Nonparental Child Care during Nonstandard Hours:

Who Uses It and How Does It Influence Child Well-being?

by

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ABSTRACT

Over the last three decades there has been a rise in the number of workers employed during nonstandard (evening and overnight) hours; accompanying this trend has been a renewed interest in documenting workers, their families, and outcomes associated with nonstandard-hour employment. However, there are important gaps in the current literature. Few have considered how parents who work nonstandard hours care for their children when parental care is unavailable; little is known about who participates in nonparental child care during nonstandard hours, or the characteristics of those who participate. Most pressingly from a policy perspective, it is unclear how participation in nonparental child care during nonstandard hours influences child well-being. This study aims to fill these gaps. This dissertation paints a descriptive portrait of children and parents who use nonstandard child care, explores the relationship between nonstandard hours of nonparental child care participation and various measures of child well-being, and identifies longitudinal patterns of participation in nonstandard-hour child care. I find that children who participate in nonstandard-hours of nonparental child care look significantly different from those who do not participate. In particular, children are more likely to be older, identify as black or Hispanic, and reside with younger, unmarried parents who have lower levels of education. Estimates also suggest a negative relationship between participation in nonstandard-hour child care and child well-being. Specifically, children who participate in nonstandard-hour care show decreased school engagement and school readiness, increased behavioral problems, decreased social competency, and lower levels of physical health. These findings have serious implications for social and education policy.

DEDICATION

To my daughter, Dharma, who always picks the right path.

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PREFACE

In October of 2013 I was listening to a National Public Radio report featuring interviews of parents who worked unusual hours. One parent was employed as a taxi driver in New York City and expressed the difficulty he faced in finding child care for his daughter. As a child care researcher, I was drawn to this man's story and sought additional information. Several pertinent question were revealed: who uses nonparental child care during nonstandard hours and what does this care look like?, what relationship, if any, exists between participation in this care and child well-being?, and how do children participate in this care over time?

Following exhaustive, and unsuccessful, attempts to locate research that addressed these questions, I came to a conclusion: this would be the topic for my dissertation. Since no observational data was available describing the environment facing children who participate in child care during evening and overnight hours, I located local centers and arranged to investigate. I spent the Spring semester of 2014 observing children, parents, and caregivers in child care centers during all hours of operation. My observations were surprising. Children were dropped-off and picked-up at random times; some children arrived at the center directly after school, remained all evening, and were sent to school by the center the next morning. Sleeping conditions were less than ideal: children slept on cots in one large room; the light in the room was dimmed to allow the caregiver enough light to read while the children slept; as parents came and went with their children, the door slammed and discussions were held at normal volume; and the janitor vacuumed in the hallway. Some children brought pajamas and sheets; others slept

on the plain cot with their normal clothing on. Children were not given the opportunity to brush their teeth or attend to any hygienic tasks aside from using the restroom.

I also discovered important information regarding parents. While most parents were single and working or attending school, some were in two-parent households where both parents worked evenings or overnight. Almost 90 percent of all parents received child care subsidies, meaning that their income was relatively low. Occupations were diverse: some parents were in professional positions (e.g. nurses) and some were in the service industry (including adult entertainment).

Based on my observations, it was evident that this dissertation should explore the connection between participation in evening and overnight care and child well-being. However, because of the novelty of the research, this dissertation must also provide a descriptive analysis of the children and parents who use nonstandard-hour care. In order to reach both goals, this dissertation will adopt a three empirical-paper layout. Each empirical section serves on its own to address one of three related research questions. This study will reveal more about the topic of nonstandard child care participation than a narrower approach.

CHAPTER 1

INTRODUCTION

Goodnight room. Goodnight moon. Goodnight cow jumping over the moon.

Goodnight stars, goodnight air, goodnight noises everywhere

Margaret Wise Brown, *Goodnight Moon* (1947)

Background

Fallout from the Great Recession has been well documented. Research suggests that everything from shifts in public concern over climate change (Scruggs & Benegal, 2012) to changes in health and health behaviors (Tekin et al., 2013) have been associated with the rise and fall of the Great Recession. Notably, a small community of research questions the long-term effect of the Great Recession on the quality of jobs. This research offers interesting conclusions. First, there was a dramatic shift for some workers toward "bad jobs,"[1] particularly for female workers (Kambayashi & Kato, 2012). Second, a significant portion (23.5%) of employees in certain states transitioned from working standard hours to working nonstandard hours (evening, night, and rotating); these employees were far more likely to be black and parents (DeMarco, 2013). Third, women were less likely during the recession to work standard hours in both dual-earner and single-earner families (Morrill & Pabilonia, 2013). Forth, globally there was a marked increase in employment during nonstandard hours since the beginning of the Great Recession; in the United States, this was particularly true for mid-career, older workers (Stone, 2012).

[1] The authors describe "bad jobs" as those with unpredictable schedules, particularly when hours worked are during evening and overnight hours.

There are important consequences associated with increases in labor force participation during nonstandard hours, particularly when workers have children. Nonstandard work is associated with worker sleep deprivation (Akerstedt, 2003), diminished physical health (Costa, 2003; Klerman, 2005; Ulker, 2006), marital instability (Mills & Täht, 2010; Presser, 2000; Täht, 2011), stress and poor behavioral well-being (Costa et al., 1989; Barton et al., 1995; Hsueh & Yoshikawa, 2007; Liu et al., 2011), and decreased parental acuity (Grzywacz et al., 2011; Rapoport & Le Bourdais, 2002). Households where at least one parent is engaged in nonstandard work experience additional difficulty as a family unit, including reporting more conflict, less cohesion, and poorer home environments (Bianchi, 2011; Craig & Powell, 2011; Hsueh & Yoshikawa, 2007; La Valle et al., 2002; Lleras, 2008; Presser, 2007; Tuttle & Garr, 2012). Research focusing on the association between nonstandard-hour employment and children's outcomes concludes that children of mothers who are employed during nonstandard hours have poorer behavioral, cognitive, and physical well-being (Gassman-Pines, 2011; Han, 2008; Han & Waldfogel, 2007; Joshi & Bogen, 2007; Rosenbaum & Morett, 2009; Strazdins et al., 2004; Strazdins et al., 2006) compared to children of mothers who work standard, daytime hours.

Anecdotally, media reports suggest that parents have a difficult time finding child care during evening and overnight hours; child care that is available is often unstable and lower in quality than child care available during daytime hours. National income and program participation data reveal that 24 percent of mothers working nonstandard hours

report using center-based care (Kimmel & Powell, 2006)[2]; furthermore, state-level data provided by Illinois indicate that 17 percent of new child care requests are for evening or overnight care (IDHS, 2014).[3] However, recent survey data released by National Survey of Early Care and Education reveal that only 7 percent of national child care centers report offering child care during nonstandard hours (NSECE, 2015). Given the limited information regarding parental employment during nonstandard hours and use of child care during these hours, important questions remain.

Who uses child care during nonstandard hours, what I call 'nonstandard child care'? Research investigating shifting labor market behaviors suggests that particular groups are more likely to work nonstandard-hours; perhaps certain groups are also more likely to use nonparental child care during nonstandard hours. What types of nonstandard child care are used? If some parents, but not all, use center-based nonstandard child care, the others must make alternative arrangements using relative and nonrelative home-based care. How stable are nonstandard child care arrangements? If a significant degree of volatility exists in securing nonstandard child care, parents may be forced to make alternative, temporary arrangements that do not match child care preferences. What does a typical day look like for children who participate in nonstandard child care? This question has serious, but diverse, implications depending on the age of the child. Children who attend school during the day may also participate in nonstandard-hour care during

[2] Kimmel and Powell use 1992-1993 Survey of Income and Program Participation data to calculate these figures.

[3] In response to national employment data made available through the 2004 CPS, the state of Illinois began tracking parental requests for evening and overnight care made through their Child Care Resource and Referral program. Others who have tracked state-level responses (Blank et al., 2001) have not reported similar action in other states.

the evening; this leaves little time for children and parents to engage with one another. Parents must also trust that their child's care provider attend to after-school tasks such as checking homework and preparing children for bed. Children who are too young to attend school during the day may instead be at home with their parents or also participate in standard-hour care. Given that parents working nonstandard hours must sleep during the day, those children who remain home with parents may be providing self-care or placed under the supervision of the television. What do children do during nonstandard-hour care? Standard-hour care typically incorporates curriculum into daily schedules; is this also the case for nonstandard-hour care? What are the sleeping conditions like? If children are placed in a room with multiple children, it is likely to be relatively noisy, especially if parents drop-off and pick-up children at unpredictable times. Do children perform typical nighttime rituals, such as changing into pajamas, brushing their teeth, etcetera? Care providers may not have the resources available to ensure that positive health behaviors, in particular, are demonstrated.

Research Questions

To fill the gaps in our current understanding of the use of nonstandard child care, this dissertation addresses the following research questions:

Main Question 1: Who participates in nonparental child care during nonstandard hours?

Sub-Question 1. Who uses nonstandard child care?

Sub-Question 2. How do participants differ from nonparticipants in terms of demographic, economic, and occupational characteristics?

Main Question 2: Does participation in nonparental child care during nonstandard hours influence child well-being?

Sub-Question 1. In what ways does participation in nonstandard child care influence child well-being?

Sub-Question 2. What are the mechanisms connecting participation in nonstandard child care and child well-being?

Main Question 3: Is nonparental child care participation during nonstandard hours static or dynamic?

Sub-Question 1. What are the longitudinal patterns of nonstandard child care participation?

Sub-Question 2. How do participants with different patterns of nonstandard child care differ across demographic, economic, and occupational characteristics?

To tackle the specified research questions, this dissertation addresses the main questions in three separate parts. In the first part, this dissertation provides a descriptive comparison of families who use standard hours of nonparental care ('standard child care') to those who use nonstandard hours of nonparental care ('nonstandard child care'). Using the Urban Institute's 1999 and 2002 National Survey of America's Families (NSAF), I begin by developing a classification mechanism to sort children into categories of participants and nonparticipants in nonstandard child care for a sample of children under the age of 13. Classification as a participant is based on parental responses to employment and child care-use questions. Parents are surveyed regarding typical

employment behavior, with regard to time of day, and typical child care usage during work hours. These questions, coupled with household roster variables, allow me to construct a classification mechanism and identify nonstandard child care participants. I then present simple descriptive statistics comparing differences in characteristics between participants and nonparticipants. Nonparticipants are not a homogenous group. Three policy-relevant reference groups are also examined: (1) those with employed parents, (2) those using standard hours of nonparental child care, (3) and those with one parent working nonstandard hours while the other parent provides care. Finally, I present multivariate analyses estimating differences in demographic, economic, and occupation characteristics based on children's status as a participant or nonparticipant in nonstandard child care.

In the second part, this dissertation investigates how participation in nonstandard child care influences child well-being. There are three hypothesized avenues through which participation in nonstandard child care can influence child well-being. First, parents are likely to be employed during nonstandard hours, and evidence from shift work research concludes that parental nonstandard-hour employment is negatively associated with child well-being (Dunifon et al. 2013; Han et al., 2013; Kim et al., 2014; Li et al., 2014). Second, children must be participating in nonparental child care. While evidence from child care research is mixed, nonparental child care available during nonstandard hours is in lower supply, unreliable, and unstructured (Collins et al., 2002; Sandstrom et al., 2012). This indicates that participation is negatively associated with child well-being. Finally, parental decisions to work nonstandard hours may generate additional income for parents to spend on market goods that improve child well-being,

such as medical care. However, parents who work nonstandard hours need to sleep during the very hours when medical facilities are open. I present main analyses estimating children's well-being as a function of (1) parental nonstandard-hour employment, (2) child care received during parental work hours, and (3) parental and household inputs. I examine how mechanisms of nonstandard-hour employment and nonparental child care alter the relationship between participation and child well-being. Finally, because instruments used in the NSAF to measure well-being differ depending on the age of the child, children ages 0 to 5 and children ages 6 to 11 are examined separately in all analyses.

In the third part, this dissertation exploits panel data to understand how static and dynamic patterns and durations of participation in nonstandard child care are related to characteristics of the child and parent. Participation is relatively straightforward when using cross-sectional data: an observed child is classified as a participant or nonparticipant. Across four waves of data there is likely to be many changes in the participation status of children in nonstandard child care – these shifts in participation must be accounted for to (1) identify the variety of patterns of participation and (2) properly model characteristics of children who do or do not participate in nonstandard child care. Using the Early Childhood Longitudinal Study – Birth cohort (ECLS-B), I begin by developing a classification mechanism to sort children into categories of participants and nonparticipants for the sample of children in each wave of the survey. These data stand apart from others in that parental time-of-employment and child care use during work hours is recorded for children from infancy through kindergarten entry. Parental responses to these questions allow me to construct a classification mechanism

and identify participants and nonparticipants. I present main analyses estimating differences in participation across characteristics, and Cox proportional hazards analyses testing which child and parent characteristics are associated with participation.

Significance of the Study

This study is the first to both identify children and parents who use nonstandard child care and explore how participation in this care influences child well-being. Given the upward trajectory of nonstandard-hour work among parents, this dissertation addresses contemporary issues faced by parents who must balance shifting labor market conditions and conventional child care market conditions. In order to explore this topic, this dissertation has used survey data to construct a novel mechanism to classify children as participating, or not participating, in nonstandard child care. This mechanism is useful not only for this study, but can be used in future research aimed at understanding the relationship between participation in nonstandard child care and a variety of outcomes.

By investigating the relationship between participation in nonstandard child care and children's well-being and development, this dissertation also contributes to two sets of literature: the growing shift work literature, as well as the established child care literature. Research emerging from the shift work and child care literatures has neglected to incorporate families' use of nonstandard child care into their separate examinations of child well-being. Shift work literature has previously estimated the relationship between parental work during nonstandard hours and child well-being. However, this research overlooks a potential confounding relationship between how children are cared for while their parents are working nonstandard hours and the child's well-being. A contribution

particular to the shift work literature lies in identifying how parental nonstandard work affects children through mechanisms other than parental employment. Child care literature, on the other hand, routinely evaluates the relationship between children's care during parental work and child well-being. Still, this research has yet to differentiate between participation in child care during standard versus nonstandard hours. A contribution limited to child care literature lies in the suspension of previously held assumptions that all nonparental child care use takes place during standard hours. Contributions are made by this dissertation to both the shift work and child care literatures.

Finally, findings from this dissertation have important policy implications for education and social policy, as well as for early childhood education programs. Certain groups of parents may be more likely to have difficulty accessing nonstandard child care than others. Rural communities may have limited local child care providers, leaving parents to seek care that is in neighboring areas. Parents who rely on public transportation may find it difficult to locate nonstandard child care that is both close to public transit lines and geographically accessible to either their work or home location. Single mothers also potentially face greater challenges in securing nonstandard child care than their married or cohabitating counterparts, resulting in either alterations in work behavior or the use of lower-quality child care. If nonstandard child care is a type of care which is demanded but not supplied by market forces,[4] state and locally-run programs can

[4] Currently, limited data are available regarding the growth of the nonstandard child care market or participation rates in nonstandard child care. Anecdotal evidence from states suggests that upwards of 30 percent of all new child care inquiries are for services offering nonstandard hours of care. In addition, Sandstrom, Giesen, & Chaundry (2012) published a policy brief through the Urban Institute exploring a qualitative look at local child care markets. They found that early education care failed to meet scheduling

potentially fill the gap or child care subsidy programs could be restructured to encourage pre-existing privately-run facilities to offer 24/7 care. If participation in nonstandard child care has detrimental effects for children's cognitive, socio-emotional, behavioral, and physical development, program evaluation is necessary to identify the mechanisms which may mediate this relationship. Furthermore, state and federal agencies tasked with improving early childhood education would have the opportunity to offer policy suggestions aimed at improving the long-term prospects for these children. Finally, if increasing numbers of children participate in nonstandard child care, experience developmental delays, and then enter public schools without the proper tools to make them successful, education policy must be prepared with an effective response for increased demands for remediation resources.

Outline of this Study

The remainder of the paper proceeds as follows. Chapter 2 focuses on creating a descriptive portrait of children and parents who use nonstandard child care. Section 1 introduces the topic. Section 2 offers a brief review of relevant work from the shift work and child care literatures. Section 3 describes the National Survey of America's Families dataset and the mechanism used to classify children as participants or nonparticipants. Section 4 presents the results. Section 5 concludes.

needs of parents working nonstandard hours who are in need of nonparental child care. Specifically, center-care was hard to find, had no space, had age restrictions, and was not in proximity to their home or work. Some national data collected from state Child Care Resource and Referral centers suggests that approximately 15% of parents seeking new care arrangements are looking for care during nonstandard hours.

Chapter 3 focuses on exploring the relationship between participation in nonstandard child care and various measures of child well-being. Section 1 introduces the topic. Section 2 develops the conceptual framework guiding the analyses, offers a review of relevant work from shift work and child care literatures, and identifying potential mechanisms which uniquely affect nonstandard child care participants. Section 3 describes the National Survey of America's Families dataset and the mechanism used to classify children as participants or nonparticipants. Section 4 specifies the model used to estimate the relationship between participation and child well-being. Section 5 presents the results. Section 6 concludes.

Chapter 4 explores the use of nonstandard child care as children age. Section 1 introduces the topic. Section 2 offers a brief review of relevant work from the shift work and child care literatures. Section 3 describes the Early Childhood Longitudinal Study – Birth cohort dataset and the mechanism used to classify children as participants or nonparticipants. Section 4 presents the empirical model. Section 5 presents the results. Section 6 concludes.

CHAPTER 2

WHO USES NONPARENTAL CHILD CARE DURING NONSTANDARD HOURS?: A DESCRIPTIVE ANALYSIS USING THE NATIONAL SURVEY OF AMERICA'S FAMILIES

Introduction

Increasingly workers are finding employment during evening or overnight hours – what is often labeled nonstandard hours. The Bureau of Labor Statistics (BLS) recorded in 2004[5] that almost 30 percent of the working population was employed in either permanent nonstandard-hour positions or regularly rotated in and out of nonstandard-hour schedules (Price, 2011). McMenamin (2007) finds this to be a sharp increase from the 13 percent of workers who reported working during any nonstandard hours in 1985.[6] Of those that the BLS recorded as working permanent nonstandard-hour positions, 23 percent reported working evening-only hours[7], and over 10 percent reported working overnight-only hours[8]. Almost half of all workers who report being employed in permanent nonstandard-hour positions were women of child-bearing age (McMenamin, 2007). Most importantly, two out of every five parents with children under the age of 5 reported working any nonstandard hours (McMenamin, 2007); in some states, upwards of 70 percent of single, low-skilled mothers report working any nonstandard hours (Stoll et al., 2006).

[5] The most recent supplemental survey from the BLS to include questions of shift work occurred in 2004.
[6] This data is displayed graphically in Appendix Figure A.
[7] Between the hours of 2pm and 12am.
[8] Between the hours of 9pm and 8am.

The increased prevalence of nonstandard work has been accompanied by growing research investigating outcomes for parents who are employed during nonstandard hours. Nonstandard work appears to be associated with sleep deprivation (Akerstedt, 2003), diminished physical health (Costa, 2003; Klerman, 2005; Ulker, 2006), marital instability (Presser, 2000; Mills & Täht, 2010; Täht, 2011), stress and poor behavioral well-being (Costa et al., 1989; Barton et al., 1995; Hsueh & Yoshikawa, 2007; Liu et al., 2011), and decreased parental acuity (Rapoport & Le Bourdais, 2002, Grzywacz et al., 2011). Further research considers how parents' engagement in nonstandard hours of work impacts the functioning of the family unit, generally concluding that households where at least one parent is engaged in nonstandard work experience more conflict, less cohesion, and poorer home environments (La Valle et al., 2002; Hsueh & Yoshikawa, 2007; Presser, 2007; Lleras, 2008; Bianchi, 2011; Craig & Powell, 2011; Tuttle & Garr, 2012). Considerable research extends the investigation to assess relationships between parental nonstandard work and child outcomes. A substantial amount of this work finds associations between mothers working nonstandard hours and children with increased behavioral, cognitive, and health disparities (Strazdins et al., 2004; Strazdins et al., 2006; Joshi & Bogen, 2007; Han & Waldfogel, 2007; Han, 2008; Rosenbaum & Morett, 2009; Gassman-Pines, 2011). Suggested policy responses by this research range from increasing the availability of child care subsidies and move parents into standard work hours (Presser, 2003) to creating public/private partnerships that increase the availability of stable child care during nonstandard hours (Kimmel & Powell, 2006).

Despite the breadth of extant shift work research there is a gap in the literature. To date, no research provides a detailed examination of children and parents who use

nonparental child care during nonstandard hours. This paper addresses this gap. Few have considered how parents who work nonstandard hours care for their children when parental care is unavailable. Three pieces of research (Presser, 2003; Han, 2004; Kimmel & Powell, 2006) have attempted to understand how parents who are employed during nonstandard hours select child care. The trend is to model child care selection and parental employment among two-parent households, and primary conclusions from each of these three pieces of research reveal that parents are less likely to choose formal care.

The aim of this paper is to provide a descriptive portrait of children who participate in, and parents who use, nonstandard hours of nonparental child care ('nonstandard child care'). I begin by developing a classification mechanism to sort children into categories of participants and nonparticipants for a sample of children under the age of 13. Participation is based on parental responses to employment and child care-use questions. Parents are surveyed regarding typical employment behavior, with regard to time of day, and typical child care usage during work hours. These questions, coupled with household roster variables, allow me to construct a classification mechanism and identify nonstandard child care participants. I then present simple descriptive statistics comparing differences in characteristics between participants and nonparticipants. Nonparticipants are not a homogenous group. Three policy-relevant reference groups will also be examined: (1) those with employed parents, (2) those using standard hours of nonparental child care, (3) and those with one parent working nonstandard hours while the other parent provides care. Finally, I present multivariate analyses estimating differences in participation across characteristics. The analyses use data from the Urban Institute's 1999 and 2002 National Survey of America's Families (NSAF). This dataset is

used, primarily, because employment questions in the survey allow for identification of parents using nonstandard hours of child care.

I find that older children, and children with parents who have a high school degree or some college, increased family income, and single, black, male parents are more likely to participate in nonstandard child care. Occupation data further suggests that parents who work Service sector positions are more likely to be employed during nonstandard hours compared to all other occupations. However, policy-relevant sub-group analyses indicate that samples of children who are normally treated as homogenous in either child care and shift work literature do not look similar when estimating participation in nonstandard child care. This suggests that policy recommendations may not be relevant for nonstandard child care participants when they are borne from previous analyses that do not control for time-of-day of nonparental child care use.

The remainder of the paper proceeds as follows. Section 2 offers a brief review of relevant work from the shift work and child care literatures. Section 3 describes the NSAF dataset and the mechanism used to classify children as participants or nonparticipants. Section 4 presents the results. Section 5 concludes.

Overview of US Shift Work and Child Care Research

Relatively little research considers what children do when their parents work nonstandard hours. Two main branches of literature feed into this paper's examination of children and parents who use nonstandard child care. The first is the shift work literature, which focuses on identifying individuals who work nonstandard hours. The second is the

child care literature, which focuses on identifying children and parents who participate in nonparental child care.

Shift work literature

A growing body of shift work literature is focused on identifying who works nonstandard hours. Presser and Ward (2011) trace characteristics of nonstandard hour workers over time. They find that between the ages of 18 and 39 almost 73 percent of workers report working nonstandard hours at some point. Men are 22 percentage points more likely to work a nonstandard hour schedule at any point, and those with some college or a bachelor's degree are almost 19 percentage points more likely than those with only a high school diploma to work nonstandard hours. These findings conflict with Täht's (2011) examination, who finds that men with less educational attainment are more likely to work nonstandard hours due to pay differences.

Wight et al. (2008) and Mills and Täht (2010) conclude that parents in general are more likely to work nonstandard hours than non-parents, structuring schedules so that one parent works nonstandard hours while the other works standard hours in order to avoid using and paying for nonparental child care. Presser (1988, 1989, 2004) and Stoll et al. (2006) agree, finding that two-parent households use shift work as a solution to avoid using nonparental child care. Lehrer (1989) reports that all parents working nonstandard hours are less likely to use formal types of child care (e.g. center-based, nonrelative home-based), which Collins et al. (2002), Han (2004, 2005), and Kimmel and Powell (2006) confirm.

In stark contrast to this, Presser (2004) concludes that single mothers are more likely than couples to work nonstandard hours, with over a third of single mothers working any nonstandard hours; these numbers increase to 2 out of every 5 when restricted to those with children under the age of 5, and 3 out of 5 when restricted to low-income, single mothers with children under the age of 5. However, Presser (1986) and Sandstrom et al. (2012) report that single women often alter time-of-day work behaviors due to child care concerns, moving to standard hours when child care cannot be found.

