

Nonstandard Work Schedules, Child Care Subsidies, and Child Care Arrangements

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ABSTRACT

This paper examines the complexity of low-income mothers' child care arrangements, with attention to nonstandard job schedules and child care subsidies. Data come from the Women's Employment Study, a panel study of low-income mothers. Of interest is whether nonstandard work schedules and child care subsidies are associated with the type and amount of care families' use. Findings demonstrate that net of other factors, respondents who work evenings rely less on formal care, but use a significantly greater number of care hours annually. In addition, net of other factors, subsidy receipt is related to more formal care and a greater number of care hours annually. The robustness of these findings is examined with fixed effects regressions using three waves of WES data.

KEY WORDS: Nonstandard Work Schedules, Child Care Subsidies, Child Care Arrangements

Demographic and social policy trends over the last several decades challenge traditional approaches to managing work and family life, especially practices around child care during working hours. Most women with children work outside the home, and 75% of children under five years of age are in non-parental care while their parents work (Capizzano, Adams, & Sonenstein, 2000). Current social policy directed at low-income families reflects these trends, as evidenced by the adoption of a mandatory work-based system of cash assistance, the 1990s' expansions to the Earned Income Tax Credit, and the growth of government spending for child care assistance¹. Child care assistance is a key policy lever for increasing employment of low-income parents by reducing monetary costs of nonparental care (Adams & Rohacek, 2002).

Trends that favor maternal employment also pose labor market challenges to low-skilled working families. There has been a growth in the part-time and contingent workforce and an increase in *non-standard work schedules* – jobs requiring evening, weekend, or variable schedules (Presser, 2003; Tilly, 1996). Presser and Cox (1997) find that many occupations forecasted to have high growth (such as cashiers, retail sales, and home health aides) disproportionately employ low-income women with young children. Jobs with nonstandard schedules are beneficial to some, but can interfere with family roles and activities and complicate efforts to secure nonparental child care (Presser, 2003; Heymann, 2000). These associations with child care and family life may mediate the effect of nonstandard work on children's well-being (Dunifon, Kalil & Bajracharya, 2005; Han, 2005).

Most child care research – whether concerned with the influence of child care

price on maternal employment (e.g., Blau, 2001; Kimmel, 1998) or parental decision-making about type of care (e.g., Davis & Connelly, 2005) – focuses on the primary care arrangement (usually the arrangement used for the most hours) of a focal child (typically the youngest child). But national survey data demonstrate that over 40% of parents use multiple care arrangements simultaneously (Presser, 2003; Smith, 2000). Only recently have studies begun to examine factors associated with these “packages” of care (Henly & Lambert, 2005; Scott, London, & Hurst, 2005; Presser, 2003), or how they change over time (Chaudry, 2004).

In the current paper, we use data collected as part of the Women’s Employment Study (WES) to examine the child care patterns of a random sample of low-income mothers, attending to the full range of child care these mothers report using over the course of a year for all children under 14 years of age. Given the growth in nonstandard schedule jobs, we consider the influence of maternal work schedules on the types and amount of care parents use. We reason that work schedules set the parameters for when care is needed, and are therefore important factors in parental decision-making about child care. Although some mothers, especially married mothers, select nonstandard jobs to enable shared caregiving between spouses (Becker & Moen, 1999; Staines & Pleck, 1986), most “view their employment during nonstandard hours primarily as an accommodation to labor market needs, and not as a personal preference” (p.29, Presser & Cox, 1997).

Given the increased government role in funding child care, we also consider whether child care subsidy use is associated with the type and amount of child care mothers report. By reducing child care expenses, subsidies may allow parents to purchase

more care or enter the more expensive formal care market. While we do not have measures of quality in the current study, formal care arrangements such as centers and preschools (over relative and in-home care) have been found to foster cognitive development and school readiness skills, especially for low-income pre-school children (e.g., Fuller, Kagan, Caspary, & Gauthier, 2002; Zaslow, McGroder, Cave, & Mariner, 1999), and may be indicative of higher quality settings overall (Coley, Chase-Landsdale, & Li-Grining, 2001; Kontos, Howes, Shinn, & Galinsky, 1997).

The current study has three aims: 1) to describe child care patterns among WES respondents, taking into account the range of different child care arrangements used over time; 2) to examine the association between nonstandard work characteristics and different types and amounts of child care; and 3) to examine the relationship between child care subsidy use and different types and amounts of child care.

BACKGROUND LITERATURE

Child Care Arrangements

Child care arrangements can be broadly categorized as *center-based* or *home-based*. Center-based care includes formal programs such as nursery schools, preschools, after school, and Head Start programs. Home-based arrangements provide care either in the home of the caregiver or in the child's home by a non-parental provider. Examples can include a grandmother who watches her grandchildren in her home, an individual who cares for her neighbor's infant, or a family child care provider who cares for several children. In addition to non-parental arrangements, many children are cared for by fathers during maternal work hours.

Multiple care arrangements are used by more than 40 percent of employed mothers. Multiple arrangements might be playful responses to parental preferences for more than one provider, or they may instead represent “crazy quilts” (Folk & Yi, 1994) of patchwork care (Scott, et al., 2005). Chaudry’s (2004) qualitative study of low-income families in New York shows that children are often in multiple care arrangements throughout the week, and they experience frequent changes in care over time as well. The families Chaudry studied used five or more primary arrangements, and many more supplemental arrangements, over the first 4 years of a child’s life. In the current study, we examine patterns of child care, with particular attention to the combinations of care mothers used for all children under 14 years of age.

Nonstandard Work and Child Care

Two-fifths of American workers work the majority of their hours outside of daytime, weekday hours (Presser, 2003), almost thirty percent have variable start and end times (Golden, 2001), and ten percent cannot provide a “usual” schedule because their schedules change so frequently (Golden, 2001; 2005). Nonstandard schedules are more common among low-skilled mothers than other groups, given their disproportionate representation in service sector occupations that rely heavily on nonstandard scheduling (Presser, 2003; Presser & Cox, 1997). Some mothers choose nonstandard work in order to enable family caregiving; however, the majority report working at nonstandard times because of labor market requirements rather than to accommodate their own preferences (Presser, 2003). Whatever their motivations, research suggests that nonstandard workers use different child care arrangements than standard workers.

Most formal child care programs are only open during weekday hours, close by 6pm, and have rules that require children to attend programs during scheduled times (Illinois Action For Children, 2005; Willer, Hofferth, Kisker, Divine-Hawkins, Farquhar, & Glantz, 1991). Licensed family child care homes may provide greater flexibility, but are also rarely available during late evenings or weekend hours (Willer, et al., 1991; Bromer & Henly, 2004; Touminen, 2003). Given these constraints, parents who work nonstandard schedules may be encouraged to use unregulated, informal caregivers, especially relatives or to rely on shared parenting arrangements (Han, 2004; Presser, 2003; Presser & Cox, 1997; Casper & O'Connell, 1998).

