

Costs of Work: Effects of Parental Work Scheduling on Childcare Arrangements

Peter Hepburn
Departments of Sociology & Demography
University of California, Berkeley

2232 Piedmont Avenue
Berkeley, CA 94720
pshepburn@demog.berkeley.edu

Acknowledgements

I would like to acknowledge the feedback provided on various iterations of this paper by Sandra Smith, Jennifer Johnson-Hanks, David Harding, Daniel Schneider, Lisa Gennetian, and Elayne Oliphant. I would like to thank Rupa Datta (NORC) for facilitating access to NSECE data. This research was conducted with support from grant 90YE0183 from the Office of Planning, Research, and Evaluation (Administration for Children and Families, U.S. Department of Health and Human Services).

Abstract

This study analyzes relationships between parental working schedules and several aspects of childcare arrangements for young children in low-income single-mother and two-partner households. The 2012 National Survey of Early Care and Education (NSECE) is used to develop work schedule typologies and evaluate relationships between 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). Nonstandard schedules are associated with increased childcare complexity, 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 non-parental care and are in more complex childcare arrangements than their peers. Findings point to the cumulative disadvantage accruing to the children of single mothers, especially those working nontraditional shifts.

Word Count:

Main Body: 9,585

Main Body and References: 11,478

Key Words: Family; Low-Income Families; Early Childhood; Work Hours; Time Use; Child Care Arrangements

INTRODUCTION

Working conditions matter for families as well as for workers themselves. Over the last 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 childcare 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 co-parental, 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).

This research, however, leaves a number of issues unresolved. First, while 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 childcare and children’s development suggests that attention also be paid to other characteristics of childcare arrangements, such as complexity and continuity of care. Second, most of the research on childcare 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 relationships between parental work schedules and the type, complexity, and continuity of childcare for young children in low-income households. Analysis is restricted to single-mother and heterosexual two-partner households with children under age five who fall below 200% of the poverty line. Households with children below 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 childcare arrangements; and the continuity of childcare. 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 non-parental 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 childcare arrangements. This is also the first academic study to explore these questions in the wake of either Welfare Reform or the Great Recession.

Results indicate that work schedules are 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—receive significantly more relative care and less home-based care, and their care arrangements are more complex and in place for shorter periods. Many of the same conclusions hold for the children of single mothers working non-traditional “off-standard” shifts, a new class of schedules that emerges in analysis. Work schedules appear to play a less-significant role in shaping care arrangements in two-partner households, however. The protective effects of a second partner appear 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 have significantly more complex care arrangements that include more of all three types of care.

BACKGROUND: NONSTANDARD WORK AND CHILDCARE ARRANGEMENTS

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

Parents turn to a number of sources for the care of their young children. The literature on childcare generally divides care into three broad types: center-based, home-based, and relative care (M. Burchinal, Magnuson, Powell, & Hong, 2015). Center-based care constitutes care provided in an organizational setting; it can include childcare centers, nurseries, preschools, pre-K, 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 their 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 (SIPP) indicate that 23.5% of all children under age five 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, childcare 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 above, this paper introduces a new measure—care complexity—that gets at the same concept. Complexity accounts for the ordering and variation in time spent with each unique care provider as well as the sheer number of providers. 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; M. 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), though also 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). While 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, 2004; 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 am to 6 pm (Enchautegui, 2013), 7 am to 5 pm (Han, 2004), 8 am to 4 pm (Presser, 2003), and 8 am to 6 pm (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 sub-sections detail, work schedules are one factor that may constrain parents' choice of childcare and affect the complexity and continuity of childcare arrangements.

Types of Childcare

Why would parental work schedules shape choices about childcare type? Economic consumer choice theory provides a framework for interpreting parental decisions regarding childcare; work schedules represent one variable within this framework (Blau, 2001; A. Chaudry, Henly, & Meyers, 2010; M. K. Meyers & Jordan, 2006). The central claim of the theoretical framework is

that childcare 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 childcare subsidies reduce the cost of certain types of care, as families move out of childcare deserts—childcare 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 eight percent of care centers serving children age zero to five were open after 7 pm, before 6 am, 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 (Ajay 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 (Ajay Chaudry, 2004; Levine, 2013; Mensing, French, Fuller, & Kagan, 2000; Sandstrom & Chaudry, 2012; NSECE Project Team, 2015). Family members, by contrast, are often reported to be essential supports in maintaining steady employment and childcare arrangements, especially for those working nontraditional hours (Carrillo, Harknett, Logan, Luhr, & Schneider, 2017; Ajay Chaudry, 2004; Scott et al., 2005). Previous research has demonstrated that mothers working nonstandard hours rely mostly on co-parental, relative, or home-based care for their childcare

needs; those working standard shifts are more likely to use center-based care and less likely to rely on co-parents (Enchautegui et al., 2015; Han, 2004; Kimmel & Powell, 2006). Theory and prior quantitative and qualitative research thus leads to a number of 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 non-parental care should lead non-working households 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 non-parental 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.

Childcare 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 childcare arrangements (Ajay Chaudry, 2004; J. R. Henly & Lyons, 2000; Levine, 2013; Mensing et al., 2000; Sandstrom & Chaudry, 2012). Both

Chaudry (2004) and Scott and colleagues (2005) highlighted the relationship between nonstandard or unpredictable working schedules and complex, unstable sets of childcare 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 non-parental 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 several hypotheses:

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

Hypothesis 2B: Non-work is likely to reduce childcare 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.

Childcare 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 above, however, yields a number of hypotheses. The inclusion of more providers in care arrangements—especially providers such as relatives who may not view childcare as a proper job

(J. R. 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 non-parental care at nonstandard hours—appear particularly prone to breakdown, thus requiring more frequent rearrangements of care (Ajay 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 childcare 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: Non-work should increase continuity of care by reducing reliance on non-parental 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 childcare choice—papers 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 do not include paternal schedules in analysis, while Han treats maternal and paternal working schedules as independent from one another. Third, both offer limited generalizability. Han’s study is based

on the NICHD Study of Early Child Care and Youth Development, which was non-representative of all households with children; low-income households—those most likely to experience nonstandard work schedules—were under-represented in the data. Kimmel and Powell's paper, while based on SIPP 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 childcare multiplicity—the nearest measure to care complexity—suffer from a similar set of limitations as detailed above (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 paper that I am aware of to use quantitative methods to explore the relationship between parental work schedules and childcare continuity.