McMenamin (2007) details changes in demographic characteristics of nonstandard hour workers, using data from the Work Schedule and Work at Home survey, a special supplement to the BLS' 2004 Current Population Survey. As previously noted, the BLS report shows that approximately 30 percent of workers engage in any nonstandard hours of work. McMenamin (2007) finds that those most likely to work nonstandard hours are: males, blacks, and those with less than a high school education. Only ten percent of workers employed during nonstandard-only hours report that their reason for working these hours are for better child care arrangements, while over half report that it is due to the "nature of the job."

Child care literature

A considerable amount of child care literature details the characteristics of child and parent participants. In general, authors agree that parents make child care choices along the following lines: race or ethnicity, child's age, income or poverty status, and parental educational attainment.

Several authors conclude that race and ethnicity of parents are associated with child care choice. Kreader et al. (2005) and Huston et al. (2002) find that black children are more likely than their white counterparts to participate in nonparental child care, especially in center-based care. Early and Burchinal (2001) find that this is true for Asian children as well. Conversely, Huston et al. (2002) and Fuller et al. (1996) both conclude that Hispanic children are more likely than all other children to use parental care than any other type of child care and are the least likely group to use center-based care.

Age of children is a predictable correlate with child care choice. Kreader et al. (2005) report that half of all children born in 2001 use some form of nonparental child care by 9 months of age. Huston et al. (2002) identify primary factors affecting child care choice, noting that households with children under the age of 5 are more likely to use center-based child care. Capizzano et al. (2000) conclude that infants and toddlers are more likely to be cared for by parents compared to 3 and 4 year-olds, who are more likely to use center-based care.

Parental income serves as a solid predictor of child care choice. Tang et al. (2012) concludes that low-income families have limited selection of child care providers due to geographic inaccessibility of care centers. Meyer and Jordan (2006) report that parental employment in higher-income positions is the single best predictor of participation in center-based care. Kreader et al. (2005) find that families with income below the federal poverty level are less likely to use nonparental child care. Collins et al. (2002) focus on child care subsidies, concluding that low-income families will use center-based care when subsidies exist that make them affordable. Henly and Lyons (2000) argue that low-

income mothers tend to seek child care that is affordable, safe, and convenient – most often nonrelative child care. Hofferth and Wissoker (1992) sees price as a critical barrier to center-based care entry, especially for mothers who are paid a low hourly wage.

Finally, several authors identify associations between parental educational attainment and child care choice. Huston et al. (2002) note that adults with more education and skill training are more likely to use center-based care than their counterparts. Hofferth (1999) finds a trend across all working mothers to seek-out more formal, reliable child care such as center-based and nonrelative care. This trend is especially prominent for mothers in professions that required more training and educational attainment.

Based on these two literatures, there are some hypotheses that can be specified. Given the current trajectory of shift work findings, high-skilled men appear the most likely group to work nonstandard hours. If these men are doing so as part of a plan with their spouse or partner to avoid child care costs, then they will not participate in nonstandard child care. Single women are another group likely to work nonstandard hours, as long as child care is available, and would by default be participating in nonstandard child care. In addition, child care literature suggests controls should include: race/ethnicity of child and parent, age of child, poverty status of family, and parental educational attainment. These factors have been shown to be highly suggestive of child care choice in general, if not specifically during nonstandard hours.

Data Source and Classification Mechanism

Data source

Data for this paper come from the 1999 and 2002 waves of the National Survey of America's Families (NSAF).[9] The NSAF is a cross-sectional survey which was initially conducted in 1997.[10] Additional waves followed in 1999 and 2002.[11] The purpose of the survey is to collect information on the economic, physical, and social well-being of adults under the age of 65, and their children, who reside in the United States. While the survey oversamples those residing in households with incomes below 200 percent of the federal poverty threshold, the survey is representative of the non-institutionalized, civilian population in the US. Moreover, thirteen states which account for over half of the US population are oversampled.[12] Information is collected on up to two randomly selected focal children in three specific age ranges: ages 0 to 5, ages 6 to 11, and ages 12 to 17. The data used here are drawn primarily from the NSAF's focal child file. This file contains information on children's child care participation, for children between the ages of 0 and 12, and demographic characteristics of the child and family.

[9] There are implications associated with using data collected this long ago. Primarily, more current data suggests that a growing percentage of workers are employed during nonstandard hours. However, this data does not reveal the parental status of workers or allow me to identify children participating in nonstandard child care.

[10] Although this was the first wave of the NSAF to be collected, the 1997 wave will not be used in this analysis due to the lack of collection of child care data during this initial wave.

[11] Wave one of the NSAF was conducted from January to November of 1997, sampling over 44,000 households and recording information on over 100,000 individuals. Wave two was conducted from February to October of 1999 and sampled over 40,000 households and recorded information on over 100,000 individuals. Wave three was conducted from February to October of 2002 and sampled almost 40,000 households and recorded information on just over 100,000 individuals.

[12] Alabama, California, Colorado, Florida, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, New York, Texas, Washington, and Wisconsin.

The baseline sample from the 1999 and 2002 waves includes 70,270 children, the unit of analysis for this descriptive analysis, between the ages of 0 to 17. Child care information was only collected on children between the ages 0 to 12. Since this is a necessary measure for my classification mechanism, I constrain the sample to children within this age range, leaving the analysis sample at 50,910 children. *Table 1* provides summary statistics for the analysis sample of NSAF children and their households. Approximately 65 percent of children's parents report being employed, with over 18 percent of those parents employed during nonstandard hours.[13] This percentage remains relatively constant across the two years of the survey.

Classification mechanism

Participation in nonstandard child care is not directly observed in the NSAF. For this reason a classification mechanism must be constructed. Due to the importance of this mechanism, the construction of the indicator for participation in nonstandard child care deserves attention. Since this paper is the first to identify children who participate in nonstandard child care, there is no previous literature to guide this classification process. While many surveys gather data about employment, few ask questions about the time of day during which adults are employed. The NSAF collects rich information on both parents and their children. Notably, the NSAF asks questions about parental work

[13] While this number is dramatically deviates from the 30 percent that McMenamin (2007) reports, there are any number of reasons to explain the difference. One, there are between 5 and 2 years have passed between when the NSAF and the BLS data collection were completed and employment during nonstandard hours may have altered. Two, differences in the way that each of the survey's posited the question of nonstandard-hour work may have elicited varying responses. Three, the oversampling of specific groups by the NSAF may have served to oversample groups that tend not to work nonstandard hours, thus decreasing the reported ratio of nonstandard hour workers to the overall sample.

schedules, specifically asking, “Do you mostly work between 6a.m. and 6 p.m.?” Few surveys additionally collect information about primary child care use during employment, the concurrence of which allows me to construct a classification mechanism. Due to the combination of employment and child care questions, the NSAF is uniquely suited for this current research.

Children will be classified as participating in nonstandard child care if a number of qualifications are met: (1) the parental respondent(s) reports mostly working outside of the hours of 6am to 6pm, (2) the child’s primary source of child care while the parent is at work, looking for work, or in school is nonrelative care, relative out-of-home care, or center-based care, (3) that the parent works for as many or more hours as the child participates in care, and (4) if there is no spouse in the household, the parental respondent does not live with another adult who may potentially be caring for the child while the parent works. The third assumption is used initially to strictly define ‘participation’ and will be eased later in the paper as a robustness check. *Figure 1* illustrates the survey items used to identify parents who concurrently (1) work nonstandard hours, (2) use nonparental child care to care for their children while they work, and (3) have no other adult present in the household to care for their child.

The first variable used in the construction of the classification mechanism is the parental nonstandard-hour work variable. This variable is constructed from a survey question that queries whether the parent, “Usually works between the hours of 6am to 6pm.” If the answer is no, then the parent is determined to be working nonstandard hours for the purposes of this analysis. The second variable used in the construction of the

classification mechanism is the primary child care variable.[14] This variable is pre-generated from several survey questions that assess the number of child care providers that the child participates in during the week while the parent works, looks for work, or is in school and the number of hours during that week that the child spends with each provider. An aggregated count is then completed where one provider is designated as the primary provider. The third variable considers whether another adult lives in the home that could be providing care for the child while the parent works nonstandard hours. If it is another parent, then they also are asked if they work outside of the hours of 6am to 6pm; if it is not another parent then the child must be excluded as a participant. If a child meets all qualifications – has a parent who works nonstandard hours, uses nonparental child care as a primary source of care while the parent works, and no other adult lives in the home who can care for them during nonstandard hours – then the child is classified as participating in nonstandard child care.

Once the classification mechanism is constructed and the participant group is identified then several reference groups can be constructed. *Figure 2* illustrates the mechanisms for classifying a child as participating in nonstandard child care or as belonging to one of the four reference groups. *Participates* is always equal to one when the previously discussed qualifications are met. *Participates* is set equal to zero when

[14] Two separate primary child care variables come pre-generated in this dataset. The first is 'Primary child care – FC' where the child's primary child care is calculated based solely on the total number of hours the child participates in each arrangement. The second, 'Primary child care – MKA works' is calculated based on the arrangement that the child spends the most time at while the parent is at work. The correlation between these two variables is high, 0.918, suggesting that children have relative stability in their child care provider regardless of parental employment. It is worth noting, however, that this stability is higher for those in Reference groups 3 and 4, whose correlation coefficients for the two primary child care variables are 0.947 and 0.991, respectively. Participants' correlation coefficient is parallel to the overall unrestricted sample.

children are identified as belonging to one of the reference groups. Since there are four separate reference groups, it is necessary to make four versions of the participant indicator. $Participates_1$ equals zero for Nonparticipants – all other children ages 0 to 12 in the sample who are not participants. This reference group will be the primary group used in the comparative analyses. One policy-relevant sub-group are those children whose parents are employed. For this second reference group, children between the ages 0 to 12 whose parents are employed and who are not participants, $Participates_2$ equals zero and they will be labeled the Employed Nonparticipants (ENP) group. A second policy-relevant sub-group are those children who use standard hours of nonparental child care while their parents work. For this third reference group, children between the ages 0 to 12 whose parents are employed and use nonparental care during daytime (standard) hours, $Participates_3$ equals zero and they will be labeled the Standard Shift and Nonparental Care (SaNP) group. A final policy-relevant sub-group are those children with one parent who works nonstandard hours while the other parent provides child care. For this forth reference group, children between the ages 0 to 12 whose parents work nonstandard hours and use parental child care during these hours, $Participates_4$ equals zero and they will be labeled the Nonstandard Shift and Parental Care (NSaP) group.

One drawback with using the NSAF to identify participants in nonstandard child care is that the survey neither records children's times of entry into or exit out of child care, nor is the hour when parents start or end a work shift known. For this reason, it is possible to identify *likely* nonstandard child care participants. In addition, it may also be the case that some parents use nonstandard child care for reasons other than working (e.g. schooling, errands, or personal time). The NSAF does not directly question respondents

about use of nonstandard child care in general, so these individuals would not be recognized as using nonstandard child care within this framework.[15]

Results

To lay the groundwork for the multivariate analyses, this section will begin by presenting the descriptive statistics for groups of children based on nonstandard child care participation classification, as described above. Descriptive statistics include the following: total count of child-observations in each of the participant and reference groups (Nonparticipants, ENP, SaNP, NSaP), means for child and parent characteristics in each of the participant and reference groups, and (when applicable) statistical significance from two-sample t-tests weighing the difference of the means across participant and reference groups. Finally, I perform multivariate analyses which estimate likelihoods of nonstandard child care participation given a specified matrix of child and parental characteristics.

Who participates in nonstandard child care?

Table 2 provides information regarding the distribution of demographic and child care characteristics for children who have been classified as participating in nonstandard child care. Two-sample t-tests weigh the differences in means between children who participate in nonstandard child care as compared to each of the four reference groups. Mean value differences from *Table* 2 illustrate a number of trends. Children who participate in nonstandard child care are more likely than children in the four reference

[15] The number of individuals this may exclude is unknown. Research suggests that most mothers (78 percent) use nonparental child care for employment-related reasons, as measured when the child is 3-years of age (Brooks-Gunn et al., 2002).

groups to be younger, more likely to identify as black, enrolled in more weekly child care arrangements, during more weekly hours of child care, and more likely to use specific types of child care as their general primary child care arrangement (relative-out-of-home or nonrelative care). These findings suggest that parents who work nonstandard hours find it difficult to arrange consistent child care services and therefore must shuffle children between multiple arrangements to fill the time that they are at work between relatives and other more formal arrangements. However, Head Start is a child care arrangement that is not typically available during evening and overnight hours; if Head Start is the child's primary general arrangement then they must also be attending additional arrangements during the nonstandard hours that their parents work.

Table 3 provides information regarding the distribution of demographic, educational, and employment characteristics for parents of children who have been classified as participating in nonstandard child care. Children who participate in nonstandard child care are more likely than children across the four reference groups to have parents who are younger, more likely to identify as black, more likely to have completed some college but less likely to have earned a bachelor's degree, more likely to work two or more jobs, less likely to have income that falls below two times the Federal Poverty Level, and more likely to fall into marital categories where there is no other spouse in the home (separated, divorced, and never married). These findings, coupled with those from *Table 2*, suggest that many parents who use nonstandard child care are single heads-of-household and are holding two jobs in that capacity. One position may be during normal daytime 'standard' hours while the other is not, thus the need for multiple child care arrangements that fall outside the time of 6am to 6pm. Such an explanation

could account for increased use of Head Start for this population of children as the daytime child care arrangement, with the parent then shuttling the child between other arrangements afterward to fill the remainder of the hours.

To test these employment assumptions, I take advantage of the occupation data retained in the NSAF. Occupation data in the NSAF is collected on parents of focal children and reported across the 14 major occupation codes, as reported in the U.S. Census. I further aggregate these into six group-way groupings, following Schmidt and Strauss (1975) and later Congressional Budget Office (2007) groupings. The summaries for these occupations can be found across participant and reference groups in *Table 4*. Parents who work nonstandard hours, regardless of parental or nonparental child care use, are more likely to work in Service occupations, a finding that is unsurprising given previous discussions of parental skill and income. Parents of participants are particularly less likely than all other reference groups to work in Technical/Sales/Clerical occupations. To further test the veracity of these occupation differences, occupation data will be included in the multivariate analyses.

How do nonstandard child care participants compare to nonparticipants?

To augment the simple descriptive statistics, probit regression analysis is performed in the following section. Separate regressions will be run restricting the sample to mirror the four reference groups previously described. Equation (1) is shown as follows:

$$\text{Equation 1: } Participates_{ist} = \beta_1 Characteristic_{ist} + \mathbf{\Phi}_s + \eta_t + \varepsilon_{ist},$$

where *i* indexes individuals, *s* indexes state of residence, and *t* indexes wave. The variable *Characteristic* represents various demographic, employment, and economic characteristics for the child and parent. These include: gender, race and ethnicity, marital status of primary parent, education attainment of primary parent, type of care used during parental work hours, number of weekly child care arrangements, number of weekly hours child is in child care, placement on federal poverty scale, current employment, number of jobs, and hourly rate of pay. *Participates* is equal to one when the classification mechanism has indicated that the child participates in nonstandard child care, and zero if the child is assigned to one of the four reference groups. The coefficient of interest is β_1 which can be interpreted as how participation in nonstandard child care is associated with various child or parental demographic, employment, and economic characteristics. By regressing the *Participates* variable onto the matrix of child and parental characteristics I will estimate the likelihood of individuals with that characteristic being classified as a participant. $\mathbf{\Phi}$ represents state fixed effects and η represents wave dummy variables.[16] Standard errors are adjusted for household-level clustering.[17]

Model 1 examines nonstandard child care participation among all households with children ages 0 to 12. This model will serve as the primary model to observe differences between participants and an unrestricted sample of nonparticipants. Models 2, 3, and 4 narrow the examination to policy-relevant sub-groups: households with children ages 0 to

[16] In this analysis I have stacked two waves of the NSAF to create my sample. For this reason, I am including state and wave dummy variables to eliminate potential bias caused by comparing participant and nonparticipant children across states and time.

[17] The NSAF collects information on all resident children under the age of 18 in any household. Potentially, multiple children from one household could be represented in one group or across groups. To mitigate bias in the coefficients I control for household membership by clustering standard errors at the household level.

12 with a parental respondent who is employed, parents who are employed and use nonparental child care (during either standard or nonstandard hours), and parents who are employed during nonstandard hours and use parental or nonparental child care. Using four models, whose sample restrictions simulate the classification mechanisms of the participant and reference groups previously outlined, allows me to compare multiple groups of nonparticipants to uniquely-defined participants.

Discussion of descriptive and multivariate results

Given that no previous research has identified children who participate in nonstandard child care, it is useful to (1) allow this group to be defined as broadly as possible, devoting the bulk of the results discussion to comparing participants to the unrestricted sample of nonparticipants and (2) to reserve the remainder of the discussion for identifying significant changes that occur in associations between *Participates* and the covariates as the reference group of nonparticipants becomes more narrowly defined.

Table 5 contains the marginal probability effects from the probit regression results from Equation 1 using all four models. Model 1 is the focus of this discussion and estimates participation from an unrestricted sample of children. This model allows me to compare participant children to the broadest sample of nonparticipants – all other children who are not strictly classified as participating in nonstandard child care. Significant differences appear across virtually all covariates in this model.

Children's age is highly statistically significant, where for each additional year of age a child is .8 percentage points more likely to participate in nonstandard child care. However, this relationship is not linear in nature, as indicated by the negative coefficient reported by the age-squared variable. *Figure 3* displays the distribution, by single year of

age, of nonparental child care participation across the participants and nonparticipant groups. As shown, there is a nonlinear decline in likelihood of participation as the child ages. Understanding how children participate in nonstandard child care over time is not feasible given the current cross-sectional data, but is a relationship which should be further explored.

Marital status, gender, and race/ethnicity of the primary caregiving parent are highly correlated with participation in nonstandard child care. Unsurprisingly, parents who are separated, divorced, or never married are more likely than their married counterparts to select nonstandard child care. Female parents are 1.8 percentage points less likely to use nonstandard child care than their male counterparts. Black parents are 1.4 percentage points more likely to use nonstandard child care than their white counterparts. None of these findings are surprising given that McMenamin (2007) reported that these groups were more likely to work nonstandard hours overall, regardless of parental status.

However, McMenamin (2007) also reported that workers with less-than a high school education were more likely to be employed during nonstandard hours; findings reported here indicate that parents with a high school education are .8 percentage points more likely to use nonstandard child care than their lower-skilled counterparts. Moreover, parents with some college are 1.5 percentage points more likely to use nonstandard child care than parents with less-than a high school education. There are several potential reasons for the disconnection in lower-skilled nonstandard-hour workers not selecting nonstandard child care. First, it could be the case that lower-skilled workers are also

younger and therefore less likely to have children to enroll in child care. In results not shown, I include interactions between education achievement and age of parents. The coefficients on these interactions indicate no relationship between the age and skill of the worker that correlate with selection of nonstandard child care. Second, it could be the case that medium-skilled workers are paid higher wages than their lower-skilled counterparts who are employed during nonstandard hours and can therefore afford different child care options. Child care literature suggests that lower-wage parents have to piece together child care, using more arrangements for smaller batches of time. In results not shown, I loosen the hours restriction on classifying participants, allowing parents who use nonstandard child care for fewer hours in the day than they work to be classified as participants. Those parents with some college remain more likely to select nonstandard child care and do so by 1.6 percentage points. However, results indicate that there is no longer any difference in likelihood of nonstandard child care use across less-than-high-school and high-school educated parents. This finding indicates that low-skilled parents do select nonstandard child care but use this care for far fewer hours than their counterparts with a high school degree, suggesting that cost of care is a barrier to use.

If cost is a barrier to use then family income should be a strong correlate of children participating in nonstandard child care, and results indicate that it is. For every additional $10,000 increase in family income children are .3 percentage points more likely to participate in nonstandard child care. Given that the average monthly cost of care reported for participants is $252 ($3,024 annually), the magnitude of additional income associated with selecting nonstandard child care appears disproportionate. A potential explanation for this relationship rests with single parents' propensity for

working nonstandard hours, as Presser (2004) concludes. Nonstandard-hour workers frequently receive "shift differentials," or higher wages for working less desirable nonstandard hours, a benefit that McMenamin (2007) reports accounts for upwards of 10% of employees' decisions to work nonstandard hours. It may be the case that some single parents are selecting nonstandard work schedules in order to secure higher wages, and as a result must also turn to nonstandard child care to look after their children while they work. In this scenario, higher incomes and selection of nonstandard child care would be highly correlated, but not causally related and therefore appear disproportionate.

It may also be the case that parents employed in certain occupations are more likely than those employed in other occupations to select nonstandard child care. In *Table 6*, I show results incorporating occupation covariates into Equation 1 for Models 1 through 4, using Service sector occupations as the reference group. I find that parents in Managerial/Professional and Technical/Sales/Clerical occupations are 4 percentage points less likely, parents in Production/Craft/Repair occupations are 3.3 percentage points less likely, and parents in Farming/Forestry/Fishing occupations are 9.4 percentage points less likely to use nonstandard child care than those in Service occupations. However, parents working in Operators/Fabricators/Laborers occupations are as likely to use nonstandard child care as those in Service occupations. These findings are in line with McMenamin's (2007), where 37% of all employees in Service occupations work nonstandard hours, compared to 9% for Management/Professional, 16% for Technical/Sales/Clerical, and 10% for Farming/Forestry/Fishing. While it is difficult to compare the other occupation categories due to Census reclassifications, McMenamin reports that 26% of workers in Production/Transportation/Material-moving occupations

report working nonstandard hours. This is an area that requires further consideration. McMenamin finds that 48% of employees in nonstandard-hour positions reported that they worked these hours due to the "nature of the job" (p. 11). Anecdotal evidence from popular media suggests that more industries are moving toward a "shift employment" model. If this is the case, certain occupations will fit this model of work more than others. Identifying those occupations will provide insight about child care demand.

Discussion of findings for policy-relevant sub-groups

Turning the attention to policy-relevant sub-groups, I will start by examining changes from Model 1 to Model 2. Primarily, results indicate that gender of parent, educational attainment, and family income are no longer correlated with children participating in nonstandard child care. Looking to the descriptive statistics in *Table 3* I find that sample restrictions for the ENP group, children whose parents are employed, indicate that the values here shrink accordingly as compared to children in the full sample of nonparticipants. It is not surprising that restricting nonparticipants to children with employed parents would make them look more like participants – employment during nonstandard hours is the primary classification mechanism for determining if a child *Participates*. The covariates which transformed are also not surprising since (1) those are the variables associated with groups more likely to be employed – higher-skilled males, and (2) when parents are employed families would report higher incomes than unemployed families. Interestingly, the matching-up of the covariates does not explain the change in family income. While not statistically significant, the point estimate on family income becomes negative in Model 2, indicating that decreases in family income

are associated with children participating in nonstandard child care. From a policy perspective this a concern if lower-wage, lower-skilled parents are disproportionately employed in nonstandard-hour positions and face additional child care obstacles. In combination, this not only creates employment barriers but also pose potential well-being risks for their children when quality, reliable care is not available.

Changes from Model 1 to Model 3 are striking. Model 3 estimates participation in nonstandard child care, but restricts the sample to children whose parents are employed and use nonparental child care to care for their children while they work. This sample of children would be treated as homogenous in child care literature. Parental education coefficients reverse in sign and increase in magnitude, revealing that higher-skilled parents are between 3.3 to 7.9 percentage points less likely than their lower-skilled counter parts to select nonstandard child care. Also, as parents age they are less likely to select nonstandard child care. These findings are important from a policy perspective because they highlight that a sample of children normally treated as homogenous when evaluating policy and program treatments in child care literature are statistically dissimilar. Failing to account for time-of-use when modeling relationships between child care participation and various outcomes may lead to inaccurate policy recommendations.

Model 4 estimates reveal a reinforced return to Model 1 estimates. Model 4 estimates participation in nonstandard child care, restricting the sample to any children who have at least one parent working nonstandard hours. This sample of children would be treated as homogenous in shift work literature. For each additional year of age children are 4.6 percentage points more likely to participate; black parents are 9.2 percentage points more likely to select nonstandard care than white parents; parents with

a high school to bachelor's degree are between 4.9 to 11.5 percentage points more likely to select nonstandard child care than those parents with no degree; non-married parents are at least 14 percentage points more likely to select nonstandard child care; and for every additional $10,000 in family income children are 2.4 percentage points more likely to participate in nonstandard child care. Changes in occupation estimates in *Table 6* indicate that Managers/Professionals employed in nonstandard-hour positions are 5 percentage points more likely to select nonstandard child care than parents who hold Service occupations. If previous findings shown in shift work literature were to hold true, expectations would be that this is a fairly homogenous groups of parents who self-select into nonstandard-hour positions in order to avoid using nonparental child care. While this is the case for some, it also appears to be the case that an almost equal number of highly-skilled, high-wage, professionally employed parents are working nonstandard hours and using nonstandard child care, a group which shift work literature has yet to have delineated. This is problematic from a policy perspective because policy and program recommendations coming from shift work literature have not distinguished how these two groups of parents and children are differentially affected by working nonstandard-hour shifts.