In fact, recent research suggests that nonstandard workers are less likely to use center care as a primary arrangement than either relative or parent care (Han, 2004; Presser, 2003). In one of the few longitudinal studies of the relationship, Han (2004) observes a significant shift to center care accompanying employment shifts from nonstandard to standard schedules, and an opposite shift from center to paternal care arrangements when maternal employment moves from standard to nonstandard schedules.

Nonstandard workers are also more likely than other workers to use more than one child care arrangement (Presser, 2003; Folk & Yi, 1994). Nonstandard workers require a more varied set of care hours than do standard workers, making it more difficult for a single provider to cover all hours of necessary care. Informal caregivers may have more flexibility than formal providers to cover varied hours (Coley et al., 2001), but they have competing demands on their time as well, including their own jobs and caregiving responsibilities (Henly & Lambert, 2005; Hogan, Hao, & Parish, 1990; Presser, 1989).

Nonstandard workers may also purchase more child care overall than standard workers. For example, to the extent that nonstandard workers believe that center or preschool experiences are important developmentally for their children, they may use a formal care arrangement whether or not it serves as an employment support, and still require additional care hours to fill their needs during work hours. In the current study we examine whether nonstandard work is associated with more total child care hours, as well as considering its association with the type and number of arrangements used.

Subsidy Use and Child Care

The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996 consolidated federal funding for child care into the Child Care and Development Block Grant (CCDBG), and PRWORA also permitted states to draw from Temporary Assistance to Needy Families (TANF) funds to supplement child care spending further. States have significant flexibility in the design and implementation of their subsidy systems (including determining eligibility criteria), although federal law requires states to make CCDBG funds available to most legal nonparental care options (e.g., centers, family care homes, relative and nonrelative providers).

In Michigan, the focus of the current study, CCDBG and TANF funds were blended, and child care funding increased more than 300 percent from 1996 to 2000 (Seefeldt, Leos-Urbel, McMahon, & Snyder, 2001). Parents who meet income-eligibility guidelines, have a child under 14 years of age, and are employed or engaged in employment-related TANF activities are eligible for subsidies (see Danziger et al., 2004 for fuller description of Michigan's subsidy program.)

Studies examining work incentives of child care subsidy programs have found that child care subsidy use is related to maternal employment (Bainbridge, Meyers, & Waldfogel, 2003; Meyers, Heintze, & Wolf, 2002), and may reduce child-care related problems once employed (Press, Fagan, & Laughlin, 2006). Using WES data, Danziger, Ananat, and Browning (2004) find a significant relationship between subsidy use and both earnings and employment duration.

Less research has investigated whether and how subsidies influence parents' child care choices. If subsidies make higher cost arrangements more affordable, parents with subsidies may select more expensive kinds of care, such as child care centers and preschools. However, pressure from caseworkers to use less expensive forms of care, a shortage of formal providers willing to accept subsidies, or subsidy levels that keep more expensive kinds of care out of reach – would presumably limit subsidized parents' formal care options.

There is some evidence that subsidies may alter child care use, and move low-income parents into the formal care market (Brooks, Risler, Hamilton, & Nackerud, 2002; Layzer & Burstein, 2005). For example, Crosby and her colleagues (2005) examine 13 experimental welfare and employment programs and find that low-income parents who were provided expanded child care assistance were more likely to use center-based care.

Child care subsidies may also be related to the total number of care hours parents purchase or the number of arrangements they use, although research on these associations is limited. By lowering expenses, child care subsidies may increase the quantity of care parents can buy – either a greater number of hours or additional providers for children not

previously in nonparental care. A less positive scenario, which would also result in more arrangements for subsidy users, would occur if subsidy users exited arrangements more quickly due to short subsidy spells (Meyers, Peck, Davis, Collins, et. al, 2002; Lowe, Weisner, & Geis, 2003). While our data do not capture duration of subsidy spells, we are able to examine whether, over the course of a year, subsidy users report a greater number of arrangements than nonsubsidy users.

Other associations with child care arrangements

Of central concern to this study is nonstandard work and subsidy use; however, there are several other established correlates of child care arrangements that we take into account in our analyses. For example, children in two parent mother-father households are more likely to use father care and have fewer child care hours overall, whereas children in single parent households are more likely to use relative care. Center care and nonrelative care rates do not differ significantly across single or two parent structures (Presser, 2003; Chaudry, 2004; Earle, Adams, & Tout, 2001). Having adults or older children in the home is associated with an increased use of relative care and a reduced reliance on formal care (Leibowitz, Waite, & Witsberger, 1988; Lehrer, 1983).

Education, race/ethnicity, and income also show important relationships to child care arrangements (Johansen, et al., 1996; Floge, 1985). About one-fifth of African American and European American preschoolers use centers, with substantially lower rates for Latinos (Liang, Fuller, & Singer, 2000). Low-income families are more likely than other income groups to use relative care and less likely to use center care; although low-income parents disproportionately use Head Start and after school programs. The limited quantity of center-based care in low-income neighborhoods may help explain the

higher rates of informal care in these communities (Fuller, et al., 2002; Gordon & Chase-Lansdale, 2001; Queralt & Witte, 1998). The use of multiple arrangements does not appear to vary by income or race and ethnicity (Smith, 2000; Folk & Yi, 1994).

Finally, children under 3 are less likely than preschool-aged children to attend formal centers and to be in multiple arrangements; and more likely to be cared for by informal providers or parents (Smith, 2000; Capizzano, et.al., 2000; Fuller, et al., 2002).

Study Hypotheses

We explore four hypotheses about the association of nonstandard work and subsidy use with child care arrangements (net of other influences):

First, we expect that nonstandard workers will report less formal care than standard workers, as measured by a lower proportion of all child care hours in formal care and a reduced likelihood of reporting any formal care.

Second, we hypothesize that nonstandard workers will use more child care than standard workers in the course of a year, as measured by a greater number of arrangements and a greater number of child care hours.

Third, we hypothesize that subsidy users will report more formal care than nonsubsidy users, as measured by a greater proportion of all care hours in formal care and an increased likelihood of reporting any formal care.

Fourth, we hypothesize that subsidy users will report more child care than nonsubsidy users, as measured by a greater number of arrangements in the last 12 months and a greater number of child care hours.

METHODS

Data

We use data from the Women's Employment Study (WES), a longitudinal panel study of current and former welfare recipients in one urban Michigan county. WES respondents were randomly selected with equal probability from an ordered list of eligible women in February 1997. To be eligible, women had to be residents of the county, receiving TANF as single parent cases, U.S. citizens, between the ages of 18 – 54, and either White or African American². There are five waves of WES data, collected between 1997 and 2003, and response rates have ranged from 86 to 93 percent at each wave. Waves 1 and 2 collected data on child care in an incompatible fashion from the other waves and are therefore not used in the current study (see Ananat & Phinney, 2004, for a discussion of differences in the child care measures across WES waves). We focus on the respondents at Waves 3 (1999; n=513), 4 (2001; n=420), and 5 (2003; n=348) who responded to the child care module of the survey. Previous WES analyses revealed no systematic attrition biases. For example, comparisons with administrative data on the entire county caseload and the WES sample on numerous variables showed few statistically significant differences across waves (Pape, 2004; Danziger, et al., 2004).

