the child selects one of four pictures that best describes a particular word's meaning. The PPVT-R has a high construct validity relative to most intelligence and vocabulary tests (Dunn & Dunn, 1981) and is a good predictor of elementary and middle school outcomes. For the NLSY children, the test-retest reliability over a 2-year period was .66. The PPVT-R scores were standardized (with $M = 100$ and $SD = 15$) to a nationally representative sample of 4,200 children in 1979; higher scores indicate better vocabulary skills.

Independent Variables

The focal set of independent variables in these analyses reflects different aspects of maternal employment. Each of the NLSY respondents was asked a series of questions concerning their labor force status for each survey week. From these items I constructed variables indicating the continuity and extent of maternal employment since reentry into the labor force and over the child's first 4 years of life.

Continuity and extent of mother's employment. By tracking the mother's employment history starting from the first quarter after the child's birth in which the mother was employed until the end of the child's 4th year, the continuity and extent of mother's employment was determined over the child's first 4 years of life. Mothers who averaged at least 35 hours per week of paid employment during a particular quarter were considered to have been employed full-time during that quarter; those who averaged less than 35 hours per week during a particular quarter were considered to have been employed part-time during that quarter. A four-category variable indicating continuity and extent of early maternal employment was then constructed. If the mother was employed full-time in all quarters from the time of reentry into the labor force following the child's birth until the end of the child's 4th year, she was considered to have been "continuously employed, full-time." If the mother was continu-

ously employed in all quarters from the time of reentry into the labor force following the child's birth but was not employed full time in all of those quarters, she was considered to have been "continuously employed, part-time." If she was employed at any time following the child's birth but was not employed in all quarters following that point, she was considered to have been "intermittently employed." The fourth category of this variable ("not employed") represents those women who were not employed at any time from the child's birth until the end of the child's 4th year.

Mother's hours employed during early childhood. This variable was computed by taking the average number of hours employed per week from the first quarter following the birth of the child until the end of the child's 4th year; weeks in which the mother was not employed were included in the calculations as zeroes.

In addition to these independent variables, I included a series of factors in the model that are likely to be related to the cognitive ability of young children.

Child characteristics. The child's age, ethnicity, birth order, and whether the child had a low (less than 5.5 pounds) birthweight were included in the child characteristics that were studied.

Maternal characteristics. This category included mother's age at child's birth, mother's years of formal education, and mother's Armed Forces Qualifying Test (AFQT) verbal ability score.

Maternal marital status. I controlled for the effects of mother's marital status at the time of the child's birth and for the mother's current marital status.

There are a number of factors in the home environment that the literature suggests may affect the cognitive development of young children. In the present study, I analyzed the effects of early family income and cognitive stimulation level. *Early family income* over the first 4 years of the child's life was operationalized by totaling the mother's income and the incomes of all persons related to the mother in the household over the 4-year period, standardizing into constant 1982-1984 dollars using the consumer price index coefficients (U.S. Bureau of the Census, 1994) and annualizing the figure.

Level of cognitive stimulation was measured by the Cognitive Stimulation subscale of the Home Observation for Measurement of the Envi-

ronment–Short Form (HOME-SF; Baker, Keck, Mott, & Quinlan, 1993). Higher scores indicate higher levels of cognitive stimulation present in the home. *Level of emotional support* for the child in the home environment was measured by the Emotional Support subscale of the HOME-SF; higher scores indicate greater levels of emotional support. The HOME-SF is based partly on interviewer observations and partly on maternal self-reports, with slightly different versions dependent on the child's age. Baker et al. (1993) presented extensive data attesting to the relatively high internal and test-retest reliability and construct validity of this instrument; their analyses indicate an alpha level of .72. Ramey, Yeates, and Short (1984) report 2-year test-retest reliabilities for the entire HOME scale of .56 and .57. Elardo and Bradley (1981) found that the HOME was a good predictor of such conditions as failure to thrive, language delay, developmental delay, and poor academic achievement. The raw scores on both subscales were standardized to a mean of 100 and a standard deviation of 15.