Robustness check

In an effort to check the robustness of these findings, I perform some additional checks to ensure that the results I find are not manifestations of a narrowly defined group of participants. In results not shown, I alter the classification mechanism by easing the restriction requiring that parents work at least as many hours as the child is placed in

nonstandard child care. This increases the number of participants by 352 (N=2,392) but leaves the results qualitatively similar to those previously estimated.

Conclusion and Policy Implications

This paper is the first to identify children who participate in, and parents who use, nonstandard child care. Despite extensive shift work literature which has detailed characteristics of workers who are employed during nonstandard hours, few have identified how parents care for their children during nonstandard hours of work. While research in child care literature has distinguished between children who participate in nonparental versus parental child care, this research has failed to consider *when* children participate in care. Therefore, the findings presented here are the first to jointly consider when children participate in nonparental child care and how children are cared for when their parents work nonstandard hours.

Results from the multivariate analyses reveal distinct differences between participants and nonparticipants, dependent on the reference group identified. Using the broadest group of nonparticipants as a reference group, I find that children who participate in nonstandard child care are more likely to be older and to reside with a higher-skilled, higher-income, single, black, male parent who acts as a primary caregiver. Policy-relevant sub-groups are identified and estimates from these models suggest that previous conclusions from child care and shift work literature, which does not account for participation in nonstandard child care, is missing differences in samples of children that may strain the efficacy of past policy recommendations.

Numerous policy implications are raised by findings presented here. Given that children who participate in nonstandard child care are older than those who typically participate in standard hours of nonparental child care, it may be necessary for child care providers who care for these children to offer different services during the evenings and overnight. Older children require assistance with homework and one-on-one engagement with school work which is historically provided by a parent. Child care providers may need inducement to change what services are offered and when they are offered to meet the needs of these children who participate in evening and overnight care. Sleeping conditions may also need to be monitored to ensure that children are in an environment which is conducive to establishing and maintaining proper rest cycles. If children aged five to twelve attend school during the day and nonparental child care in the evenings or overnight, it is likely that little communication occurs between children and parents. It may also be necessary to encourage nonstandard child care providers to establish improved communication with parents so that early signs of cognitive, behavioral, or physical developmental issues can be identified and addressed early on.

While requiring changes to nonstandard child care providers could be effectively performed by state-level agencies who oversee child care facility licensure, increasing requirements may also cause some providers to find it is no longer in their interest to offer services during nonstandard hours. It may also be the case that too few providers offer services to meet the demand of parents. To counter this, employers who choose to employ workers during evening and overnight hours could be required to offer additional benefits to workers who are employed during these shifts, including a form of child care subsidy, which would be paid to facilities to ensure new standards are put in place that

meet the needs of children who use the services. Alternatively, federal minimum wage guidelines could require a differential wage for those working second and third shift positions which would buffer against child care providers who set increased rates for offering mandated enhanced services. Or, as Tekin (2007) has previously suggested, state agencies could alter child care subsidy allocation mechanisms to ensure that accepting providers offer facilities which meet the demands of nonstandard-hour workers.

The findings presented here offer an important and unique first look at children who participate in, and parents who use, nonstandard child care; however, there are some limitations to the current research. While the NSAF does ask questions of parental work shift and child care use during work hours, this is not a substitute for an indicator of nonstandard child care use. Future research should collect information on known users of nonstandard child care. In addition, occupation data used in the NSAF is less than detailed. McMenamin's (2007) outlines workers' responses for why they work nonstandard hours, reasons that could allow for a causal understanding of the relationship between nonstandard employment and child care. Shift work literature frequently eludes to that it is unknown if parents choose to work nonstandard hours and fit child care needs around those hours or choose to avoid nonparental child care and therefore work nonstandard hours to meet this preference. More detailed and longitudinal occupation data would allow a causal direction to be established. Another limitation to the NSAF is that it is a cross-sectional survey of children and provides no insight into how parents and children interact with nonstandard child care over time. Future work should attempt to analyze how children's participation in nonstandard child care alters over time and identify patterns and duration of participation. Finally, the NSAF data, while helpful in

asking questions of daytime or non-daytime work, did not distinguish between parents who work evening or overnight hours. It may be that children, and parents, who participate in nonstandard child care between the hours of 2pm to midnight (evening hours) differ dramatically form those who participate between 9pm to 8am (overnight hours). Future work should consider differences between these groups of children who participate in nonstandard child care.

Beyond limitations of the data and this current research, there are additional questions which should be the focus of future research that ties into evaluations from the shift work and child care literatures. Both child care and shift work literatures have assumed nonstandard child care participants are homogenous with some other group of children: nonparental child care participants and children whose parents work nonstandard hours and use parental care, respectively. However, I find that this assumption does not hold when I evaluate sub-group differences in children's demographic, household economic, and child care characteristics. Both child care and shift work literatures have used this assumption of homogeneity beyond analyses that assess the demographic features of children and their families – research considering child outcomes comprises a growing segment of both bodies of research. Additionally, little is known about how parents who use nonstandard child care select child care, and even less is known about how fathers select nonparental child care. Do parents seeking nonstandard care look for similar child care qualities as parents seeking standard child care? What obstacles, if any, hinder their ability to select child care of choice (e.g. lack of provider access during hours)? Do fathers gauge quality differently than mothers? Do they use formal or informal methods to find providers? Finally, while a significant

amount of research in the child care field has been dedicated to exploring the association between child care participation and child well-being, future work should control for the time of day during which care is used.

Appendix: Tables and Figures

Table 1: Summary Statistics for Children under 13 and Their Households in the NSAF

Variable	Range	All Children (N = 50,910)	1999 Children (N = 25,929)	2002 Children (N = 24,989)
Employment characteristics (%)				
Employed	0 – 1	0.647 (0.478)	0.659 (0.474)	0.636 (0.481)
Work nonstandard shift	0 – 1	0.187 (0.390)	0.199 (0.399)	0.176 (0.381)
2 or more jobs	0 – 1	0.062 (0.240)	0.058 (0.234)	0.065 (0.247)
Age of child (years)	0 – 12	5.863 (3.642)	6.130 (3.677)	6.120 (3.740)
Age of parent respondent (years)	15 – 65	34.863 (7.886)	34.597 (7.734)	35.128 (8.027)
Female child (%)	0 – 1	0.488 (0.500)	0.489 (0.500)	0.487 (0.500)
Female parent respondent (%)	0 – 1	0.819 (0.385)	0.829 (0.377)	0.829 (0.377)
Parent respondent's race / ethnicity (%)				
White	0 – 1	0.633 (0.482)	0.638 (0.481)	0.628 (0.483)
Black	0 – 1	0.155 (0.362)	0.158 (0.365)	0.153 (0.360)
Hispanic	0 – 1	0.161 (0.367)	0.152 (0.359)	0.170 (0.376)
Other	0 – 1	0.049 (0.215)	0.049 (0.216)	0.049 (0.215)
Parent respondent's education (%)				
Less than High School	0 – 1	0.135 (0.341)	0.137 (0.344)	0.132 (0.339)
High School	0 – 1	0.427 (0.494)	0.440 (0.496)	0.415 (0.493)
Some College	0 – 1	0.166 (0.372)	0.169 (0.375)	0.163 (0.369)
Bachelor's Degree	0 – 1	0.270 (0.444)	0.252 (0.434)	0.288 (0.453)
Parent respondent's marital status (%)				
Married, spouse present	0 – 1	0.704 (0.457)	0.699 (0.459)	0.709 (0.454)
Separated	0 – 1	0.053 (0.224)	0.059 (0.236)	0.047 (0.211)
Divorced	0 – 1	0.093 (0.291)	0.096 (0.295)	0.091 (0.288)
Widowed	0 – 1	0.011 (0.102)	0.010 (0.102)	0.011 (0.102)
Never married	0 – 1	0.138 (0.345)	0.135 (0.341)	0.142 (0.349)
Child care characteristics				
Weekly arrangements (#)	0 – 5	0.760 (0.802)	0.772 (0.801)	0.748 (0.803)
Hours per week (#)	0 – 168	12.066 (18.089)	12.271 (18.111)	11.858 (18.066)
Monthly expense ($)	1 – 5000	295.716 (327.396)	--	295.716 (327.396)
Paying for care (%)	0 – 1	0.889 (0.313)	--	0.889 (0.313)
Expense-to-income (%)	0.008 – 0.88	0.091 (0.236)	--	0.091 (0.236)
Primary child care [not restricted to parental work hours] (%)				
Center care	0 – 1	0.106 (0.308)	0.107 (0.309)	0.105 (0.307)
Before/after school care	0 – 1	0.080 (0.272)	0.077 (0.267)	0.084 (0.277)
Relative care	0 – 1	0.220 (0.415)	0.227 (0.419)	0.214 (0.410)
Nonrelative care	0 – 1	0.115 (0.319)	0.115 (0.319)	0.114 (0.318)
Head Start	0 – 1	0.017 (0.130)	0.018 (0.133)	0.017 (0.127)
Self-care	0 – 1	0.052 (0.222)	0.051 (0.219)	0.054 (0.226)
Parent care	0 – 1	0.390 (0.488)	0.382 (0.485)	0.398 (0.490)
Federal Poverty Level (%)				
Below FPL	0 – 1	0.168 (0.374)	0.177 (0.382)	0.159 (0.365)
Below 2x FPL	0 – 1	0.398 (0.490)	0.417 (0.493)	0.380 (0.485)
Below 4x FPL	0 – 1	0.596 (0.491)	0.615 (0.487)	0.577 (0.494)
Family income ($)	0 – 338,000	54,734 (42,442)	51,657 (39,410)	57,929 (45,157)

Note: Calculations from the 1999 and 2002 NSAF, except child care cost, which is drawn solely from the 2002 NSAF. Primary child care totals exclude relative in-home care and are calculated based on total hours spent across all child care arrangements throughout the week, regardless of if the child was in the care setting during parental work hours of not. Standard deviations are in parentheses. All figures are weighted using the appropriate NSAF weight.

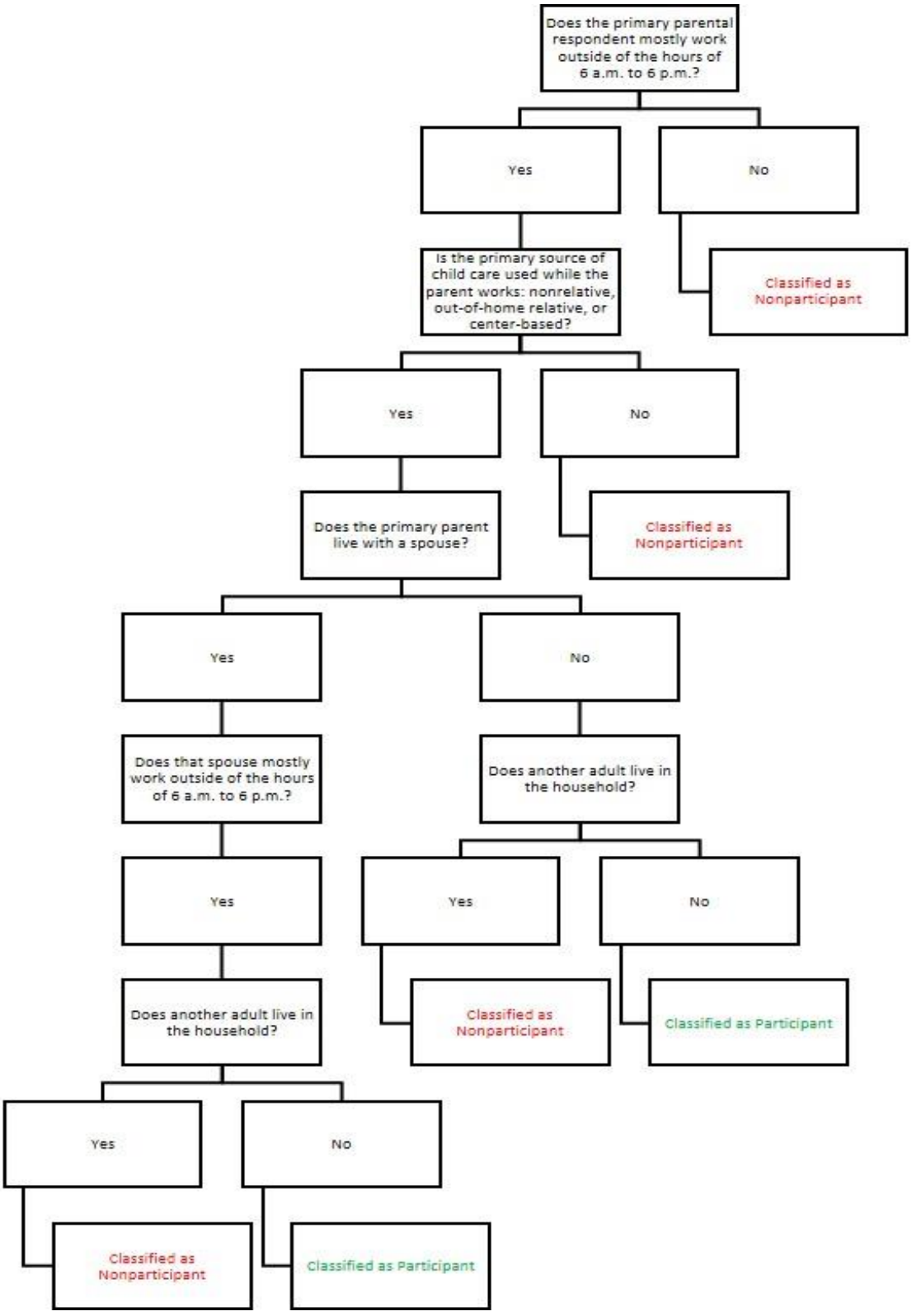


Figure 1: NSAF Classification Schema

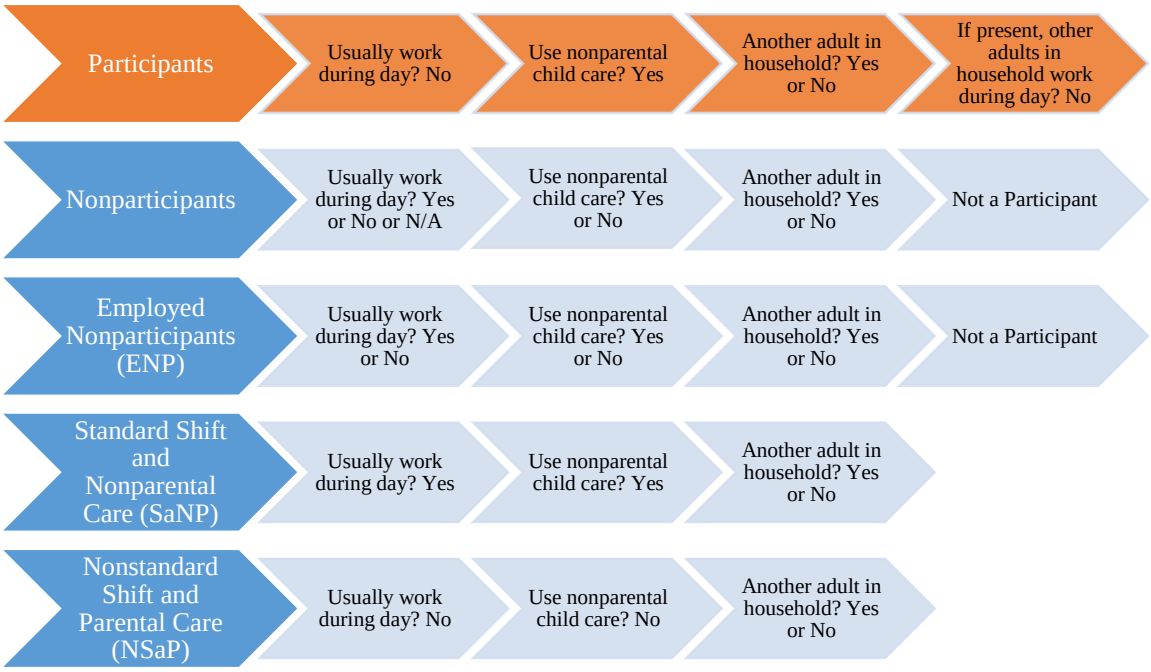


Figure 2: Classification of Participant and Reference Groups

Table 2: Demographic Characteristics for Participants and Nonparticipants

Variable	Participants (N=2,040)	Nonparticipants (N=48,870)	ENP (N=32,147)	SaNP (N=14,129)	NSaP (N=2,626)
Age of child (years)	5.296	6.158	6.477	5.425	6.379
	(3.313)	(3.720)***	(3.691)***	(3.295)*	(3.831)***
Female child (%)	0.525	0.487	0.483	0.477	0.469
	(0.500)	(0.500)	(0.500)	(0.500)	(0.500)
Child's race / ethnicity (%)					
White	0.563	0.608	0.625	0.630	0.570
	(0.496)	(0.488)***	(0.484)***	(0.483)***	(0.495)**
Black	0.246	0.158	0.159	0.183	0.126
	(0.431)	(0.365)***	(0.365)***	(0.387)***	(0.332)***
Hispanic	0.148	0.181	0.161	0.139	0.235
	(0.355)	(0.385)	(0.367)**	(0.345)***	(0.424)***
Other	0.043	0.052	0.056	0.048	0.069
	(0.204)	(0.223)	(0.230)	(0.215)	(0.253)***
Child care characteristics					
Weekly arrangements (#)	1.453	0.733	0.861	1.387	0.213
	(0.650)	(0.795)***	(0.807)***	(0.607)***	(0.498)***
Hours per week (#)	27.190	11.469	14.767	26.207	2.143
	(20.738)	(17.714)***	(19.216)***	(19.403)*	(8.032)***
Monthly expense ($)	252.216	303.990	314.465	340.396	206.890
	(243.695)	(319.344)***	(324.127)***	(347.183)***	(205.989)
Paying for care (%)	0.871	0.898	0.901	0.914	-
	(0.312)	(0.303)	(0.299)	(0.281)*	
Expense-to-income (%)	0.130	0.083	0.080	0.083	0.070
	(0.049)	(0.015)*	(0.013)***	(0.014)**	(0.009)
Primary child care [not restricted to parental work hours] (%)					
Center care	0.219	0.102	0.109	0.241	0.045
	(0.413)	(0.302)***	(0.312)***	(0.428)***	(0.208)***
Before/after school care	0.127	0.079	0.102	0.232	0.014
	(0.333)	(0.269)***	(0.303)	(0.422)***	(0.117)***
Relative care	0.315	0.217	0.249	0.219	0.073
	(0.465)	(0.412)***	(0.432)***	(0.414)***	(0.261)***
Nonrelative care	0.291	0.108	0.132	0.281	0.035
	(0.465)	(0.310)***	(0.339)***	(0.449)**	(0.183)***
Head Start	0.043	0.016	0.012	0.026	0.005
	(0.202)	(0.126)***	(0.108)***	(0.158)***	(0.073)***
Self-care	0.004	0.054	0.068	0.001	0.018
	(0.060)	(0.226)***	(0.252)***	(0.033)	(0.131)***
Parent care	0	0.405	0.306	0	0.810
		(0.491)***	(0.461)***		(0.393)***

Note: Calculations from the 1999 and 2002 NSAF. All figures are weighted using the appropriate NSAF weight. "Relative care" does not include in-home relative care. Data on child care cost are drawn solely from the 2002 NSAF. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 3: Economic Characteristics for Participants and Nonparticipants

Variable	Participants (N=2,040)	Nonparticipants (N=48,870)	ENP (N=32,147)	SaNP (N=14,129)	NSaP (N=2,626)
Employment characteristics (%)					
Employed	1	0.634 (0.482)***	1	1	1
Work nonstandard shift	1	0.138 (0.345)***	0.137 (0.344)***	0***	1
2 or more jobs	0.075	0.061	0.061	0.055	0.053
	(0.263)	(0.239)***	(0.239)***	(0.227)***	(0.223)*
Age of parent respondent (years)	33.141	34.930	35.477	34.452	35.030
	(7.239)	(7.903)***	(7.337)***	(7.198)***	(7.235)***
Female parent respondent (%)	0.751	0.822	0.748	0.787	0.701
	(0.432)	(0.383)***	(0.434)	(0.410)**	(0.446)***
Parent respondent's race / ethnicity (%)					
White	0.583	0.635	0.652	0.661	0.596
	(0.493)	(0.482)***	(0.476)***	(0.474)***	(0.491)**
Black	0.245	0.152	0.153	0.177	0.128
	(0.430)	(0.359)***	(0.360)***	(0.382)***	(0.335)***
Hispanic	0.127	0.162	0.141	0.116	0.209
	(0.333)	(0.369)	(0.348)*	(0.320)***	(0.407)***
Other	0.043	0.049	0.052	0.045	0.066
	(0.204)	(0.216)	(0.221)	(0.207)**	(0.248)**
Parent respondent's education (%)					
Less than High School	0.102	0.136	0.081	0.053	0.134
	(0.303)	(0.343)**	(0.272)***	(0.224)***	(0.341)***
High School	0.498	0.423	0.424	0.419	0.474
	(0.500)	(0.494)***	(0.494)***	(0.493)***	(0.499)
Some College	0.187	0.165	0.183	0.184	0.174
	(0.390)	(0.371)***	(0.386)***	(0.388)**	(0.379)***
Bachelor's Degree	0.213	0.272	0.311	0.341	0.215
	(0.409)	(0.445)***	(0.463)***	(0.474)***	(0.411)
Parent respondent's marital status (%)					
Married, spouse present	0.589	0.708	0.704	0.650	0.792
	(0.492)	(0.455)***	(0.456)***	(0.477)***	(0.406)***
Separated	0.080	0.050	0.049	0.054	0.038
	(0.272)	(0.219)***	(0.217)***	(0.226)***	(0.191)***
Divorced	0.110	0.093	0.112	0.140	0.065
	(0.313)	(0.290)***	(0.316)	(0.347)	(0.247)***
Widowed	0.008	0.011	0.007	0.006	0.009
	(0.088)	(0.102)***	(0.083)	(0.077)	(0.093)
Never married	0.216	0.135	0.126	0.151	0.095
	(0.412)	(0.342)***	(0.332)***	(0.358)***	(0.293)***
Federal Poverty Level (%)					
Below FPL	0.340	0.348	0.298	0.233	0.360
	(0.475)	(0.476)	(0.457)**	(0.423)***	(0.481)
Below 2x FPL	0.345	0.399	0.394	0.396	0.454
	(0.478)	(0.490)**	(0.489)*	(0.489)*	(0.500)**
Below 4x FPL	0.801	0.531	0.529	0.526	0.723
	(0.403)	(0.499)***	(0.500)***	(0.500)***	(0.451)
Family income ($)	51,682	54,862	59,765	61,926	51,855
	(39,312)	(42,564)***	(42,277)***	(44,281)***	(36,634)

Note: Calculations from the 1999 and 2002 NSAF. All figures are weighted using the appropriate NSAF weight. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 4: Occupation Summary Statistics for Participants and Reference Groups

Variable	Participants (N=2,028)	Nonparticipants (N=32,352)	ENP (N=32,054)	SaNP (N=14,089)	NSaP (N=2,600)
Six-way Groupings (%)					
Managerial & Professional	0.243	0.352	0.355	0.403	0.191
	(0.429)	(0.478)***	(0.479)***	(0.491)***	(0.393)***
Technicians, Sales, & Clerical	0.292	0.317	0.317	0.331	0.326
	(0.455)	(0.065)***	(0.465)***	(0.471)***	(0.469)***
Services	0.271	0.162	0.161	0.124	0.264
	(0.445)	(0.368)***	(0.367)***	(0.329)***	(0.441)
Production, Craft, & Repair	0.059	0.061	0.061	0.057	0.067
	(0.235)	(0.240)	(0.239)	(0.233)	(0.250)
Operators, Fabricators, & Laborers	0.130	0.088	0.088	0.071	0.136
	(0.336)	(0.284)***	(0.283)***	(0.257)***	(0.343)
Farming, Forestry, & Fishing	0.002	0.014	0.014	0.009	0.013
	(0.043)	(0.119)***	(0.117)***	(0.092)***	(0.115)***

