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Parental Work Schedules and Child-Care Arrangements in Low-Income Families

Objective: This study analyzes the relationships between parental working schedules and several aspects of child-care arrangements for young children in low-income single-mother and two-partner households.

Background: Children whose parents work nonstandard schedules may hold child-care arrangements that are less stimulating or developmentally productive than their peers whose parents work standard schedules. This study builds on previous research by expanding the set of outcomes under analysis, accounting for coscheduling in two-partner households, revising traditional shift definitions, and using recent, nationally representative data.

Method: The 2012 National Survey of Early Care and Education is used to develop work schedule typologies. Regression methods are employed to evaluate the relationships between these schedules and the use of center-based, home-based, and relative care; continuity of care; and complexity of care (a new measure introduced as an alternative to care multiplicity).

Results: Nonstandard schedules are associated with increased child-care complexity and decreased continuity and the types of care that children receive in single-mother households but less so in two-partner households. In two-partner households the largest effects are in households in which both partners work standard schedules; children in these households receive more nonparental care and are in more complex child-care arrangements.

Conclusion: Findings point to the cumulative disadvantage accruing to the children of single mothers, especially those working nontraditional shifts.

Implications: Labor market inequalities yield consequences for children's development and intergenerational stratification.

Working conditions matter for families as well as for workers themselves. During the past several decades, as labor protections have weakened and working conditions have deteriorated by a number of standards-including safety, compensation, and scheduling-researchers have explored how aspects of work may affect those to whom employees are connected. Particular attention has been paid to the consequences of evening- and night-shift schedules-referred to here as nonstandard schedules-for workers' children, including effects on their child-care arrangements, which have been found to be less stimulating or developmentally productive (Han, 2004; Kimmel & Powell, 2006). Previous research has demonstrated associations between maternal nonstandard work schedules and increased use of coparental, relative, and home-based care; decreased use of center-based care; and increases in the number of care providers employed (Enchautegui, Johnson, & Gelatt, 2015; Han, 2004, 2005; Kimmel & Powell, 2006; Presser, 2003).

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This research, however, leaves a number of issues unresolved. First, although this literature has been primarily concerned with questions of what types of care parents select (i.e., home-based, center-based, or relative care), the literature on child care and children's development suggests that attention also be paid to other characteristics of child-care arrangements, such as complexity and continuity of care. Second, most of the research on child-care choice deals with work schedules of only one parent, typically the mother, ignoring the potentially exacerbating or moderating effects of the other parent's schedule (if they are present in the household). Third, research to date has relied almost exclusively on traditional shift definitions and has failed to explore the emergence and effects of new working schedules. Finally, all previous analyses of these questions rest on data collected in the early 1990s or earlier. It is unclear whether the same relationships continue to hold in the current day.

I employ the 2012 National Survey of Early Care and Education (NSECE) to analyze the relationships between parental work schedules and the type, complexity, and continuity of child care for young children in low-income households. Analysis is restricted to single-mother and heterosexual two-partner households with children younger than age 5 who fall below 200% of the poverty line. Households with children younger than school age are typically in greatest need of care, and those living at or below the poverty line represent the most vulnerable population. They are also the population whose members are most likely to work a nontraditional schedule (Enchautegui, 2013; Hamermesh, 2002; Presser, 2003). Rather than impose increasingly ill-suited, traditional shift definitions, I derive work schedules from detailed scheduling data using sequence analysis and clustering techniques not previously applied in this literature. I show how these work schedules are associated with the use of home-based, center-based, and relative care; the overall complexity of child-care arrangements; and the continuity of child care. As used here, home-based care refers to regular, paid care provided by an individual who does not have a prior relationship with the child; center-based care is regular, organizational care; and relative care is regular care provided by a family or household member of the child. Care complexity, as introduced here, is a new measure and represents

an alternative to care multiplicity. Multiplicity has typically been operationalized as a count of how many nonparental care providers a child has (or a binary indicator of having more than one). Care complexity, by contrast, exploits the richness of the NSECE data to account for the number, ordering, and variation in time spent with each unique care provider (Aisenbrey & Fasang, 2010; Elzinga, 2006, 2010; Elzinga & Liefbroer, 2007). In two-partner households, I take the work schedules of both partners into account; this is the first study to consider the effects of two-partner scheduling on child-care arrangements. This is also the first academic study to explore these questions with data collected in the wake of either welfare reform or the Great Recession.

The results indicate that work schedules were strongly associated with care arrangements in single-mother households. Young children of low-income single mothers working nonstandard schedules-relative to their peers whose mothers work standard schedules-received significantly more relative care and less home-based care, and their care arrangements were more complex and in place for shorter periods. Many of the same conclusions held for the children of single mothers working nontraditional "off-standard" shifts, a new class of schedules that emerges in analysis. Work schedules appeared to play a less significant role in shaping care arrangements in two-partner households, however. The protective effects of a second partner appeared to reduce the effects of nonstandard work. The largest results are found in households wherein both partners work a standard schedule; young children in such households had significantly more complex care arrangements that included more of all three types of care.

BACKGROUND: NONSTANDARD WORK AND CHILD-CARE ARRANGEMENTS

Before delving into theory and presenting hypotheses, it is important to introduce the multiple aspects of child-care arrangements analyzed here, describe the developmental consequences of such arrangements, and define nonstandard work schedules.

Parents turn to a number of sources for the care of their young children. The literature on child care generally divides care into three broad types: center-based, home-based, and relative care (Burchinal, Magnuson, Powell, & Hong, 2015). Center-based care constitutes care provided in an organizational setting; it can include child-care centers, nurseries, preschools, prekindergarten, and Head Start programs. Home-based care is paid care not provided by a relative; it may happen in the child's home (e.g., a nanny or sitter) or in another setting (e.g., a provider operating out of his or her own home). Relative care is care provided by a family member, most often a grandmother. Estimates derived from the 2008 Survey of Income and Program Participation indicate that 23.5% of all children younger than age 5 are regularly in center-based care; 11.2% are regularly in home-based care; and 42.1% are regularly in relative care (Laughlin, 2013).

In addition to their composition by provider type, child-care arrangements are often assessed in terms of how complicated they are or how long they have been in place (Sandstrom & Huerta, 2013). Care multiplicity—a count of providers or a binary indicator of having more than one provider-is often used as a measure of having a more or less complicated arrangement. As noted previously, this article introduces a new, far richer measure: care complexity. Complexity accounts not just for the sheer number of providers but also for the ordering and variation in time spent with each unique care provider. How long arrangements have been in place-the continuity of care-is typically assessed in terms of months of care provided.

Types of care used, care multiplicity, and continuity of care have all been associated with children's developmental outcomes (Bernal & Keane, 2011; Burchinal et al., 2015; Sandstrom & Huerta, 2013). Center-based care has been linked to a range of cognitive and academic benefits (Cornelissen, Dustmann, Raute, & Schönberg, 2016; Del Boca, Piazzalunga, & Pronzato, 2017; Felfe & Lalive, 2013; Hansen & Hawkes, 2009; Vandell, Burchinal, & Pierce, 2016), but also to some increased behavioral problems (Belsky et al., 2007; Ruhm & Waldfogel, 2011). Home-based and relative care tend to produce worse outcomes in terms of school readiness than either parental or center-based care (Bernal & Keane, 2011; Datta Gupta & Simonsen, 2010; Del Boca et al., 2017; Gregg, Washbrook, Propper, & Burgess, 2005; Hansen & Hawkes, 2009; Herbst, 2013). Care multiplicity has been associated with decreased prosocial tendencies and increased behavioral problems (Claessens & Chen, 2013; Morrissey, 2009; Pilarz & Hill, 2014). Although not all changes of providers may be detrimental to children (Sandstrom & Huerta, 2013), greater continuity of care has been linked to lower distress, increased school readiness, and fewer externalizing behaviors (Cryer et al., 2005; Loeb, Fuller, Kagan, & Carrol, 2003; Pilarz & Hill, 2014; Tran & Weinraub, 2006).