Finally, a methodological question looms over these previous studies: if working schedules are increasingly divorced from traditional shift definitions (J. R. Henly & Lambert, 2005; Lein, Benjamin, McManus, & Roy, 2005), what do we miss by continuing to use those categories? Previous research suggests that 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 (AUTHOR n.d.). 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 childcare arrangements more similar to their peers with parents who work nonstandard schedules?

DATA & METHODS

This study uses data from the 2012 National Survey of Early Care and Education (NSECE), a nationally-representative study of the supply of and demand for childcare. The study was

comprised of four surveys which collected data from households with children under the age of 13, center-based childcare providers, individual workers at those centers, and providers of both formal (registered, licensed) and informal (non-registered) home-based childcare. 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, though 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 seven-day week. Respondents were asked to report, day by day, schedules for three major activities (work, school, and job training), for the week immediately preceding the interview. This data collection strategy effectively trades coverage off against detail: while 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 employ sequence analysis and clustering methods to develop week-level typologies of parental working schedules from these data. I analyze 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 can be found in AUTHOR n.d.

Schedule data are 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. There are 672 entries in the course of a seven-day week, running from 12 am Monday until 11:59 pm Sunday (four 15-minute blocks per hour * 24 hours per day * 7 days per week = 672). While the NSECE allowed for four possibilities for each state (“work,” “school,” “training,” or “other”), I simplify to just 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 divide the week-long schedules from single mothers into a series of days (each individual thus has seven 96-entry vectors). Following Lesnard (2008, 2010), I employ Dynamic Hamming Distance (DHD) matching, a variant of Optimal Matching (OM) in which the cost of transitioning between states varies with time. DHD matching is well-suited to a time-varying process like employment. To establish the necessary multi-dimensional substitution matrix I rely solely on the transition rates between states at each point in time. I use the resulting dissimilarity matrix and employ the non-hierarchical 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 non-workers. 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 suggests that a strong structure has been identified (Rousseeuw, 1987; Studer, 2013)

I then re-configure the data into a week format; each single mother has a sequence of seven days where each day is represented by the cluster to which it has been assigned in the previous step. I run 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 is to categorize each single mother's week (ASW of .751). Each week-level cluster is primarily but not exclusively made up of days of the associated type; weekends are particularly likely to be non-working 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 make use of a hierarchical clustering algorithm (beta-flexible); analyze non-working days separately from working days in the first-stage clustering; and combine similar day-level clusters before carrying out the second-stage clustering.)

Analysis and clustering of two-partner households follows a very similar pattern, but with one major change at the beginning: I combine male and female schedules to produce a single household-level schedule. This results 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 above, I derive a time-varying substitution matrix, output a dissimilarity matrix via DHD matching, and then derive clusters of couple-day schedules (ASW of .587). I again re-configure these into a week-level format where each couple's week is represented as a sequence of clusters; I perform a second sequence analysis and clustering across these sequences to derive a categorization of couple-weeks (ASW of .636). For two-partner households I find, 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 for clustering performs better than PAM at both the day and week level.

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

TABLE 1 HERE

For single mothers there are seven schedule types. Within the sample of low-income households with young children, the majority (65.4%) of all single-mothers fall into the "Limited Work" category. Most respondents in this category report no work, and the schedules of those who do more closely resemble non-work than any of the other options. The next most common type is a standard schedule (a modal schedule of 8 am to 5 pm); 12.9% of single-mothers hold such a schedule. There are three schedule types that resemble a standard schedule, but with important differences: "Short" schedules that fall within standard hours but consist of less work (modal 8:15 am to 3 pm); "Early" schedules which both start and end earlier in the day than standard schedules (modal 6 am to 2:30 pm); and "Long" work days which start around 9 am and run late (till 7 pm on average). These three—which I refer to interchangeably as off-standard or

nontraditional schedules—make up 14.4% of the sample. Finally, there are two nonstandard type schedules—evening (modal 3 pm to 11 pm) and night (modal 11 pm to 7 am) shifts—which combine for 7.2% of the sample.

In low-income two-partner households with young children, I likewise divide seven schedule types into four groups. The first group is, again, “Limited Work,” which accounts for 32.3% of all two-partner households. The second group is “Dual Standard,” wherein both male and female partner work a standard day shift; this group makes up 14.2% of the sample. The third group is made up of couples where either the male or female partner works a standard schedule and the other partner does not work. I term these “Single Standard” households; they make up 49.3% of the sample. The last group—“Nonstandard”—is made up of 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 combine for 4.3% of the sample. Note that there is no nontraditional or off-standard group for two-partner households. Partners within these households are almost certainly working such schedules, but they do not emerge as a separate group in the sequence analysis and clustering process.

Dependent Variables

I developed five dependent variables from the NSECE that allow me to test the hypotheses laid out above. The first three provide the total amount of time that children spend in each of the three types of childcare. 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 childcare centers during the week), I aggregate to get the total care *by type* rather than by provider. I average across all children under age 5 in a household. On average, children under age five from low-income households spend 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 do not make use of the given type of care. As an example, while *all* children under age five from households under 200% of the poverty line only receive an average of 1.5 hours per week of home-based care, the average *among those who receive any care of this sort* is 30.1 hours per week.

The fourth dependent variable is childcare complexity, which is a measure of how complicated childcare 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 childcare calendars. Much as with the parental schedules, respondents are asked to account for care arrangements for all children under age 13 in the household for the previous seven days. Respondents are able to designate one of a set of previously-enumerated childcare providers for each 15-minute block over that period. As with parental schedules, each child schedule consists of a vector of 672 states. Each state can take on one of 16 values (or a “missing” value); these values correspond to parental care, care by one of the previously-enumerated childcare providers (there is a maximum

of 11 such providers per child in these data), unattended periods, care by a not-previously-enumerated relative, care by a non-relative 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 *do not* aggregate by provider type (as with the counts of hours of care described above). A child with three center-based providers will have a sequence that reflects not only the time they spend with each but 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 under age five from low-income households, the distribution is bimodal. 42.5% of sample households have minimal turbulence of zero; among those with some turbulence the mean is 9.76 and the standard deviation is 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 under age 5, I measure the duration, in months, between the date of interview and the most recent childcare 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 under age 5, the average time since last search was 12.4 months and the standard deviation is 15.8 months. There is, 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 have a shorter period; each

additional year of age for the youngest child corresponds with a 1.5 month increase in this variable.