Note: Calculations from the 1999 and 2002 NSAF. All figures are weighted using the appropriate NSAF weights. Major occupation codes are recorded as used in the U.S.Census. Occupation data is available on 66% of focal children's parents. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 5: Probit Results for Nonstandard Child Care Participation

Variable	***Model 1: All children***	***Model 2: Children with employed parents***	***Model 3: Children in nonparental child care***	***Model 4: Children whose parents work nonstandard hours***
Age of child (years)	0.008	0.010	0.004	0.046
	(0.001)***	(0.001)***	(0.003)	(0.007)***
Age of child, squared	-0.001	-0.001	-0.001	-0.006
	(0.000)***	(0.000)***	(0.000)*	(0.001)***
Age of parent respondent (years)	0.001	-0.002	-0.006	-0.006
	(0.001)	(0.001)	(0.003)**	(0.006)
Age of parent respondent, squared	-0.000	0.000	0.000	-0.000
	(0.000)*	(0.000)	(0.000)*	(0.000)
Female child	-0.001	-0.000	-0.000	0.010
	(0.002)***	(0.003)	(0.005)	(0.014)
Female parent respondent	-0.018	-0.005	-0.031	0.003
	(0.002)***	(0.003)	(0.007)***	(0.018)
Parent respondent's race / ethnicity				
Black	0.014	0.017	0.021	0.092
	(0.003)***	(0.004)***	(0.009)**	(0.024)**
Hispanic	0.001	-0.002	0.007	-0.019
	(0.003)	(0.005)	(0.010)	(0.024)
Other	0.008	0.010	0.047	-0.032
	(0.005)	(0.008)	(0.016)***	(0.038)
Parent respondent's education				
High school degree	0.008	-0.003	-0.040	0.049
	(0.004)**	(0.006)	(0.012)***	(0.026)*
Some college	0.015	0.005	-0.033	0.115
	(0.004)***	(0.006)	(0.013)***	(0.030)***
Bachelor's degree	0.000	0.000	-0.079	0.094
	(0.004)	(0.007)	(0.013)***	(0.031)***
Parent respondent's marital status				
Separated	0.031	0.030	0.026	0.319
	(0.004)***	(0.006)***	(0.013)**	(0.034)***
Divorced	0.024	0.017	-0.014	0.275
	(0.003)***	(0.005)***	(0.010)	(0.026)***
Widowed	-0.001	-0.005	-0.052	0.136
	(0.011)	(0.016)	(0.034)	(0.099)
Never married	0.025	0.023	0.015	0.239
	(0.003)***	(0.004)***	(0.009)*	(0.024)***
Income				
Family income (10,000s of dollars)	0.003	-0.001	-0.007	0.024
	(0.000)***	(0.000)	(0.000)***	(0.001)***
Family income, squared	0.000	0.000	0.000	-0.000
	(0.000)***	(0.000)	(0.000)***	(0.000)**
Number of observations	**50,499**	**33,893**	**16,050**	**4,635**

Note: Calculations from the 1999 and 2002 NSAF. Dependent variable is participation in nonstandard child care where participation equals one and zero otherwise. Marginal probability effects are reported, along with household-cluster robust standard errors (in parentheses).Model 1 includes all children ages 0 to 12, Model 2 includes all children with parents who are employed, Model 3 includes all children who participate in any hours of nonparental child care, and Model 4 includes any children whose parent(s) work nonstandard hours. Child care expense and payment information is available only for focal children in the 2002 NSAF. All models includes state and wave dummy variables. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 6: Probit Results for Nonstandard Child Care Participation, by Occupation

Variable	***Model 1: All children***	***Model 2: Children with employed parents***	***Model 3: Children in nonparental child care***	***Model 4: Children whose parents work nonstandard hours***
Service sector as reference group				
Managerial & Professional	-0.039	-0.040	-0.117	0.050
	(0.005)***	(0.005)***	(0.009)***	(0.024)**
Technicians, Sales, & Clerical	-0.039	-0.040	-0.108	-0.046
	(0.004)***	(0.004)***	(0.008)***	(0.021)**
Production, Craft, & Repair	-0.033	-0.034	-0.098	-0.003
	(0.007)***	(0.007)***	(0.014)***	(0.024)
Operators, Fabricators, & Laborers	-0.004	-0.004	-0.024	-0.003
	(0.005)	(0.005)	(0.011)**	(0.025)
Farming, Forestry, & Fishing	-0.094	-0.092	-0.194	-0.225
	(0.020)***	(0.020)***	(0.041)***	(0.098)**
Number of observations	**34,107**	**33,792**	**15,998**	**4,597**

Note: Calculations from the 1999 and 2002 NSAF. Dependent variable is participation in nonstandard child care where participation equals one and zero otherwise. Marginal probability effects are reported, along with household-cluster robust standard errors (in parentheses). Service sector occupation is the reference group. Model 1 includes all children ages 0 to 12, Model 2 includes all children with parents who are employed, Model 3 includes all children who participate in any hours of nonparental child care, and Model 4 includes any children whose parent(s) work nonstandard hours. All models includes state and wave dummy variables. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

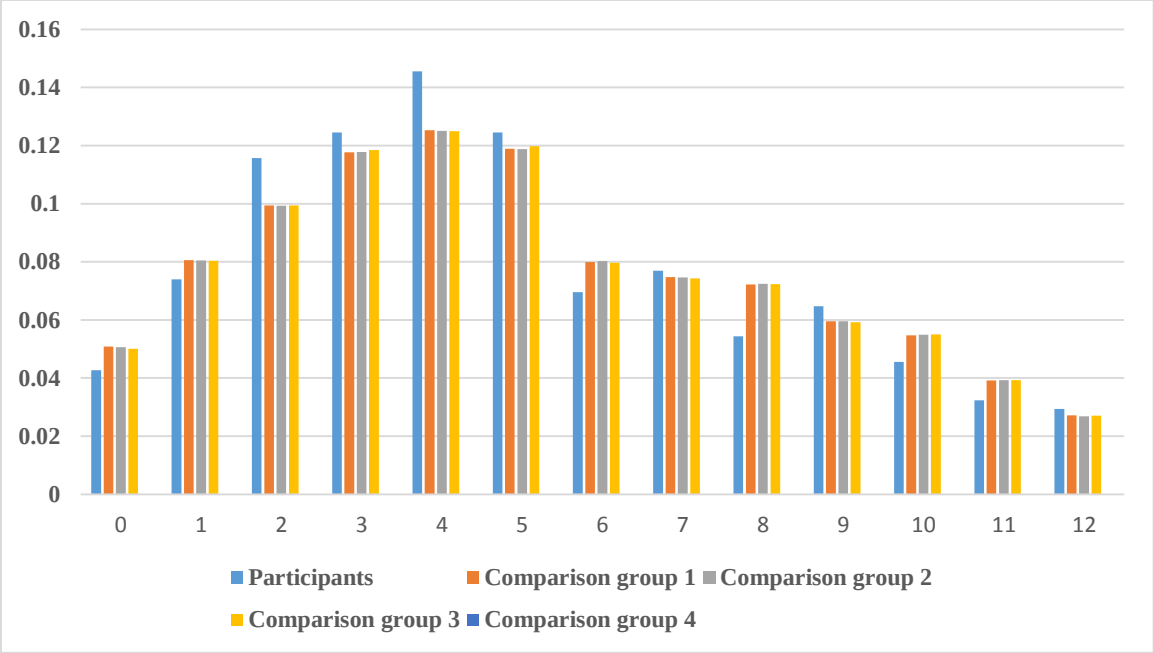


Figure 3: Nonparental Child Care Participation Distribution by Group and Single Year-of-Age

CHAPTER 3

NONPARENTAL CHILD CARE DURING NONSTANDARD HOURS: DOES PARTICIPATION INFLUENCE CHILD WELL-BEING?

Introduction

Large numbers of individuals are employed during evening or overnight hours – what is often labeled nonstandard hours. National employment data reveal that one-fifth of the working population are employed in either permanent or rotating nonstandard-hour positions (McMenamin, 2007). [18] Notably, one-third of nonstandard-hour employees are parents with children under the age of 6 and one-half are parents with children under the age of 13 (McMenamin, 2007). While two-parent households working nonstandard hours are frequently cited as "tag-team" parenting – working alternative shifts to leave one parent with the child – it may also be the case that parents require nonparental child care in order to work nonstandard hours (Han & Fox, 2011). Indeed, national income and program participation data reveal that 24 percent of mothers working nonstandard hours report using center-based care (Kimmel & Powell, 2006)[19]; furthermore, state-level data provided by Illinois indicate that 17 percent of new child care requests are for evening or overnight care (IDHS, 2014).[20]

The prevalence of nonstandard work has been accompanied by an upsurge of research investigating outcomes for parents working nonstandard hours. Nonstandard

[18] Statistics are drawn from the Work Schedules and Work at Home survey, the most recent supplemental survey from the BLS to include questions of shift work, which was conducted in tandem with the May 2004 Current Population Survey.

[19] Kimmel and Powell use 1992-1993 Survey of Income and Program Participation data to calculate these figures.

[20] In response to national employment data made available through the 2004 CPS, the state of Illinois began tracking parental requests for evening and overnight care made through their Child Care Resource and Referral program.

work is associated with sleep deprivation (Akerstedt, 2003), diminished physical health (Costa, 2003; Klerman, 2005; Ulker, 2006), marital instability (Mills & Täht, 2010; Presser, 2000; Täht, 2011), stress and poor behavioral well-being (Costa et al., 1989; Barton et al., 1995; Hsueh & Yoshikawa, 2007; Liu et al., 2011), and decreased parental acuity (Grzywacz et al., 2011; Rapoport & Le Bourdais, 2002). Households where at least one parent is engaged in nonstandard work experience additional difficulty as a family unit, including reporting more conflict, less cohesion, and poorer home environments (Bianchi, 2011; Craig & Powell, 2011; Hsueh & Yoshikawa, 2007; La Valle et al., 2002; Lleras, 2008; Presser, 2007; Tuttle & Garr, 2012). Another stream of research investigates the relationship between parental nonstandard work and child outcomes. This work concludes that children of mothers who are employed during nonstandard hours have poorer behavioral, cognitive, and physical well-being (Gassman-Pines, 2011; Han, 2008; Han & Waldfogel, 2007; Joshi & Bogen, 2007; Rosenbaum & Morett, 2009; Strazdins et al., 2004; Strazdins et al., 2006) compared to children of mothers who work standard, daytime hours.

Another body of research considers the role that participation in nonparental child care plays in child well-being. Behavioral development can be positively or negatively altered by exposure to a variety of types or characteristics of child care (Loeb et al., 2004; Loeb et al., 2007; McCartney et al., 2010; Morrissey, 2009). Children from low-income families experience cognitive gains associated with participation in high-quality nonparental child care (Burchinal et al., 2011; Dearing et al., 2009; Duncan & NICHD, 2003; Mashburn, 2008). Moreover, children who attend child care facilities with strict nutrition guidelines and planned physical activities report significantly lower rates of

obesity (Maher et al., 2008; Story et al., 2006; Benjamin et al., 2008; Benjamin et al., 2009). However, exposure to care at younger ages (Bradley & Vandell, 2007), for longer hours (Brooks-Gunn et al., 2002), or to care of lower-quality (Pluess & Belsy, 2009) is negatively associated with both cognitive and behavioral development.

Despite the breadth of extant shift work *and* child care research there is a gap in the literature. To date, no research provides a detailed examination of how participation in nonstandard-hour child care influences child well-being. This paper addresses this gap. Specifically, the aim of this paper is to investigate how participation in nonstandard hours of nonparental child care influences child well-being. There are three hypothesized avenues through which participation in nonstandard child care can influence child well-being. First, parents are likely to be employed during nonstandard hours, and evidence from shift work research concludes that parental nonstandard-hour employment is negatively associated with child well-being (Dunifon et al. 2013; Han et al., 2013; Kim et al., 2014; Li et al., 2013). Second, children must be participating in nonparental child care. While evidence from child care research is mixed, nonparental child care available during nonstandard hours is in lower supply, unreliable, and unstructured (Collins et al., 2002; Sandstrom et al., 2012). This indicates that participation is negatively associated with child well-being. Finally, parental decisions to work nonstandard hours may generate additional income for parents to spend on market goods that improve child well-being, such as medical care. However, parents who work nonstandard hours need to sleep during the very hours when medical facilities are open.

Using the Urban Institute's 1999 and 2002 National Survey of America's Families (NSAF), I begin by developing a classification mechanism to sort children into categories of participants and nonparticipants of nonstandard child care for a sample of children under the age of 12. These data stand apart from others in that parental time-of-employment and child care use during work hours is recorded. Parental responses to these questions allow me to construct a classification mechanism and identify participants and nonparticipants. Nonparticipants are not a homogenous group. Three policy-relevant reference subgroups are examined: those with employed parents, those using standard hours of nonparental child care, and those with one parent working nonstandard hours while the other parent provides care. I present main analyses estimating children's well-being as a function of (1) parental nonstandard-hour employment, (2) child care received during parental work hours, and (3) parental and household inputs. I examine how mechanisms of nonstandard-hour employment and nonparental child care alter the relationship between participation and child well-being. Finally, because instruments used in the NSAF to measure well-being differ depending on the age of the child, children ages 0 to 5 and children ages 6 to 11 are examined separately in all analyses.

For children ages 0 to 5, I find that parents of nonstandard child care participants are more likely than parents of all nonparticipants to report greater difficulty maintaining parent-child attachments and engaging in activities shown to provide cognitive stimulation. Children ages 6 to 11 who participate in nonstandard child care are more likely to lack proficient engagement with school, require special education services in school, report poorer contemporaneous physical health, show difficulty in maintaining parent-child attachments, and experience greater behavioral problems when compared to

nonparticipant children. Results from nonstandard-hour employment and nonparental child care mechanism analyses reveal that participants use greater numbers of weekly child care arrangements, and for more hours, than nonparticipants. Findings from this research have important policy implications for education and social policy. Preschool-aged children are taking on fewer outings, which are found to be cognitively stimulating (Ehrle & Moore, 1999); school-aged children who participate in nonstandard child care are more likely to report fair or poor physical health conditions. Such findings indicate that nonstandard child care providers should be induced to alter environments to better suit children's physical needs - whether through improving access to cognitively stimulating activities, training of proper hygiene behaviors, or creating adequate spaces where children can sleep. Additionally, school-aged children who participate in nonstandard child care are 6.1 percentage points more likely to receive special education remediation services. If children are increasingly participating in nonstandard child care, it follows that a larger demand for remediation resources coincides, creating a strain on limited public school funds.

The remainder of the paper proceeds as follows. Section 2 develops the conceptual framework guiding the analyses, offers a review of relevant work from shift work and child care literatures, and identifying potential mechanisms which uniquely affect participants. Section 3 describes the NSAF dataset and the mechanism used to classify children as participants or nonparticipants. Section 4 specifies the model used to estimate the relationship between participation and child well-being. Section 5 presents the results. Section 6 concludes.

Theoretical Considerations

To frame this investigation, I begin by considering relevant conceptual-theoretical perspectives that depict the production of child well-being. Next, I present research from shift work and child care fields to identify mechanisms connecting nonstandard child care participation and child well-being. Finally, I offer a discussion of hypotheses based on identified mechanisms.

Child production function and anticipated mechanisms

While the focus of this paper is on nonstandard child care, it is well-established that child well-being is heavily influenced by other household dynamics. Thus, I specify a child production function (Becker, 1965) similar to previous approaches by those in shift work (Han, 2005; Han, 2006; Han & Waldfogel, 2007) and child care literatures (Belsky et al., 2007; Brooks-Gunn et al.,2002; Herbst, 2013). I examine child well-being as a function of (1) parental time inputs, (2) nonparental time inputs, and (3) household inputs (e.g. market goods, medical care, food, etc.). Understanding how each input potentially influences child well-being serves two purposes. First, the process provides a framework to identify the specific mechanisms connecting nonstandard child care participation and child well-being. Second, the process points to more general mechanisms of parental work decisions, choices about nonparental child care selection, and household input selection that influence child well-being and have the potential to bias estimates.

Parental time inputs. Parental decisions about time can alter child well-being in a variety of ways. Parental time inputs are distinguished along two planes: quantity and

quality[21]. Decisions about employment[22], household size, and pursuit of other activities serve to contribute to the quantity of time inputs; parents' natural endowments, education, and well-being contribute to quality of time inputs. How employment decisions serve to alter child well-being are of utmost importance for this study. Parents who choose to be employed generally decrease the quantity of parental time inputs in production of child well-being, although significantly more so for preschool-aged children (who may be at home otherwise) than school-aged children. The relationship between parental quality of time inputs and child well-being is less clear. Research indicates that unemployed individuals are more likely to report poor mental and physical health compared to their employed counterparts (Clark, 2003; Cole et al., 2009; Flatau et al., 2000; Layard, 2006). However, parental employment decreases the quality of time inputs (Buehler & O'Brien, 2011; Milkie et al., 2010; Morris & Levine Coley, 2004), especially for low-income mothers in full-time positions. In fact, literature examining the relationship between early maternal employment and child well-being generally show negative effects on cognitive and behavioral development (Bernal, 2008; Bernal & Keane, 2011; Brooks-Gunn et al., 2002; James-Burdumy, 2005; Waldfogel et al., 2002). While conflicting evidence makes it difficult to discern the connection, changes to parental time inputs in general influence child well-being.

[21] Others have argued that men and women are not perfect substitutes in household production models and should be treated as separate units (Gronau, 1977; Becker, 1981). For the purposes of this study I treat all parenting time as equal in both quality and quantity.

[22] It is necessary to note that parental natural endowments, education, and well-being additionally contribute to employment decisions and there is a recursive nature to employment decisions, pursuit of other activities (such as continuing education), and the quality of time inputs. For a more complete discussion of how parental decisions at home influence children see Leibowitz (1974).

Parents may make decisions to work nonstandard-hour schedules as a result of occupational preference or pay differentials. While parents are theoretically optimizing household inputs, evidence demonstrates that parents who select nonstandard employment experience greater degrees of parental stress (Costa et al., 1989; Barton, et al. 1995; Hsueh & Yoshikawa, 2007; Liu et al., 2011), household strife (Presser, 2000; Mills & Täht, 2010; Täht, 2011), and decreased parental acuity (Grzywacz et al., 2011; Heymann & Earle, 2001; Rapoport & Le Bourdais, 2002), thus diminishing the quality of time inputs. Further evidence shows reductions in parental well-being has divergent effects based on the age of the child in the household, where preschool-age (Han, 2008; Han et al., 2013; Joshi & Bogen, 2007; Morrissey et al., 2011; Odom et al., 2013; Täht & Mills, 2012) and school-age children (Daniel et al., 2009; Dockery et al., 2009; Han & Fox, 2011; Han & Miller, 2009; Han & Waldfogel, 2007; Kim et al., 2014; Rosenbaum & Morett, 2009) experience myriad developmental delays associated with diminished child well-being. Additionally, parents who work nonstandard hours must sleep during daytime hours. How they occupy their preschool-age children is unknown and likely varies; some may use standard-hour nonparental child care, while others use a mixture of television, technology, or self-care. Parental well-being reductions and time constraints are specific mechanisms which decrease parental time inputs that produce child well-being.

Nonparental time inputs. Parental decisions about time inputs directly influence parental decisions about nonparental time inputs. Parents have preferences with regard to quality of care, quantity of care, and cost of care; when care is not available that fits these preferences, parents must prioritize their preferences. Many parents find that the ideal fit involves incorporating multiple child care arrangements, thus extending nonparental time

inputs to three planes: number of hours, number of arrangements, and quality of care. Moreover, the age of the child impacts choices parents make regarding nonparental care; school-age children generally spend a significant portion of daytime hours attending school, whereas preschool-age children do not. Evidence from child care literature is mixed regarding nonparental child care participation and its influence on preschool-age child well-being. Low-income children benefit from exposure to high-quality child care (Belsky et al., 2007; Burchinal et al., 2011; Dearing et al., 2009). However, when children are in care for longer hours (Bradley & Vandell, 2007; Brooks-Gunn et al., 2002; Loeb et al., 2007; McCartney et al., 2010), in more care arrangements (Morrissey, 2009), in lower-quality care (Pluess & Belsky, 2009), or from advantaged homes (Herbst, 2013) then negative associations are reported for child well-being. Nonparental time inputs may not ideally reflect parents' optimal nonparental child care preferences, but instead represent available arrangements which are accessible, affordable, and cover necessary schedules. Due to conflicting evidence and potential mismatch in parental preferences for care and actual care secured, it is difficult to discern general mechanisms of nonparental time inputs on preschool-aged child well-being.

Mechanisms of nonparental time inputs for school-aged children's well-being may prove less ambiguous. Evidence from child care research reveals uniform conclusions that adolescent involvement in structured after-school care, as opposed to self-care, is positively associated with various measures of child well-being (Granger, 2009; Mahoney & Parente, 2009; Roche et al., 2007; Vandell et al., 2005). Recent applications of social-context theory illustrate that (1) children have needs for secure caregiver-attachments that shift over time and (2) adolescents with access to caregivers

who are accessible for support and offer stability in their relationship display enhanced socio-emotional development (Han et al., 2010; Hendrix, 2011; McCartney et al., 2007; Prior & Glaser, 2006; Rutter, 2011; Zeanah et al, 2011). Secure caregiver-attachment is a general mechanism through which nonparental time inputs influence the production of child well-being.

Parents choosing to work nonstandard hours may need nonparental child care during these hours. Evidence related to nonstandard child care and its influence on child well-being is sparse. One branch of research concludes that child care accessibility is an ongoing constraint for parents working nonstandard hours (De Marco et al., 2009; Kimmel & Powell, 2006; Sandstrom et al., 2012). When the supply of child care is scarce, parents may forego quality preferences, opting instead for care that is available. Substitutions may include lower-quality care or multiple care arrangements to fill necessary blocks of time. Participation in low-quality, unpredictable care has previously been associated with diminished child well-being. It may be the case that exposure to low-quality care across a large number of unstable arrangements is specific mechanism through which nonstandard child care participation influences child well-being.

A second line of research from shift work literature, focusing on households where both parents work nonstandard hours (Han & Miller, 2009), reports increased maternal closeness and decreased adolescent depression. In households where both parents work nonstandard hours, it is a plausible assumption that the child is cared for by nonstandard child care. General mechanisms of secure child-caregiver attachments may

be particularly relevant in defining the relationship between participation and child well-being.

Household inputs. In the child production function, parental decisions about parental and nonparental time inputs ultimately influence decisions about household inputs. Generally, parents who choose to be employed decrease their parental time inputs and increase nonparental time inputs. When nonparental time inputs are secured through formal, paid channels, parental employment decisions reflect net-child care costs and net-wages (Herbst, 2010). Optimally, net-child care costs are less than net-household incomes, leaving the household with greater access to monetary resources and household inputs (Duncan, et al., 2011); consumption of higher quality and greater quantities of household inputs increases child well-being. However, research examining the influence of household employment decisions on child development indicates that monetary resources are less effective than other inputs in producing child well-being (Del Boca et al., 2014). Moreover, there is a cost-quality trade off in formal nonparental child care, where higher-quality care is generally more expensive (Dowsett et al., 2008; Fuller et al., 2002); when nonparental care is selected based partially on cost, any gains to child well-being achieved through better access to household inputs are diminished by exposure to low-quality care. Finally, employed parents may receive health insurance through their employer, affording greater access to preventative and emergency healthcare for their children. Access to employer-provided healthcare is a household input gained through parental employment, but not all parents select coverage for their children. Employer-provided healthcare for dependents generally requires employees to pay bi-weekly premiums; payment of premiums decreases net-household income or may discourage

some from selecting coverage. Due to this evidence, it is difficult to discern the general mechanisms connecting changes to household inputs and child well-being.

Mechanisms connecting household inputs and child well-being may prove less ambiguous for parents who select nonstandard-hour employment. For this study, the interest centers on parents who use nonstandard child care. As previously described, some parents work nonstandard-only schedules must balance child care costs with net-wages such that the household is left with greater access to higher-quality household inputs.[23] However, because parents who work nonstandard hours must sleep during daytime hours, it may be more difficult for parents working nonstandard hours to access appropriate medical care for their children. Substitutions are available to fit parents' schedules, such as urgent care or walk-in clinics; these substitutions are often more expensive or of poorer quality. Indeed, some evidence indicates that children whose parents work nonstandard hours suffer physical decline (Miller & Han, 2008). Once again, due to conflicting evidence, it is difficult to discern the nonstandard-hour-specific mechanisms connecting changes to household inputs and child well-being.