WES data are well suited for examining the complexity of child care because information on all care arrangements in the previous 12 months for all children under 14 in the household is collected. This allows us to investigate the amount of care used across an entire year rather than at a point in time, and to consider how care may get packaged across a variety of arrangements.

Measures

Dependent Variables. Respondents were asked about all care arrangements during working hours in the previous 12 months for all children under 14 in the household. For

each of six different types of arrangements, the respondent was asked to report the number of children in care, the number of months the child(ren) was/were in the arrangement, the number of hours per week used, the number of different places of that type the respondent uses (or had used in the last 12 months), and whether the arrangement was subsidized by the Michigan Family Independence Agency (the welfare department). The nonparental care types were: 1) day care, center, nursery, or preschool (referred to as “center care”); 2) after school program; 3) Head Start; 4) a relative; and 5) a non-relative. The sixth care type was father care.

We constructed four composite measures of child care arrangements that serve as the dependent variables. The first is a dichotomous indicator of *any formal care in the last year*, where formal care included center, after school, or Head Start arrangements. The *any formal care* measure was recalculated without Head Start for the subsidy models because we did not expect subsidies to affect Head Start use in the same fashion as they would other types of formal care, given that Head Start is already subsidized.

The second dependent measure addresses the degree of formal care and is calculated as the *proportion of all child care hours in the last year that were in formal care settings*. In the subsidy models, Head Start also is not included as a form of formal care, but its use is reflected in the denominator of the degree of formal care measure.

The third and fourth dependent variables, *number of hours annually* and *number of arrangements annually*, count the amount of child care, regardless of type, that respondents report using in the previous 12 months. *Number of hours* is measured continuously, as the total hours across all sectors and all children in the last year, and *number of arrangements* is calculated trichotomously (0, 1, 2 or more). When calculating

the number of arrangements, each different arrangement is treated as a separate arrangement, even when it is in the same sector. Thus, if someone reports her grandmother and uncle as different providers, this would be two arrangements. Descriptive statistics for the four dependent measures are reported in Table 1.

We created two versions of each of the four dependent measures. The first treated all care arrangements including father care as child care. The second version treated only nonparental arrangements as child care. For example, the total number of care hours used in the previous year includes hours in which the child was in father care in version 1, but excludes father care hours in version 2. Because father care is not a subsidy-eligible type of care, only version 2 is used to test the subsidy hypotheses.

Independent Variables. We analyzed several measures that address both the variability and timing of work schedules. First, a dichotomous measure of *flexible start/end times* indicates whether the respondent has a regular time of day that she begins and ends work (*regular, varied*). Second, a measure of *variable hours* indicates whether the number of hours worked change from week to week (*a lot, a fair amount vs. a little, hardly at all*). A third measure, *some evening hours*, indicates whether the respondent reports working primarily daytime hours or at least some regular evening hours. The nonstandard work variables were asked of respondents who were working at the time of the survey.

The other primary independent variable measures subsidy use. Respondents were considered receiving a child care subsidy if they reported that part or all of their child care expenses were paid by the Michigan Family Independence Agency.

Control Variables. We include respondents' age (*under 35; 35 or older*); whether white (0) or African American (1); marital - cohabitation status (0 = *no*; 1 = *yes*); number of adults in household; number of adult children in the household; education (*less than high school, high school degree, more than high school education*); number of children under 3 years of age, 3 to 5 years of age, 6 to 10 years of age, and 11 to 17 years of age. In addition, we include personal mastery, a psychological resource that benefits coping under situations of limited control, to account for psychological differences that might relate to both independent and dependent measures (Pearlin, Lieberman, Menaghan, & Mullan, 1981). Models also include the proportion of months employed in each year given that child care use will be affected by amount of employment. Finally, father care is included as a control variable in all models using version 2 of the dependent variables.

Because of concerns about endogeneity with our central study variables, we do not include controls for wages or income. However, education is assumed to be a rough proxy for human capital, which relates both to the jobs a respondent can get and the types of child care she is able to arrange, while being at least pre-determined.

Analytic Strategy

First, characteristics of our sample are reported across the variables of interest at waves 3, 4, and 5 (Table 1). Second, a comprehensive picture of the child care patterns of respondents at Wave 4 are presented for the six types care. Of central interest is the prevalence of the different care arrangements and the variety of ways in which they are packaged (Table 2). To conserve space, we do not report patterns for the other waves. Third, we run cross-sectional multivariate analyses estimating child care outcomes, using Wave 4 data (Tables 3 and 4)³. To test hypotheses about nonstandard work, the four

measures of child care are regressed on the three measures of nonstandard work in separate models. These models include the subsample of respondents working at the time of the survey ($n = 306$), and control for all covariates described above. To test hypotheses about subsidy use, the four measures of child care are regressed on subsidy use and the set of covariates. These analyses are run on the subsample of subsidy eligible respondents ($n = 355$)⁴.

Next, we estimate fixed effects models using Waves 3, 4, and 5 (Table 5) to account for unmeasured characteristics that may bias the statistical estimates in the cross-sectional data (see Appendix). Specifically, a respondent may have unobserved characteristics that affect both the types of care she uses and the type of job she has (or her subsidy use). Person fixed-effects allows us to control for everything about a respondent that does not change over time. In these models, we also add specific dummies for the year of each WES interview. Year effects control for the possibility that more child care became available, the local economy experienced recession, or relative demand for non-standard jobs or subsidies changed between WES survey waves.

Two limitations of a fixed effects estimation strategy deserve note. First, fixed effects models do not produce effect estimates for respondents whose scheduling status (or subsidy status) does not change across the three waves, thereby limiting the power of these models by reducing the effective sample size substantially. Second, fixed effects analyses cannot account for biases that are due to unmeasured characteristics that change over time. These limitations notwithstanding, fixed effects analyses provide one means of testing the robustness of our cross-sectional multivariate findings.

RESULTS

Sample Descriptives

Table 1 reports sample descriptives at Waves 3, 4, and 5 for the target sample: respondents with children under 14 years of age and some employment in the year prior to the survey wave. Wave 4 descriptives are summarized, noting differences across waves when applicable. Of the 420 respondents at Wave 4, 72 percent are 35 years of age or under (by wave 5, only two-thirds) and 57 percent are African American. Forty percent are married or cohabiting, and over half reside in households with two or more adults, typically a spouse or a grandmother. Slightly more than one-fourth have not graduated from high school or obtained a high-school equivalency certificate, whereas 39 percent have more than a high school degree. Slightly more than one-fifth have at least one child less than 3 years of age, just over 40 percent have at least one child 3 to 5 years of age, and 88 percent have a child over 5 years of age. By Wave 5, respondents have significantly fewer children from birth to 5 and significantly more children over 11 years of age.