Analysis Sample

I impose a number of sample restrictions on the data. First, I remove 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 is 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 remove 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 under age 18 in the U.S. as of 2010; by comparison there were roughly 30 million households with children under age 13 (Gates, 2013). Both single-father and same-sex two-partner households are deserving of analysis, but there is insufficient sample to allow it in these data. Third, I remove 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 remove households with no children under age 5 or without schedule data for their young children (n=1,400 single-mother households; n=3,240 two-partner households). Fifth, I remove households with income above 200% of the poverty line (n=140 single-mother households; n=1,770 two-partner households). Finally, sixth, I drop 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 leaves a remaining analytic sample of 1,230 single-mother and 2,090 two-partner households with children under age five and incomes under 200% of the poverty line. This subset represents just under seven million American households. The samples for analysis of care continuity are

smaller because the selected child in these households may be over age five; the analytic samples here are 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 paper have been rounded to the nearest 10 and/or restricted to three significant/leading digits.)

Analysis

Several multivariate regression approaches are applied to derive empirical associations between work schedules and these aspects of childcare arrangements. Because these dependent variables are heavily right-skewed and/or have a large number of zero responses, basic OLS assumptions are untenable. In its place I use zero-inflated poisson (ZIP) regression models for the three measures of childcare use and childcare complexity and a negative binomial regression model for childcare 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 childcare 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 AIC).

Within each of these models I include 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 childcare choice and stability (A. Chaudry et al., 2010; M. K. Meyers & Jordan, 2006; Weber, 2011). These covariates are:

respondent's race (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/GED," "Some College," and "College Degree or More"); occupation (values are "None Recorded," "Managerial/Professional," "Technical/Support/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 age five 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 are 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/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 are weighted using the provided sample weights (which adjust to make the sample nationally representative of all households with a child under age 13). Restricting to low-income households with children under age five, the sample represents 2.5 million single-mother households and 4.36 million two-partner households. The samples are, in some ways, quite similar. Each type of household includes, on average, two children. The youngest child is, on average, between two and two-and-a-half years old; roughly half of these households also include at least one child older than five years (but under age 13). Approximately 83% of these households have 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, however, the samples look quite different. The mean family income in single-mother households is over \$8,000 per year lower than in two-partner households. The welfare reciprocity rate is 14.5 percentage points higher in single-mother households, and such households are almost twice as likely as two-partner households to have an additional (non-partner) adult member present in the household. Two-partner households are substantially more likely to own both their home and a car. Respondents from two-partner households report being white and Hispanic more often and black less often than in single-mother households. The female partners in two-partner households are, on average, better educated than single mothers and somewhat less likely to work in a service occupation.

TABLE 2 HERE

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 childcare complexity and a negative binomial regression model for childcare 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 treat those with standard schedules as the reference category; in two-partner households the single standard schedule category serves as the reference.

*Single-Mother Households***TABLE 3 HERE**

I predicted that non-workers (relative to standard workers) would make less use of all three types of care (Hypothesis 1B). The estimates provide clear support for this hypothesis in single-mother households: limited work is 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 is associated with significantly higher odds of reporting zero childcare complexity; relative to single mothers with a standard schedule, those in the limited work cluster have 7.8 times the odds of zero complexity ($e^{2.05} = 7.77$). This is consistent with Hypothesis 2B. I find no association, however, between limited work and childcare 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 find some evidence supporting these predictions. Both nonstandard and off-standard schedules, relative to a standard schedule, are associated with significantly fewer hours of home-based care. Off-standard schedules are marginally negatively associated with center-based care but, surprisingly, I find no evidence that children of single mothers working nonstandard schedules receive significantly less center-based care. The top-panel results on relative care are null, but in the bottom panel we see that nonstandard schedules are marginally negatively associated with a zero response. Put another way, single mothers working a nonstandard schedule are marginally more likely to make use of *at least some* relative care than their counterparts working standard schedules. As we see below, this translates into a non-trivial gap in care used. Consistent with Hypothesis 2A, nonstandard schedules are associated with greater childcare complexity (a marginally significant positive association is found for off-standard schedules as well). Both nontraditional and nonstandard schedules are associated with reduced continuity of childcare arrangements, which is in line with Hypothesis 3A.

Two-Partner Households

TABLE 4 HERE

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

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

Finally, I find only limited support for my hypotheses on two-partner households with nonstandard schedules. As predicted in Hypothesis 1A, children in such households receive marginally less center-based care, but there is no association with home-based care. Contrary to my hypothesis, children in such households receive significantly *less* relative care. There is no evidence supporting Hypothesis 2A (on care complexity), but some support for Hypothesis 3A, insofar as such schedules are 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 "Hyp 1A: -"). Those hypotheses for which no support is found on the given outcome measure are left unshaded; those with marginal or significant associations in the predicted direction are shaded in grey; the one hypothesis for which significant contradictory evidence was found is shaded in black. Eight of 10 hypotheses

are supported for single-mother households and eight of 14 are supported in two-partner households.

TABLE 5 HERE

As an additional step, I produced a set of marginal plots associated with the dependent variables in these two tables. These plots present 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 serve 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 HERE

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 are 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, is home-based care, which is more common for children from dual standard households than for those from any other schedule type. Second, variation in care by schedule type is 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 is six hours for center-based care and 13 for relative care; the same differences are both three hours in two-partner households. Both points suggest a protective effect of two-partner households. Children from two-partner households receive less non-parental care and work scheduling has 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 is increasingly common as schedules shift from limited work to standard to off-standard to nonstandard. Center-based care, by contrast, is most common for children of single mothers with standard schedules and less so among those with off-standard or nonstandard schedules.

FIGURE 2 HERE

The results on childcare complexity in Figure 2 look, 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 have a complexity score 3.1 times greater than those in two-partner households with a single standard schedule. Children in dual-standard households have the most complex arrangements among those in two-partner situations, but even there the estimated complexity is lower than in single-mother households with the least complex arrangements (limited work single mothers).

FIGURE 3 HERE

Finally, in Figure 3 we see variations in childcare continuity. The most notable result is the low continuity predicted in single-mother households with a nonstandard schedule: their estimated time since last search was just under five 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.

DISCUSSION & CONCLUSION

Economic consumer choice theory suggests that working schedules represent important constraints on parental childcare decisions. The reduced supply of non-parental 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, since they cannot call upon 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 childcare arrangements.