ANALYSIS

DESCRIPTIVE RESULTS

Descriptive statistics for all of the variables in the models are reported in Table 1. For the entire sample, about one tenth of the mothers were employed continuously and full-time from the time they reentered the paid labor force following their child's birth; about one fifth were employed continuously but part-time, and about half were employed intermittently. Only about one fifth of the mothers were not employed at any time following the child's birth. The women were employed an average of about 15 hours per week during the child's first 4 years of life. About two thirds of the mothers were married at the time of the child's birth, and about 60% were married at the time of assessment. The mothers averaged about 12 years of education, and the families averaged just under $13,000 (in constant 1982-1984 dollars) in annual income over the child's first 4 years of life. The data in Table 1 are also presented separately for Hispanic, Black, and non-Hispanic, non-Black children and their mothers; not surprisingly, there are wide variations in child and mother characteristics across gender and ethnic subgroups.

Interactions with gender and ethnicity. In many studies in this area, gender and ethnicity are included in the models additively (e.g., Belsky & Eggebeen, 1991; Parcel & Menaghan, 1994), implicitly assuming that

TABLE 1
Descriptive Statistics for Variables in Analyses, by Gender and Ethnicity

	All Children	*Hispanics*		*Blacks*		*Non-Black, Non-Hispanic*	
		Female	*Male*	*Female*	*Male*	*Female*	*Male*
Unweighted sample size	2,040	182	191	331	309	511	516
PPVT-R[a] standardized score	85.83	75.86	77.86	77.24	72.06	97.49	94.51
	(22.67)	(26.57)	(26.25)	(18.79)	(23.53)	(15.65)	(17.36)
Child's characteristics							
Birth order	1.68	1.81	1.77	1.77	1.76	1.58	1.61
	(0.91)	(1.06)	(1.03)	(0.93)	(0.94)	(0.85)	(0.82)
Low birthweight	0.08	0.07	0.09	0.11	0.1	0.07	0.05
Age (in years)	5.12	5.12	5.06	5.14	5.25	5.04	5.12
	(0.79)	(0.85)	(0.80)	(0.80)	(0.81)	(0.74)	(0.77)
Mother's characteristics							
Never married at time of birth	0.29	0.20	0.23	0.62	0.60	0.12	0.13
Married at time of birth	0.64	0.71	0.71	0.34	0.34	0.81	0.79
Age at child's birth	22.02	21.77	22.18	21.72	21.23	22.33	22.40
	(2.81)	(2.72)	(2.87)	(2.82)	(2.69)	(2.83)	(2.76)
Mother's AFQT[b] score	31.92	21.90	22.82	18.85	20.04	43.67	42.68
	(25.11)	(20.11)	(18.90)	(16.59)	(18.12)	(26.17)	(25.64)
Mother's education (in years)	11.72	11.03	11.25	11.85	11.98	11.85	11.77
	(2.76)	(2.21)	(6.56)	(1.69)	(1.86)	(2.11)	(1.98)
Never married	0.20	0.16	0.15	0.42	0.47	0.07	0.06
Currently married	0.60	0.63	0.65	0.37	0.37	0.74	0.72
Region of residence							
Northeast	0.14	0.15	0.14	0.12	0.11	0.16	0.16
North Central	0.26	0.08	0.10	0.22	0.25	0.34	0.32
South	0.40	0.27	0.24	0.57	0.55	0.34	0.34
West	0.21	0.49	0.52	0.09	0.09	0.16	0.17
Family environment							
Early family income ($1,000)	12.84	11.78	11.52	7.51	6.92	17.35	16.21
	(14.43)	(11.38)	(10.66)	(9.16)	(9.15)	(16.84)	(16.75)
Cognitive-stimulation level	97.53	95.63	93.52	92.45	93.17	101.97	101.17
	(15.74)	(15.31)	(15.77)	(17.21)	(17.16)	(13.61)	(13.79)
Emotional-support level	97.35	99.34	95.88	91.46	90.17	102.41	100.27
	(15.74)	(15.32)	(15.23)	(15.74)	(15.69)	(14.06)	(14.87)
Maternal employment over first 4 years of life							
Continuously employed (full-time)	0.09	0.10	0.07	0.09	0.11	0.09	0.08