Hypotheses

[23] Once again, the evidence regarding the efficacy of increased quantities and quality of household inputs compared to the traded parental time inputs is conflicting (see Duncan et al., 2011 versus Del Boca et al., 2014). In related research, Currie (1993) finds that targeted in-kind transfers are significantly more effective at improving child well-being than cash transfers; however, a more recent examination of targeted in-kind transfer programs and cash transfers found mixed results for child well-being all the way around (Gassman-Pines & Hill, 2013). Notably, Meyer and Sullivan (2003) refocus the debate by illustrating (1) how poorly income predicts consumption and (2) how well consumption predicts improvements in child well-being.

Now that the mechanisms have been isolated that potentially drive the relationship between inputs and outcomes in the child production function, expected results can be outlined.

> *H_1: Nonstandard child care participants are less likely to be engaged in school compared to all nonparticipants.*
>
> *H_2: Nonstandard child care participants are more likely to receive special education services compared to all nonparticipants.*
>
> *H_3: Nonstandard child care participants are more likely to display behavioral or emotional well-being difficulties compared to all nonparticipants.*
>
> *H_4: Nonstandard child care participants are more likely to have parents report aggravation in parenting their child compared to all nonparticipants.*

Evidence from shift work literature indicates that children with parents employed during nonstandard hours suffer cognitive-development and behavioral setbacks; since evidence from child care literature is mixed, it is likely that setbacks would be exacerbated by participation in low-quality, unpredictable child care that is available during nonstandard hours. In addition, increased difficulty of securing reliable, high-quality care would likely escalate parental stress, further impacting parental mental health.

> *H_5: Nonstandard child care participants are less likely to have a good or better current physical health status compared to all nonparticipants.*
>
> *H_6: Nonstandard child care participants are less likely to have maintained their physical health status from the previous year compared to all nonparticipants.*

Evidence from shift work literature indicates that parents working nonstandard hours experience a variety of roadblocks when scheduling and maintaining health care arrangements for their children. While evidence from child care literature is mixed, placement in low-quality care settings would likely serve to exacerbate complications in

achieving or maintaining satisfactory physical health. For instance, evidence indicates that nonparental child care participants (1) fail to consume meals that meet strict nutritional guidelines and (2) receive less access to adequate physical activity, both of which are correlated with higher BMI and obesity rates; children participating in nonstandard child care would additionally be exposed to hygiene routines, normally overseen by parents at home, which may be truncated or nonexistent in nonstandard child care settings.

> *H_7: Nonstandard child care participants are more likely to enroll in employer-provided healthcare compared to all nonparticipants.*
>
> *H_8: Nonstandard child care participants are less likely to be uninsured during the previous year compared to all nonparticipants.*

Although no evidence indicates that parents employed during nonstandard hours are more likely to select employer-provided insurance or remain insured compared to parents employed during standard hours, not all nonparticipants are employed. In addition, if parents employed during nonstandard hours do receive wage differentials due to shift worked, they may be more likely than counterparts employed during standard hours to agree to select employer-provided insurance; as household incomes increase, parents may be more willing to pay premiums.

Mechanism hypotheses

Predictions about the relationship between nonstandard child care participation and child well-being are motivated by mechanisms unique to parental employment, nonparental child care participation, and household inputs. Supplementary analysis testing how participants and nonparticipants differ across hypothesized mechanisms

provides a more nuanced understanding of the relationship between nonstandard child care participation and child well-being.

Data Source and Classification Mechanism

Data source

Data for this paper come from the 1999 and 2002 waves of the National Survey of America's Families (NSAF).[24] The NSAF is a cross-sectional survey initially conducted in 1997.[25,26] The purpose of the survey is to collect information on the economic, physical, and social well-being of U.S. adult residents under the age of 65 and their children. While the survey oversamples those residing in households with incomes below 200 percent of the federal poverty threshold, the survey is representative of the non-institutionalized, civilian population. Moreover, thirteen states that account for over half of the US population are oversampled.[27] Information is collected on up to two randomly selected focal children in three specific age ranges: ages 0 to 5, ages 6 to 11, and ages 12 to 17. The data used here are drawn primarily from the NSAF's Focal Child file. This file

[24] There are implications associated with using data collected this long ago. Primarily, more current data suggests that a growing percentage of workers are employed during nonstandard hours. However, this data does not reveal the parent status of workers or allow me to identify children participating in nonstandard child care.

[25] Although this was the first wave of the NSAF to be collected, the 1997 wave is not used in this analysis due to the lack of collection of child care data during this initial wave.

[26] Wave one of the NSAF was conducted from January to November of 1997, sampling over 44,000 households and recording information on over 100,000 individuals. Wave two was conducted from February to October of 1999 and sampled over 40,000 households and recorded information on over 100,000 individuals. Wave three was conducted from February to October of 2002 and sampled almost 40,000 households and recorded information on just over 100,000 individuals.

[27] Alabama, California, Colorado, Florida, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, New York, Texas, Washington, and Wisconsin.

contains information on children's child care participation, for children ages 0 to 12, and demographic characteristics of the child and family.

The baseline sample from the 1999 and 2002 waves includes 70,270 children ages 0 to 17. I constrain the sample to children on whom child care participation information was collected, eliminating children ages 13 to 17 (19,360 children). I additionally constrain the sample to children with non-missing child care information (666 children).[28] I exclude children 12 years-of-age from the analysis due to differences in behavioral well-being measures compared to children ages 6 to 11 (3,794 children). Finally, I restrict the sample to children whose parents report both employment and shift information, when applicable, leaving the analysis sample at 46,450 children. Analyses in this paper distinguish between children ages 0 to 5 (preschool-aged) and children ages 6 to 11 (school-aged). The final analysis sample is 24,271 preschool-aged and 22,173 school-aged children.

Classification mechanism

Participation in nonstandard child care is not directly observed in the NSAF. For this reason, a classification mechanism must be constructed. Notably, two uncommon questions are posed in the NSAF that make it uniquely suited for the current research. One, the NSAF records information about parental work schedules, and two, the NSAF

[28] Child care information is considered "missing" if the parent fails to report either (1) child care arrangements used while the parent works, look for work, or attends school, or (2) all total child care arrangements used in a week. In a small number of cases (242) unemployed parents have failed to report all total child care arrangements for their children. For this analysis, these children have been classified in the broadest group of Nonparticipants. In results not shown, these children have been excluded from the sample; the results are qualitatively similar.

collects information about primary child care use during employment. The concurrence of work-schedule and child care data allow me to construct a classification mechanism.

Children are classified as participating in nonstandard child care if a number of qualifications are met: (1) the parental respondent(s) reports mostly working outside of the hours of 6am to 6pm, (2) the child's primary source of child care while the parent is at work, looking for work, or in school is nonrelative care, relative out-of-home care, or center-based care, (3) that the parent works for as many or more hours as the child participates in care, (4) any cohabitating spouses also work nonstandard hours, and (5) the parent(s) does not live with another adult who is potentially caring for the child while the parent(s) works.[29]

Figure 4 illustrates the scheme used to identify nonstandard child care participants.[30] The first variable used in the construction of the classification mechanism is the parental nonstandard-hour work variable. This variable is constructed from a survey question that queries whether the parent "Usually works between the hours of 6am to 6pm." If the answer is no, the parent is determined to be working nonstandard hours for the purpose of this analysis. The second variable used in the construction of the

[29] While qualification three appears to be unnecessarily restrictive, there is good reason to apply this constraint. Parents who work nonstandard hours may use parental or in-home relative child care while they work and nonparental child care for a few hours during the day while they sleep. Without the third qualification, these children would be classified as Participants in nonstandard child care, when in fact they are not. Alternatively, parents working nonstandard hours may only use a few hours of nonparental care between the hours when the focal child exits school and the parent leaves work. For example, imagine a parent working a 12pm to 8pm shift who uses nonrelative care from 4pm (when the child leaves school) to 8pm (when the parent retrieves them from care). In this scenario, without the third qualification in the classification mechanism, the child would be classified as a Participant in nonstandard child care, which they are – however, not to the degree that other participants are. The third qualification maintains a 'strict' classification of participation; in order to include 'partial-participants', the third qualification are removed for these individuals later in the paper as a robustness check.

[30] Appendix Figure D features a Classification Schema illustrating how all survey questions are related.

classification mechanism is the primary child care variable.[31] This variable is pre-generated from several survey questions that assess the number of child care providers the child participates in during the week while the parent works, looks for work, or is in school and the number of hours during that week that the child spends with each provider.[32] An aggregated count is completed where one provider is designated as the primary provider. The third variable considers whether another adult lives in the home who may be providing care during nonstandard hours. If it is another parent, they also are asked if they work outside of the hours of 6am and 6pm; if it is not another parent, the child must be excluded as a participant. If a child meets all qualifications, the child is classified as participating in nonstandard child care.

Once the classification mechanism is constructed, and the participant group identified, several reference groups can be constructed. *Figure 4* illustrates the schema for classifying a child as a participant or belonging to one of four reference groups. Nonparticipants are all other children ages 0 to 11 in the sample who are not participants. This reference group is the primary group used in comparative analyses. Three additional

[31] Two separate primary child care variables come pre-generated in this dataset. The first is 'Primary child care – FC' where the child's primary child care is calculated based solely on the total number of hours the child participates in each arrangement. The second, 'Primary child care – MKA works' is calculated based on the arrangement that the child spends the most time at while the parent is at work. The correlation between these two variables is high, 0.918, indicateing that children have relative stability in their child care provider regardless of parental employment. It is worth noting, however, that this stability is higher for those in Reference groups 3 and 4, whose correlation coefficients for the two primary child care variables are 0.947 and 0.991, respectively. Participants' correlation coefficient is parallel to the overall unrestricted sample.

[32] I also must construct a variable to meet qualification three in the classification mechanism – child participates in as many (or more) hours of care per week as their parent works. In order to construct the 'Hours' variable, I use variables in the NSAF where parents record (1) hours currently worked per week and (2) a total count of hours per week the child used their primary child care. When the number of hours the child attends child care is greater or equal to the number of hours the parent works, the child passes the third qualification.

reference groups are constructed based on policy-relevant divisions. The second reference group of children, those between the ages 0 to 11 whose parents are employed during any shift, use any type of child care, and who are not participants, are labeled the Employed Nonparticipants (ENP) group. The third reference group of children, those between the ages 0 to 11 whose parents are employed and use nonparental care during daytime (standard) hours, are labeled the Standard Shift and Nonparental Care (SaNP) group. The forth reference group, those between the ages 0 to 11 whose parents work nonstandard hours and use parental child care during these hours, are labeled the Nonstandard Shift and Parental Care (NSaP) group.

One drawback with using the NSAF to identify participants in nonstandard child care is that the survey neither records children's times of entry into or exit out of child care, nor is the hour when parents start or end a work shift known. For this reason, it is possible to identify *likely* participants. In addition, it may be the case that some parents use nonstandard child care for reasons other than working (e.g. volunteer work, errands, or personal time). The NSAF does not directly question respondents about use of nonstandard child care in general, so these individuals are not recognized as using nonstandard child care within this framework.[33]

Well-being instruments

Various instruments are used in the NSAF to measure well-being of focal children. *Table 7* illustrates how scales, individual scale items, and non-scale items are

[33] The number of individuals this may exclude is unknown. Research indicates that most mothers (78 percent) use nonparental child care for employment-related reasons, as measured when the child is 3-years of age (Brooks-Gunn et al., 2002).

coded in the NSAF. Instruments used to measure child well-being vary by the following age groups: children ages 0 to 5 and children ages 6 to 11. Instruments used to measure well-being for children ages 0 to 5 are presented first; those for children ages 6 to 11 are presented last.

Scales and individual items for children 0 to 5. The *Parental Aggravation Scale* is used to assess aggravation in parenting the focal child.[34] Four individual items comprise this scale: how often in the past month have you felt the child was much harder to care for than most, felt the child did things that really bothered you a lot, felt you are giving up more of your life to meet the child's needs than you ever expected, and felt angry with the child. For each individual item, the parent is asked to rate the child using a four-point scale: [1] *all of the time*, [2] *most of the time*, [3] *some of the time*, and [4] *none of the time*. Responses to individual items, when totaled, create a scale score ranging from 4 to 16, where a higher score indicates greater parental aggravation. These questions are asked of all focal children ages 0 to 11 in the survey,[35] with a Cronbach's alpha of .63. This variable is coded as continuous in the analysis.

Three individual items are used to gauge the cognitive well-being of children ages 0 to 5. Two survey questions comprise the *Index of Child Cognitive Stimulation*, designed to measure the frequency of cognitive stimulation children receive (Ehrle & Moore,

[34] Parental aggravation, also referred to as parental sensitivity, has been shown to have a moderately strong correlation with the security of parent-child attachments (De Wolff & Ijzendoorn, 1997). More recent findings confirm that positive parent-child interactions strengthens attachment bonds between parents and their children (Bosmans et al., 2006). While it could be argued that this scale serves as a mechanism connecting nonstandard child care participation and child well-being, I argue that positive parent-child interactions are an indication of greater social-emotional well-being.

[35] Scale scores for children whose parent/guardian answered three out of four questions are standardized to a 16-point scale. In cases where fewer than three questions are answered, the child's score is coded as missing.

1999).[36] Parents are first asked to report: How many days in the past week did you or any family member read stories or tell stories to the child? [0] *none*, [1] *one day*, [2] *two days*, [3] *three days*, [4] *four days*, [5] *five days*, [6] *six days*, or [7] *seven days*. Next, parents are asked to report: How often in the past month have you or any family member taken the child on any kind of outing, such as to the park, grocery store, a church, or a playground? [1] *once a month or less*, [2] *about two or three times a month*, [3] *several times a week*, or [4] *about once a day*. These questions are asked of all focal children ages 0 to 5 in the survey.[37] The "read to" variable is coded as a continuous count variable and the "outing" variable is coded as an ordinal variable for the analysis. The third item gauges if the focal child currently receives special education services, asking: Does child now receive special education services? [1] *yes* or [2] *no*.[38] This question is asked of all focal children ages 2 to 11 in the survey.[39] For the analysis, this variable is coded as unity for "yes" responses, and zero otherwise.

Non-scalable items are used in this survey to measure child well-being for children ages 0 to 5. Two individual questions gauge the child's physical health status. The first question gauges the child's current health status, asking: In general, would you

[36] The *Index of Child Cognitive Stimulation* is the title assigned to these two questions in the 1999 report compiled by the Urban Institute benchmarking measures of child and family well-being. For additional information, see Ehrle and Moore (1999).

[37] Cronbach's alpha is not available for these questions since they do not comprise a scale measuring physical health.

[38] This question is not the only location in the Focal Child survey where parents have the opportunity to report if the focal child receives special education services. CAGRAD records the current grade children ages 5 to 11 are currently enrolled in; parents are able to specify *special education* at this time. CLGRAD records the last completed grade for children ages 2 to 11; parents are able to specify *special education* at this time. If a parent has reported attendance in special education for either of these questions, but has not recorded a response for the CSPECED survey question, the focal child has been recoded as receiving special education in this analysis.

[39] If the parent records no current grade for the child or current receipt of special education services, the item is recorded as missing.

say the focal child's health is [1] *excellent*, [2] *very good*, [3] *good*, [2] *fair*, or [1] *poor*. This question is asked of all focal children ages 0 to 11 in the survey. For the analysis, this variable is dichotomously coded, where a response of "very good" or "excellent" is coded as unity, and zero otherwise. The second question gauges the child's relative health status compared to last year, asking: How is your child's health in general compared to 12 months ago – is it [1] *much better*, [2] *somewhat better*, [3] *about the same*, [4] *somewhat worse*, and [5] *much worse*. This question is asked of all focal children ages 2 to 11 in the survey.[40] . For the analysis, this variable is dichotomously coded, where a response of "somewhat better" or "much better" is coded as unity, and zero otherwise. Five questions are used to ascertain the current healthcare insurance status of the child. Parents are asked to report the current status of the child as: [1] *insured through employer-provided insurance*, [2] *insured through Medicaid/CHIP/or state insurance*, [3] *insured through individually purchased plan*, or [4] *currently uninsured*. Parents of all focal children 0 to 11 are also asked to report how many of the previous 12 months the child was insured.[41] Individual indicator variables are constructed for the analysis, where: currently enrolled in employer plan equals unity, or zero if uninsured; currently enrolled in government sponsored plan equals unity, or zero if uninsured; currently self-insured equals unity, or zero if uninsured; insured all of the last 12 months equals unity, or zero otherwise.

[40] Cronbach's alpha is not available for these questions since they do not comprise a scale measuring physical health.
[41] Cronbach's alpha is not available for these questions since they do not comprise a scale measuring insurance coverage.

Scales and individual items for children 6 to 11. Three scales are available that measure child well-being for children ages 6 to 11: *Parental Aggravation Scale*, *School Engagement Scale*, and *Behavioral Problems Index Scale*. In addition to scales used to measure child well-being, several non-scalable items are included for children ages 6 to 11.

The *Parental Aggravation Scale* is used to assess aggravation in parenting focal children ages 6 to 11. Details for this scale have been previously outlined.

The *School Engagement Scale* is used to assess the degree to which focal children are engaged in school. Four individual items comprise this scale: how often the child cares about doing well in school, if the child only works on schoolwork when forced to, if the child does just enough schoolwork to get by, and if the child always does homework. For each individual item, the parent is asked to rate the child using a four-point scale: [1] *all of the time*, [2] *most of the time*, [3] *some of the time*, and [4] *none of the time*. Responses to individual items, when totaled, create a scale score ranging from 4 to 16, where a higher score indicates less school engagement. These questions are asked of all focal children ages 6 to 11 in the survey[42] and have a Cronbach's alpha[43] of .76. This variable is coded as continuous in the analysis.

[42] Scale scores for children whose parent/guardian answered only three of four questions are standardized to a 16-point scale. In cases where fewer than three questions are answered, the child's score is coded as missing.

[43] Cronbach's alpha is typically used to measure internal consistency of a scale. Alpha can range from negative infinity to one. Very high alphas (.95 or above) can indicate that the scale is using redundant items; alphas closer to zero indicate that the individual items taken together do not form a consistent instrument for measuring whatever latent variable the scale is designed to measure.

The *Age 6-11 Behavioral Problems Index Scale* is used to assess behavior and emotional problems for children ages 6 to 11. Six individual items comprise this scale, asking how often in the last month had the child: felt worthless or inferior; been nervous, high-strung, or tense; act too young for their age; didn't get along with other kids; couldn't concentrate or pay attention for long; and been unhappy, sad, or depressed. For each individual item, the parent is asked to rate the child using a three-point scale: [1] *often true*, [2] *sometimes true*, and [3] *never true*. Responses to individual items, when totaled, create a scale score ranging from 6 to 18, where a higher score indicates greater behavior problems. These questions are asked of all focal children ages 6 to 11 in the survey[44], with a Cronbach's alpha of .73. This variable is coded as continuous in the analysis.

Several non-scalable items are used to assess child well-being for children ages 6 to 11. All items have been detailed previously, and include: receipt of special education services; contemporaneous and comparative physical health status; and current and historical health insurance coverage.

Parental employment and child care mechanisms

In addition to evaluating the influence of nonstandard child care participation on child well-being, supplementary analyses serve to identify the unique role mechanisms play in this relationship. Mechanisms of nonstandard-hour parental employment and nonparental child care available in the NSAF include: parental mental health, number of

[44] Scale scores for children whose parent/guardian answered five out of six questions are standardized to an 18-point scale. In cases where fewer than five questions are answered, the child's score is coded as missing.

weekly hours in nonparental child care, number of weekly nonparental child care arrangements, monthly cost of nonparental child care, monthly cost of nonparental child care as a percent of family income, type of nonparental child care used, and number of annual well-child exams received.

Parental mental health is a scale constructed by NSAF and comprised of five items drawn from the Medical Outcomes Study's Mental Health Inventory (MHI-38). The primary caregiving parent is asked to report: how frequently in the past month have you been a very nervous person, felt calm or peaceful, felt downhearted and blue, been a happy person, and felt so down in the dumps that nothing could cheer you up. For each individual item, the parent is asked to rate the child using a four-point scale: [1] *all of the time*, [2] *most of the time*, [3] *some of the time*, and [4] *none of the time*. Responses to individual items, when totaled, create a scale score ranging from 5 to 20, where a higher score indicates better mental health. These questions are asked of all focal children ages 0 to 11 in the survey[45], with a Cronbach's alpha of .81.This variable is coded as ordinal in the analysis.

Child care characteristics are collected on focal children in the NSAF. Parents are asked to record the weekly number of hours spent in specific child care arrangements. A variable is constructed in the NSAF to sum all hours across all arrangements. A second variable is constructed in the NSAF to sum the total weekly number of regular child care arrangements used. These variables are constructed for all focal children ages 0 to 11 in

[45] Scale scores for children whose parent/guardian answered four out of five questions are standardized to a 20-point scale. In cases where fewer than three questions are answered, the parent's score is coded as missing.

the survey and are coded as continuous in the analysis. Parents are asked to record the different kinds of child care used for each child at least once a week during the previous month and the number of hours spent in each. A variable is constructed in the NSAF identifying the primary source of child care for each child. This variable is constructed for all focal children ages 0 to 11 in the survey and is coded as a single dichotomous variable in the analysis, set equal to unity for those who use noncenter-based care, and zero otherwise. Parents are asked to estimate the total amount of money paid during the last month for all child care used. This question is asked of all focal children ages 0 to 11 in the 2002 wave of the survey and is coded as continuous in the analysis. Based on this question, I construct a cost of child care as a percent of family income variable. Parents are asked to report total family income in the previous year. This question is asked for all focal children ages 0 to 11 in the survey. The constructed variable multiplies the monthly cost of child care variable by twelve, dividing this product by the reported family income. This variable is constructed for all focal children ages 0 to 11 in the 2002 wave of the survey, and is coded as continuous in the analysis.

Finally, parents are asked to report the number of times the child received well-child care during the previous 12 months. This question is asked of all focal children ages 0 to 11 in the survey and is coded as continuous in the analysis.

Summary statistics

Tables 8 and *9* provide summary statistics for demographic characteristics, covariates, and nonstandard child care mechanisms for children ages 0 to 5, and ages 6 to 11, respectively. For preschool-aged children, approximately 60 percent of parents report

being employed, with 21 percent of the employed working nonstandard hours; for school-aged children, approximately 68 percent of parents report being employed, with 18 percent of the employed working nonstandard hours.[46] This percentage remains relatively constant across the two years of the survey.

Table 10 provides summary statistics for well-being instruments included as dependent variables in the analysis. Summary statistics are reported separately for children ages 0 to 5 and 6 to 11 due to differences in well-being measures.

Empirical Model

Empirical model

Ordinary least squares regression (OLS) and logistic regression analysis are used to empirically test how participation in nonstandard child care influences child well-being. The constructed scales measuring child well-being are continuous, so use of OLS regression provides the best linear unbiased estimator. Logistic regression is used for dichotomous variables measuring child well-being. Ordered logistic regression analysis produces the best linear unbiased estimate in cases where the dependent variable is ordinal, as is the case with the individual items used to construct scales measuring child well-being.[47]

[46] This percentage is almost identical to the national figure tracked by the BLS May 2004 Current Population Survey supplemental, Work Schedules and Work at Home survey. They reported 17.7% of adults in nonstandard-hour only positions. McMenamin (2007) did note that parents of younger children are more likely to work nonstandard hours than parents of older children; this likely accounts for the difference in percentage found in the NSAF population between the age groups.

[47] Brant tests performed on ordinal dependent variables indicate that the parallel regression assumptions are violated, making the use of ordered logistic regression as the linear estimator inefficient. In lieu of ordered logistic regression, all estimated results for ordinal dependent variables are derived using generalized

Equation (1) represents the model used in all regression analyses, and is shown as follows:

$$\text{Equation 1: } Y^*_{ist} = \gamma_1 P_{ist} + \boldsymbol{\chi}'_{ist}\beta + \boldsymbol{\Phi}_s + \eta_t + (\boldsymbol{\Phi}_s \text{ x trend}) + \varepsilon_{ist},$$

where *i* indexes individual, *s* indexes states, *t* indexes years, and *Y** is a continuous latent representation of the *i*th child's well-being, *Y*. The following scales are used as measures of child well-being: *Parental Aggravation Scale, School Engagement Scale*, and *Behavioral Problems Index Scale*.[48] In addition, non-scale individual items, described in *Table 9*, are used as measures of child well-being. The *P* represents the child-specific nonstandard child care participation classification in each year, where *Participates* is equal to one when the classification mechanism indicates that the child participates in nonstandard child care, and zero if they are assigned into one of the reference groups. The coefficient of interest is γ, which returns the difference in the predicted value of the *i*th child's well-being scale score when they participate in nonstandard child care, *ceteris paribus*.[49] The vector given by $\boldsymbol{\chi}'$ represents a number of observable demographic characteristics, including age of mother; age of mother squared; age of child; age of child squared; gender of child; gender of parent; race/ethnicity of child (three dummy variables); marital status of respondent (four dummy variables); educational attainment (four dummy variables), presence of siblings in the household, total number of children

ordered logistic regression (GOLOGIT). For additional information on this user-written estimation command see Williams (2006).