The target sample is relatively stably employed although not necessarily in the same job, with the mean percentage of months worked between Wave 3 and 4 at 82 percent. Slightly over one-fourth reported jobs with variable start and end times, 49 percent reported work hours that varied week to week (this dropped to 40 percent by wave 5), and 47 percent reported working evening hours or a mix of evening and daytime hours. Almost 48 percent of the subsidy eligible sample receives a child care subsidy at Wave 4.

Descriptive Analysis of Child Care Patterns (Wave 4)

Of the 420 respondents employed in the 12 months between Waves 3 and 4 and with a child under 14 years of age, 9.8 percent reported not using any nonparental care

arrangements or father care, and 36.9 percent reported only one arrangement (Table 1). The remainder use two (29.5 percent), three (12.6 percent), or 4 or more (11.2 percent) arrangements. Multiple arrangements may signal that a single child is in more than one arrangement simultaneously, that multiple children are in arrangements simultaneously, or that arrangements are sequential, and one or multiple children has experienced instability in care in the last 12 months. The data do not allow us to examine movement in and out of different arrangements.

Table 2 provides information on the Wave 4 patterns of child care over the last 12 months. The first row of Table 2 demonstrates that 62.1 percent of respondents use at least some relative care, 31 percent some father care, 21 percent some center care, 20 percent some non-relative home-based care, 8.8 percent some after-school care, and 9.3 percent a Head Start center. Center, relative, non-relative, and father care are all used for an average of over 20 hours per week, Head Start for 14 hours per week, and after school care for almost 10 hours per week.

Most child care users reported packaging an arrangement with at least one other type of care over the year (row 3, Table 2). All Head Start users, and over 90 percent of those in after school programs, reported using at least one other arrangement in the previous 12 months. Over 80 percent of those reporting center care use an additional arrangement, and over two-thirds of those who use relative and non-relative providers reported at least one other arrangement. Over 80 percent of father care users also reported another arrangement.

Row 4 of Table 2 breaks down these findings further to illustrate the specific types of care that are packaged with each care type. The findings reveal that relative care

is not only the most common kind of care, it is also the most frequently used additional arrangement. Even for relative users as a group, a second relative arrangement is almost as common (41 percent) as father care (47 percent). As with past research (Capizzano & Adams, 2000), it is less common to package formal care arrangements together than to combine arrangements across formal and informal sectors or within the informal sector.

Cross-Sectional Nonstandard Work Models (Wave 4)

The cross-sectional analyses examine the relationship between each of the nonstandard work measures (*variable start and end times, hours that change week to week, some evening hours*) with the measures of child care (*any formal care, the proportion of child care hours in formal care, the number of child care hours, and the number of child care arrangements*). These relationships are examined, controlling for covariates hypothesized to be important to child care use: respondent age, education, race, cohabitation status, ages and number of children, number of adults in the household, mastery, and proportion of months employed. The nonstandard work models are run with both versions of the dependent variable; the version that counts father care as a type of care is reported on Table 3.

We conduct different analyses depending on the level of measurement of the dependent variables: a Probit for the dichotomous measure *any formal care*, a Tobit for the censored variable *proportion of all child care hours in formal care*, an Ordinary Least Squares regression for the continuous variable *annual number of child care hours*, and a Multinomial Logit for *number of arrangements*, which we treat categorically (0, 1, 2 or more)⁵.

For each outcome variable, the models were run separately for each of the nonstandard work variables. However, we only report the results for models that include *evening work* on Table 3 because the other two nonstandard work measures – *variable start and end times* and *hours change week to week* – were not significant in any of the cross-sectional models (unreported results available from authors by request).

We hypothesized that nonstandard workers would report less formal care than standard workers, as measured by a lower proportion of all care hours in formal care and a reduced likelihood of reporting any formal care type. Consistent with this hypothesis, we find that respondents with some evening work are significantly less likely to use any formal care arrangement, and a lower proportion of all their child care hours are in formal settings, as reported in the second and third columns of Table 3 respectively.

Education and the number and age of children are related to both measures of formal care in a consistent way. Respondents with more than a high school degree are significantly more likely to use any formal care and reported a significantly higher proportion of hours of formal care. Having more children between the ages of 3 to 5 years old is also significantly associated with both measures of formal care use, whereas having more children between the ages of 11 to 17 years of age is negatively related to formal care. These relationships are consistent with previous research.

In Hypothesis 2, we predict that nonstandard workers will use more child care than standard workers, as measured by number of child care hours and number of arrangements. As with the results for formal care, we find that the timing of work (*some evening hours*) but not the variability of the schedule (*variable start/end times* and *variable hours*) is associated with child care arrangements. As indicated by column 4 of

Table 3, respondents with evening hours use markedly more child care hours than do workers with daytime-only hours (395 hours more per year, or about 8 hours more per week). Even when the sample is restricted to the 277 respondents with at least some child care hours, evening workers use more hours of child care than daytime workers.

We do not find support for our hypothesis that nonstandard workers use more arrangements over the course of the year. Instead, as reported in columns 5 and 6 of Table 3, the multinomial logit results indicate that whereas evening workers are less likely than exclusively day workers to use no child care at all (as compared to using only one arrangement), they are no more likely to use two or more arrangements (as compared to one arrangement).

Several control variables are related to our measures of amount of care. Respondents over 35 years of age, with less than a high school education, and who are married or cohabiting use significantly fewer child care hours annually. On the other hand, respondents use significantly more child care hours if they live with more adults, have more children less than 3 years of age or between 3 to 5 years of age, and worked a greater proportion of months in the last year. Regarding number of arrangements, less educated respondents are less likely to be without child care altogether as compared to one arrangement but no more or less likely to have two or more arrangements than one arrangement. African Americans are less likely than Whites to have two or more arrangements as compared to one arrangement, as are respondents with higher mastery scores. Respondents with more children younger than 3 years of age and 3 to 5 years of age are more likely to have two or more arrangements as compared to one arrangement, whereas for respondents with older children the situation is reversed and multiple care

arrangements are less likely. There is not a significant relationship between no arrangement (versus one arrangement) and the number of children younger than 3 or 3 to 5; however respondents with more children 6 to 10 are less likely to have no arrangement at all and respondents with more children 11 to 17 are more likely to have no arrangements at all.

The nonstandard work models were also run with the second version of the dependent variables that excluded father care from the construction of the dependent variable (and included it as a model covariate). The results are robust across this alternative specification (results available from authors by request). Evening work continues to be associated with the use of any formal care, the degree of formal care, and the total number of child care hours. Respondents with evening work also continue to show a greater likelihood of using only one arrangement as opposed to no arrangements, with no reliable differences for multiple arrangements. Moreover, with this alternative specification, we find that respondents who use father care are marginally less likely to report formal care and they use fewer nonparental child care hours overall. However, father care does not relate to the number of nonparental child care arrangements used.