Continued

TABLE 1 Continued

	All Children	Hispanics		Blacks		Non-Black, Non-Hispanic	
		Female	Male	Female	Male	Female	Male
Continuously employed (part-time)	0.19	0.12	0.20	0.19	0.17	0.23	0.19
Intermittently employed	0.52	0.57	0.51	0.51	0.46	0.51	0.55
Not employed	0.21	0.21	0.22	0.21	0.26	0.17	0.18
Average hours employed	14.43	13.05	12.90	15.54	13.94	15.02	14.47
	(13.81)	(13.04)	(13.29)	(14.36)	(14.27)	(13.82)	(13.56)

NOTE: Table entries are means for continuous variables and proportions for categorical variables with standard deviations in parentheses.
a. PPVT-R = Peabody Picture Vocabulary Test-Revised.
b. AFQT = Armed Forces Qualifying Test.

there is a single process whereby the predictor variables affect cognitive or behavioral outcomes for all children. Some studies (e.g., Baydar & Brooks-Gunn, 1991) limit their analyses to children of one ethnicity only and develop models that are additive with respect to gender. Others (e.g., Desai et al., 1989) perform separate analyses by gender and develop additive models with respect to ethnicity. Operating under the assumption that the processes affecting cognitive outcomes differ by both gender and ethnicity, I performed a combined analysis of all children including interaction effects of all 28 terms from the model in Table 2 with gender and ethnicity. This model had an R^2 of .446, compared to a model that included only the additive effects of gender and ethnicity, which had an R^2 of .402; the incremental F test comparing these models yields $F = 1.57$ with 97 and 1,908 df, $p < .001$. Clearly, the processes affecting cognitive outcomes differ by gender and ethnicity. Thus it is advisable to analyze the data for the six ethnicity/gender subgroups separately (as I have done in Tables 1, 2, and 3).

ORDINARY LEAST SQUARES (OLS) REGRESSION MODELS

Ordinary least squares multiple regression analyses using listwise deletion for missing data were performed on the unweighted data using the standardized PPVT-R score as the dependent variable. The unstandardized (b_i) coefficients for each of the effects and the model R^2 for each analysis are presented in Table 2. In general, these models fit the data relatively well; the R^2 values range from .226 (Black females) to .389

TABLE 2
OLS[a] Regressions Predicting PPVT-R[b] Score by Gender and Ethnicity

	Hispanics		*Blacks*		*Non-Black, Non-Hispanic*	
Variable	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*
Model R^2	.39*	.28*	.23*	.33*	.37*	.30*
Child's characteristics						
Birth order	–1.27	0.26	–2.22	–0.38	–4.21*	–4.02*
Low birthweight	3.25	8.44	–5.03	–4.25	–2.00	–0.96
Age (in years)	5.93*	4.85	4.09*	5.96*	1.77*	3.93*
Region of residence						
Northeast	–7.49	–12.48*	–4.66	–9.19	3.92	0.22
North Central	–10.30	–6.63	1.22	–7.86	3.88*	–0.27
South	–7.58	–2.63	–1.36	–12.75*	2.42	–1.13
Mother's characteristics						
Mother's AFQT[c] score	0.23*	0.23*	0.15*	0.21*	0.15*	0.16*
Age at child's birth	0.41	0.21	0.52	–0.87	0.08	0.68*
Never married at time of child's birth	11.84	12.12	–0.74	3.66	–3.55	–3.38
Married at time of child's birth	5.71	–0.68	–0.96	–3.61	1.70	2.66
Education (in years)	1.17	0.76*	0.32	1.44	–0.05	–0.75
Currently never married	–10.07	–10.12	–2.82	–6.89	3.34	10.83*
Currently married	–2.83	–2.46	–2.36	–1.62	–3.25	–3.63*
Family environment						
Early family income ($1,000)	1.18*	0.70	0.34	0.49	–0.04	0.34*
Cognitive-stimulation level	0.78*	0.33	0.01	0.62*	0.40*	0.26*
Emotional-support level	0.10	0.17	0.20*	0.15	0.11*	0.13*
Maternal employment over first 4 years of life						
Continuously employed full-time?	13.95	–53.48	–11.23	24.87	–4.41	35.05
Continuously employed part-time?	59.17	–68.95	–12.40	51.64	17.50	–5.45
Intermittently employed?	38.80	–22.09	–16.82	48.74*	4.05	4.32
Average hours employed	1.59	1.45	–0.07	0.31	0.35	0.04
Interactions with early family income						
Early Family Income × Continuous Full-Time Employment	–1.39	–2.13*	–0.33	0.21	0.16	–0.26
Early Family Income × Continuous Part-Time Employment	–1.69*	–1.93*	–0.50	0.20	0.38	–0.25