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

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 at their low attachment to the labor market is driven in part by the cost or inaccessibility of preferred childcare options. While this paper cannot provide insight into their employment decisions, future research should consider the role of childcare in those processes.

For two-partner households there are two particularly revealing sets of findings. The first, regarding partners who fall in the limited work category, runs contrary to hypothesized relationships. With two exceptions, limited work does not result in childcare 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 non-working partner to do most childcare and not rely on outside providers, then budgets change little by adding a second non-working partner. The second major set of findings for two-partner households relate to those households in which both partners work a standard schedule (dual standard). Here I find that, as anticipated, such schedules are associated with more complex arrangements that involve more of all three types of care. The lack of available parental care during the day translates 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 have 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 is 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 non-parental 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, Childcare, and Inequality

While this study contributes to the literatures on work, family, and childcare choice, 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 these 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; G. 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—is associated with certain characteristics of childcare arrangements. It is worth considering the broader implications of these findings, especially as they relate to children’s school readiness.

Childcare 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). While endogeneity between parental and child characteristics, work choices, and childcare 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, results in this paper 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 childcare 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., 2004; 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 non-causal. It is beyond the scope of this paper to claim that schedule X *leads* to childcare 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 childcare. Such items are important and deserve close analysis as both motivating factors and satisficing responses (A. Chaudry et al., 2010; J. R. 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 (A. Chaudry et al., 2010; M. K. 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. Carrillo and colleagues’ (2017) recent article is a useful step in this direction.

There are at least three immediate directions for future research building on this paper. 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 childcare arrangements. Second, it would be worthwhile to investigate the role of the childcare subsidy system in mediating the relationships described here. The Child Care Development Fund (CCDF) was established to promote both parental employment and high-quality childcare

(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 kids from the effects of non-standard 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 childcare 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 over the last 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 childcare 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 childcare arrangements. These findings are based on analysis of recent data, take into account co-scheduling in two-partner households, and expand the set of variables under analysis to include childcare complexity and continuity. These findings point to the significance of labor market factors in determining childcare choices. Especially for the children of single mothers working nonstandard or nontraditional schedules—many of whom already face a number of disadvantages—these results suggest a further avenue by which inequality is manifested.

REFERENCES

- Aisenbrey, S., & Fasang, A. F. (2010). New Life for Old Ideas: The “Second Wave” of Sequence Analysis Bringing the ‘Course’ Back Into the Life Course. *Sociological Methods & Research*, 38(3), 420–462. <https://doi.org/10.1177/0049124109357532>
- Belsky, J., Vandell, D. L., Burchinal, M., Clarke-Stewart, K. A., McCartney, K., & Owen, M. T. (2007). Are There Long-Term Effects of Early Child Care? *Child Development*, 78(2), 681–701. <https://doi.org/10.1111/j.1467-8624.2007.01021.x>
- Bernal, R., & Keane, M. P. (2011). Child Care Choices and Children’s Cognitive Achievement: The Case of Single Mothers. *Journal of Labor Economics*, 29(3), 459–512. <https://doi.org/10.1086/659343>
- Blau, D. (2001). *The Child Care Problem: An Economic Analysis*. New York: Russell Sage Foundation.
- Bowman, M., Connelly, J., Datta, R., Venkataraman, L., Sjoblom, M., Brooks, M., ... Wolter, K. (2013). *National Survey of Early Care and Education: Summary of Data Collection and Sampling Methodology* (No. OPRE Report #2013-46). Washington, DC: Office of Planning, Research; Evaluation, Administration for Children; Families, U.S. Department of Health; Human Services.
- Burchinal, M., Magnuson, K., Powell, D., & Hong, S. S. (2015). Early Childcare and Education. In R. M. Lerner, M. H. Bornstein, & T. Leventhal (Eds.), *Handbook of child psychology and*

- developmental science*, vol. 4: *Ecological settings and processes* (7th ed., pp. 223–267). Hoboken: John Wiley & Sons, Inc.
- Carrillo, D., Harknett, K., Logan, A., Luhr, S., & Schneider, D. (2017). Instability of Work and Care: How Work Schedules Shape Child-Care Arrangements for Parents Working in the Service Sector. *Social Service Review*, 91(3), 422–455. <https://doi.org/10.1086/693750>
- Chaudry, A. (2004). *Putting Children First: How Low-Wage Working Mothers Manage Child Care*. New York: Russell Sage Foundation.
- Chaudry, A., Henly, J., & Meyers, M. (2010). *Conceptual Frameworks for Child Care Decision-Making* (pp. 1–41). Washington, DC: Office of Planning, Research; Evaluation.
- Claessens, A., & Chen, J.-H. (2013). Multiple Child Care Arrangements and Child Well Being: Early Care Experiences in Australia. *Early Childhood Research Quarterly*, 28, 49–61. <https://doi.org/10.1016/j.ecresq.2012.06.003>
- Cornelissen, T., Dustmann, C., Raute, A., & Schönberg, U. (2016). *Who Benefits from Universal Child Care? Estimating Marginal Returns to Early Child Care Attendance*.
- Cryer, D., Wagner-Moore, L., Burchinal, M., Yazejian, N., Hurwitz, S., & Wolery, M. (2005). Effects of Transitions to New Child Care Classes on Infant/Toddler Distress and Behavior. *Early Childhood Research Quarterly*, 20, 37–56.
- Datta Gupta, N., & Simonsen, M. (2010). Non-Cognitive Child Outcomes and Universal High Quality Child Care. *Journal of Public Economics*, 94, 30–43.
- Del Boca, D., Piazzalunga, D., & Pronzato, C. (2017). The Role of Grandparenting in Early Childcare and Child Outcomes. *Review of Economics of the Household*, 1–36.
- Elzinga, C. H. (2006). *Turbulence in Categorical Time Series*.
- Elzinga, C. H. (2010). Complexity of Categorical Time Series. *Sociological Methods & Research*, 38(3), 463–481. <https://doi.org/10.1177/0049124109357535>
- Elzinga, C. H., & Liefbroer, A. C. (2007). De-Standardization of Family-Life Trajectories of Young Adults: A Cross-National Comparison using Sequence Analysis. *European Journal of Population*, 23(3-4), 225–250. <https://doi.org/10.1007/s10680-007-9133-7>
- Enchautegui, M. E. (2013). *Nonstandard Work Schedules and the Well-Being of Low-Income Families*. Washington, DC: Urban Institute.
- Enchautegui, M. E., Johnson, M., & Gelatt, J. (2015). *Who Minds the Kids When Mom Works a Nonstandard Schedule?* Washington, DC: Urban Institute.
- Felfe, C., & Lalive, R. (2013). *Early Child Care and Child Development: For Whom it Works and Why*. Berlin: The German Socio-Economic Panel Study at DIW Berlin.
- Gates, G. J. (2013). *LGBT Parenting in the United States* (pp. 1–6). Los Angeles: The Williams Institute, UCLA School of Law.
- Gerstel, N., & Clawson, D. (2014). Class Advantage and the Gender Divide: Flexibility on the Job and at Home. *American Journal of Sociology*, 120(2), 395–431.
- Gregg, P., Washbrook, E., Propper, C., & Burgess, S. (2005). The Effects of a Mother's Return to Work Decision on Child Development in the UK. *The Economic Journal*, 115, 48–80. <https://doi.org/10.1111/j.0013-0133.2005.00972.x>