[48] In *Table 13*, one of the items in the *Cognitive Stimulation Index,* the number of days in a week the child is read to, is treated as a continuous count variable and its relationship to nonstandard child care participation is estimated using OLS.

[49] Estimates from both logistic regression and generalized ordered logistic regression have been transformed into marginal probability effects for ease of interpretation.

in the household, and total number of nonparent adults in the household.[50] Controlling for observable characteristics of the parent and child eases endogeneity concerns regarding unobservable heterogeneity in factors affecting parental employment and household input decisions. In this analysis I stack two waves of the NSAF to create my sample. For this reason, I include state and wave effects to eliminate potential bias caused by comparing participant and nonparticipant children across states and time. $\mathbf{\Phi}$ represents a vector of state fixed effects, to account for permanent differences across states that simultaneously influences local nonstandard-hour employment and child well-being (e.g., state policies that expand nonstandard child care options or encourage employers to provide pay differentials); η represents wave dummy variables to account for time-varying national determinants of nonstandard-hour employment and child well-being (e.g., minimum wage changes or labor policies affecting shift work employment). Standard errors are adjusted for state-specific linear time trends to purge estimates of unobservables trending at different rates within states over time (e.g., changes in cost for nonstandard child care or pay for nonstandard-hour workers).

Reference groups

Four versions of the specified empirical model are used. Model 1 examines nonstandard child care participation among all households with children. This model serves as the primary one to observe differences between participants and an unrestricted sample of nonparticipants. Models 2, 3, and 4 narrow the examination to policy-relevant sub-groups: households with an employed parent, households with an employed parent

[50] This count includes dummy variables equal to one when demographic controls are missing information.

who uses nonparental child care (during either standard or nonstandard hours), and households where parents are employed during nonstandard hours and use parental or nonparental child care. Using four models, whose sample restrictions simulate the classification mechanisms of the participant and reference groups previously outlined, allows me to compare multiple groups of nonparticipants to uniquely-defined participants. These reference groups reflect policy-relevant differences in employment status and child care use.

Sample division by age

Age restrictions are applied to all analyses in order to ensure that only children in the appropriate age range are included in the sample. Two age ranges are specified, which are based on the well-being instruments applied in the NASF survey: children 0 to 5 and children 6 to 11. This restriction serves two purposes. One, children in specified age ranges receive explicit well-being survey questions in the NSAF, so disaggregating the groups allows for a more nuanced interpretation. Two, the relationship between participation in nonstandard child care and child well-being may differ by age.

Results

To lay the groundwork for the main analyses, this section begins by presenting descriptive statistics for groups of children based on nonstandard child care participation classification. Descriptive statistics include the following: total count of child-observations in each of the participant and reference groups (Nonparticipants, ENP, SaNP, NSaP), means for child well-being measures in each of the participant and reference groups, and (when applicable) statistical significance from two-sample t-tests

weighing the difference of the means across participant and reference groups. Finally, I estimate the influence of participation on various measures of child well-being using the model specified from the child production function.

Comparing well-being across participants and nonparticipants

Tables 11 and *12* provide information regarding the distribution of child well-being measures for children ages 0 to 5 and 6 to 11, respectively, who have been classified as participating in nonstandard child care. Two-sample t-tests weigh the differences in means between children who participate in nonstandard child care compared to each of the four reference groups. Mean value differences illustrate persistent dissimilarities in child well-being between participants and nonparticipants, regardless of age. Findings indicate that children who participate in nonstandard child care differ meaningfully from nonparticipants across all scales, and non-scalable items, used to measure well-being. Additional analyses test the veracity of these findings by placing them into the context of the child production function.

Discussion of descriptive and multivariate results

Given that no previous research has examined how participation in nonstandard child care influences child well-being and development, it is useful to (1) allow the group of nonparticipants to be defined as broadly as possible, devoting the bulk of the results discussion to comparing participants to the unrestricted sample of nonparticipants and (2) to reserve the remainder of the discussion for identifying significant changes that occur in associations between *Participates* and well-being measures as the reference group of nonparticipants becomes more narrowly defined.

Table 13 contains the main results for children ages 0 to 5, and *Table 14* contains the main results for children 6 to 11, using Model 1. Restricting the main results to Model 1 allows me to compare children who participate in nonstandard child care to the broadest sample of nonparticipants – all other children who are not strictly classified as participating in nonstandard child care. Moving from Column A, where the empirical model has no control variables included, to Column C, where the full set of controls are included, allows me to achieve a primary objective: ensuring that coefficients stand up to inclusion of a variety of controls added into the model.

Main results featured in *Table 13* estimate the relationship between participation in nonstandard child care and various scales measuring child well-being for children ages 0 to 5.[51] Parents with children ages 0 to 5 who participate score 8.4 percent of a standard deviation higher on *Parental Aggravation Scales* than those whose children do not participate. Remembering that higher scores on the *Parental Aggravation Scale* indicate greater aggravation, this result indicates that parents of children ages 0 to 5 who participate are more aggravated with their children. Children who participate are 3.7 percentage points less likely to be taken on daily outings compared to their nonparticipant counterparts. Finally, participants are 1.3 percentage points more likely to be insured through employer-sponsored health insurance than nonparticipants.

Main results featured in *Table 14* estimate the relationship between nonstandard child care participation and various scales measuring child well-being for children ages 6 to 11.[52] Participants score 10 percent of a standard deviation higher on *School*

[51] Full regression results are available in Appendix Table B.
[52] Full regression results are available in Appendix Table C.

Engagement Scales than nonparticipants, where higher scores indicate less engagement. Children who participate score 16 percent of a standard deviation higher on *Behavioral Problems Index Scales* than nonparticipants, where higher scores indicate more behavioral problems. Children ages 6 to 11 are also 6.1 percentage points more likely to receive special education services, 3.4 percentage points less likely to report very good or excellent current physical health, 6.8 percentage points less likely to be insured through a government-sponsored healthcare plan compared to being uninsured, and 2.5 percentage points less likely to be insured for the previous 12 months compared to counterparts who do not participate in nonstandard child care.

While the consequences for participants' decreased physical health reports and increased use of educational remediation services is critical to note, no less marked are the implications for parent-child attachments, school engagement, and socio-behavioral competency. Poor parent-child attachment has been shown to exacerbate decreased levels of social competence (Main & Solomon, 1986) and in some cases predict them (Feldman & Masalha, 2010). Competency in peer-to-peer relationships is essential for children of all ages, as this difficulty can persist over time if not properly addressed (Verissimo et al., 2014) and impact future mental health (Payton et al., 2000) and cognitive-performance (Belsky & Pluess, 2012). Participants ages 6 to 11 are simultaneously less engaged in school and require special education services to keep up with their peers; these children require greater resources compared to their nonparticipant counterparts. Finally, results for children ages 6 to 11 show that parents who work nonstandard hours are less likely to be continually insured, illustrating that their children have decreased access to healthcare. This may explain participants' poor contemporaneous physical health.

Children who participate in nonstandard child care deviate from their nonparticipant counterparts across a spectrum of individual well-being measures. *Table 15*, for children ages 0 to 5, and *Table 16*, for children ages 6 to 11, show the marginal probability effects from generalized ordered logistic regression results using the individual items used to construct child well-being scales in the NSAF. Parents of all children who participate in nonstandard child care are more likely to report that their children are harder to care for than other children (4.2 and 6 percentage points, respectively). Parents of children ages 0 to 5 are 2.8 percentage points more likely to report that they felt angry with their child sometime in the last month. Both of these responses may indicate a behavioral problem that the parent is dealing with when interacting with the child; alternatively, they may reflect frustration parents have in finding adequate care for their children during work hours, feelings which are in turn projected onto the child. Children ages 6 to 11 who participate in nonstandard child care are more likely to demonstrate behavioral problems: participants are 4.1 percentage points more likely to be nervous or tense; 6.7 percentage points more likely to have difficulty in getting along with other kids; 6 percentage points more likely not to be able to concentrate for long; and 4.2 percentage points more likely to appear unhappy, sad, or depressed. Finally, participants ages 6 to 11 are 4.1 percentage points more likely to be forced to do their homework, compared to nonparticipants. This reflects a disconnection between schools, nonstandard care providers, and parents in regard to homework expectations.

Discussion of findings for policy-relevant sub-groups

Pivoting to policy-relevant sub-groups, I examine results produced in *Tables 17* and *18* containing main results using all four models.[53] Model 1 was the focus of the previous section, and here I start by examining changes from Model 1 to Model 2. Remember that Model 2 restricts the sample by eliminating any children whose parents are not currently employed, mimicking the ENP reference group. This is a necessary sub-group to isolate given that the independent variable is constructed using mechanisms which categorize children based on parental employment decisions. Results for children ages 0 to 5 appear in *Table 17*; results for children ages 6 to 11 appear in *Table 18*.

Results in *Table 17* indicate that children ages 0 to 5 who participate in nonstandard child care are read to 5 percent of a standard deviation more than nonparticipants whose parents are employed. In addition, children ages 0 to 5 who participate in nonstandard child care are equally as likely as their counterparts with employed parents to be covered by employer-provided health insurance. Results in *Table 18* for children ages 6 to 11 who participate in nonstandard child care are virtually the same as those in Model 1, with two exceptions. Children ages 6 to 11 who participate in nonstandard child care have parents who report 10 percent of a standard deviation greater aggravation and are equally as likely to be covered by government-sponsored insurance as their counterparts whose parents are employed.

[53] Remember that the main results featured in *Tables 13* and *14* estimate the relationship between participation in nonstandard child care and various scales that measure child well-being. These scales can be referenced in *Table 7*. In addition, estimates for several non-scale categorical items are included; these areas of well-being are cognitive stimulation and physical health. As was true in *Tables 13* and *14*, results presented in *Tables 17* and *18* are estimated using both OLS, for continuous well-being scales, and logistic regression, for categorical variables.

Moving to Model 3, I restrict the sample to employed parents who primarily use nonparental child care to care for their children while they work, mimicking the SaNP reference group. It is important to note that this sample of participant and nonparticipant children are treated as homogeneous in child care literature; if this assumption is valid, than estimated coefficients for child well-being outcomes comparing participants and nonparticipants should reveal no significant differences. As shown in *Tables 17* and *18*, I find that results in Model 3 are relatively similar for both age ranges when compared to Models 1 and 2.

Finally, in Model 4, I restrict the sample to children who have at least one parent working a nonstandard hour shift, and are cared for by either nonparental or parental care while their parent(s) works. The reference group created by this sample restriction mimics that of the NSaP reference group. It is important to note that this sample of participant and nonparticipant children are treated as homogeneous in shift work literature; if this assumption is valid, than estimated coefficients for child well-being outcomes comparing participants and nonparticipants should reveal no significant differences.

Results in *Table 17* indicate that children ages 0 to 5 who participate in nonstandard child care are 2.8 percentage points more likely to receive special education services than children with one parent working nonstandard hours while the other provides care. Participants are also 3.6 percentage points less likely to report very good or excellent current physical health compared to children who are cared for by one parent while the other works nonstandard hours. Finally, participants ages 0 to 5 are 6.6 percentage points more likely to be covered by government-sponsored health insurance

than be uninsured, 15.9 percentage points more likely to be covered by individually purchased health insurance than be uninsured, and 2.2 percentage points more likely to be insured for the previous 12 months.

Results in *Table 18* reveal that children ages 6 to 11 who participate in nonstandard child care have parents who report 15 percent of a standard deviation greater parental aggravation and are equally as likely as nonparticipants to be uninsured, compared to nonparticipants.

Mechanism checks

In order to understand how hypothesized mechanisms influence the relationship between participation and child well-being, I perform supplementary mechanism checks found in *Table 19* for children in both age ranges. In these analyses, the hypothesized parental employment and child care mechanisms are used as dependent variables. This allows me to estimate the relationship between mechanisms and nonstandard child care participation.

I find that several hypothesized mechanisms significantly differ across children based on participation status. For children ages 0 to 5, monthly child care costs are $53.73 lower when children participate in nonstandard child care; this result is in line with data showing that informal care is generally less expensive than formal care. Participants ages 0 to 5 use .5 more arrangements and 10 more hours of child care per week than nonparticipants. Finally, participant children ages 0 to 5 are 17.3 percentage points more likely to use noncenter-based child care than nonparticipants. For children ages 6 to 11, participants use .63 more arrangements and 12 more hours of child care per

week than nonparticipants, and are 16.8 percentage points more likely to use noncenter-based child care than nonparticipants.

Robustness checks

In order to check the robustness of these findings, I perform some additional checks to ensure that the results are not manifestations of a narrowly defined group of participants or coding of variables. In results not shown, I alter the classification mechanism by easing the restriction requiring that parents work at least as many hours as the child is placed in nonstandard child care. This increases the number of participants by 352 (N=2,392) but leaves the results qualitatively similar.

Conclusion and Policy Implications

This paper is the first to consider how children fare when they participate in nonstandard child care. Despite extensive shift work literature which details well-being outcomes due to parental employment during nonstandard hours, few have distinguished how child well-being is influenced by the care children receive while their parents work nonstandard hours. Evaluations of child well-being in child care literature distinguishes between children who participate in nonparental versus parental child care; however this research fails to consider *when* children participate in care. Therefore, the findings presented here are the first to jointly consider how children fare when they participate in nonparental child care while parents work nonstandard hours.

Results from the analyses reveal distinct well-being differences between participants and nonparticipants, dependent on the age group identified. Using the broadest group of nonparticipants as a reference group, I find meaningful dissimilarities between participants and nonparticipants. Children ages 0 to 5 display poor parent-child

attachment, as evidenced by *Parental Aggravation Scale* estimates, and are less likely to receive increased cognitive stimulation, as evidenced by estimates for frequency of outings. Poor physical health reports associated with participation in nonstandard child care are singularly observed for children between the ages of 6 to 11. Children ages 6 to 11 also show decreased behavioral-emotional competency, less engagement with school, and increased likelihood of receiving special education services.

Policy-relevant sub-groups are identified and estimates from these models indicate that previous conclusions from child care and shift work literature, which does not account for participation in nonstandard child care, are missing differences in samples of children which may strain the efficacy of past policy recommendations. In particular, substantial differences emerge when comparing participants with children who are cared for by one parent while the other parent works nonstandard hours.

Supplementary analyses investigating the influence of hypothesized mechanisms reveal which mechanisms are more closely associated with participation. Estimates reveal that the relationship between participation and child well-being are likely driven by monthly care cost, number of arrangements and hours in care per week, and type of child care used.

Numerous policy implications are raised by findings presented here. Given that all ages of children who participate in nonstandard child care are more likely to display decreased behavioral and emotional well-being, it is necessary for nonstandard child care providers to offer more age-specific or child-focused activities. Caregivers need to be trained in the various stages that children progress through in their caregiver-attachment needs so that children of all ages can be properly cared for. This is especially true for

noncenter-based care settings, where children of all ages are more likely to receive care during nonstandard hours.

School-aged children report poorer physical health conditions than nonparticipants. While future work can aim to identify the exact mechanisms of this relationship, it is likely that children who participate in nonstandard care have less access to outdoor play areas, have fewer hours of active play, receive food that is substandard in terms of nutritional requirements, have decreased access to or training in proper hygiene (e.g. brushing teeth, washing hands), or simply do not have adequate access to environments conducive for sleep. Children in nonstandard child care settings frequently sleep in noisy, crowded, uncomfortable settings where parents arrive at unpredictable intervals to collect their children. Child care providers must regulate evening and overnight environments to ensure that children can establish and maintain proper rest cycles.

Finally, given that school-aged children who participate in nonstandard child care are more likely to require remediation services in school compared to their nonparticipant counterparts, it is clear that nonstandard child care providers are not adequately meeting the cognitive needs of children during non-school hours. School-aged children who spend little (or no) time with parents between the end of the school day and the beginning of nonstandard child care require additional attention to ensure that developmental setbacks identified in school are being addressed by the child's most immediate caregiver – in this case, nonstandard child care providers. Increased communication between school teachers, caregivers, and parents – whether in the form of developing an Individual Learning Plan or some other tool – could serve to maintain parity in addressing cognitive

development needs of the child, regardless of who is currently providing care. In addition, children ages 0 to 5 who participate in nonstandard child care are less likely than their nonparticipant counterparts to receive frequent cognitive stimulation at home. Nonstandard child care providers may be required to either expose these children to more frequent outings to cognitively stimulate them, or identify solutions to parents that would improve the child's experience.

While requiring changes to nonstandard child care providers could be effectively performed via state-level agencies who oversee child care facility licensure[54], increasing requirements may cause some providers to find it is no longer in their interest to offer services during nonstandard hours. It may also be the case that too few providers offer services to meet the demand of parents. Newly released data from the National Study of Early Care and Education (OPRE, 2014) suggests this is true; only 7% of all licensed child care centers reported operating during evening and overnight hours. To counter this mismatch in supply and demand, employers who choose to employ workers during evening and overnight hours could be required to offer benefits to nonstandard-hour workers, such as a form of child care subsidy paid to facilities; this tool could ensure new standards are put in place to meet the needs of children who use the services. Alternatively, federal minimum wage guidelines could require a differential wage for those working second and third shift positions, which would buffer against child care providers who set increased rates for offering mandated enhanced services. Or, as Tekin (2007) has previously indicated, state agencies could alter child care subsidy allocation

[54] In 1998 the state of Illinois passed separate licensure requirements for child care providers who offer evening and overnight care which requires providers to monitor hygiene habits of children and create sleeping areas that are free from disruption of arriving and departing children.

mechanisms to ensure that accepting providers offer facilities which meet the demands of nonstandard-hour workers. Currently subsidized high-quality programs could also be altered to increase the supply of care during evening hours; Head Start and Early Head Start programs could be altered to require provision of care until 10pm.

The findings presented here offer an important and unique first look at children who participate in nonstandard child care; however, there are some limitations to the current research. While the NSAF does ask questions of parental work shift and child care use during work hours, this is not a substitute for an indicator of nonstandard child care use. Future research should collect information on known users of nonstandard child care. Another limitation to the NSAF is that it is a cross-sectional survey of children and provides no insight into how parents and children interact with nonstandard child care over time. Future work should attempt to analyze how children's participation in nonstandard child care alters over time and identify patterns and duration of participation. It may be the case that specific patterns and durations differentially influence child well-being, but this relationship should be explored in greater detail. Well-being data collected for the NSAF was inadequate for examining cognitive and behavioral development in infants and preschool children. Future work should look to data with rich well-being data collected on younger children to explore the relationship between participants of this age and various well-being measures. Finally, the NSAF data, while helpful in asking questions of daytime or non-daytime work, did not distinguish between parents who work evening or overnight hours. It may be that children who participate in nonstandard child care between the hours of 2pm to midnight (evening hours) differ dramatically from those who participate between 9pm and 8am (overnight hours). Future work should

consider differences between these groups of children who participate in nonstandard child care.

Appendix: Tables and Figures

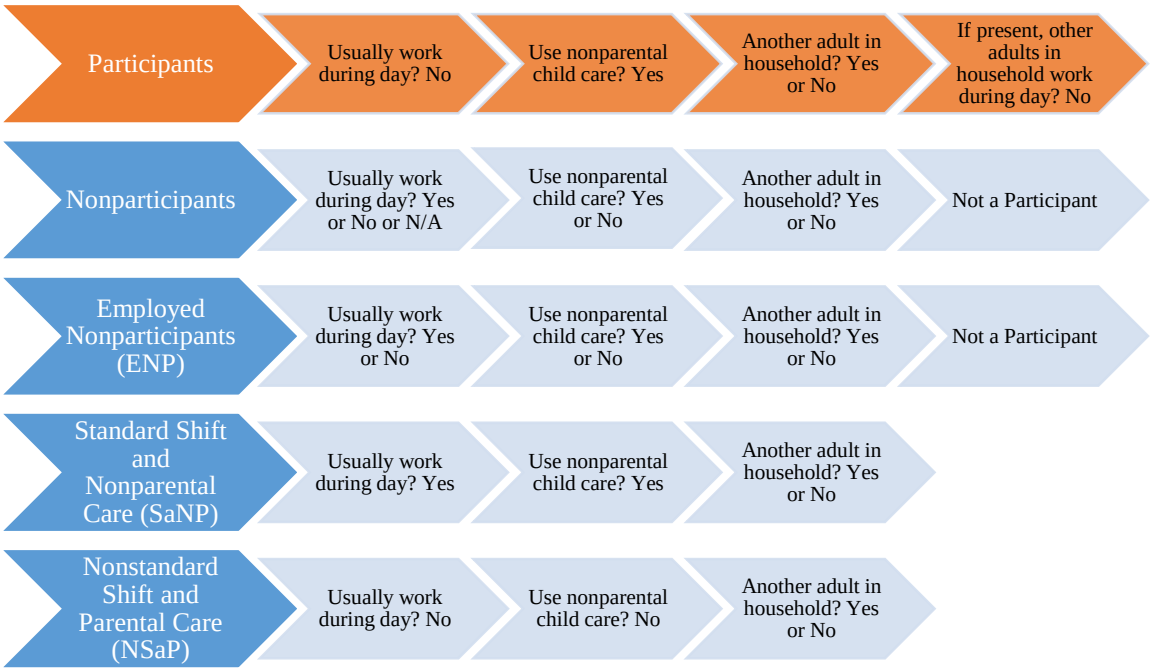


Figure 4: Classification of Participant and Reference Groups

Table 7: Child Well-being Scales and Non-scale Items in the NSAF

Scales and Non-Scale Items	Ages 0 to 5	Ages 6 to 11	Well-being Measure	Individual Items	Time Reference	Individual Item Coding	Range of Scale or Item
Parental Aggravation Scale	✓	✓	Measures parent-to-child interactions and parenting practices	Child is harder to care for than most Child really bothers me a lot I give up a lot of my needs for the child I have felt angry with the child	Last month/ 30 days	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = None of the time	4 to 16; higher scores indicate greater parental aggravation
School Engagement Scale	✗	✓	Measures child's interest in and willingness to do schoolwork	Cares about doing well in school Only works on schoolwork when forced to Does just enough schoolwork to get by Always does schoolwork	Current	1 = All of the time 2 = Most of the time 3 = Some of the time 4= None of the time	4 to 16; some individual items are reverse-coded so that higher scores indicate less engagement
Ages 6 to 11 Behavioral Problems Index Scale	✗	✓	Measures behavioral and social-emotional development of child	Feels worthless or inferior Has been nervous or tense Acts too young for their age Has difficulty getting along with other kids Can't concentrate or pay attention for long Has been unhappy, sad, or depressed	Last month/ 30 days	1 = Often true 2 = Sometimes true 3 = Never true	6 to 18; higher scores indicate greater behavioral problems
Non-Scale Items: Physical Health	✓	✓	Measures parental perceptions of current and relative physical health	Current physical health status "Very Good" or "Excellent"? Current physical health status improved since last year?	Current	0 = No 1 = Yes	0 to 1
Non-Scale Items: Cognitive Stimulation	✓	✗	Measures level of cognitive stimulation provided by engaging children in stimulating interactions	Number of days in the past week a family member read to the child Number of times in the past month a family member took the child on an outing	Last Week Last month	0 days to 7 days 1 = Once a month 2 = About 2 or 3 times a month 3 = Several times a week 4 = About once a day	0 to 7 days 1 to 4
Non-Scale Item: Special Education	✓	✓	Measures use of special education resources	Currently receives special education services?	Current	0 = No 1 = Yes	0 to 1

Source: Scale and item detail from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF.