Cross-Sectional Subsidy Models (Wave 4)

For the subsidy models, the sample is not limited to only people working at the time of the survey but includes people who worked any time in the prior survey year. The sample is restricted to only subsidy-eligible respondents (84.8 percent), based on the income eligibility formula used by the Michigan Family Independence agency⁶. Version two of our dependent measures is used in the subsidy models because father care is not a subsidy-eligible child care type. In addition, Head Start is not counted as a type of formal

care in subsidy models because we would not expect Head Start, which is already subsidized, to be affected by subsidy vouchers in the same manner as center and afterschool care.

Table 4 reports the results of the subsidy models for the four dependent variables. Hypothesis 3 predicts that subsidy use is related to a greater likelihood of using any formal care (e.g., center or after school) and to a higher proportion of all child care hours spent in formal care. As shown in columns 2 and 3 of Table 4, we find that respondents who use a subsidy are indeed significantly more likely to use a center or after school arrangement, and they spend a significantly greater proportion of all their child care hours in these kinds of formal care, relative to those subsidy-eligible respondents who do not report receiving a subsidy.

Hypothesis 4 predicts that subsidy users would report more nonparental child care than nonsubsidy users, as measured by a greater number of nonparental child care hours and a greater number of nonparental arrangements. As with our nonstandard work models, our hypothesis regarding child care hours is supported. Column 4 of Table 4 shows that respondents using a subsidy report about 670 more child care hours annually (about 13 hours per week).

To examine the relationship between subsidy use and number of arrangements, we restricted the sample to the subset of respondents reporting at least one nonparental arrangement ($n=277$), given that subsidies are not available to individuals without child care. Thus, instead of a multinomial logit, we run an OLS regression on number of arrangements (1, 2, 3, and 4 or more). There was not a significant relationship observed between subsidy use and the number of arrangements. This suggests that subsidy users

may not be facing greater child care instability than nonsubsidy users, but they are also not adding on new arrangements to accommodate summer months or multiple children. Instead, subsidy users are apparently using more hours of care within the same number of arrangements.

Fixed Effects Models (Waves 3, 4, and 5)

In order to account for unmeasured characteristics that may bias the statistical estimates in the cross-sectional data, we next estimate fixed effects models (Table 5). The fixed effects models examine the relationship between the nonstandard work and subsidy measures with child care arrangements using Waves 4 and 5 for degree of formal care and number of child care hours, and using Waves 3, 4, and 5 for any formal care arrangement. Wave 3 does not include information on child care hours by type of care, so it could not be used for any dependent measures related to hours of care. Standard errors are clustered to account for the nonindependence of observations of a single respondent across waves. Because these models include both year and person fixed-effects, only changes in the independent variables that correspond to changes in the dependent variables, independent of general change trends, determine the estimates.

Table 5 reports the results of the longitudinal analyses. For each dependent variable, the coefficients and clustered standard errors are reported for the nonstandard work variable and the subsidy variable (statistics for the control variables are not included on the table). Three different models for each dependent variable are reported. First, the bivariate model is run without additional covariates. In the second specification, covariates that change over time (e.g., marital status, ages of children, number of adults in the household) and the year-specific dummy variables (Waves 3, 4,

and 5) are included. The third specification is the individual fixed effects model, in which person-specific dummies are added (in addition to control and year-specific dummies) to control for observed and unobserved respondent differences that do not change over time. Because the analyses continued to show no relationship between the dependent variables and *variable start/end times* and *hours change week to week*, models with these variables are not reported on Table 5. In addition, given that no cross-sectional relationship was observed for *multiple arrangements*, only results for the remaining three dependent variables are reported.

As reported on Table 5, we continue to observe the negative relationship between evening work and the use of any formal care in Models 1 and 2 that we found in the cross-sectional analyses, however the magnitude of the association decreases by about two-thirds when individual fixed effects are considered, and the relationship is no longer significant. Regarding the proportion of child care hours that are formal, we again find a negative relationship between evening hours and proportion of formal care. The effect size remains stable across the three models, however the increase in the standard error when person dummies are included in the specification eliminates the significance of the fixed effects estimate. Regarding amount of care, we observe a positive relationship between total number of hours and the evening work variable in models 1 and 2, however the effect diminishes entirely in the fixed effects models. Thus, the results of the fixed effects analyses suggest that we cannot rule out the possibility that selection is explaining the relationship between evening work and our child care variables.

Regarding subsidy use, we find that subsidy users continue to show a greater likelihood of using formal care. This relationship is somewhat weaker but remains

significant in the fixed effects model. Subsidy users also report a higher proportion of formal care hours; however this relationship does not hold in the fixed effects model, suggesting that selection processes may explain the association. On the other hand, the effect for child care hours is robust across the three models and stronger than that observed in the cross-sectional models. Specifically, subsidy users report almost 1000 more care hours (about 19 hours per week) than those without subsidies.

DISCUSSION

This paper examines the complexity of low-income parents' child care patterns, with particular attention to the arrangements of mothers who work nonstandard job schedules and mothers who receive child care subsidies. By examining all care in the last year, rather than restricting our focus to the primary provider at a point in time, we find that multiple arrangements across the year are the norm, and there is great diversity in patterns of care. Informal relative care is common (62 percent in Wave 4), and is the type of care that most frequently supplemented other kinds of care. Moreover, almost one-third of fathers provided some care while mothers worked. Father care did not reduce the likelihood of using other care arrangements, although it was related to fewer nonparental care hours overall and less formal care use.

Formal care was a relatively common arrangement in WES, with almost 40 percent of respondents reporting using a center, an after school program, and/or Head Start program. We hypothesized that nonstandard hour employment and variable work schedules would make it difficult to find care in the formal sector, and our hypotheses were partially supported. We found evidence that evening workers used less formal care, but there was no relationship between formal care use and variable hour work. In fact,

our two measures that tapped variable schedules proved unrelated to any of our dependent measures, whereas evening work showed consistent relationships to several outcomes.

We also expected that nonstandard schedules would lead to more hours of care and more arrangements overall because it would be difficult to find consistent caregivers to accommodate nonstandard work hours and because parents with evening hours might purchase daytime formal care for developmental purposes while still requiring evening care to meet their work needs. The results showed that evening workers did report more care hours overall, however the relationship diminished in the fixed effects model. In addition, although evening workers were more likely to use at least one versus no child care arrangement, multiple arrangements were no more common for nonstandard workers.

Our results regarding multiple arrangements are contrary to other studies (e.g., Presser, 2003; Folk & Yi, 1994). One possibility for our null finding might be that the relatively narrow variance in job characteristics represented by WES respondents is insufficient to detect the effects of nonstandard work schedules, especially given our sample size. Research by Presser (2003) and Folk & Yi (1994) use national data sets with a much larger range of occupational and income categories.

A second explanation for why we do not find a relationship between nonstandard work and multiple arrangements concerns the measure of multiple arrangements itself. Its emphasis on all care arrangements over a year for children under 14 is quite different from other studies of multiple arrangements that are concerned with point in time estimates. For example, the National Survey of Families and Households measures all

arrangements in the last week for children under 5 years of age. It seems plausible that nonstandard schedules exert their influence most directly at a point in time (i.e., parents must construct a patchwork of arrangement to fit their present work needs). While we hypothesized that these packages of care would potentially be unstable and ultimately result in more arrangements over the course of a year, our data do not support this conclusion.