- Guryan, J., Hurst, E., & Kearney, M. S. (2008). *Parental Education and Parental Time with Children*. Cambridge, MA: National Bureau of Economic Research.
<https://doi.org/10.1007/s13398-014-0173-7.2>
- Hamermesh, D. S. (2002). Timing, Togetherness and Time Windfalls. *Journal of Population Economics*, 15(4), 601–623. <https://doi.org/10.1007/s001480100092>
- Han, W.-J. (2004). Nonstandard Work Schedules and Child Care Decisions: Evidence from the NICHD Study of Early Child Care. *Early Childhood Research Quarterly*, 19(2), 231–256.
<https://doi.org/10.1016/j.ecresq.2004.04.003>
- Han, W.-J. (2005). Maternal Nonstandard Work Schedules and Child Cognitive Outcomes. *Child Development*, 76(1), 137–154. <https://doi.org/10.1111/j.1467-8624.2005.00835.x>
- Hansen, K., & Hawkes, D. (2009). Early Childcare and Child Development. *Journal of Social Policy*, 38(2), 211–239. <https://doi.org/10.1017/S004727940800281X>
- Henly, J. R., & Lambert, S. J. (2005). Nonstandard Work and Child-Care Needs of Low-Income Parents. In S. M. Bianchi, L. M. Casper, & R. B. King (Eds.), *Work, family, health, and well-being* (pp. 469–488). Mahwah, NJ: Lawrence Erlbaum Associates.
- Henly, J. R., & Lyons, S. (2000). The Negotiation of Child Care and Employment Demands Among Low-Income Parents. *Journal of Social Issues*, 56(4), 683–706.
<https://doi.org/10.1111/0022-4537.00191>
- Herbst, C. M. (2013). The Impact of Non-Parental Child Care on Child Development: Evidence from the Summer Participation “Dip”. *Journal of Public Economics*, 105, 86–105.
<https://doi.org/10.1016/j.jpubeco.2013.06.003>
- Herbst, C. M. (2015). *The Rising Cost of Child Care in the United States: A Reassessment of the Evidence*. Bonn: IZA.
- Horm, D. M., File, N., Bryant, D., Burchinal, M., Raikes, H., Forestieri, N., ... Cobo-Lewis, A. (2018). Associations Between Continuity of Care in Infant-Toddler Classrooms and Child Outcomes. *Early Childhood Research Quarterly*, 42, 105–118.
<https://doi.org/10.1016/j.ecresq.2017.08.002>
- Joshi, P., & Bogen, K. (2007). Nonstandard Schedules and Young Children’s Behavioral Outcomes among Working Low-Income Families. *Journal of Marriage and Family*, 69 (February), 139–156. <https://doi.org/10.1111/j.1741-3737.2006.00350.x>
- Kalil, A. (2015). Inequality Begins at Home: The Role of Parenting in the Diverging Destinies of Rich and Poor Children. In P. R. Amato, A. Booth, S. M. McHale, & J. Van Hook (Eds.), *Families in an era of increasing inequality* (Vol. 5, pp. 63–82). Geneva: Springer International Publishing. <https://doi.org/10.1007/978-3-319-08308-7>
- Kalil, A., Ryan, R., & Corey, M. (2012). Diverging Destinies: Maternal Education and the Developmental Gradient in Time With Children. *Demography*, 49(4), 1361–1383.
<https://doi.org/10.1007/s13524-012-0129-5>
- Kimmel, J. (2006). Child Care, Female Employment, and Economic Growth. *Community Development*, 37(2), 71–85. <https://doi.org/10.1080/15575330609490208>

- Kimmel, J., & Powell, L. M. (2006). Nonstandard Work and Child Care. *Eastern Economic Journal*, 32(3), 397–419.
- Kornrich, S., & Furstenberg, F. (2013). Investing in Children: Changes in Parental Spending on Children, 1972-2007. *Demography*, 50(1), 1–23. <https://doi.org/10.1007/s13524-012-0146-4>
- Laughlin, L. (2013). *Who's Minding the Kids? Child Care Arrangements: Spring 2011* (No. April).
- Lein, L., Benjamin, A. F., McManus, M., & Roy, K. (2005). Economic Roulette: When is a Job not a Job? *Community, Work & Family*, 8(4), 359–378. <https://doi.org/10.1080/13668800500262752>
- Lesnard, L. (2008). Off-Scheduling within Dual-Earner Couples: An Unequal and Negative Externality for Family Time. *American Journal of Sociology*, 114(2), 447–490. <https://doi.org/10.1086/590648>
- Lesnard, L. (2010). *Setting Cost in Optimal Matching to Uncover Contemporaneous Socio-Temporal Patterns* (Vol. 38, pp. 389–419). <https://doi.org/10.1177/0049124110362526>
- Lesnard, L., & Kan, M. Y. (2011). Investigating Scheduling of Work: A Two-Stage Optimal Matching Analysis of Workdays and Workweeks. *Journal of the Royal Statistical Society. Series A: Statistics in Society*, 174(2), 349–368. <https://doi.org/10.1111/j.1467-985X.2010.00670.x>
- Levine, J. A. (2013). *Ain't No Trust: How Bosses, Boyfriends, and Bureaucrats Fail Low-Income Mothers and Why it Matters*. Berkeley; Los Angeles: University of California Press.
- Loeb, S., Fuller, B., Kagan, S. L., & Carrol, B. (2004). Child Care in Poor Communities: Early Learning Effects of Type, Quality, and Stability. *Child Development*, 75(1), 47–65.
- Mensing, J. F., French, D., Fuller, B., & Kagan, S. L. (2000). Child Care Selection Under Welfare Reform: How Mothers Balance Work Requirements and Parenting. *Early Education and Development*, 11(5), 573–595. <https://doi.org/10.1207/s15566935eed1105>
- Meyers, M. K., & Jordan, L. P. (2006). Choice and Accommodation in Parental Child Care Decisions. *Community Development*, 37(2), 53–70. <https://doi.org/10.1080/15575330609490207>
- Morrissey, T. W. (2008). Familial Factors Associated With the Use of Multiple Child-Care Arrangements. *Journal of Marriage and Family*, 70(May), 549–563.
- Morrissey, T. W. (2009). Multiple Child-Care Arrangements and Young Children's Behavioral Outcomes. *Child Development*, 80(1), 59–76.
- NSECE Project Team. (2014). *Characteristics of Center-Based Early Care and Education Programs: Initial Findings from the National Survey of Early Care and Education (NSECE)* (pp. 1–35).
- NSECE Project Team. (2015). *Provision of Early Care and Education during Non-Standard Hours* (pp. 1–4). Washington, DC: Office of Planning, Research; Evaluation.
- NSECE Project Team. (2016). *Characteristics of Home-Based Early Care and Education Providers: Initial Findings from the National Survey of Early Care and Education* (pp. 1–106).