Table 8: Demographic Characteristics for Children 0 to 5 in the NSAF

Variable	Range	All Children (N = 24,271)	1999 Children (N = 12,236)	2002 Children (N = 12,035)
Employment characteristics (%)				
Employed	0 – 1	0.597 (0.491)	0.619 (0.486)	0.574 (0.495)
Work nonstandard shift	0 – 1	0.211 (0.408)	0.226 (0.418)	0.196 (0.397)
2 or more jobs	0 – 1	0.058 (0.234)	0.054 (0.227)	0.062 (0.242)
Age of child (years)	0 – 12	2.557 (1.684)	2.591 (1.678)	2.523 (1.689)
Age of parent respondent (years)	15 – 65	31.656 (7.366)	31.505 (7.303)	31.805 (7.425)
Female child (%)	0 – 1	0.490 (0.500)	0.490 (0.500)	0.490 (0.500)
Female parent respondent (%)	0 – 1	0.826 (0.379)	0.813 (0.390)	0.840 (0.367)
Child's race / ethnicity (%)				
White	0 – 1	0.598 (0.490)	0.605 (0.488)	0.590 (0.492)
Black	0 – 1	0.154 (0.361)	0.154 (0.361)	0.154 (0.361)
Hispanic	0 – 1	0.193 (0.394)	0.188 (0.390)	0.198 (0.398)
Other	0 – 1	0.056 (0.229)	0.053 (0.225)	0.058 (0.234)
Parent respondent's education (%)				
Less than High School	0 – 1	0.138 (0.345)	0.139 (0.346)	0.137 (0.344)
High School	0 – 1	0.424 (0.494)	0.443 (0.497)	0.405 (0.491)
Some College	0 – 1	0.153 (0.360)	0.158 (0.365)	0.147 (0.354)
Bachelor's Degree	0 – 1	0.283 (0.450)	0.257 (0.437)	0.309 (0.462)
Parent respondent's marital status (%)				
Married, spouse present	0 – 1	0.721 (0.449)	0.711 (0.454)	0.731 (0.443)
Separated	0 – 1	0.045 (0.207)	0.050 (0.219)	0.040 (0.195)
Divorced	0 – 1	0.057 (0.232)	0.062 (0.240)	0.053 (0.223)
Widowed	0 – 1	0.006 (0.079)	0.008 (0.086)	0.005 (0.071)
Never married	0 – 1	0.170 (0.375)	0.169 (0.374)	0.171 (0.376)
Parent well-being				
Parental Mental Health scale	5 – 20	16.089 (2.558)	16.119 (2.533)	16.060 (2.583)
Child well-being				
Well-child exams last 12 mo. (#)	0 – 24	2.050 (2.016)	2.036 (2.016)	2.064 (2.016)
Child care characteristics				
Weekly arrangements (#)	0 – 5	0.972 (0.855)	0.978 (0.848)	0.966 (0.861)
Hours per week (#)	0 – 168	18.947 (21.650)	19.319 (21.687)	18.577 (21.608)
Cost per month ($)	1 – 5000	350.494 (348.361)	-	350.494 (348.361)
Cost as pct to family inc. (%)	0.001 - .88	0.010 (0.024)	-	0.010 (0.024)
Primary child care [not restricted to parental work hours] (%)				
Center care	0 – 1	0.241 (0.427)	0.243 (0.429)	0.238 (0.426)
Before/after school care	0 – 1	0.015 (0.120)	0.014 (0.117)	0.016 (0.124)
Relative care	0 – 1	0.239 (0.427)	0.241 (0.428)	0.238 (0.426)
Nonrelative care	0 – 1	0.134 (0.340)	0.137 (0.344)	0.130 (0.336)
Head Start	0 – 1	0.039 (0.194)	0.041 (0.198)	0.037 (0.189)
Self-care	0 – 1	0.002 (0.042)	0.002 (0.045)	0.002 (0.039)
Parent care	0 – 1	0.324 (0.468)	0.314 (0.464)	0.334 (0.472)
Federal Poverty Level (%)				
Below FPL	0 – 1	0.174 (0.379)	0.182 (0.386)	0.166 (0.372)
Below 2x FPL	0 – 1	0.409 (0.492)	0.429 (0.495)	0.390 (0.488)
Below 4x FPL	0 – 1	0.604 (0.489)	0.628 (0.483)	0.580 (0.494)
Family income ($)	0 – 338,000	53,490 (42,649)	48,750 (38,482)	58,181 (45,928)

Source: Author's calculations from the 1999 and 2002 NSAF, except child care cost, which drawn solely from the 2002 NSAF.
Note: Primary child care totals exclude relative in-home care and are calculated based on total hours spent across all child care arrangements throughout the week, regardless of if the child was in the care setting during parental work hours of not. Parental Mental Health scale score is precalculated in the NSAF by summing responses to five items, standardized to a 20-point scale where a higher score indicates better mental health. Standard deviations are in parentheses. All figures are weighted using the appropriate NSAF weight.

Table 9: Demographic Characteristics for Children 6 to 11 in the NSAF

Variable	Range	All Children (N = 22,179)	1999 Children (N = 11,413)	2002 Children (N = 10,766)
Employment characteristics (%)				
Employed	0 – 1	0.683 (0.465)	0.692 (0.462)	0.675 (0.468)
Work nonstandard shift	0 – 1	0.175 (0.380)	0.182 (0.386)	0.168 (0.374)
2 or more jobs	0 – 1	0.065 (0.247)	0.062 (0.240)	0.069 (0.253)
Age of child (years)	0 – 12	8.504 (1.701)	8.484 (1.695)	8.524 (1.707)
Age of parent respondent (years)	15 – 65	37.060 (7.305)	36.685 (7.124)	37.437 (7.463)
Female child (%)	0 – 1	0.487 (0.500)	0.486 (0.500)	0.488 (0.500)
Female parent respondent (%)	0 – 1	0.821 (0.383)	0.814 (0.389)	0.829 (0.377)
Child's race / ethnicity (%)				
White	0 – 1	0.616 (0.487)	0.625 (0.484)	0.606 (0.489)
Black	0 – 1	0.163 (0.369)	0.163 (0.369)	0.163 (0.370)
Hispanic	0 – 1	0.172 (0.378)	0.164 (0.370)	0.181 (0.385)
Other	0 – 1	0.049 (0.216)	0.049 (0.215)	0.050 (0.218)
Parent respondent's education (%)				
Less than High School	0 – 1	0.132 (0.339)	0.134 (0.341)	0.130 (0.336)
High School	0 – 1	0.425 (0.494)	0.435 (0.496)	0.415 (0.493)
Some College	0 – 1	0.177 (0.382)	0.180 (0.384)	0.175 (0.380)
Bachelor's Degree	0 – 1	0.263 (0.440)	0.248 (0.432)	0.278 (0.448)
Parent respondent's marital status (%)				
Married, spouse present	0 – 1	0.693 (0.461)	0.694 (0.461)	0.693 (0.461)
Separated	0 – 1	0.057 (0.231)	0.061 (0.239)	0.052 (0.222)
Divorced	0 – 1	0.120 (0.324)	0.121 (0.326)	0.118 (0.323)
Widowed	0 – 1	0.013 (0.115)	0.012 (0.111)	0.014 (0.118)
Never married	0 – 1	0.117 (0.321)	0.111 (0.314)	0.122 (0.327)
Parent well-being				
Parental Mental Health scale	5 – 20	15.961 (2.661)	15.965 (2.631)	15.957 (2.692)
Child well-being				
Well-child exams last 12 mo. (#)	0 – 24	0.893 (1.313)	0.882 (1.347)	0.903 (1.277)
Child care characteristics				
Weekly arrangements (#)	0 – 5	0.606 (0.705)	0.620 (0.705)	0.592 (0.705)
Hours per week (#)	0 – 168	6.818 (11.949)	6.886 (11.758)	6.750 (12.138)
Cost per month ($)	1 – 4400	248.980 (269.689)	-	248.980 (269.689)
Cost as pct to family inc. (%)	0.001 - .369	0.007 (0.013)	-	0.007 (0.013)
Primary child care [not restricted to parental work hours] (%)				
Center care	0 – 1	0 (0)	0 (0)	0 (0)
Before/after school care	0 – 1	0.144 (0.351)	0.138 (0.345)	0.150 (0.357)
Relative care	0 – 1	0.219 (0.413)	0.232 (0.422)	0.205 (0.404)
Nonrelative care	0 – 1	0.110 (0.313)	0.109 (0.312)	0.111 (0.314)
Head Start	0 – 1	0 (0)	0 (0)	0 (0)
Self-care	0 – 1	0.064 (0.244)	0.060 (0.237)	0.068 (0.251)
Parent care	0 – 1	0.456 (0.498)	0.448 (0.497)	0.464 (0.499)
Federal Poverty Level (%)				
Below FPL	0 – 1	0.163 (0.370)	0.174 (0.379)	0.153 (0.360)
Below 2x FPL	0 – 1	0.390 (0.488)	0.409 (0.492)	0.372 (0.483)
Below 4x FPL	0 – 1	0.592 (0.492)	0.606 (0.489)	0.577 (0.494)
Family income ($)	0 – 338,000	55,934 (42,666)	52,024 (39,573)	59,869 (45,230)

Source: Author's calculations from the 1999 and 2002 NSAF, except child care cost, which drawn solely from the 2002 NSAF.
Note: Primary child care totals exclude relative in-home care and are calculated based on total hours spent across all child care arrangements throughout the week, regardless of if the child was in the care setting during parental work hours of not. Parental Mental Health scale score is precalculated in the NSAF by summing responses to five items, standardizing to a 20-point scale where a higher score indicates better mental health. Standard deviations are in parentheses. All figures are weighted using the appropriate NSAF weight.

Table 10: Summary Statistics for Dependent Variables in the NSAF

Variable	Range	1999 Children Ages 0 to 5	2002 Children Ages 0 to 5	1999 Children Ages 6 to 11	2002 Children Ages 6 to 11
Parental Aggravation Scale Score	4 – 16	5.958 (1.815)	5.991 (1.854)	6.183 (1.818)	6.154 (1.892)
Harder to care for	1 – 4	3.681 (0.614)	3.647 (0.657)	3.696 (0.612)	3.669 (0.638)
Really bother me a lot	1 – 4	3.495 (0.634)	3.497 (0.619)	3.408 (0.634)	3.422 (0.631)
Give up needs for child	1 – 4	3.414 (0.896)	3.400 (0.907)	3.400 (0.885)	3.410 (0.902)
Felt angry with child	1 – 4	3.452 (0.532)	3.466 (0.531)	3.315 (0.501)	3.347 (0.518)
School Engagement Scale Score	4 – 16	-	-	6.657 (2.536)	7.006 (2.535)
Cares about doing well	1 – 4	-	-	1.608 (0.769)	1.649 (0.745)
Forced to do homework	1 – 4	-	-	3.147 (0.956)	3.026 (1.002)
Schoolwork to get by	1 – 4	-	-	3.226 (1.003)	3.052 (1.064)
Always does homework	1 – 4	-	-	1.429 (0.760)	1.456 (0.774)
Behavioral Problems Index Scale Score	6 – 18	-	-	7.919 (2.021)	7.983 (2.078)
Feels worthless/inferior	1 – 3	-	-	2.848 (0.385)	2.843 (0.395)
Has been nervous/tense	1 – 3	-	-	2.688 (0.526)	2.669 (0.544)
Acts too young for age	1 – 3	-	-	2.768 (0.494)	2.735 (0.531)
Difficulty with other kids	1 – 3	-	-	2.638 (0.547)	2.648 (0.542)
Not able to concentrate for long	1 – 3	-	-	2.492 (0.644)	2.487 (0.542)
Unhappy/sad/depressed	1 – 3	-	-	2.648 (0.513)	2.642 (0.521)
Physical Health Items:					
Current health status	1 – 5	1.610 (0.857)	1.608 (0.850)	1.648 (0.868)	1.719 (0.914)
Health compared to last year	1 – 5	2.558 (0.807)	2.557 (0.820)	2.725 (0.689)	2.710 (0.704)
Insurance Coverage Items:					
Insured through employer	0 – 1	0.630 (0.483)	0.607 (0.488)	0.654 (0.476)	0.636 (0.481)
Insured through Medicaid/CHIP/state	0 – 1	0.224 (0.417)	0.277 (0.448)	0.166 (0.372)	0.231 (0.421)
Individually insured	0 – 1	0.038 (0.191)	0.037 (0.189)	0.046 (0.209)	0.037 (0.190)
Currently uninsured	0 – 1	0.108 (0.310)	0.079 (0.269)	0.134 (0.341)	0.096 (0.294)
Insured for previous 12 months	0 – 1	0.834 (0.372)	0.877 (0.329)	0.813 (0.390)	0.862 (0.345)
Cognitive Stimulation:					
Days read to last week	0 – 7	4.942 (2.321)	4.216 (2.976)	-	-
Frequency of outings last month	1 – 4	3.102 (0.681)	3.053 (0.685)	-	-
Non-Scale Education Items:					
Receives Special Education	0 – 1	--	0.068 (0.252)	-	0.131 (0.338)

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* Standard deviations are in parentheses. All figures are weighted using the appropriate NSAF weight. Reference group for insurance coverage are those who are uninsured.

Table 11: Well-being Measures for Participants, Ages 0 to 5

Dependent Variable	Participants (N=1,255)	Nonparticipants (N=23,000)	ENP (N=14,154)	SaNP (N=8,314)	NSaP (N=1,133)
Parental Aggravation Scale	6.148	5.965	5.849	5.875	5.880
	(1.960)	(1.828)***	(1.742)***	(1.729)***	(1.806)***
Harder to care for	3.631	3.666	3.695	3.712	3.657
	(0.679)	(0.634)***	(0.603)***	(0.584)***	(0.652)**
Really bothers me a lot	3.453	3.498	3.527	3.500	3.547
	(0.656)	(0.625)***	(0.604)***	(0.600)***	(0.641)**
Give up needs for child	3.354	3.410	3.458	3.481	3.384
	(0.966)	(0.898)	(0.860)***	(0.840)***	(0.921)
Felt angry with child	3.414	3.462	3.473	3.433	3.531
	(0.580)	(0.529)***	(0.521)***	(0.519)	(0.503)***
Cognitive Stimulation:					
Days read to last week	2.760	1.853	1.719	2.529	1.441
	(3.410)	(3.390)***	(3.354)***	(3.429)***	(3.263)***
Frequency of outing last month	3.109	3.076	3.071	3.067	3.056
	(0.684)	(0.683)	(0.668)*	(0.639)**	(0.716)*
Physical Health:					
Health very good or excellent	1.608	1.609	1.574	1.592	1.571
	(0.844)	(0.853)**	(0.812)***	(0.806)**	(0.810)***
Improved health since last year	2.575	2.557	2.597	2.624	2.582
	(0.801)	(0.814)	(0.784)**	(0.763)***	(0.796)
Insurance Coverage:					
Insured through employer	0.652	0.621	0.703	0.744	0.646
	(0.477)	(0.485)**	(0.457)***	(0.436)***	(0.478)
Insured through Medicaid/CHIP/state	0.239	0.256	0.191	0.166	0.234
	(0.427)	(0.436)	(0.393)***	(0.372)***	(0.424)
Individually insured	0.039	0.038	0.037	0.035	0.030
	(0.195)	(0.192)	(0.188)	(0.183)	(0.171)
Uninsured	0.070	0.084	0.069	0.055	0.089
	(0.255)	(0.278)*	(0.254)	(0.228)**	(0.285)*
Insured for previous 12 months	0.869	0.867	0.885	0.899	0.858
	(0.337)	(0.340)	(0.320)	(0.301)***	(0.349)
Non-Scale Education Items:					
Receives special education	0.055	0.069	0.051	0.053	0.040
	(0.228)	(0.254)	(0.220)	(0.224)	(0.196)

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* All figures are weighted using the appropriate NSAF weight. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. Reference group for insurance coverage are those who are uninsured. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 12: Well-being Measures for Participants, Ages 6 to 11

Dependent Variable	Participants (N=698)	Nonparticipants (N=21,481)	ENP (N=14,775)	SaNP (N=5,342)	NSaP (N=1,297)
Parental Aggravation Scale	6.815	6.168	6.098	6.080	6.000
	(1.993)	(1.851)**	(1.774)***	(1.732)***	(1.696)***
Harder to care for	3.667	3.683	3.700	3.715	3.681
	(0.627)	(0.625)***	(0.606)***	(0.568)***	(0.630)***
Really bothers me a lot	3.354	3.417	3.438	3.429	3.495
	(0.735)	(0.629)*	(0.612)**	(0.607)*	(0.570)***
Give up needs for child	3.454	3.403	3.437	3.454	3.458
	(0.873)	(0.894)	(0.864)**	(0.847)***	(0.893)
Felt angry with child	3.345	3.330	3.331	3.332	3.365
	(0.569)	(0.508)	(0.501)	(0.503)**	(0.501)
School Engagement Scale	6.972	6.827	6.801	6.860	6.681
	(2.616)	(2.539)***	(2.492)***	(2.454)***	(2.362)**
Cares about doing well	1.651	1.628	1.628	1.635	1.583
	(0.798)	(0.756)**	(0.746)**	(0.730)*	(0.706)**
Forced to do homework	3.001	3.089	3.083	3.056	3.102
	(1.017)	(0.980)*	(0.961)*	(0.947)	(0.976)
Schoolwork to get by	3.100	3.140	3.177	3.157	3.217
	(1.110)	(1.035)**	(1.005)***	(0.999)***	(0.949)*
Always does homework	1.421	1.443	1.443	1.445	1.471
	(0.760)	(0.767)	(0.746)	(0.739)	(0.805)
Behavioral Problems Index Scale	8.361	7.938	7.872	7.948	7.869
	(2.189)	(2.044)***	(1.945)***	(1.898)***	(2.016)***
Feels worthless/inferior	2.806	2.847	2.855	2.861	2.877
	(0.418)	(0.389)	(0.373)	(0.360)	(0.360)
Has been nervous/tense	2.586	2.681	2.686	2.678	2.699
	(0.617)	(0.532)***	(0.524)***	(0.523)***	(0.534)***
Acts too young for age	2.708	2.753	2.777	2.778	2.737
	(0.530)	(0.512)	(0.482)**	(0.479)*	(0.534)
Difficulty with other kids	2.538	2.646	2.659	2.644	2.671
	(0.596)	(0.542)***	(0.530)***	(0.532)***	(0.528)***
Not concentrate for long	2.417	2.492	2.504	2.460	2.481
	(0.653)	(0.643)***	(0.629)***	(0.635)***	(0.645)***
Unhappy/sad/depressed	2.589	2.647	2.648	2.629	2.672
	(0.555)	(0.516)***	(0.509)***	(0.513)**	(0.508)***
Physical Health:					
Health very good or excellent	1.799	1.680	1.640	1.620	1.669
	(0.904)	(0.891)***	(0.849)***	(0.822)***	(0.869)**
Improved health since last year	2.690	2.718	2.738	2.730	2.680
	(0.691)	(0.697)	(0.660)*	(0.666)*	(0.717)
Insurance Coverage:					
Insured through employer	0.699	0.665	0.736	0.768	0.677
	(0.459)	(0.472)*	(0.441)**	(0.422)***	(0.468)
Insured through	0.176	0.200	0.146	0.141	0.180
Medicaid/CHIP/state	(0.381)	(0.400)	(0.353)**	(0.348)**	(0.385)
Individually insured	0.034	0.042	0.040	0.030	0.037
	(0.182)	(0.199)	(0.195)	(0.171)	(0.189)
Uninsured	0.090	0.094	0.079	0.061	0.106
	(0.287)	(0.292)	(0.270)	(0.239)***	(0.308)
Insured for previous 12 months	0.835	0.859	0.877	0.897	0.846
	(0.371)	(0.348)*	(0.329)***	(0.304)***	(0.361)
Non-Scale Education Items:					
Receives special education	0.183	0.127	0.120	0.125	0.135
	(0.388)	(0.333)***	(0.325)***	(0.330)***	(0.342)**

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* All figures are weighted using the appropriate NSAF weight. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. Reference group for insurance coverage are those who are uninsured. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 13: Main Results for Participation on Scale Outcomes, Ages 0 to 5

Dependent Variable: Well-Being Scales and Non-Scale Items	***(A)***	***(B)***	***(C) Full Model 1***
Parental Aggravation Scale	0.182	0.155	0.154
	(0.046)***	(0.045)***	(0.044)***
Non-Scale Items:			
Days read to last week	0.037	0.048	0.042
	(0.063)	(0.051)	(0.053)
Frequency of outings	-0.028	-0.036	-0.037
	(0.011)***	(0.010)***	(0.010)***
Receives special education	0.006	0.010	0.005
	(0.013)	(0.013)	(0.011)
Current health very good or better	-0.011	-0.011	-0.012
	(0.008)	(0.009)	(0.009)
Improved health since last year	0.013	0.013	0.014
	(0.013)	(0.012)	(0.012)
Currently insured through employer	0.023	0.015	0.013
	(0.010)**	(0.006)***	(0.005)**
Currently insured through Medicaid/CHIP/state	0.022	0.011	0.005
	(0.024)	(0.026)	(0.023)
Currently individually insured	0.048	0.082	0.086
	(0.037)	(0.049)*	(0.052)*
Insured for previous 12 months	0.003	0.004	0.002
	(0.008)	(0.007)	(0.006)
Demographics	**N**	**Y**	**Y**
State and Year Effects	**N**	**N**	**Y**

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* Independent variable is participation in nonstandard child care where participation equals one and zero otherwise. OLS is performed for continuous well-being scale dependent variables and number of times read to last week; logistic regression is performed for remaining non-scale items. Reference group for outings are those who receive daily outings; reference group for special education are those who do not receive special education; reference group for current health are those with good, fair, or poor health; reference group for last year's health are those who maintained or declined in health; reference group for insurance coverage are those who are uninsured. Marginal (probability) effects are reported, along with standard errors (in parentheses) which have been adjusted for state-year clustering. Column A regresses participation in nonstandard child care on various child well-being scales or non-scale items. Column B adds demographic control covariates (age of child and parent, gender of child and parent, race of child, marital status of parent, educational attainment of parent, blurred household income, total number of non-adult siblings in household, presence of children ages 0-5, presence of children ages 6-17, and total number of non-parent adults in household). Column C (Full Model 1) adds demographic control covariates and state and year effects. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 14: Main Results for Participation on Scale Outcomes, Ages 6 to 11

Dependent Variable: Well-Being Scales and Non-Scale Items	***(A)***	***(B)***	***(C)*** ***Full Model 1***
Parental Aggravation Scale	0.142	0.135	0.138
	(0.099)	(0.095)	(0.095)
School Engagement Scale	0.289	0.257	0.260
	(0.109)***	(0.108)**	(0.109)**
Behavioral Problems Index Scale	0.386	0.328	0.331
	(0.094)***	(0.092)***	(0.092)***
Non-Scale Items:			
Receives special education	0.055	0.058	0.061
	(0.022)**	(0.023)**	(0.023)***
Current health very good or better	-0.034	-0.034	-0.034
	(0.014)**	(0.014)**	(0.015)**
Improved health since last year	0.018	0.011	0.012
	(0.017)	(0.015)	(0.016)
Currently insured through employer	0.010	0.011	0.010
	(0.013)	(0.008)	(0.007)
Currently insured through Medicaid/CHIP/state	-0.019	-0.067	-0.068
	(0.038)	(0.040)*	(0.041)*
Currently individually insured	-0.031	0.034	-0.041
	(0.040)	(0.037)	(0.037)
Insured for previous 12 months	-0.023	-0.022	-0.025
	(0.014)*	(0.013)*	(0.013)*
Demographics	**N**	**Y**	**Y**
State and Year Effects	**N**	**N**	**Y**

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* Independent variable is participation in nonstandard child care where participation equals one and zero otherwise. OLS is performed for continuous well-being scale dependent variables and number of times read to last week; logistic regression is performed for remaining non-scale items. Reference group for outings are those who receive daily outings; reference group for special education are those who do not receive special education; reference group for current health are those with good, fair, or poor health; reference group for last year's health are those who maintained or declined in health; reference group for insurance coverage are those who are uninsured. Marginal (probability) effects are reported, along with standard errors (in parentheses) which have been adjusted for state-year clustering. Column A regresses participation in nonstandard child care on various child well-being scales or non-scale items. Column B adds demographic control covariates (age of child and parent, gender of child and parent, race of child, marital status of parent, educational attainment of parent, blurred household income, total number of non-adult siblings in household, presence of children ages 0-5, presence of children ages 6-17, and total number of non-parent adults in household). Column C (Full Model 1) adds demographic control covariates and state and year effects. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 15: Logit Results for Participation on Individual Items, Ages 0 to 5

Dependent Variable: Well-Being Scale Individual Items	*(A)*	*(B)*	*(C)* *Full Model 1*
Parental Aggravation Scale			
Harder to care for	0.041	0.043	0.042
	(0.014)***	(0.015)***	(0.014)***
Really bothers me a lot	0.024	0.018	0.018
	(0.012)*	(0.013)	(0.013)
Give up needs for child	0.010	0.014	0.013
	(0.015)	(0.016)	(0.016)
Felt angry with child	0.030	0.028	0.028
	(0.012)**	(0.014)**	(0.014)**
Demographics	**N**	**Y**	**Y**
State and Year Effects	**N**	**N**	**Y**