Regarding subsidy use, our findings suggest that the children of subsidy users are more likely to use formal care, and this effect is robust across the different model specifications. This evidence that subsidies may encourage formal care use is interesting in light of recent research suggesting benefits to formal care, especially high quality center care (e.g., Loeb, Fuller, Kagan, & Carrol, B.; 2004; NICHD, 2000) and after school care (Chung, de Kanter, & Stonehill, 2002). We cannot determine from our data whether the association between subsidy and formal care use is signaling changing maternal preferences as a result of subsidies, or alternately whether subsidies are allowing families who already desire formal care, but cannot afford it without the subsidy, to enter the more expensive formal care market (Layzer & Burstein, 2005). This is an important policy-relevant distinction for future research to investigate.

Subsidy users report significantly more child care hours over the course of the year as compared to nonsubsidy users. The effect is robust to alternative model specifications that relied on multiple waves of data and that controlled for measured and unmeasured individual characteristics. The effect size is rather large, with subsidy users reporting almost 1000 hours more of care per year, an additional 19 hours per week.

As with the nonstandard work models, the subsidy models did not give any

evidence that subsidy use was associated with more arrangements across the year. Thus, we have no reason to believe that subsidy users are facing care disruptions at any greater rate than nonsubsidy users. Our ability to model this relationship directly is limited by the absence of information in WES on the exact dates in the last year when a respondent took up a subsidy and the duration of subsidies. Still, this finding is an initial step toward an understanding of the relationship between subsidy use and child care arrangements that we hope will be pursued in future research.

Limitations

While WES data are rich in many regards, the sample is relatively small which challenges our ability to observe reliable associations, especially in the fixed effects models. Moreover, the time period in which questions about arrangements are asked is the previous 12 months, making it impossible to determine whether multiple arrangements occur simultaneously or serially. With a larger sample, it would be possible to do subgroup analyses on respondents with only one child and only one arrangement to compare to the broader sample. However, such subgroups are too small to produce reliable estimates with these data.

The data also do not allow us to differentiate licensed relative and non-relative caregivers from unlicensed ones, requiring us to treat all relative and nonrelative care as “informal”. Yet, we know from prior research that some licensed family child care homes have very intentional programming, are quite structured, and are run by caregivers with formal training in child care and development (Touminen, 2003), suggesting that some relative and non-relative arrangements might have more appropriately been categorized as “formal”, at least in comparison to an informal babysitting relationship

provided by a grandparent or a neighbor.

The fixed effects models eliminate person-level characteristics that may bias cross-sectional estimation techniques. As such, they serve as a test of the robustness of the relationships observed in the cross-sectional models. While effectively addressing selection concerns, fixed effects models do not allow us to make causal claims about the direction of the relationships we observe. Thus, while we have demonstrated that some within-respondent changes in nonstandard work and subsidy use are related to changes in child care arrangements, it remains plausible that child care arrangements cause the changes in subsidy use and/or nonstandard work status, rather than the other way around as our conceptualization of the relationship suggests.

Conclusion

The increased labor force participation of low-income mothers has brought benefits to many women and their families. But employment creates child care challenges that have not been satisfactorily addressed by current public policy. The policy challenge is to retain the advantage created by new labor market opportunities available to mothers while reducing the burdens, dislocation, and accompanying social costs. Subsidies are an important step toward reducing parents' child care expenses, but many eligible families do not receive subsidies and government funding for child care has been flat for the last several years. Moreover, there has been limited public attention to the question of how policy can best support the child care needs of nonstandard workers, although these workers are becoming standard in today's economy (Presser, 2003).

Nonstandard Work Schedules, Child Care Subsidies, and Child Care Arrangements

TABLES

Table 1

Sample Descriptives by Wave of WES

	Wave 3 ¹ (n=513) Percentage	Wave 4 (n=420) Percentage	Wave 5 (n=348) Percentage
<u>Controls</u>			
35 or younger	77.4	72.4	65.3**
African American	56.0	57.1	57.5
Child under 3 (% yes)	28.1	22.4	6.3**
Mean number of children under 3 (SE)	.36 (.59)	.27 (.49)	.06** (.24)
Child 3 to 5	51.8	40.8	28.7**
Mean number of children 3 to 5 (SE)	.65 (.71)	.47 (.62)	.31** (.52)
Child over 5	79.7	88.1	94.8**
Mean number of children 6 to 10 (SE)	.92 (.90)	.98 (.90)	.92 (.79)
Mean number of children 11 to 17 (SE)	.65 (.95)	.83 (1.05)	.99** (1.08)
Married or Cohabiting	35.9	40.2	38.7
Average Number of Adults in Household	1.63	1.61	1.52+
Less than High School Education	28.9	25.5	26.1
HS degree/GED	34.8	35.3	29.5
More than High School Degree	36.3	39.1	44.4+
Proportion of months in last year employed (SE)	.774 (.306)	.817 (.274)	.794 (.284)
<u>Nonstandard Work</u>			
Variable Start and End Times	26.6	25.7	27.3

Nonstandard Work Schedules, Child Care Subsidies, and Child Care Arrangements

Hours Vary Week to Week	49.6	48.5	40.3*
Evening or Mixed Evening/Day hours	46.4	46.9	51.1
<u>Subsidy</u>			
Child Care Subsidy Eligibility	93.2	84.8	74.8**
Child Care Subsidy Use (of eligibles)	46.0	47.8	43.3
<u>Dependent Variables</u>			
Average Child Care Hours in Previous Year ¹	NA	1286.1	1238.2
Total Number of Arrangements ²			
0	24.8	9.8	15.8
1	29.8	36.9	35.0
2	23.4	29.5	23.5
3	14.4	12.6	13.8
4 or more	7.7	11.2	11.9
Any Formal Care	40.5	38.9	41.7
Proportion of All Child Care Hours in Formal Care	NA	.196	.186

⁺ $p < .10$. * $p < .05$. ** $p < .01$. Two-tailed test. Standard errors in parentheses

¹No hours questions were asked in the Wave 3 child care module, so *average child care hours in previous year* and *proportion of all child care hours in formal care* cannot be calculated for Wave 3.

²Wave 3 module does not ask about more than one arrangement of the same type (e.g., multiple relative arrangements). Thus, for Wave 3 the number of arrangements variable measures the number of modes of care rather than the number of types of arrangements regardless of mode, and cannot be directly compared to distributions for the other waves.