- Pearlmutter, S., & Bartle, E. E. (2003). Participants' Perceptions of the Childcare Subsidy System. *Journal of Sociology and Social Welfare*, 30(4), 157–173.
- Peisner-Feinberg, E. S., Burchinal, M. R., Clifford, R. M., Culkin, M. L., Howes, C., Kagan, S. L., & Yazejian, N. (2001). The Relation of Preschool Child-Care Quality to Children's Cognitive and Social Developmental Trajectories through Second Grade. *Child Development*, 72(5), 1534–1553. <https://doi.org/10.1111/1467-8624.00364>
- Pilarz, A. R., & Hill, H. D. (2014). Unstable and Multiple Child Care Arrangements and Young Children's Behavior. *Early Childhood Research Quarterly*, 29, 471–483. <https://doi.org/10.1016/j.ecresq.2014.05.007>
- Presser, H. B. (2003). *Working in a 24/7 Economy: Challenges for American Families*. New York: Russell Sage Foundation.
- Ramey, G., & Ramey, V. A. (2009). *The Rug Rat Race*. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.1007/s13398-014-0173-7.2>
- Rousseeuw, P. J. (1987). Silhouettes: A Graphical Aid to the Interpretation and Validation of Cluster Analysis. *Journal of Computational and Applied Mathematics*, 20, 53–65. [https://doi.org/10.1016/0377-0427\(87\)90125-7](https://doi.org/10.1016/0377-0427(87)90125-7)
- Ruhm, C., & Waldfogel, J. (2011). *Long-Term Effects of Early Childhood Care and Education*.
- Ruzek, E., Burchinal, M., Farkas, G., & Duncan, G. J. (2014). The Quality of Toddler Child Care and Cognitive Skills at 24 months: Propensity Score Analysis Results from the ECLS-B. *Early Childhood Research Quarterly*, 29(1), 12–21.
- Sandstrom, H., & Chaudry, A. (2012). 'You have to choose your childcare to fit your work': Childcare Decision-Making among Low-Income Working Families. *Journal of Children and Poverty*, 18(2), 89–119. <https://doi.org/10.1080/10796126.2012.710480>
- Sandstrom, H., & Huerta, S. (2013). *The Negative Effects of Instability on Child Development: A Research Synthesis*. Washington, DC: Urban Institute.
- Sandstrom, H., Giesen, L., & Chaudry, A. (2012). *How Contextual Constraints Affect Low-Income Working Parents' Child Care Choices* (No. February) (pp. 1–11). Washington, DC: Urban Institute.
- Scott, E. K., London, A. S., & Hurst, A. (2005). Instability in Patchworks of Child Care when moving from Welfare to Work. *Journal of Marriage and Family*, 67(2), 370–386. <https://doi.org/10.1111/j.0022-2445.2005.00122.x>
- Studer, M. (2013). *WeightedCluster Library Manual: A Practical Guide to Creating Typologies of Trajectories in the Social Sciences with R*.
- Tekin, E. (2005). Child Care Subsidy Receipt, Employment, and Child Care Choices of Single Mothers. *Economics Letters*, 89(1), 1–6. <https://doi.org/10.1016/j.econlet.2005.03.005>
- Tekin, E. (2014). Childcare Subsidy Policy: What it Can and Cannot Accomplish. *IZA World of Labor*, 43(July), 1–10. <https://doi.org/10.15185/izawol.43>
- Tran, H., & Weinraub, M. (2006). Child Care Effects in Context : Quality, Stability, and Multiplicity in Nonmaternal Child Care Arrangements During the First 15 Months of Life. *Developmental Psychology*, 42(3), 566–582. <https://doi.org/10.1037/0012-1649.42.3.566>

- Vandell, D. L., Burchinal, M., & Pierce, K. M. (2016). Early Child Care and Adolescent Functioning at the End of High School: Results from the NICHD Study of Early Child Care and Youth Development. *Developmental Psychology*, 52(10), 1634–1645.
<https://doi.org/10.1016/j.cognition.2008.05.007>
- Weber, R. B. (2011). *Understanding Parents' Child Care Decision-Making: A Foundation for Child Care Policy Making* (No. February). Washington, DC: Office of Planning, Research; Evaluation. Retrieved from
http://www.acf.hhs.gov/sites/default/files/opre/parents{_}childcare.pdf
- Youngblade, L. M. (2003). Peer and Teacher Ratings of Third- and Fourth-Grade Children's Social Behavior as a Function of Early Maternal Employment. *Journal of Child Psychology and Psychiatry*, 44(4), 477–488.