Nonstandard schedules are those that involve working a majority of hours outside of the "standard" day shift, Monday through Friday. Definitions of the standard shift vary; they include, but are not limited to, 6 a.m. to 6 p.m. (Enchautegui, 2013), 7 a.m. to 5 p.m. (Han, 2004), 8 a.m. to 4 p.m. (Presser, 2003), and 8 a.m. to 6 p.m. (Joshi & Bogen, 2007). By Presser's definition, 28% of all American workers held some type of nonstandard schedule as of 2010 (Enchautegui, 2013). Such schedules are not evenly distributed across the labor market; they are more common for men, less-educated workers, minorities, and those working in the service and retail sectors (Enchautegui, 2013; Hamermesh, 2002; Presser, 2003). Nonstandard schedules were not always so unevenly distributed: Between the early 1970s and the late 1990s, the burden of evening and night work shifted to those at the bottom of the income distribution (Hamermesh, 2002). As the following three subsections detail, work schedules are one factor that may constrain parents' choice of child care and affect the complexity and continuity of child-care arrangements.

Types of Child Care

Why would parental work schedules shape choices about child-care type? Economic consumer choice theory provides a framework for interpreting parental decisions regarding child care; work schedules represent one variable within this framework (Blau, 2001; Chaudry, Henly, & Meyers, 2010; Meyers & Jordan, 2006). The central claim of the theoretical framework is that child-care choices represent maximizations of preferences (related to type, quality, or other features of care) subject to various budget constraints. Parents attempt to procure as much of the preferred type(s) of care for their children as is possible given their income, the cost and availability of the various types of care, and the information that is available to them. As these constraints shift-as

incomes increase, as child-care subsidies reduce the cost of certain types of care, as families move out of child-care deserts—child-care choices change (Blau, 2001; Kimmel, 2006; Tekin, 2005). Within this framework, working schedules are interpreted as a constraint that limits the selection of certain types of care.

This constraint is largely a function of when certain types of care are available. Center-based care is almost exclusively limited to standard shift hours (with some additional buffers to accommodate commuting). In 2012, only 8% of care centers serving children aged 0 to 5 were open after 7 p.m., before 6 a.m., or on weekends (NSECE Project Team, 2015). In multiple qualitative studies, mothers with nonstandard or unstable schedules report that center-based care is functionally inaccessible to them because of timing (Chaudry, 2004; Pearlmutter & Bartle, 2003; Sandstrom, Giesen, & Chaudry, 2012; Scott, London, & Hurst, 2005). Home-based care is somewhat more available in the evening and overnight, but most such care is provided by unlicensed providers in whom many mothers report little trust (Chaudry, 2004; Levine, 2013; Mensing, French, Fuller, & Kagan, 2000; NSECE Project Team, 2015; Sandstrom & Chaudry, 2012). Family members, by contrast, are often reported to be essential supports in maintaining steady employment and child-care arrangements, especially for those working nontraditional hours (Carrillo, Harknett, Logan, Luhr, & Schneider, 2017; Chaudry, 2004; Scott et al., 2005). Previous research has demonstrated that mothers working nonstandard hours rely mostly on coparental, relative, or home-based care for their child-care needs; those working standard shifts are more likely to use center-based care and less likely to rely on coparents (Enchautegui et al., 2015; Han, 2004; Kimmel & Powell, 2006). Theory and prior quantitative and qualitative research thus leads to the following hypotheses:

Hypothesis 1A: Households with one or more members working a nonstandard or nontraditional schedule will make less use of center-based and home-based care and more use of relative care.

Center-based care will be largely unavailable during working hours; home-based care is more accessible but little trusted; and relatives will prove the best option for covering evening and night work. *Hypothesis 1B:* Increased availability of parental time and decreased demand for nonparental care should lead nonworking house-holds to make less use of all three types of care.

Hypothesis 1C: Two-partner households in which both partners work a standard shift will have less available parental time and therefore greater demand for nonparental care. All three types of care will be readily available during working hours; such households will likely make more use of all types than those with a single standard schedule. Note that this hypothesis necessarily does not pertain to single-mother households.

Child-Care Complexity

There is reason to expect that parents working nonstandard or nontraditional shifts may be at greater risk of having children in more complex care arrangements. A number of ethnographic and small-sample interview studies have documented the difficulties that low-income working mothers face in establishing stable, trusted child-care arrangements (Chaudry, 2004; Henly & Lyons, 2000; Levine, 2013; Mensing et al., 2000; Sandstrom & Chaudry, 2012). Both Chaudry (2004) and Scott et al. (2005) highlighted the relationship between nonstandard or unpredictable working schedules and complex, unstable sets of child-care arrangements (see also Carrillo et al., 2017).

Quantitative evidence on the link between nonstandard parental work schedules and this aspect of care arrangements is, however, limited. Presser (2003) found that households in which mothers work nonstandard (and especially weekend) shifts were more likely to employ multiple nonparental care providers. By contrast, Morrissey (2008) found no evidence that nonstandard maternal work schedules predicted care multiplicity. Extrapolating from the previous quantitative and qualitative evidence leads to the following hypotheses:

Hypothesis 2A: Children whose parents work nonstandard or nontraditional shifts will hold more complex child-care arrangements than their peers. Families will need more providers, both for care at nonstandard hours and to bridge periods between parental and nonparental care.

Hypothesis 2B: Nonwork is likely to reduce child-care complexity by increasing the availability of parental care.

Hypothesis 2C: As a function of increased demand for care, two-partner households in which both partners work a standard shift will likely have more complex care arrangements than similar households in which only one partner works.

Child-Care Continuity

I have been unable to locate any quantitative evidence assessing the link between work schedules and the continuity of care arrangements. The ethnographic and interview-based research cited previously, however, yields a number of hypotheses. The inclusion of more providers in care arrangements-especially providers such as relatives who may not view child care as a proper job (Henly & Lyons, 2000)-may lead to greater turnover. Home-based and relative care-the care options most available to low-income families, especially those in need of nonparental care at nonstandard hours-appear particularly prone to breakdown, thus requiring more frequent rearrangements of care (Chaudry, 2004; Scott et al., 2005). These findings point to the mediating role of types of care in the relationship between parental work schedules and child-care continuity.

Hypothesis 3A: Households with nonstandard or nontraditional work schedules will display less continuity of care than those with standard schedules. These households are likely to have to rely more heavily on types of care that are prone to failure, thus requiring more frequent changes to child-care arrangements.

Hypothesis 3B: Nonwork should increase continuity of care by reducing reliance on nonparental care.

It is unclear whether two-partner households in which both partners work a standard shift will have more or less continuous care arrangements than similar households in which only one partner works. As such, no hypothesis is put forward in that case.