Continued

TABLE 2 Continued

	Hispanics		*Blacks*		*Non-Black, Non-Hispanic*	
Variable	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*
Early Family Income × Intermittent Employment	–1.33*	–1.14	0.11	0.04	0.13	–0.27
Early Family Income × Hours Employed	0.01	0.03	–0.04	–0.02	–0.01	–0.00
Interactions with cognitive stimulation						
Cognitive Stimulation × Continuous Full-Time Employment	0.07	0.83	0.13	–0.26	0.05	–0.29
Cognitive Stimulation × Continuous Part-Time Employment	–0.38	0.83	0.18	–0.55	–0.17	0.09
Cognitive Stimulation × Intermittent Employment	–0.24	0.27	0.19	–0.51*	–0.04	–0.01
Cognitive Stimulation × Hours Employed	–0.02	–0.02	0.00	–0.01	–0.00	–0.00
Constant	–76.40*	–11.09*	24.33	–21.90	33.43*	24.98*

* Indicates coefficients that are at least twice as large as their standard errors. Table entries are unstandardized (b_i) regression coefficients.
a. OLS = ordinary least squares.
b. PPVT-R = Peabody Picture Vocabulary Test- Revised.
c. AFQT = Armed Forces Qualifying Test.

(Hispanic females). For comparison purposes, the analyses were also run using means substitution for the AFQT score, cognitive stimulation, and emotional support (which accounted for nearly all of the missing data in the sample). These analyses produced results that were substantially similar to those employing listwise deletion for missing data.

Child's background characteristics. Birth order is negatively related to the PPVT-R score for five of the six groups, although the effect is statistically significant only for non-Hispanic, non-Black children. Low birthweight is negatively associated with the PPVT-R score for all but Hispanic children. As might be expected, age is positively associated with the PPVT-R score for all groups. Black and Hispanic children in the Northeast and North Central regions tend to score lower on the PPVT, whereas non-Hispanic, non-Black children in these regions tend to score

somewhat higher. All groups residing in the South except non-Hispanic, non-Black females tend to score lower on the PPVT.

Mother's marital status. There are no consistent or statistically significant effects of mother's marital status at time of child's birth on the PPVT-R score. Non-Hispanic, non-Black sons of never married mothers had significantly higher PPVT-R scores than did sons of formerly married mothers, whereas sons of currently married mothers had significantly lower scores.

Mother's characteristics. In general, mother's age at time of child's birth is positively associated with the PPVT-R score (although the effect is significant only for non-Hispanic, non-Black males). Mother's intelligence (as measured by the AFQT verbal ability score) has a statistically significant positive effect on the child's PPVT-R score for all six groups.

Early family income. There is a statistically significant positive effect of average family income over the first 4 years of life on the PPVT-R score for non-Hispanic, non-Black males and for Hispanic females.

Level of cognitive stimulation. Level of cognitive stimulation has a positive effect on the PPVT-R for all six groups (statistically significant for all but Hispanic males and Black females).

Level of emotional support. There is a positive effect of level of emotional support on the PPVT-R for all six groups (statistically significant for Black females and for non-Hispanic, non-Black children).