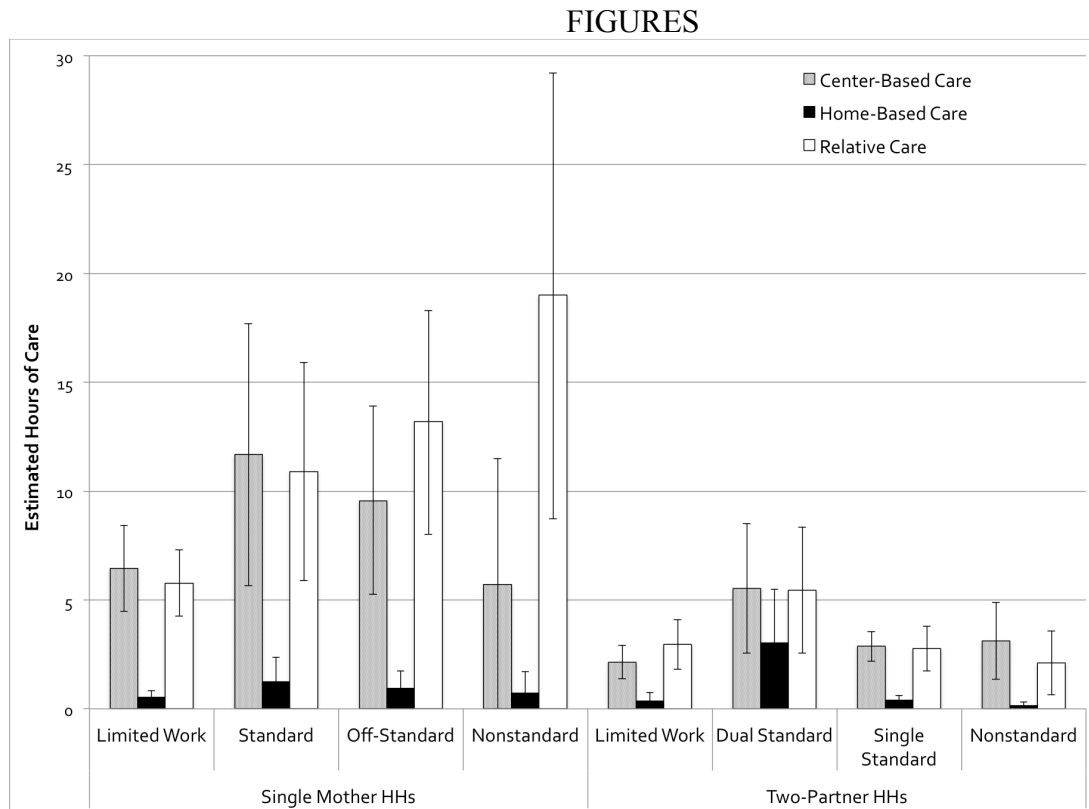


Figure 1. Estimated Childcare Use in Single-Mother and Two-Partner Households by Type of Care.

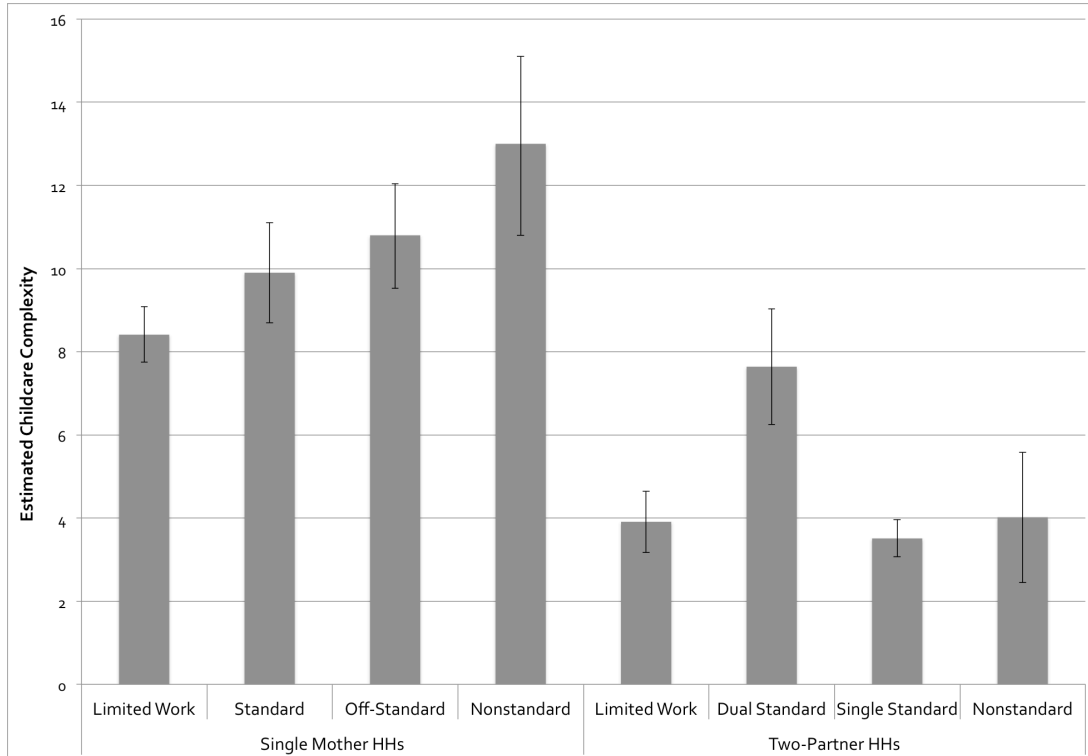


Figure 2. Estimated Childcare Complexity in Single-Mother and Two-Partner Households.