Limitations in the Previous Research

The two major previous quantitative analyses of the relationships between parental work scheduling and child-care choice—articles by Han (2004) and Kimmel and Powell (2006)—share a number of limitations. First, both rely on data collected in the early 1990s; no subsequent analyses have addressed these questions with more recent data. Second, neither addresses

the interplay of male and female schedules in partnered households. Kimmel and Powell (2006) do not include paternal schedules in analysis; Han (2004) treats maternal and paternal working schedules as independent from one another. Third, both offer limited generalizability. Han's study was based on the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development, which was nonrepresentative of all households with children; low-income households-those most likely to experience nonstandard work schedules-were underrepresented in the data. Kimmel and Powell's (2006) article, although based on Survey of Income and Program Participation data, limited analysis to married households and thus tells us little about the experience of unmarried couples or single-mother households.

Previous quantitative analyses of the relationship between parental work schedules and child-care multiplicity—the nearest measure to care complexity—suffer from a similar set of limitations (Morrissey, 2008; Presser, 2003). Data are out of date, offer limited generalizability, and cannot account for joint scheduling in two-partner households. This is the first article that I am aware of to use quantitative methods to explore the relationship between parental work schedules and child-care continuity.

Finally, a methodological question looms over these previous studies: If working schedules are increasingly divorced from traditional shift definitions (Henly & Lambert, 2005; Lein, Benjamin, McManus, & Roy, 2005), what do we miss by continuing to use those categories? Many of the working schedules that would be included in the traditional standard category in fact begin prior to normal starting times and end either significantly earlier or later than the traditional definitions would suggest. Do these new nontraditional off-standard schedules allow parents to use the same sorts of care as standard workers, or do the children of employees with such schedules experience child-care arrangements more similar to their peers with parents who work nonstandard schedules?

DATA AND METHODS

This study uses data from the National Survey of Early Care and Education (NSECE), a nationally representative study of the supply of and demand for child care collected in the United States in 2012 (http://www.norc.org/Research/

Projects/Pages/national-survey-of-early-careand-education.aspx). The study was composed of four surveys that collected data from households with children younger than the age of 13, center-based child-care providers, individual workers at those centers, and providers of both formal (registered, licensed) and informal (nonregistered) home-based child care. I make use of the household survey, which gathered data from 11,629 households from 755 communities across all 50 states and the District of Columbia. Data were collected primarily through computer-assisted, in-person interviews, although a minority were conducted via computer-assisted telephone interviewing (information on the address-based survey design and sampling can be found in Bowman et al., 2013).

Independent Variables

The NSECE has a number of unusual features, foremost among which are extensive parental schedules. In most surveys that collect schedules, data are gathered either from a single specific day (as in the American Time Use Survey) or with reference to an abstract "usual" day (as in the May supplement to the Current Population Survey). They are also most often collected from a single individual and not from both members of a couple (Lesnard, 2008). The NSECE, however, collected work schedule data for the respondent and their partner (if present in the household) for a full 7-day week. Respondents were asked to report, day by day, schedules for three major activities (work, school, and job training, including time spent commuting for all three), for the week immediately preceding the interview. Data were collected from a single respondent and in a single sitting, so recall and response problems may arise (especially when the respondent is reporting on their partner's activities). This data collection strategy effectively trades coverage off against detail: Although it does not allow for the fine-grained level of specificity that time diary data offer, it does provide an unprecedented glimpse into how families with children organize working schedules.

I employed sequence analysis and clustering methods to develop week-level typologies of parental working schedules from these data. I analyzed single-mother and two-partner households separately. Joint scheduling in two-partner households necessarily yields different work schedules than are present in single-mother households, and thus direct comparison of the two groups is untenable. I briefly summarize the process of deriving schedules here; additional details are available on request.

Schedule data were stored as person-level vectors of states where each entry in the vector refers to what the person was doing during a given 15-minute period (start and end times for reported activities were rounded to the nearest quarter hour). There are 672 entries in the course of a 7-day week, running from 12 a.m. Monday until 11:59 p.m. Sunday (four 15-minute blocks per hour \times 24 hours per day \times 7 days per week = 672). Where the NSECE allowed for four possibilities for each state (work, school, training, or other), I simplified to just the following two: work and other (with the latter including both school and training). I then split the schedule data into two groups: individual lines from single-mother households and paired lines from two-partner households.

I divided the weeklong schedules from single mothers into a series of days (each individual thus had seven 96-entry vectors). Following Lesnard (2008, 2010), I employed dynamic Hamming distance (DHD) matching, a variant of optimal matching in which the cost of transitioning between states varies with time. DHD matching is well suited to a time-varying process such as employment. To establish the necessary multidimensional substitution matrix I relied solely on the transition rates between states at each point in time. I used the resulting dissimilarity matrix and employed the nonhierarchical partitioning around medoids (PAM) algorithm to derive clusters from the data (Studer, 2013). The final selection of clusters involved weighing both fit statistics and the descriptive potential of each additional group. This is, admittedly, a somewhat subjective process, but a necessary one. Adjudicating number of clusters by fit statistics alone would frequently lead to a clearly inadequate two-cluster solution: workers and nonworkers. I attempted to select more clusters where (a) the additional cluster offered a qualitatively new pattern relative to those already selected and (b) the additional cluster did not result in significantly worse average silhouette width across all clusters. Silhouette width is a measure of the tightness and separation of clusters; it runs on the interval [-1,1]. Average silhouette width

(ASW) allows for evaluation of overall clustering validity. The ASW of the seven-cluster solution for single-mother person-days is .762, which suggested that a strong structure had been identified (Rousseeuw, 1987; Studer, 2013).

I then reconfigured the data into a week format; each single mother had a sequence of 7 days where each day was represented by the cluster to which it has been assigned in the previous step. I ran a second sequence analysis and clustering exercise, again using DHD matching and the PAM algorithm, across this set of person-week sequences. The end result was to categorize each single mother's week (ASW of .751). Each week-level cluster was primarily but not exclusively made up of days of the associated type; weekends were particularly likely to be nonworking regardless of cluster. (I would like to thank an anonymous reviewer for pointing out the similarity between this approach to analyzing workweeks and the process described by Lesnard and Kan [2011]. Indeed, both entail a two-stage optimal matching algorithm, both make use of DHD matching at both stages, and both rely on theory-driven combinations of clusters. In terms of differences, Lesnard and Kan [2011] made use of a hierarchical clustering algorithm (beta flexible), analyzed nonworking days separately from working days in the first-stage clustering, and combined similar day-level clusters before carrying out the second-stage clustering.)

Analysis and clustering of two-partner households followed a similar pattern, but with one major change at the beginning: I combined male and female schedules to produce a single household-level schedule. This resulted in four possible values for each 15-minute interval: both partners working, female partner working, male partner working, and neither working. Following the same model as noted previously, I derived a time-varying substitution matrix, output a dissimilarity matrix via DHD matching, and then derived clusters of couple-day schedules (ASW of .587). I again reconfigured these into a week-level format where each couple's week was represented as a sequence of clusters; I performed a second sequence analysis and clustering across these sequences to derive a categorization of couple-weeks (ASW of .636). For two-partner households, I found, based on both qualitative review and a number of fit statistics (ASW, point biserial correlation, and Herbert's gamma), that Ward's minimum variance method

Table 1.	Distribution	of Schedule	Types in S	Single-Mother
(n = 1,	230) and Two	o-Partner He	ouseholds	(n = 2,090)

Single-mot househol	ther ds	Two-partner households				
Schedule types Percen		Schedule types	Percent			
Limited work	65.4	Limited work	32.3			
Standard	12.9	Dual standard	14.2			
Off-standard	14.4	Single standard	49.3			
Short	5.7	Female standard	7.4			
Early	3.6	Male standard	41.9			
Long	5.1	Nonstandard schedules	4.3			
Nonstandard schedules	7.2	Dual w/female shift	1.0			
Evening	а	Dual w/male shift	2.0			
Night	а	Male shift	1.3			

Note. All values are weighted.