Maternal employment factors. Continuity and extent of maternal employment over the first 4 years of life has a statistically significant effect on the PPVT-R score only for Black males. In general, Black males whose mothers were employed (either continuously or intermittently) during this period had higher PPVT-R scores than those whose mothers were not employed. Average hours employed over the first 4 years of life did not have a statistically significant effect on the PPVT-R for any of the six groups.

EFFECTS OF INTERACTION TESTS

The major hypotheses of this study implicate interactions between early family income and early maternal employment and between cogni-

TABLE 3
F Tests for Interactions by Gender and Ethnicity

	Gender/Ethnicity Subgroup					
	Black		*Hispanic*		*Non-Black, Non-Hispanic*	
Interaction Effect	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*
Early Family Income × Continuity and Extent of Employment	0.89	0.05	1.88	1.48	0.89	0.72
Early Family Income × Hours Worked During Infancy	0.09	1.45	0.20	2.36	0.09	0.04
Cognitive Stimulation × Continuity and Extent of Employment	0.44	2.90*	0.31	0.80	0.44	0.57
Cognitive Stimulation × Hours Worked During Infancy	0.05	0.03	0.98	1.62	0.05	0.01

* Indicates an interaction F test significant beyond the .05 level. Table entries are F statistics from the tests for relevant interaction effects.

tive stimulation level and early maternal employment. The F values for the interaction tests are presented in Table 3.

The interaction tests can be summarized very simply: Of the 24 possible interaction effects, only one is statistically significant beyond the .05 level. The interaction of cognitive stimulation level with continuity and extent of employment is statistically significant for Black males. However, the nature of this interaction (depicted in Figure 1) is not entirely consistent with the model. Black male children whose mothers were not employed during the first 4 years of life show the strongest positive effect of cognitive stimulation, but the effect for children whose mothers were employed continuously and full-time also show a positive effect. There is essentially no effect of cognitive stimulation on the PPVT-R score for Black male children whose mothers were employed continuously and part-time or for those whose mothers were employed intermittently.

DISCUSSION

Are the most advantaged children truly disadvantaged by early maternal employment? My analyses suggest that they are not. My discussion

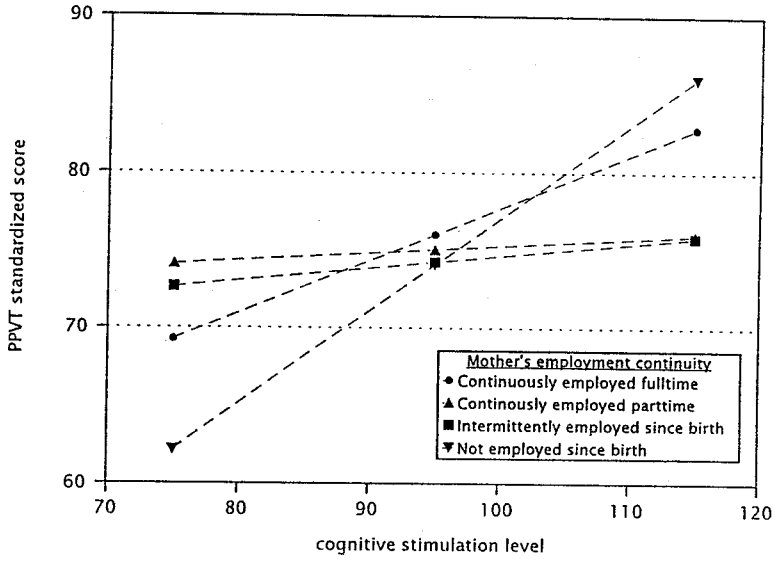

Figure 1: Interaction of Employment Continuity With Cognitive Stimulation on PPVT-R[a] Score (Black males, ages 4-6 years)

a. PPVT-R = Peabody Picture Vocabulary Test- Revised.

of the household economics perspective led me to hypothesize that early family income and level of cognitive stimulation in the home (indicators of advantages that children might enjoy) might interact with measures of early maternal employment in terms of their effects on child cognitive outcomes. To test for the existence of these interactions, I performed a series of OLS regressions on data provided by 2,040 4- to 6-year-olds from the NLSY. In each of the six models (one model for each gender/ethnicity subgroup) I estimated effects of interactions between (a) early family income and continuity and extent of maternal employment, (b) early family income and average hours employed, (c) level of cognitive stimulation and continuity and extent of maternal employment, and (d) level of cognitive stimulation and average hours employed.