Nonstandard Work Schedules, Child Care Subsidies, and Child Care Arrangements

Table 2
Wave 4 Child Care Arrangements

	Center care	After School Program	Head Start	Relative Care	Non- Relative care	Father Care
% using at least some of this type of care ¹ (n)	21.0% (88)	8.81% (37)	9.3% (39)	62.1% (261)	20.0% (82)	31.0% (130)
Mean # of hours per week, of users of this type of care (SE)	25.96 (14.7)	9.78 (5.32)	14.15 (7.47)	27.18 (20.73)	23.22 (16.62)	21.22 (14.92)
% using this type of care with more than one arrangement (n)	80.7% (71)	91.9% (34)	100% (39)	66.9% (174)	70.7% (58)	81.5% (106)
Additional care is:	Of the 71:	Of the 34:	Of the 39:	Of the 174:	Of the 58:	Of the 106:
Center	21.1%	38.2%	30.8%	26.4%	29.3%	21.7%
After school	18.3%	5.9%	7.7%	13.2%	13.8%	9.4%
Head Start	16.9%	8.8%	5.1%	14.4%	10.3%	21.7%
Relative	64.8%	67.7%	64.1%	41.1%	51.7%	77.4%
Non-relative	23.9%	23.5%	15.8%	17.9%	27.6%	20.2%
Father	32.4%	29.4%	59.0%	47.1%	36.2%	NA

⁺ $p < .10$. * $p < .05$. ** $p < .01$. Two-tailed test.

¹Calculations based on full sample (N = 420). Includes respondents with no arrangements

Nonstandard Work Schedules, Child Care Subsidies, and Child Care Arrangements

Table 3

Wave 4 Cross-Sectional Analyses: Relationship between Evening Hours Work and Dependent Measures

Variable	Any Formal Care (Probit) <i>B (SE B)</i>	Proportion of All Child Care Hours in Formal Care (Tobit) <i>B (SE B)</i>	Total Child Care Hours Annually (OLS) <i>B (SE B)</i>	Number of Child Care Arrangements (Multinomial Logit)	
				<i>O to 1 Arrangement</i> <i>B (SE B)</i>	<i>2 to 1 Arrangement</i> <i>B (SE B)</i>
Evening Work	-0.4088* (0.174)	-0.4081** (0.1315)	394.7313** (124.3651)	-1.2745* (0.5138)	-0.3979 (0.2776)
Over 35	-0.3479 (0.2133)	-0.0925 (0.1706)	-452.0034** (151.2799)	0.7892 (0.523)	-0.2959 (0.3395)
Less than high school degree	0.0325 (0.2386)	-0.0354 (0.183)	-337.3503* (164.8101)	-1.4369+ (0.7661)	-0.1012 (0.3593)
More than high school degree	0.5578** (0.1884)	0.4390** (0.1452)	44.5096 (138.1627)	-0.1333 (0.5089)	0.5265+ (0.3158)
Married/Cohabiting	-0.1137 (0.224)	-0.0344 (0.1646)	-408.8209** (156.5904)	0.5733 (0.6866)	0.3116 (0.347)
Number of adults in household	-0.1511 (0.1796)	-0.2027 (0.1328)	263.9245* (122.0108)	-0.3586 (0.5814)	0.0493 (0.2648)
African American	0.0181 (0.1691)	0.1901 (0.129)	-51.3186 (124.6062)	0.1031 (0.5134)	-0.8469** (0.2807)
Total # of children less than 3	-0.0429 (0.1886)	-0.0684 (0.1402)	260.3905+ (141.8622)	0.3059 (0.6418)	0.7031* (0.3362)
Total # of children 3 to 5	0.7739** (0.1325)	0.4376** (0.1091)	327.5299** (101.2922)	-0.3202 (0.5153)	0.5516* (0.2364)
Total # of children 6 to 10	-0.1578 (0.1014)	-0.0719 (0.0749)	10.9366 (74.2916)	-0.6605+ (0.3464)	-0.3332* (0.167)
Total # of children 11 to 17	-0.1813+ (0.0978)	-0.1385+ (0.0779)	-38.4012 (65.3169)	0.4960* (0.2193)	-0.1931 (0.1532)
Mastery Score	-0.031 (0.0354)	0.0155 (0.0275)	-29.1139 (25.7355)	0.0787 (0.1036)	-0.1598** (0.061)
Proportion of months worked since Wave 3	0.6169 (0.4498)	0.0175 (0.3417)	1,286.4794** (309.6603)	-0.8153 (1.2038)	0.3404 (0.7009)
Observations	306	271	306	306	306
R-squared			0.23		
Pseudo R-squared	.19	.13		.16	

+ $p < .10$. * $p < .05$. ** $p < .01$. Two-tailed test. Standard errors in parentheses

Nonstandard Work Schedules, Child Care Subsidies, and Child Care Arrangements

Table 4

Wave 4 Cross-Sectional Analyses: Relationship between Subsidy Use and Dependent Measures for Subsidy Eligible Respondents

Variable	Any Center or After School Care (Probit)	Proportion of All Nonparental Hours in Center/After School (Tobit)	Total Nonparental Child Care Hours (OLS)	Number of Nonparental Child Care Arrangements (for subset with at least one arrangement) (OLS)
	<i>B (SE B)</i>	<i>B (SE B)</i>	<i>B (SE B)</i>	<i>B (SE B)</i>
Subsidy	0.8161** (0.1805)	0.6537** (0.1821)	669.6478** (110.84)	0.0927 (0.116)
Father Care	-0.1405 (0.1928)	-0.1418 (0.1856)	-139.3198 (118.0391)	0.2227+ (0.1256)
Over 35	-0.0634 (0.2175)	0.0729 (0.2154)	-295.2951* (125.524)	0.0307 (0.1394)
Less than high school degree	-0.211 (0.2169)	-0.252 (0.2135)	-284.6206* (125.1703)	-0.0566 (0.1317)
More than high school degree	0.5559** (0.182)	0.5239** (0.1788)	173.3247 (117.2235)	0.5001** (0.1219)
Married/Cohabiting	0.0675 (0.2009)	0.2501 (0.1857)	-402.5670** (129.0707)	-0.1647 (0.1311)
Number of adults in household	0.0692 (0.1325)	0.0139 (0.1241)	207.6712* (84.3594)	0.0266 (0.0863)
African American	-0.187 (0.1679)	0.0295 (0.1594)	-146.144 (104.928)	-0.1521 (0.1085)
Total # of children less than 3	-0.0238 (0.1665)	-0.057 (0.1639)	-69.4057 (103.4792)	-0.0335 (0.1084)
Total # of children 3 to 5	0.2877* (0.128)	0.2185+ (0.132)	173.7386* (84.6775)	0.2341* (0.0937)
Total # of children 6 to 10	-0.1199 (0.0942)	-0.092 (0.0905)	37.1609 (58.3322)	-0.1099+ (0.0634)
Total # of children 11 to 17	-0.1681+ (0.0923)	-0.1929* (0.0939)	15.8329 (50.1367)	-0.0198 (0.0551)
Mastery Score	0.0033 (0.0337)	0.0247 (0.0324)	-9.9551 (20.3325)	-0.0408+ (0.021)
Proportion of months worked since Wave 3	0.2217 (0.3372)	-0.0534 (0.3201)	950.9852** (190.1161)	0.0135 (0.2071)
Observations	355	295	355	302
R-squared			0.31	0.17
Pseudo R-squared	.17	.11		