^aValue suppressed due to small *n*.

for clustering performed better than partitioning around medoids at both the day and week levels.

Because this process results in a relatively large number of schedules in both single-mother and two-partner households, I combined similar schedules to demonstrate effects. Table 1 provides the prevalence of each of the schedules by household type and the groups into which they are combined.

For single mothers there were seven schedule types. Within the sample of low-income households with young children, the majority (65.4%) of all single-mothers fell into the "limited work" category. Most respondents in this category reported no work, and the schedules of those who did more closely resemble nonwork than any of the other options. The next most common type was a standard schedule (a modal schedule of 8 a.m. to 5 p.m.); 12.9% of single mothers held such a schedule. There were three schedule types that resemble a standard schedule, but with important differences: "Short" schedules that fell within standard hours but consist of less work (modal 8:15 a.m. to 3 p.m.); "early" schedules that both started and ended earlier in the day than standard schedules (modal 6 a.m. to 2:30 p.m.); and "long" work days that started around 9 a.m. and ran late (till 7 p.m. on average). These three-which I refer to interchangeably as off-standard or nontraditional schedules-made up 14.4% of the sample. Finally, there were two nonstandard type schedules-evening (modal

3 p.m. to 11 p.m.) and night (modal 11 p.m. to 7 a.m.) shifts—which combined for 7.2% of the sample.

In low-income, two-partner households with young children, I likewise divided seven schedule types into four groups. The first group is, again, "limited work," which accounted for 32.3% of all two-partner households. The second group is "dual standard," wherein both male and female partner worked a standard day shift; this group made up 14.2% of the sample. The third group is made up of couples where the male or female partner worked a standard schedule and the other partner did not work. I term these single standard households; they made up 49.3% of the sample. The last group-"nonstandard"-is made up of the following three schedule types: male partner working a standard shift with female partner working evening or night, female partner working a standard shift with male partner working evening or night, and male partner working evening or night with female partner not working. All told, these three combined for 4.3% of the sample. Note that there is no nontraditional or off-standard group for two-partner households. Partners within these households were almost certainly working such schedules, but they did not emerge as a separate group in the sequence analysis and clustering process.

Dependent Variables

I developed five dependent variables that allow me to test the hypotheses laid out previously. The first three provide the total amount of time that children spend in each of the three types of child care. The NSECE determines, for each enumerated provider, what sort of care (if any) that individual or organization provides for each child in the household. I coded regular, paid care provided by an individual with no prior relationship to the household as home-based care. Center-based care consists of regular care offered by Head Start, public pre-kindergartens, community-based care centers, and all other organizational care. Nearly all center-based care and a significant portion of home-based care is licensed and covered by state regulations (NSECE Project Team, 2014, 2016). Relative care is regular care-paid or unpaid-that is provided by a family member or household member of the child.

I output a set of variables that capture the number of hours per week every child spends in each of these types of care. If a child has more than one provider of a given type (e.g., they attend two different child-care centers during the week), I aggregated to get the total care by type rather than by provider. I averaged across all children younger than age 5 in a household. On average, children younger than age 5 from low-income households spent 1.5 hours per week in home-based care, 6.2 hours in center-based care, and 6.8 hours in relative care. The distribution of all of these variables is right skewed because of the large number of households that did not make use of the given type of care. As an example, although all children younger than age 5 from households under 200% of the poverty line only received an average of 1.5 hours per week of home-based care, the average among those who received any care of this sort is 30.1 hours per week.

The fourth dependent variable is child-care complexity, which is a measure of how complicated child-care arrangements are. I introduce this as an alternative to the more common measure of care multiplicity. To derive this measure I made use of the NSECE child-care calendars. Much as with the parental schedules, respondents were asked to account for care arrangements for all children younger than age 13 in the household for the previous 7 days. The respondents were able to designate one of a set of previously enumerated child-care providers for each 15-minute period during that period. As with parental schedules, each child schedule consists of a vector of 672 blocks. Each block could take on one of 16 values (or a "missing" value); these values corresponded to parental care, care by one of the previously enumerated child-care providers (there was a maximum of 11 such providers per child in these data), unattended periods, care by a not-previously-enumerated relative, care by a nonrelative provider not previously enumerated in the survey, and time spent in school.

For each child-week, I calculated the turbulence of the sequence. In so doing I did not aggregate by provider type (as with the counts of hours of care described previously). A child with three center-based providers would have a sequence that reflects not only the time they spent with each but also that each is a unique provider. Turbulence is based on the number of distinct subsequences that can be extracted from each sequence as well as the variance in duration of subsequences (Elzinga, 2006, 2010; Elzinga & Liefbroer, 2007). Unlike the somewhat more common Shannon entropy, this measure is sensitive to the ordering of states. The minimum value is zero, and there is no fixed maximum. When averaged across all children younger than age 5 from low-income households, the distribution is bimodal. Of the sample households, 42.5% had minimal turbulence of zero; among those with some turbulence the mean was 9.76 and the standard deviation was 4.95.

The fifth dependent variable is continuity of care. For one randomly selected child in the household, the NSECE respondent was asked when they most recently searched for care. Taking only households in which the selected child was younger than age 5, I measured the duration, in months, between the date of interview and the most recent child-care search. Care that has been in place longer-that has not necessitated search for new forms of care-constitutes more continuous care. In low-income households in which the selected child was younger than age 5, the average time since last search was 12.4 months and the standard deviation was 15.8 months. There was, as expected, a significant positive relationship between age of the youngest child in the household and the time since last search: Households with younger children had a shorter period; each additional year of age for the youngest child corresponded with a 1.5 month increase in this variable.

Analysis Sample

I imposed a number of sample restrictions on the data. First, I removed all interviews conducted with a respondent who was not either a biological or adoptive parent of a child in the household (n = 730). In two-partner households it was not necessary that both the respondent and his or her partner be biological or adoptive parents, which is why I refer to them throughout as partners rather than mothers and fathers. Second, I removed all single-father households (n = 370) and all same-sex two-partner households (n = 80) from the sample. There are approximately 120,000 same-sex households with children younger than age 18 in the United States as of 2010; by comparison there were roughly 30 million households with children younger than age 13 (Gates, 2013). Both single-father and same-sex two-partner households are deserving of analysis, but there was insufficient sample to allow it in these data. Third, I removed a small number of single-mother households (*n* suppressed due to small size) and a larger number of two-partner households (n = 490) because of missing or apparently erroneous schedule data. Fourth, I removed households with no children younger than age 5 or without schedule data for their young children (n = 1,400 single-mother households; n = 3,240 two-partner households). Fifth, I removed households with income above 200% of the poverty line (n = 140 single-mother)households; n = 1,770 two-partner households). Finally, sixth, I dropped cases with missing values on the covariates listed below (n suppressed due to small sample size in single-mother households; n = 80 in two-partner households). This left a remaining analytic sample of 1,230 single-mother and 2,090 two-partner households with children younger than age 5 and incomes under 200% of the poverty line. This subset represented slightly fewer than 7 million American households. The samples for analysis of care continuity were smaller because the selected child in these households may be older than age 5; the analytic samples here were 470 single-mother households and 570 two-partner households. (Note that NSECE disclosure guidelines restrict reports of weighted and unweighted frequencies and results. All numbers presented in this article have been rounded to the nearest 10 or restricted to three significant or leading digits.)