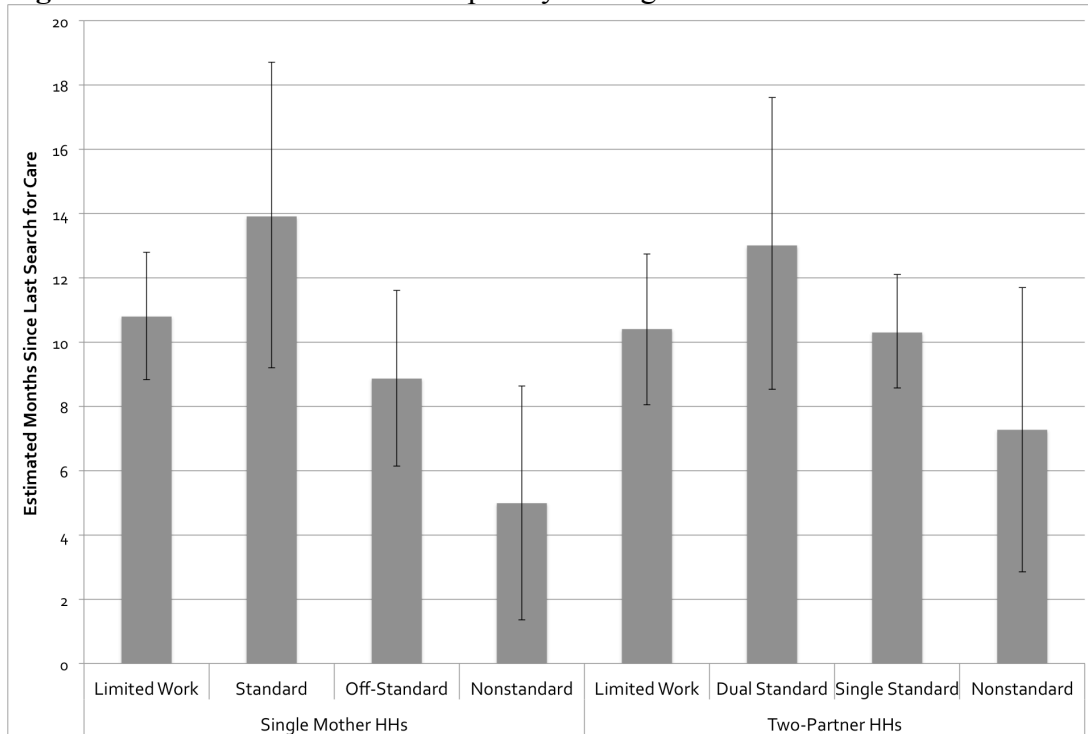


Figure 3. Estimated Childcare Continuity in Single-Mother and Two-Partner Households.

Table 1. Distribution of Schedule Types

Single-Mother Households		Two-Partner Households	
Schedule Types		Schedule Types	
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	‡	Dual w/Male Shift	2.0
Night	‡	Male Shift	1.3

‡ Value suppressed due to small n

Table 2. Sample Description

	Single-Mother HHs		Two-Partner HHs	
	Mean	SD	Mean	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	
Welfare receipt (%)	49.9		35.4	
Homeowner (%)	10.0		32.9	
Carowner (%)	64.0		89.0	
Respondent's Race				
White	34.1		51.0	
Black	34.7		11.9	
Hispanic	26.4		30.3	
Other	4.8		6.7	
Mother's Age	28.9	7.1	30	6.47
Immigrant Mother (%)	15.7		25.8	
Mother Attended School (%)	11.2		69.2	
Mother Attended Training (%)	2.5		82.0	
Mother's Education				
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	
Mother's 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	
Partner's Age			32.6	7.65
Immigrant Partner (%)			22.5	
Partner Attended School (%)			32.2	
Partner Attended Training (%)			93.7	
Partner's Education				
Less than HS			24.2	
HS diploma/GED			35.7	
Some college			19.3	
College +			20.8	
Partner's 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	
Partner Married to Mother			74.0	
Weighted Sample Size	2,500,000		4,360,000	
Unweighted Sample Size	1,230		2,090	

Table 3. Associations Between Working Schedule and Childcare Outcomes in Single-Mother Households

	Home-Based ¹		Center-Based ¹		Relative Care ¹		Complexity ¹		Continuity ²	
	Estimate	Sig	Estimate	Sig	Estimate	Sig	Estimate	Sig	Estimate	Sig
Limited Work Standard (ref)	-0.68	***	-0.444	**	-0.559	***	-0.048		-0.305	
Off-Standard	-0.279	**	-0.224	+	-0.156		0.092	+	-0.67	**
Nonstandard	-0.857	**	-0.156		0.053		0.349	***	-1.34	**
Limited Work Standard (ref)	0.146		0.406		0.1		2.050	**		
Off-Standard	0.153		-0.004		-0.485		0.722			
Nonstandard	-0.091		0.734		-0.79	+	1.360			

significance levels: +<.1, *<.05, **<.01, ***<.001

1: ZIP model which 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 five 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 indicating participation in training activities in the recorded week; dummy variable for homeownership; 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

2: Negative binomial regression model with the same set of predictors as above.

Table 4. Associations Between Working Schedule and Childcare Outcomes in Two-Partner Households

	Home-Based ¹		Center-Based ²		Relative Care ²		Complexity ²		Continuity ³	
	Estimate	Sig	Estimate	Sig	Estimate	Sig	Estimate	Sig	Estimate	Sig
Limited Work	0.055		-0.257	*	-0.468	*	-0.076		-0.37	
Dual Standard	0.714	***	0.333	*	0.132		0.211	***	0.224	
Single Std (ref)										
Nonstandard	-0.453		-0.529	+	-0.813	*	0.014		-0.955	+
Limited Work	0.16		0.247		-0.473		-0.192			
Dual Standard	-1.36	**	-0.303		-0.526	+	-1.570	***		
Single Std (ref)										
Nonstandard	0.598		-0.329		-0.467		-0.120			

significance levels: +<.1, *<.05, **<.01, ***<.001

- 1: ZIP 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 five 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;
- 2: ZIP model as above, but includes an interaction between schedule and observed schedule variability in the second-stage model as well as dummy variables in both the first- and second-stage models for female and male
- 3: Negative binomial regression model with the same set of predictors as in (2).

Table 5. Summary of Support for Hypotheses

	Hypothesis 1			Hypothesis 2	Hypothesis 3
	<i>Home-Based</i>	<i>Center-Based</i>	<i>Relative</i>	<i>Complexity</i>	<i>Continuity</i>
Single-Mother Households					
<i>Nonstandard</i>	Hyp 1A: –	Hyp 1A: –	Hyp 1A: +	Hyp 2A: +	Hyp 3A: –
<i>Non-working</i>	Hyp 1B: –	Hyp 1B: –	Hyp 1B: –	Hyp 2B: –	Hyp 3B: +
Two-Partner Households					
<i>Nonstandard</i>	Hyp 1A: –	Hyp 1A: –	Hyp 1A: +	Hyp 2A: +	Hyp 3A: –
<i>Non-working</i>	Hyp 1B: –	Hyp 1B: –	Hyp 1B: –	Hyp 2B: –	Hyp 3B: +
<i>Dual Standard</i>	Hyp 1C: +	Hyp 1C: +	Hyp 1C: +	Hyp 2C: +	<i>n/a</i>

key: No Support Supporting Evidence Contradictory Evidence