What inferences can be drawn concerning the hypotheses raised in this study? One way of interpreting the results is to point out that of the 24 interaction tests (4 in each of the 6 gender/ethnicity groups), only 1 was statistically significant (and the nature of that interaction is not completely consistent with the model). Thus claims that maternal employment during early childhood has disproportionately negative effects on the cognitive

abilities of the "most advantaged" of America's children seem to be somewhat exaggerated.

If these analyses *had* discovered the interactions predicted by the model, one possible interpretation would have been the relatively low quality of substitute care arrangements available to employed mothers. Poor-quality (market) substitute care would be an imperfect substitution for better quality (nonmarket) care provided in the child's home. However, the substitution of market for nonmarket goods and services in these families seems to be, if not perfect, at least adequate. The interactions that appear in these data are not consistent across gender or ethnicity groups and are not particularly robust in any case. One explanation of this finding is that the quality of substitute care tends to be highly related to its cost and that children of better educated mothers and children from higher income households tend to be placed in more expensive substitute care arrangements (see, e.g., Hofferth, Brayfield, Deich, & Holcomb, 1991). Thus families of the "most advantaged" children seem to deliberately seek out higher quality substitute care, preventing these children from being disproportionately "disadvantaged" by their mother's employment.

One concern with the design of this study is that, because of the nature of the sampling procedure and the timing of the child assessments, only children of relatively young mothers were studied (the mean age of the mothers at their child's birth was just over 22 years). Given the fact that age at first marital birth has been increasing in recent years, it is likely that the sample omits many professional and career-oriented women who are more likely to delay their first birth. However, the findings are still readily generalizable to children of relatively young mothers and are probably not atypical of all children.

It can be argued that there are selection problems that cloud the interpretation of these data. Most notably, it is possible that differences in maternal employment behavior may actually reflect preexisting differences between mothers. Mother's intellectual aptitudes, sense of mastery and self-esteem, and premarital employment history probably have effects on maternal employment behavior, thus making it difficult to determine whether any observed effects of maternal employment on child outcomes are real or spurious. Greenstein (1993), however, argued that early maternal employment has effects on child behavioral outcomes even after controlling for background factors, and it does not seem unreasonable to assume that the same is true for cognitive outcomes.

What are the implications of the present research for the household economics model? First, the findings suggest that the substitution of market for nonmarket goods and services, although not perfect, does not

substantially differ for those children who are most advantaged in terms of household income and level of cognitive stimulation as compared to those who are less advantaged. If this substitution process varied across economic levels, for example, one expects to find that as household income increased cognitive ability should *decrease* for children of continuously employed mothers but *increase* for children of nonemployed mothers; I found no such interactions.

If this substitution process varied across households with different levels of advantages for children, one also expects to find interactions of hours worked during infancy with household economic level; I found no such interactions. If the process varied across households varying in level of cognitive stimulation for their young children, one expects to find statistically significant interactions of continuity and extent of early maternal employment with cognitive stimulation level; of the six gender/ethnicity groups, I found such an interaction only for Black males, and the nature of that interaction is not entirely consistent with the model. I found no statistically significant interaction effects between cognitive-stimulation level and hours worked during infancy for any of the six groups.

In summation, these findings suggest that Milne, Myers, and Ginsburg's (1986) conclusion that "mother's employment has the most negative effects on the achievement of the most advantaged" (p. 152) must be viewed somewhat skeptically. While Milne, Myers, Ginsburg's (1986) and Desai et al.'s (1989) arguments are consistent with a household economics model that explains differential effects of maternal employment as a result of imperfect substitution of market for nonmarket goods and services, the findings reported here do not support such a model. There *is* a substitution of market for nonmarket goods taking place, but that substitution process does not seem to vary substantially across households with different levels of advantages such as household income or level of cognitive stimulation.

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