Analysis

Several multivariate regression approaches were applied to derive empirical associations between work schedules and these aspects of child-care arrangements. Because these dependent variables were heavily right skewed or had a large number of zero responses, basic ordinary least squares regression assumptions were untenable. In its place I used zero-inflated poisson (ZIP) regression models for the three measures of child-care use and child-care complexity and a negative binomial regression model for child-care continuity. Both ZIP and negative binomial regression allow for overdispersion of the dependent variable, but do so in somewhat different ways. ZIP regression consists of two simultaneous models: a logistic regression predicting excess zeroes within the count data and

a standard poisson regression. Negative binomial regression is simpler, essentially adding a parameter to poisson regression that adjusts the variance independent of the mean. Because of the large number of zero responses, ZIP is the more appropriate model for the child-care use variables. For the complexity and continuity measures, I tested both types of models on each and chose the model that best fit the data (based on Akaike information criterion).

Within each of these models I included a broad set of covariates; these covariates are included in both stages of the ZIP regressions. Inclusion of these variables helps to control for a number of relationships either documented or hypothesized in the literature on child-care choice and stability (Chaudry et al., 2010; Meyers & Jordan, 2006; Weber, 2011). These covariates are: respondent's race/ethnicity (disregarding sex of the respondent in two-partner households; values are White, Black, Hispanic, or other), age (continuous), educational attainment (values are less than high school, high school diploma or GED, some college, and college degree or more), occupation (values are none recorded; managerial or professional; technical, support, or sales; administrative; service; production; and other), school attendance (dummy variable indicating report of any school attendance in the schedule for the observed week), training attendance (dummy variable indicating report of any training attendance in the schedule for the observed week), natural logarithm of family income (derived from an imputed measure of total family income), observed variability in parental work schedule (dummy variable indicating whether parental work schedule switched between categories between Monday and Friday of the recorded week), number of children in the household (continuous), age of the youngest child in the household (continuous), a dummy variable indicating presence of children aged 5 to 13 in the household, dummy variable indicating that children in the household have a relative within a 45-minute drive of home, dummy variable indicating whether any English is spoken in the home, dummy variable indicating whether the household owns their home, and a dummy variable indicating whether the household owns their own car. In two-partner households, age, educational attainment, occupation, school attendance, and training attendance were entered for both partners.

I present two sorts of results in what follows. First, I provide results on the key predictors (parental schedule type) from each of the regression models I carried out. Second, I present marginal plots that demonstrate how each of the dependent variables is estimated to vary across parental schedule type, holding all other covariates at their mean values. These plots help to translate regression results into more tractable measures of the differences in care received depending on work schedule and across the single-mother and two-partner divide.

RESULTS

Table 2 provides a description of the sample split by household type (single mother and two partner). All results presented here were weighted using the provided sample weights (which adjust to make the sample nationally representative of all households with a child younger than age 13). Restricting to low-income households with children younger than age 5, the sample represented 2.5 million single-mother households and 4.36 million two-partner households. The samples were, in some ways, quite similar. Each type of household included, on average, two children. The youngest child was, on average, aged between 2 and $21/_2$ years old; roughly half of these households also included at least one child older than age 5 (but younger than age 13). Approximately 83% of these households had a relative within 45 minutes of home, and almost 60% could count on that relative to provide regular care for their child (either for free or for pay) if needed.

On income, asset ownership, and race/ethnicity, however, the samples looked quite different. The mean family income in single-mother households was more than \$8,000 per year lower than in two-partner households. Single-mother households were almost twice as likely as two-partner households to have an additional (nonpartner) adult member present in the household. Two-partner households were substantially more likely to own both their home and a car. Respondents from two-partner households reported being White and Hispanic more often and Black less often than in single-mother households. The female partners in two-partner households were, on average, better educated than single mothers and somewhat less likely to work in a service occupation.

	Single-m	Two-partner HHs		
Variable	M	SD	M	SD
Number of children	2.11	1.12	2.26	1.13
Age of the youngest child	2.42	1.41	2.08	1.44
Includes a child older than age 5 (%)	50.4		55.2	
Family income (\$)	16,500	11,200	25,100	13,100
Additional adult HH member (%)	41.8		22.9	
Relatives nearby (%)	83.8		83.2	
Nearby relative would care (%)	59.4		62.9	
English spoken at home (%)	89.6		82.8	
Homeowner (%)	10.0		32.9	
Car owner (%)	64.0		89.0	
Respondent's race (%)	01.0		07.0	
White	3/11		51.0	
Black	34.7		11.0	
Hispanic	26.4		30.3	
Other	1 9		50.5	
- Culler	4.0	7 1	0.7	6 47
Female age	28.9	7.1	30.0	0.47
Female attended school (%)	11.2		8.1	
Female attended training (%)	2.5		1.4	
Female education (%)	26.0		10.0	
Less than HS	26.0		19.8	
HS diploma/GED	32.1		31.3	
Some college	26.8		25.4	
College +	15.1		23.6	
Female occupation (%)				
None recorded	50.6		57.5	
Managerial/professional	8.4		8.3	
Technicians/support/sales	5.1		4.6	
Administrative	8.7		5.8	
Service	23.3		15.2	
Production/manufacturing	3.5		4.0	
Other occupation	0.4		4.6	
Male age			32.6	7.65
Male attended school (%)			4.7	
Male attended training (%)			3.3	
Male education (%)				
Less than HS			24.2	
HS diploma/GED			35.7	
Some college			19.3	
College +			20.8	
Male occupation (%)				
None recorded			24.3	
Managerial/professional			10.1	
Technicians/support/sales			9.7	
Administrative			3.3	
Service			8.8	
Production/manufacturing			25.9	
Other occupation			17.9	
Partners married (%)			74.0	
Weighted sample size	2,500.000		4,360.000	
Unweighted sample size	1,230		2,090	

Table 2. Sample Description

Note. All values are weighted. HH = household; HS = high school.

Work Schedule	Home based ^a n = 1,230		Center based ^a n = 1,230		Relative care ^a n = 1,230		Care complexity ^a n = 1,230		Care stability ^b n = 470	
	В	SE B	В	SE B	В	SE B	В	SE B	В	SE B
Limited work	-0.68^{***} (0.51)	0.14	-0.44^{**} (0.64)	0.14	-0.56^{***} (0.57)	0.15	-0.05 (0.95)	0.10	-0.30 (0.74)	0.28
Standard (ref.)										
Off standard	-0.28^{**} (0.76)	0.11	-0.22^{\dagger} (0.80)	0.12	-0.16 (0.86)	0.13	0.09 [†] (1.10)	0.52	-0.67^{**} (0.51)	0.24
Nonstandard	-0.86 ^{**} (0.42)	0.31	-0.16 (0.86)	0.18	0.05 (1.05)	0.16	0.35 ^{***} (1.42)	0.08	-1.34 ^{**} (0.26)	0.51
Limited work	0.15 (1.16)	0.51	0.41 (1.50)	0.43	0.10 (1.11)	0.34	2.05 ^{**} (7.77)	0.72		
Standard (ref.) Off standard	0.15 (1.17)	0.43	0.00 (1.00)	0.31	-0.49 (0.62)	0.35	0.72 (2.06)	0.64		
Nonstandard	-0.09 (0.91)	0.68	0.73 (2.08)	0.53	-0.79 [†] (0.45)	0.45	1.36 (3.90)	0.95		

 Table 3. Summary of Regressions Predicting Child-Care Outcomes as a Function of Parental Work Schedules in Single-Mother Households, Controlling for Background Variables

Note. All models employ sample weights. The top panel contains predictions of association between type of schedule and quantity of each type of care, complexity, and continuity. The bottom panel—which is only relevant to the first four models—presents results from the logistic element of the zero-inflated poisson models, predicting likelihood of an excess zero response on the given dependent variable. Numbers in parentheses are exponentiated beta coefficients; these should be interpreted as incident rate ratios in the top panel and odds ratios in the bottom panel. ref. = reference category.