+ $p < .10$. * $p < .05$. ** $p < .01$. Two-tailed test. Standard errors in parentheses

Table 5

Longitudinal Analyses: Summary of Coefficients for Nonstandard Work and Subsidy Regressions Predicting Any Formal Care, Degree of Formal Care, and Total Number of Child Care Hours

Variable	Any formal (OLS, waves 3, 4, and 5)			Proportion of All Child Care Hours that are Formal (OLS, waves 4 and 5)			Total Number of Child Care Hours Annually (OLS, waves 4 and 5)		
	Bivariate	With Controls and Year Dummies ¹	With individual fixed effects	Bivariate	With Controls and Year Dummies	With individual fixed effects	Bivariate	With Controls and Year Dummies	With individual fixed effects
	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)	<i>B</i> (<i>SEb</i>)
Daytime/Eve-Mixed 0 = daytime	-0.1204** (0.0368)	-0.1282** (0.0356)	-0.0489 (0.0744)	-0.1581** (0.0328)	-0.1627** (0.0324)	-0.1719 (0.1174)	330.22** (110.69)	258.86* (106.93)	-89.52 (338.06)
Child Care Subsidy 0=no subsidy	0.2146** (0.0455)	0.2210** (0.0477)	.1594* (0.0760)	0.1554** (0.0320)	0.1625** (0.0348)	.0266 (0.1400)	904.32** (85.21)	806.81** (92.30)	999.77** (273.22)

⁺*p* < .10. **p* < .05. ***p* < .01. Two-tailed test.

Note: Robust standard errors in parentheses. Nonstandard work models include only current workers at each wave, N = 797 for Waves 3, 4, and 5 and N = 544 for Waves 4 and 5. Subsidy models include only subsidy eligible at each wave, N = 893 for Waves 3, 4, and 5 and N = 605 for Waves 4 and 5. Each coefficient represents a separate OLS regression equation. All nonstandard work models include father care in calculation of dependent variable. Subsidy models do not include father care in calculation of dependent variable. The calculation of formal care (both for the *Any Formal* variable and the *Proportion of All Child Care Hours that are Formal* variable) is calculated using Center, After School, and Head Start for nonstandard work models and Center and After School only for subsidy models,

¹Models with year and person dummies include time-varying controls: married/cohabiting, number of adults in household, number of children under 3, 3 to 5, 6 to 10, and 11 to 17.

Appendix

The potential for bias from OLS regression analyses is shown in Equation 1. The child care outcome of respondent i at time t is regressed on whether the mother is working a nonstandard schedule (or receiving a subsidy, depending on the model), as well as a set of control variables (controls_{it}). The reference category is holding a standard job (or not having a subsidy). Respondent_i represents unobservable characteristics of R that are not adjusted for in the cross-sectional analyses. If these unobservables are correlated with both respondent's work schedule status_{it} (or subsidy status_{it}) and her child care arrangement (Y_{it}), estimates will be biased. Specifically, the unmeasured components of Respondent_i would be included in the error term (ε_{it}) of Equation 1. The error term, in turn, would be correlated with both the dependent and independent variables, violating key assumptions of OLS analyses (Deaton, 1997).

$$\text{Eq 1: } Y_{it} = \alpha_{it} + \beta_1 \text{nonstandard schedule} + \gamma_1 \text{controls}_{it} + \text{Respondent}_i + \text{Year}_t + \varepsilon_{it}$$

To address this concern, we use within-respondent fixed-effect regressions, relying on repeated observations of respondents' work schedule (or subsidy use) and the outcomes of interest (Waves, 3, 4, and 5). Fixed effects models examine changes within respondents over time (rather than across respondents) and measures the effect on child care arrangements of a respondent moving from a standard to a nonstandard schedule (or from no subsidy to a subsidy) (see Greene, 1997 or Deaton, 1997 for fuller explanation of fixed effects models). The fixed-effects model for nonstandard work is illustrated in Equation 2. Each variable in the equation is averaged over all assessed time points for a specific respondent (for example, $\text{nonstandard schedule}_i$ is a mothers' average nonstandard schedule status across Waves 3-5). This average value is then subtracted

from the value at a specific time point for that respondent (nonstandard schedule_{it}, the value of the nonstandard schedule variable at a specific time point). Time invariant measures (such as respondent race) drop out of the model as do unmeasured characteristics of respondents, including components of the error term that are correlated over time.

$$\text{Eq 2: } Y_{it} - Y_i = \alpha_{it} - \alpha_i + \beta_1(\text{nonstandard schedule}_{it} - \text{nonstandard schedule}_i) + \beta_2(\text{controls}_{it} - \text{controls}_i) + \varepsilon_{it} - \varepsilon_i - \varepsilon_t$$

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Endnotes

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¹ Child care spending rose dramatically from 1996 to 2002, but federal child care spending has not increased since 2002. Thirty states reduced funding for child care programs in 2004 and fewer families received child care assistance. Still, the number of families receiving subsidized care has doubled since 1996 (Matthews & Ewen, 2004).

² Other race/ethnic groups comprised a very small proportion of the county's caseload and would be of insufficient size to allow separate examination of these groups.

³ Because WES does not ask the child care questions of the subset of respondents who were not in the labor market in the previous year, we are unable to model child care and employment decisions jointly. Previous research suggests that the characteristics that relate to mode of care are different for non-employed and employed mothers (see Davis and Connelly, 2005).

⁴ In addition to the primary models, the robustness of the cross-sectional findings were also tested to slight variations in the specification of the models (e.g., different operationalizations of the dependent variables such as treating the number of child care arrangements as continuous, adjusting the measure of child care arrangements and child care hours to the number of children under 14 in the household; the addition or subtraction of control variables such as excluding number of months worked as a control variable; and making adjustments to the base sample by excluding those with no child care arrangements from the analyses). These adjustments only minimally affected our findings, and are reported only when relevant to the interpretation of study results.

⁵ We ran a multinomial logit instead of an ordered probit or OLS for the models predicting “number of arrangements” because we did not want to assume a linear relationship between the attributes of number of arrangements (e.g., that moves from zero, to one, to multiple arrangements were necessarily in the same direction). For example, the difference between the state of having zero arrangements and having one arrangement may reflect a difference between a negative situation (e.g., a child in self-care) and a positive situation (e.g., a child cared for by a single provider); on the other hand, we are not assuming that having more child care arrangements is necessarily better than one arrangement, given that multiple arrangements may signal provider instability rather than

parental preferences for more than one arrangement. Regarding the “any formal care” models, in addition to the probit analyses we report herein, we also ran the models within a logistic regression framework. As expected, the results are practically equivalent to the probit. We report the probit results because probit analyses can be directly compared to tobit analyses, which are appropriate for our models predicting “proportion of child care hours in formal care”.

⁶ We also conducted supplemental analyses on the full sample, controlling for subsidy eligibility status. No appreciable differences between the two specifications were observed, and these results are not reported. (Calculations of eligibility status and the results of subsidy models with eligibility controlled are available from authors upon request.)