^aZero-inflated poisson regression model that includes schedule; respondent race, respondent age, respondent education, respondent occupation, number of children in the household, age of the youngest child in the household, dummy variable indicating presence of children older than age 5 in the household, natural log of family income, dummy variable indicating presence of another adult in the household, dummy variable indicating relatives live nearby, dummy variable indicating English spoken in the household, dummy variable indicating participation in school in the recorded week, dummy variable for car ownership; and a dummy variable indicating observed variability of the working schedule (entered as a predictor and interacted with schedule type). All variables are entered in both stages of zero-inflated poisson modeling (except interaction between schedule and schedule variability, which is omitted in the first-stage modeling). ^bNegative binomial regression model with the same set of predictors as in ^a.

[†]p < .10; ^{*}p < .05; ^{**}p < .01; ^{***}p < .001.

I present regression results for single-mother and two-partner households in Tables 3 and 4, respectively. In each case I report five sets of results: ZIP regression results for the three types of care and for child-care complexity and a negative binomial regression model for child-care continuity. I present results, in log-odds format, for the main effects of the key predictor of interest: parental schedule type. The tables consist of two panels. The top panel contains predictions of association between type of schedule and quantity of care, complexity, and continuity. The bottom panel—which is only relevant to the first four models—presents results from the logistic element of the ZIP models, predicting likelihood of an excess zero response on the given dependent variable. In single-mother households I treated those with standard schedules as the reference category; in two-partner households the single standard schedule category served as the reference.

Single-Mother Households

I predicted that nonworkers (relative to standard workers) would make less use of all three types of care (Hypothesis 1B). The estimates provided clear support for this hypothesis

	Home based ^a n = 2,090		Center based ^b n = 2,090		Relative care ^b n = 2,090		Care complexity ^b n = 2,090		Care stability ^c n = 570	
Work Schedule	В	SE B	В	SE B	В	SE B	В	SE B	В	SE B
Limited work	0.06	0.17	-0.26^{*}	0.12	-0.47^{*}	0.19	-0.08	0.07	-0.37	0.19
Dual standard	(1.00) 0.71^{***} (2.04)	0.13	0.33^{*}	0.16	0.13	0.18	(0.93) 0.21^{***} (1.23)	0.06	(0.07) 0.22 (1.25)	0.29
Single standard (ref.) Nonstandard	-0.45 (0.64)	0.28	-0.53^{\dagger} (0.59)	0.29	-0.81 [*] (0.44)	0.32	0.01 (1.01)	0.23	-0.96 [†] (0.38)	0.51
Limited work	0.16 (1.17)	0.64	0.25 (1.28)	0.26	-0.47 (0.62)	0.29	-0.19 (0.83)	0.20		
Dual standard	-1.36 ^{**} (0.26)	0.48	-0.30 (0.74)	0.34	-0.53 [†] (0.59)	0.30	-1.57^{***} (0.21)	0.41		
Single standard (ref.) Nonstandard	0.60 (1.82)	0.63	-0.33 (0.72)	0.35	-0.47 (0.63)	0.38	-0.12 (0.89)	0.31		

 Table 4. Summary of Regressions Predicting Child-Care Outcomes as a Function of Parental Work Schedules in Two-Partner Households, Controlling for Background Variables

Note. All models employ sample weights. The top panel contains predictions of association between type of schedule and quantity of each type of care, complexity, and continuity. The bottom panel—which is only relevant to the first four models—presents results from the logistic element of the zero-inflated poisson models, predicting likelihood of an excess zero response on the given dependent variable. Numbers in parentheses are exponentiated beta coefficients; these should be interpreted as incident rate ratios in the top panel and odds ratios in the bottom panel. ref. = reference category.

^aZero-inflated poisson regression model which includes schedule; respondent race; respondent age; partner's age; respondent education; partner's education; respondent occupation; partner's occupation; number of children in the household; age of the youngest child in the household; dummy variable indicating presence of children older than age 5 in the household; natural log of family income; dummy variable indicating presence of another adult in the household; dummy variable indicating relatives live nearby; dummy variable indicating English spoken in the household; dummy variable for homeownership; dummy variable for car ownership; and a dummy variable indicating observed variability of the working schedule. All variables are entered in both stages of zero-inflated poisson modeling. ^bZero-inflated poisson regression model as in ^c, but includes an interaction between schedule and observed schedule variability in the second-stage model as dummy variables in both the first- and second-stage models for female and male partner participation in school and training activities. ^dNegative binomial regression model with the same set of predictors as in ^b.

 $^{\dagger}p < .10; ^{*}p < .05; ^{**}p < .01; ^{***}p < .001.$

in single-mother households: Limited work was indeed associated with significantly less home-based care, center-based care, and relative care. In the lower panel of Table 3, we see that limited work was associated with significantly higher odds of reporting zero child-care complexity; relative to single mothers with a standard schedule, those in the limited work cluster had 7.8 times the odds of zero complexity ($e^{2.05} = 7.77$). This was consistent with Hypothesis 2B. I found no association, however, between limited work and child-care continuity (and thus no support here for Hypothesis 3B).

I hypothesized that both nonstandard and nontraditional work schedules would be associated with less home-based and center-based care, but more relative care (Hypothesis 1A). I found some evidence supporting these predictions. Both nonstandard and off-standard schedules, relative to a standard schedule, were associated with significantly fewer hours of home-based care. Off-standard schedules were marginally negatively associated with center-based care but, contrary to expectations, I found no evidence that children of single mothers working nonstandard schedules received significantly less center-based care. The top panel results on relative care were null, but in the bottom panel we see that nonstandard schedules were marginally negatively associated with a zero response.

Household type and		Hypothesis 1	Hypothesis 2	Hypothesis 3		
work schedule	Home-based	Center-based	Relative care	Complexity	Continuity	
Single-mother households						
Nonstandard	1A: –	1A: –	1A: +	2A: +	3A: -	
Nonworking	1B: -	1B: -	1B: –	2B: -	3B: +	
Two-partner households						
Nonstandard	1A: -	1A: –	1A: +	2A: +	3A: -	
Nonworking	1B: -	1B: -	1B: –	2B: -	3B: +	
Dual standard	1C: +	1C: +	1C: +	2C: +	n/a	

Table 5. Summary of Support for Hypotheses

Note. When no support is found for the given hypothesis, the cells are unshaded. When support is found for the given hypothesis, the cells are shaded light gray. When contradictory evidence is found for the given hypothesis, the cells are shaded in black (with white text). The hypothesized relationship between schedule type and outcome variable is indicated as either positive (+) or negative (-). n/a = not applicable.

Put another way, single mothers working a nonstandard schedule were marginally more likely to make use of at least some relative care than their counterparts working standard schedules. As we see later, this translated into a nontrivial gap in care used. Consistent with Hypothesis 2A, nonstandard schedules were associated with greater child-care complexity (a marginally significant positive association was found for off-standard schedules as well). Both nontraditional and nonstandard schedules were associated with reduced continuity of child-care arrangements, which was consistent with Hypothesis 3A.

Two-Partner Households

As with single-mother households, I predicted that nonworking two-partner households relative to those with a single standard schedule—would make significantly less use of all forms of care (Hypothesis 1B) and have lower child-care complexity (Hypothesis 2B), but potentially exhibit more continuity (Hypothesis 3B). I found limited support for these hypotheses. It appears that children in limited work households did receive significantly less center-based and relative care, but I found no significant results on home-based c are, complexity, or continuity.

I found more support for the predictions on households with a dual standard work schedule. Children in these households were both significantly less likely to receive zero home-based care (bottom panel) and, among those plausibly receiving some home-based care, received significantly more than their peers from single standard households (top panel). They received significantly more center-based care (top panel) and were marginally less likely to report a zero on relative care (bottom panel). These results provided support for Hypothesis 1C. There is evidence in both panels that such children had significantly more complex child-care arrangements, consistent with Hypothesis 2C. They did not, however, appear to differ from their peers from households with a single standard schedule in terms of continuity of care.

Finally, I found only limited support for my hypotheses on two-partner households with nonstandard schedules. As predicted in Hypothesis 1A, children in such households received marginally less center-based care, but there was no association with home-based care. Contrary to my hypothesis, children in such households received significantly less relative care. There was no evidence supporting Hypothesis 2A (on care complexity), but some support for Hypothesis 3A, insofar as such schedules were marginally negatively associated with care continuity.

Summary Measures Across Household Types

Table 5 provides a summary of findings, indicating the extent to which the various hypotheses are supported. The direction of the hypothesized relationship is indicated with a "+" or "-" (e.g., Hypothesis 1A predicts a negative relationship between nonstandard work schedules and the use of home-based care, and thus the top-left cell is labeled "1A: -"). Those hypotheses for which no support is found on the given outcome measure are left unshaded; those with marginal



FIGURE I. ESTIMATED CHILD-CARE USE IN SINGLE-MOTHER AND TWO-PARTNER HOUSEHOLDS BY TYPE OF CARE.

or significant associations in the predicted direction are shaded in gray; the one hypothesis for which significant contradictory evidence was found is shaded in black. Eight of 10 hypotheses were supported for single-mother households and eight of 14 were supported in two-partner households.

As an additional step, I produced a set of marginal plots associated with the dependent variables in these two tables. These plots presented the predicted amount of care used (in hours per week), the predicted complexity, and the predicted continuity (months since previous search for care) across both household and schedule type while holding all other covariates at their mean values. These plots served to more clearly demonstrate the variation in these elements of care arrangements within household types and to lay out the differences between household types in ways that the previous tables did not allow.

Figure 1 displays the average weekly hours of home-based, center-based, and relative care that children in these household schedule arrangements receive. A few patterns are immediately striking. First, children in single-mother households were receiving as much or more-in some cases much more-of all three of these forms of care than their counterparts in two-partner households. The sole exception was home-based care, which was more common for children from dual standard households than for those from any other schedule type. Second, variation in care by schedule type was much smaller in two-partner households than in single-mother households. In single-mother households the difference between the schedule associated with the least and the most predicted care was 6 hours for center-based care and 13 for relative care; the same differences were both 3 hours in two-partner households. Both points suggest



FIGURE 2. ESTIMATED CHILD-CARE COMPLEXITY IN SINGLE-MOTHER AND TWO-PARTNER HOUSEHOLDS.

a protective effect of two-partner households: Children from two-partner households received less nonparental care and work scheduling had less dramatic effects. Third, within the single-mother sample we see quite different patterns between relative and center-based care (home-based care is rare across all schedule types; no meaningful patterns can be discerned). Relative care was increasingly common as schedules shift from limited work to standard to off-standard to nonstandard. Center-based care, by contrast, was most common for children of single mothers with standard schedules and less so among those with off-standard or nonstandard schedules.

The results on child-care complexity in Figure 2 looked, in many ways, similar to those on relative care: higher across the board in single-mother than two-partner households and, within single-mother households, higher moving left to right across the schedule types. Children in single-mother households with a nonstandard schedule had a complexity score 3.1 times greater than those in two-partner households with a single standard schedule. Children in dual-standard households had the most complex arrangements among those in two-partner situations, but even there the estimated complexity was lower than in single-mother households with the least complex arrangements (limited work single mothers).

Finally, in Figure 3 we see variations in child-care continuity. The most notable result was the low continuity predicted in single-mother households with a nonstandard schedule: Their estimated time since last search was slightly less than 5 months, compared to 13.9 months for single mothers with a standard schedule and 7.3 months for two-partner households with a nonstandard schedule. Again, this suggests that nonstandard shifts matter, but especially when the working individual does not benefit from the protective effects of a second partner.



FIGURE 3. ESTIMATED CHILD-CARE CONTINUITY IN SINGLE-MOTHER AND TWO-PARTNER HOUSEHOLDS.

DISCUSSION

Economic consumer choice theory suggests that working schedules represent important constraints on parental child-care decisions. The reduced supply of nonparental care—especially center-based care—at nonstandard hours means that parents working evenings and nights will have fewer options available to them. This constraint should be felt most strongly by single mothers because they cannot call on a partner to provide care as an alternative. The evidence marshaled here is consistent with this theoretical framework and provides further evidence of the relationship between working schedules and child-care arrangements.

In single-mother households, the most striking results are for those who work nonstandard schedules. I found that these schedules—relative to standard schedules—were associated with more complex and less continuous care arrangements in which children spent significantly more time in relative care and less time in home-based care. There was also evidence that off-standard schedules shared many of the associations demonstrated by nonstandard schedules. These off-standard schedules would be subsumed under the standard category according to most traditional shift definitions. The analyses presented here provided reason to believe that they are associated with significantly different child-care arrangements and thus that such a combination would be, at least in this case, unwarranted.

One surprising null finding was that the children of single mothers working nonstandard schedules did not spend significantly less time in center-based care than their peers with mothers working standard schedules. A plausible explanation is that in this case mothers' work schedules—which generally end before and start after standard hours—do not actively preclude children's participation. Mothers working off-standard schedules, whose work schedules overlap in some ways with standard hours, may find coordinating such care more difficult, which could help to explain the marginally significant negative associations between such schedules and children's time in center-based care.

The large proportion—65.4%—of single mothers in the limited work category also deserves consideration. Treating these women as rational economic actors, it seems plausible that their low attachment to the labor market was driven in part by the cost or inaccessibility of preferred child-care options. Although this article cannot provide insight into their employment decisions, future research should consider the role of child care in those processes.

For two-partner households there were two particularly revealing sets of findings. The first, regarding partners who fall in the limited work category, ran contrary to hypothesized relationships. With two exceptions, limited work did not result in child-care arrangements significantly different than those that hold in single standard households. A plausible explanation is that two available parents are functionally no better than one. If the single standard schedule already allows the nonworking partner to do most child care and not rely on outside providers, then budgets change little by adding a second nonworking partner. The second major set of findings for two-partner households related to those households in which both partners work a standard schedule (dual standard). Here I found that, as anticipated, such schedules were associated with more complex arrangements that involve more of all three types of care. The lack of available parental care during the day translated into more care from more sources.

Nonstandard work yielded some of the expected results in two-partner households, but fewer than in single-mother households. This bears further reflection. In the vast majority of two-partner households in the nonstandard category, only one partner was working a nonstandard shift; the other was either working a standard shift or not working at all. Work schedules impose less of a constraint on these households: they had the luxury of a second partner who can handle care when the other partner is working in the evening or night. To reach this finding, however, one must take into account both partners and the interactions between their schedules, as was done here. The direction of causality in such cases also merits greater consideration. Such working schedules may reflect a preference on the part of parents to reduce reliance on nonparental care providers by reducing overlapping work periods (and thereby increasing parental availability). This would be consistent with my unexpected finding of a negative relationship between such schedules and the use of relative care.

Work, Child Care, and Inequality

This study contributes to the literature on work, family, and child-care choice, but the central theme is inequality. Younger, less-educated, and low-income workers are increasingly forced into jobs in which they are required to work nonstandard or untraditional schedules (Enchautegui, 2013; Hamermesh, 2002; Presser, 2003). The children of such individuals already face an array of disadvantages relative to their peers in higher income households: They receive less financial investment (Herbst, 2015; Kornrich & Furstenberg, 2013), parents spend less time caring for them (Guryan, Hurst, & Kearney, 2008; Ramey & Ramey, 2009), and the time that is spent is less targeted to developmental needs (Kalil, 2015; Kalil, Ryan, & Corey, 2012). This study investigates one mechanism by which the children of such parents may be further disadvantaged. My findings demonstrate the extent to which nonstandard work-especially for single mothers-were associated with certain characteristics of child-care arrangements. It is worth considering the broader implications of these findings, especially as they relate to children's school readiness.

Child-care quality can have significant and lasting effects on children's developmental trajectories (Belsky et al., 2007; Bernal & Keane, 2011; Peisner-Feinberg et al., 2001; Ruzek, Burchinal, Farkas, & Duncan, 2014). Although endogeneity between parental and child characteristics, work choices, and child-care decisions makes estimating causal effects of each of these types of care on children's cognitive and social development notoriously difficult (Bernal & Keane, 2011; Herbst, 2013), a number of viable approaches have been put forward. Several authors have found cognitive benefits to center-based care (Del Boca et al., 2017; Hansen & Hawkes, 2009; Vandell et al., 2016), particularly for children from disadvantaged backgrounds (Cornelissen et al., 2016; Felfe & Lalive, 2013). Recent analyses call such results into question (Herbst, 2013) and, in

addition, a number of studies have documented increased behavioral problems stemming from center-based care (Belsky et al., 2007; Ruhm & Waldfogel, 2011). Research on home-based and relative care generally points to negative effects when compared to either parental or center-based care, especially on measures of school readiness (Bernal & Keane, 2011; Datta Gupta & Simonsen, 2010; Del Boca et al., 2017; Gregg et al., 2005; Hansen & Hawkes, 2009; Herbst, 2013). As such, the results in this article on increased use of relative care by low-income single mothers working nonstandard and off-standard schedules are especially worrisome.

Likewise, a growing body of research has documented links between child-care multiplicity and continuity and children's social and behavioral problems (Sandstrom & Huerta, 2013). Greater continuity of care has been associated with lower distress, increased school readiness and language development, and fewer externalizing behaviors (Cryer et al., 2005; Horm et al., 2018; Loeb et al., 2003; Pilarz & Hill, 2014; Tran & Weinraub, 2006). Children in multiple care arrangements exhibit fewer prosocial tendencies and more (externalizing and internalizing) behavioral problems (Claessens & Chen, 2013; Morrissey, 2009; Pilarz & Hill, 2014). Care multiplicity may account for much of the observed positive association between maternal work and boy's aggressive behaviors (Youngblade, 2003). Again, the findings here relating work schedules to increased care complexity and decreased continuity-particularly for the children of single mothers working nonstandard and nontraditional schedules-is troubling in light of these findings.

Limitations & Future Directions

It bears acknowledging that the analyses conducted here are noncausal. It is beyond the scope of this article to claim that schedule X leads to child-care characteristic Y. Reverse causation is plausible: Some parents may be selecting nonstandard work schedules so as to maximize daytime parental care or make use of their preferred care option(s). The bulk of the literature, however, suggests the opposite: Workers take jobs with nonstandard schedules not because they prefer such working hours but because such an arrangement was a prerequisite of the job or no better job was available (Enchautegui et al., 2015; Presser, 2003).

This study also avoids questions of parental beliefs and preferences about child care. Such items are important and deserve close analysis as both motivating factors and satisficing responses (Chaudry et al., 2010; Henly & Lyons, 2000). Their degree of significance in decision-making processes, however, is open to question; the qualitative literature points to the primacy of logistical concerns-convenience, cost, transportation, and schedule—in choosing care (Sandstrom & Chaudry, 2012; Sandstrom et al., 2012). That being said, more research from an accommodationist lens (Chaudry et al., 2010; Meyers & Jordan, 2006)—accounting for decisions subject to institutional and social constraints-could help to further elucidate decision-making processes and the overall significance and role of work schedules in determining care arrangements. The recent article by Carrillo et al. (2017) is a useful step in this direction.

As with any large survey, the NSECE has its shares of limitations. The strategy used to collect parental scheduling data—relying on one-time reports from a single respondent for (potentially) multiple individuals for an entire week—may yield recall problems or result in respondent fatigue. I have highlighted the benefits of this approach, but further analysis of the quality and representativeness of responses is warranted. Future studies will, hopefully, begin to find ways of bridging the gap between the strategies used in the NSECE and traditional time diary data collection techniques.

There are at least three immediate directions for future research building on this article. First, there are other elements of work scheduling that deserve attention. Specifically, more quantitative analysis should be done on the relationship between unstable schedules—varying schedules over which workers exercise little control and have limited advance notice-and child-care arrangements. Second, it would be worthwhile to investigate the role of the child-care subsidy system in mediating the relationships described here. The Child Care Development Fund was established to promote both parental employment and high-quality child care (Tekin, 2014). More work should be done to assess its effectiveness in light of changes in employment practices, especially for low-skilled workers. Third, and following Gerstel and Clawson (2014), it would

be interesting to assess variation across the class divide in the relationships described here. Are higher income households more able to protect their children from the effects of nonstandard or nontraditional working schedules?

Policy Implications

There are a number of policies that may help to lessen the constraints imposed by parental working schedules. These policies can aim at either the supply of or demand for child care at nonstandard hours. In terms of the former, government incentives for the creation and expansion of center-based care beyond the standard working day could yield important returns. Expanded availability of early morning, late afternoon, and evening care could help to reduce dependence on relatives who currently help to bridge gaps between care and work hours. Night care could prove safer and more reliable than relative or home-based alternatives. There are also a number of policies that could serve to reduce demand for care at these hours. Greater worker protections and schedule controls could help to alleviate ongoing increases in the prevalence of such schedules. If fewer single mothers found themselves constrained by nonstandard and nontraditional work schedules, fewer children would face the sorts of arrangements documented above. A number of cities, including Seattle, San Francisco, and New York, have introduced ordinances during the past several years that increase worker notice or control over schedules. Broader adoption and increased reach of such legislation could help to reduce demand for care at nonstandard hours.

Conclusions

This study provides evidence that work scheduling affects multiple aspects of child-care arrangements. This is particularly true in single-mother households exposed to nonstandard and the emerging class of off-standard work schedules. The study also documents care arrangements in two-partner households. These families face different types of challenges and deal with them in distinct ways, but in all cases work scheduling appears to constrain decisions and thereby shape child-care arrangements. These findings are based on analysis of recent data, take into account coscheduling in two-partner households, and expand the set of variables under analysis to include child-care complexity and continuity. Findings pointed to the significance of labor market factors in determining child-care choices. Especially for the children of single mothers working nonstandard or nontraditional schedules—many of whom already face a number of disadvantages—these results suggested a further avenue by which inequality is manifested.

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