Source: Author's calculations from the 1999 and 2002 NSAF. *Note:* Independent variable is participation in nonstandard child care where participation equals one and zero otherwise. Generalized ordered logistic regression is performed for individual scale items, with the reference group of "none of the time" or "never true". Marginal probability effects are reported, along with standard errors (in parentheses) which have been adjusted for state-year clustering. Column A regresses participation in nonstandard child care on various child well-being scales or individual items. Column B adds demographic control covariates (age of child and parent, gender of child and parent, race of child, marital status of parent, educational attainment of parent, blurred household income, total number of non-adult siblings in household, presence of children ages 0-5, presence of children ages 6-17, and total number of non-parent adults in household). Column C (Full Model) adds demographic control covariates and state and year effects. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 16: Logit Results for Participation on Individual Items, Ages 6 to 11

Dependent Variable: Well-Being Scale Individual Items	***(A)***	***(B)***	***(C)*** ***Full Model 1***
Parental Aggravation Scale			
Harder to care for	0.057	0.057	0.059
	(0.023)**	(0.023)**	(0.023)**
Really bothers me a lot	0.012	0.012	0.011
	(0.027)	(0.027)	(0.028)
Give up needs for child	0.005	0.007	0.007
	(0.021)	(0.021)	(0.021)
Felt angry with child	-0.037	-0.019	-0.020
	(0.020)*	(0.021)	(0.021)
School Engagement Scale			
Cares about doing well	-0.003	-0.001	-0.001
	(0.004)	(0.003)	(0.002)
Forced to do homework	0.046	0.040	0.040
	(0.017)***	(0.019)**	(0.019)**
Schoolwork to get by	0.023	0.030	0.030
	(0.022)	(0.023)	(0.024)
Always does homework	-0.004	-0.001	-0.000
	(0.006)	(0.004)	(0.002)
Behavioral Problems Index Scale			
Feels worthless/inferior	0.013	0.016	0.014
	(0.017)	(0.017)	(0.017)
Has been nervous/tense	0.050	0.041	0.040
	(0.016)***	(0.016)***	(0.016)**
Acts too young for age	0.016	0.024	0.025
	(0.017)	(0.017)	(0.017)
Difficulty w/ other kids	0.072	0.065	0.066
	(0.018)***	(0.018)***	(0.018)***
Not concentrate long	0.082	0.060	0.060
	(0.021)***	(0.022)***	(0.022)***
Unhappy/sad/depressed	0.052	0.042	0.041
	(0.020)***	(0.020)**	(0.020)**
Demographics	**N**	**Y**	**Y**
State and Year Effects	**N**	**N**	**Y**

Source: Author's calculations from the 1999 and 2002 NSAF. *Note:* Independent variable is participation in nonstandard child care where participation equals one and zero otherwise. Generalized ordered logistic regression is performed for individual scale items, with the reference group of "none of the time" or "never true". Marginal probability effects are reported, along with standard errors (in parentheses) which have been adjusted for state-year clustering. Column A regresses participation in nonstandard child care on various child well-being scales or individual items. Column B adds demographic control covariates (age of child and parent, gender of child and parent, race of child, marital status of parent, educational attainment of parent, blurred household income, total number of non-adult siblings in household, presence of children ages 0-5, presence of children ages 6-17, and total number of non-parent adults in household). Column C (Full Model) adds demographic control covariates and state and year effects. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 17: Main Results for Policy Relevant Sub-groups, Ages 0 to 5

Dependent Variable: Well-Being Scales and Non-Scale Items	***Model 1: Nonparticipants***	***Model 2: ENP***	***Model 3: SaNP***	***Model 4: NSaP***
Parental Aggravation Scale	0.154	0.197	0.191	0.232
	(0.044)***	(0.046)***	(0.051)***	(0.085)***
Non-Scale Items:				
Days read to per week	0.042	0.121	0.159	0.117
	(0.053)	(0.053)**	(0.053)***	(0.084)
Frequency of outings	-0.037	-0.054	0.068	0.021
	(0.010)***	(0.011)***	(0.012)***	(0.015)
Receives special education services	0.005	0.011	0.011	0.028
	(0.011)	(0.012)	(0.012)	(0.016)*
Current health very good or better	-0.012	-0.012	-0.002	-0.036
	(0.009)	(0.008)	(0.009)	(0.013)***
Improved health compared to last year	0.014	0.017	0.010	0.028
	(0.012)	(0.011)	(0.012)	(0.015)*
Currently insured through employer	0.013	0.004	-0.002	0.022
	(0.005)***	(0.005)	(0.004)	(0.009)**
Currently insured through Medicaid/CHIP/state	0.005	0.021	0.011	0.066
	(0.023)	(0.024)	(0.025)	(0.035)*
Currently individually insured	0.086	0.086	0.067	0.159
	(0.052)	(0.059)	(0.065)	(0.060)***
Insured for previous 12 months	0.002	0.001	-0.004	0.022
	(0.006)	(0.005)	(0.005)	(0.010)**
Demographics	**Y**	**Y**	**Y**	**Y**
State and Year Effects	**Y**	**Y**	**Y**	**Y**

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* Independent variable is participation in nonstandard child care where participation equals one and zero otherwise. OLS is performed for continuous well-being scale dependent variables and number of times read to last week; logistic regression is performed for remaining non-scale items. Reference group for outings are those who receive daily outings; reference group for special education are those who do not receive special education; reference group for current health are those with good, fair, or poor health; reference group for last year's health are those who maintained or declined in health; reference group for insurance coverage are those who are uninsured. Marginal (probability) effects are reported, along with standard errors (in parentheses) which have been adjusted for state-year clustering. All models include demographic control covariates (age of child and parent, gender of child and parent, race of child, marital status of parent, educational attainment of parent, blurred household income, total number of non-adult siblings in household, presence of children ages 0-5, presence of children ages 6-17, and total number of non-parent adults in household), and state and year effects. Model restrictions are as follows: ENP restricts the sample to all children with parents who are employed, SaNP restricts the sample to all children whose parents use nonparental child care to care for their children while they work regardless of time of use, and NSaP restricts the sample to all children with parents who work nonstandard hours regardless of type of child care used to care for their children while they work. Reference group for insurance coverage are those who are uninsured. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 18: Main Results for Policy Relevant Sub-groups, Ages 6 to 11

Dependent Variable: Well-Being Scales and Non-Scale Items	***Model 1: Nonparticipants***	***Model 2: ENP***	***Model 3: SaNP***	***Model 4: NSaP***
Parental Aggravation Scale	0.138	0.175	0.151	0.273
	(0.095)	(0.096)*	(0.095)	(0.112)**
School Engagement Scale	0.260	0.267	0.206	0.200
	(0.109)**	(0.108)**	(0.113)*	(0.148)
Behavioral Problems Index Scale	0.331	0.375	0.304	0.347
	(0.092)***	(0.090)***	(0.092)***	(0.107)***
Non-Scale Items:				
Receives special education services	0.061	0.069	0.060	0.080
	(0.023)***	(0.023)***	(0.021)***	(0.028)***
Current health very good or better	-0.034	-0.036	-0.042	-0.031
	(0.015)**	(0.014)**	(0.015)***	(0.019)
Improved health compared to last year	0.012	0.018	0.011	0.017
	(0.016)	(0.015)	(0.016)	(0.018)
Currently insured through employer	0.010	-0.001	-0.006	0.010
	(0.007)	(0.006)	(0.005)	(0.012)
Currently insured through Medicaid/CHIP/state	-0.068	-0.041	-0.076	-0.025
	(0.041)*	(0.044)	(0.043)*	(0.069)
Currently individually insured	-0.041	-0.050	-0.079	-0.047
	(0.037)	(0.040)	(0.052)	(0.053)
Insured for previous 12 months	-0.025	-0.023	-0.030	-0.003
	(0.013)*	(0.011)**	(0.011)***	(0.017)
Demographics	**Y**	**Y**	**Y**	**Y**
State and Year Effects	**Y**	**Y**	**Y**	**Y**

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* Independent variable is participation in nonstandard child care where participation equals one and zero otherwise. OLS is performed for continuous well-being scale dependent variables and number of times read to last week; logistic regression is performed for remaining non-scale items. Reference group for outings are those who receive daily outings; reference group for special education are those who do not receive special education; reference group for current health are those with good, fair, or poor health; reference group for last year's health are those who maintained or declined in health; reference group for insurance coverage are those who are uninsured. Marginal (probability) effects are reported, along with standard errors (in parentheses) which have been adjusted for state-year clustering. All models include demographic control covariates (age of child and parent, gender of child and parent, race of child, marital status of parent, educational attainment of parent, blurred household income, total number of non-adult siblings in household, presence of children ages 0-5, presence of children ages 6-17, and total number of non-parent adults in household), and state and year effects. Model restrictions are as follows: ENP restricts the sample to all children with parents who are employed, SaNP restricts the sample to all children whose parents use nonparental child care to care for their children while they work regardless of time of use, and NSaP restricts the sample to all children with parents who work nonstandard hours regardless of type of child care used to care for their children while they work. Reference group for insurance coverage are those who are uninsured. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 19: Regression Results for Participation and Mechanisms, All Ages

Dependent Variable: Parental Employment and Child Care Mechanisms	***Children Ages 0 to 5***	***Children Ages 6 to 11***
Parental Mental Health (#)	-0.061	-0.018
	(0.065)	(0.109)
Number of Well-Child Exams Last Year (#)	0.024	0.085
	(0.048)	(0.062)
Monthly Child Care Cost ($)	-53.732	-19.710
	(12.447)***	(13.820)
Child Care Cost as Percent to Family Income (%)	0.001	-0.001
	(0.002)	(0.001)
Number of Weekly Child Care Arrangements (#)	0.477	0.628
	(0.023)***	(0.014)***
Number of Hours in Child Care Per Week (#)	10.269	11.798
	(0.761)***	(0.716)***
Primary Nonparental Child Care is Noncenter-Based (%)	0.173	0.168
	(0.010)***	(0.009)***
Demographics	**Y**	**Y**
State and Year Effects	**Y**	**Y**

Source: Author's calculations from the 1999 and 2002 NSAF, except child care cost, which is drawn solely from the 2002 NSAF.
Note: Independent variable is participation in nonstandard child care where participation equals one and zero otherwise. OLS is performed for continuous and dichotomous parental employment and child care mechanisms. Marginal (probability) effects are reported, along with standard errors (in parentheses) which have been adjusted for state-year clustering. All models include demographic control covariates (age of child and parent, gender of child and parent, race of child, marital status of parent, educational attainment of parent, blurred household income, total number of non-adult siblings in household, presence of children ages 0-5, presence of children ages 6-17, and total number of non-parent adults in household), and state and year effects. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

CHAPTER 4

STATIC OR DYNAMIC?: IDENTIFYING LONGITUDINAL PATTERNS OF NONPARENTAL CHILD CARE PARTICIPATION DURING NONSTANDARD HOURS USING THE ECLS-B

Introduction

Large numbers of individuals are employed during evening or overnight hours – what is often labeled nonstandard hours. National employment data reveal that one-fifth of the working population is employed in either permanent or rotating nonstandard-hour positions (McMenamin, 2007). [55] Notably, one-third of nonstandard-hour employees are parents with children under the age of 6 and one-half are parents with children under the age of 13 (McMenamin, 2007). While two-parent households working nonstandard hours are frequently cited as "tag-team" parenting – working alternative shifts to always leave one parent with the child – it may also be the case that parents require nonparental child care while working nonstandard hours (Han & Fox, 2011). Indeed, national income and program participation data reveal that 24 percent of mothers working nonstandard hours report using center-based care (Kimmel & Powell, 2006)[56]; furthermore, state-level data provided by Illinois indicate that 17 percent of new child care requests are for evening or overnight care (IDHS, 2014).[57] On a national level, newly released data exploring the

[55] Statistics are drawn from the Work Schedules and Work at Home survey, the most recent supplemental survey from the BLS to include questions of shift work, which was conducted in tandem with the May 2004 Current Population Survey.
[56] Kimmel and Powell use 1992-1993 Survey of Income and Program Participation data to calculate these figures.
[57] In response to national employment data made available through the 2004 CPS, the state of Illinois began tracking parental requests for evening and overnight care made through their Child Care Resource and Referral program.

center-based early care and education environment reveals that 7 percent of all center-based programs provide care during evening or overnight hours (OPRE, 2014).

The prevalence of nonstandard work has been accompanied by an upsurge of research investigating outcomes for parents working nonstandard hours. Nonstandard work is associated with sleep deprivation (Akerstedt, 2003), diminished physical health (Costa, 2003; Klerman, 2005; Ulker, 2006), marital instability (Mills & Täht, 2010; Presser, 2000; Täht, 2011), stress and poor behavioral well-being (Costa et al., 1989; Barton et al., 1995; Hsueh & Yoshikawa, 2007; Liu et al., 2011), and decreased parental acuity (Grzywacz et al., 2011; Rapoport & Le Bourdais, 2002). Households where at least one parent is engaged in nonstandard work experience additional difficulty as a family unit, including reporting more conflict, less cohesion, and poorer home environments (Bianchi, 2011; Craig & Powell, 2011; Hsueh & Yoshikawa, 2007; La Valle et al., 2002; Lleras, 2008; Presser, 2007; Tuttle & Garr, 2012). Another stream of research investigates the relationship between parental nonstandard work and child outcomes. This work concludes that children whose mothers are employed during nonstandard hours have poorer behavioral, cognitive, and physical well-being (Gassman-Pines, 2011; Han, 2008; Han & Waldfogel, 2007; Joshi & Bogen, 2007; Rosenbaum & Morett, 2009; Strazdins et al., 2004; Strazdins et al., 2006) compared to children whose mothers work standard, daytime hours.

Another body of research considers the role that participation in nonparental child care plays in child well-being. Behavioral development can be positively or negatively altered by exposure to a variety of types or characteristics of child care (Loeb et al., 2007; McCartney et al., 2010; Morrissey, 2009). Children from low-income families experience

cognitive gains associated with participation in high-quality nonparental child care (Burchinal et al., 2011; Dearing et al., 2009; Duncan & NICHD, 2003; Mashburn, 2008). Moreover, children who attend child care facilities with strict nutrition guidelines and planned physical activities report significantly lower rates of obesity (Story et al., 2006; Benjamin et al., 2008; Benjamin et al., 2009). However, exposure to care at younger ages (Bradley & Vandell, 2007), for longer hours (Brooks-Gunn et al., 2002), or to care of lower-quality (Pluess & Belsy, 2009) is negatively associated with both cognitive and behavioral development.

Despite the breadth of extant shift work *and* child care research there is a gap in the literature. To date, no research provides a detailed examination of children and parents who use nonparental child care during nonstandard hours over spans of time. This paper addresses this gap. Specifically, the aim of this paper is to exploit panel data to understand how static and dynamic patterns and durations of participation in nonparental child care during nonstandard hours ('nonstandard child care') are related to characteristics of the child and parent. Participation is relatively straightforward when using cross-sectional data: an observed child is classified as a participant or nonparticipant. Across four waves of data there is likely to be many changes in the participation status of children in nonstandard child care – these shifts in participation must be accounted for to (1) identify the variety of patterns of participation and (2) properly model characteristics of children who do or do not participate in nonstandard child care.

Using the Early Childhood Longitudinal Study – Birth cohort (ECLS-B), I begin by developing a classification mechanism to sort children into categories of participation

and nonparticipation for the sample of children in each wave of the survey. These data stand apart from others in that parental time-of-employment and child care use during work hours is recorded for children from infancy through kindergarten entry. Parental responses to these questions allow me to construct a classification mechanism and identify participants and nonparticipants. Nonparticipants are not a homogenous group. Three policy-relevant reference subgroups are examined: those with employed parents, those using standard hours of nonparental child care, and those with one parent working nonstandard hours while the other parent provides care. I present main analyses estimating differences in participation across characteristics, and Cox proportional hazards analyses testing which child and parent characteristics are associated with participation.

I find that children who reside with younger, lower-skilled, unmarried parents are more likely to participate in any longitudinal pattern of nonstandard child care. These findings are mirrored in the Cox proportional hazards model, where estimates show that children who reside with parents who are older, high-skilled, and married are more likely to survive the time-to-event analysis. Finally, I conclude that narrowing the reference group of nonparticipants leaves the results qualitatively similar.

The remainder of the paper proceeds as follows. Section 2 offers a brief review of relevant work from the shift work and child care literatures. Section 3 describes the ECLS-B dataset and the mechanism used to classify children as participants or nonparticipants. Section 4 presents the empirical model. Section 5 presents the results. Section 6 concludes.

Literature Review

Relatively little research considers what children do when their parents work nonstandard hours. Two main branches of literature feed into this paper's examination of children and parents who use nonstandard child care. The first is the shift work literature, which focuses on identifying individuals who work nonstandard hours. The second is the child care literature, which focuses on identifying children and parents who participate in nonparental child care.

Shift work literature

A growing body of shift work literature centers on identifying who works nonstandard hours. Presser and Ward (2011) trace characteristics of nonstandard hour workers over time. They find that between the ages of 18 and 39 almost 73 percent of workers report working nonstandard hours at some point. Men are 22 percentage points more likely to work a nonstandard hour schedule at any point, and those with some college or a bachelor's degree are almost 19 percentage points more likely than those with only a high school diploma to work nonstandard hours. These findings conflict with Täht's (2011) examination, who finds that men with less educational attainment are more likely to work nonstandard hours due to pay differences. Tekin (2007) finds that single mothers work shift work so long as child care is affordable and available; if child care subsidies steer them towards standard-hour work they will alter employment behaviors.

Wight et al. (2008) and Mills and Täht (2010) conclude that parents in general are more likely to work nonstandard hours than non-parents, structuring schedules so that one parent works nonstandard hours while the other works standard hours in order to avoid using and paying for nonparental child care. Presser (1988, 2004) and Stoll et al.

(2006) agree, finding that two-parent households use shift work as a solution to avoid using nonparental child care. Lehrer (1989) reports that all parents working nonstandard hours are less likely to use formal types of child care (e.g. center-based, nonrelative home-based), which Collins et al. (2002), Han (2004, 2005), and Kimmel and Powell (2006) confirm.

In stark contrast to this, Presser (2004) concludes that single mothers are more likely than couples to work nonstandard hours, with over a third of single mothers working any nonstandard hours; these numbers increase to 2 out of every 5 when restricted to those with children under the age of 5, and 3 out of 5 when restricted to low-income, single mothers with children under the age of 5. However, Presser (1986) and Sandstrom et al. (2012) report that single women often alter time-of-day work behaviors due to child care concerns, moving to standard hours when child care cannot be found.

McMenamin (2007) details changes in demographic characteristics of nonstandard hour workers, using data from the Work Schedule and Work at Home survey, a special supplement to the BLS' 2004 Current Population Survey. As previously noted, the BLS report shows that approximately 30 percent of workers engage in any nonstandard hours of work. McMenamin (2007) finds that those most likely to work nonstandard hours are: males, blacks, and those with less than a high school education. Only ten percent of workers employed during nonstandard-only hours report that their reason for working these hours are for better child care arrangements, while over half report that it is due to the "nature of the job."

Child care literature

A considerable amount of child care literature details the characteristics of child and parent participants. In general, authors agree that parents make child care choices along the following lines: race or ethnicity, child's age, income or poverty status, and parental educational attainment.

Several authors conclude that race and ethnicity of parents are associated with child care choice. Kreader et al. (2005) and Huston et al. (2002) find that black children are more likely than their white counterparts to participate in nonparental child care, especially in center-based care. Early and Burchinal (2001) find that this is true for Asian children as well. Conversely, Huston et al. (2002) and Fuller et al. (1996) both conclude that Hispanic children are more likely than all other children to be under parental care than any other type of child care and are the least likely group to be in center-based care.

Age of children is a predictable correlate with child care choice. Kreader et al. (2005) report that half of all children born in 2001 use some form of nonparental child care by 9 months of age. Huston et al. (2002) identify primary factors affecting child care choice, noting that households with children under the age of 5 are more likely to be in center-based child care. Capizzano et al. (2000) conclude that infants and toddlers are more likely to be cared for by parents compared to 3 and 4 year-olds, who are more likely to be in center-based care.

Parental income serves as a solid predictor of child care choice. Tang et al. (2012) concludes that low-income families have limited selection of child care providers due to geographic inaccessibility of care centers. Meyer and Jordan (2006) report that parental employment in higher-income positions is the single best predictor of participation in center-based care. Kreader et al. (2005) find that families with income below the federal

poverty level are less likely to use nonparental child care. Collins et al. (2002) focus on child care subsidies, concluding that low-income families will use center-based care when subsidies exist that make them affordable. Henly and Lyons (2000) argue that low-income mothers tend to seek child care that is affordable, safe, and convenient – most often nonrelative child care. Hofferth and Wissoker (1992) sees price as a critical barrier to center-based care entry, especially for mothers who are paid a low hourly wage.

Finally, several authors identify associations between parents' education attainment and child care choice. Huston et al. (2002) note that adults with more education and skill training are more likely to use center-based care than their counterparts. Hofferth (1999) identifies a trend across all working mothers to seek out more formal, reliable child care such as center-based and nonrelative care. This trend was especially prominent for mothers in professions that required more training and educational attainment.

Based on these two literatures, there are some hypotheses that can be specified. One, while relatively little work has been done to examine who uses nonstandard child care in general, even less is known about how this population of child care participants operates over time as children age. Child care literature typically concludes that primary use of nonparental child care is replaced by public school as children reach the age at which they can be enrolled full-time (typically kindergarten). This is a valid conclusion if the use of nonparental child care occurs during standard hours; it becomes problematic when child care use occurs during nonstandard hours. It may be that children continue to use nonstandard child care far past kindergarten enrollment, unlike their standard-hour counterparts. Two, while little work has been done in shift work literature assessing the

use of nonstandard child care, some pieces may provide clues regarding connections between duration and characteristics. Child care subsidy acceptance seem to extend the amount of time that single mothers are willing to continue use of nonstandard-hour providers; low-cost of care relative to income may also be another correlate. However, it may also be the case that lower-skilled parents are unable to find work in preferable standard-hour positions and remain employed during nonstandard hours, forced to use nonstandard child care to care for their children.

Data Source and Classification Mechanism

Data source

The Early Childhood Longitudinal Study – Birth cohort (ECLS-B) is a nationally representative panel survey, sampling approximately 14,000 children born in the US in 2001. Data collection was completed in five waves. The first wave of collection occurred between 2001 and 2002 when children turned approximately 9 months-of-age and yielded a sample of almost 11,000 respondents. The second wave of data collection occurred during 2003 when children turned approximately 2 years of age and yielded a sample of almost 10,000 respondents. The third wave of data collection occurred between 2005 and 2006 when children were preschool-age eligible (48 to 57 months) and yielded a sample of almost 9,000 respondents. The forth wave of data collection occurred between 2006 and 2007 when most children entered kindergarten and yielded a sample of almost 7,000 respondents. A second kindergarten sample occurred for the cohort who (re)entered kindergarten during the 2007-2008 school year, which yielded an additional 1,900 respondents for the sample.

The baseline sample from the four waves includes 10,688 children, the unit of analysis for this descriptive analysis. Because it is a birth cohort of children, they are all approximately the same at each wave of the survey: 9 months, 2 years, 3 years old and the last wave, which concludes when they enter kindergarten.[58] Child care information was collected across all waves. *Table 20* provides summary statistics for the analysis sample of ECLS-B children and their households. Approximately 87 percent of children have at least one employed parent, with almost 30 percent of those parents employed during nonstandard hours in the first wave.[59] This percentage decreases to 60 percent employment, with 20 percent working nonstandard hours, by the kindergarten wave of data collection.

Classification mechanism

Classifying children as nonstandard child care participants using cross-sectional data is relatively straightforward: a child either does or does not participate. However, when children are accounted for through multiple waves of survey data collection, patterns of nonstandard child care participation become much more complex. This section will detail the potential patterns of participation in nonstandard child care over four waves of the ECLS-B. Due to the importance of this mechanism, the construction of the indicator for participation in nonstandard child care deserves attention. Since this paper is the first to identify children who participate in nonstandard child care, there is no

[58] Most of the children entered kindergarten when they turned 5 years old, while a smaller sub-sample entered kindergarten when they turned 6 years old. For this analysis, the 'kindergarten wave' of data combines both those who entered kindergarten at ages 5 and 6 into one wave.
[59] Waves 1 and 3 includes employment information on residential parents and their spouses, in addition to nonresidential fathers; waves 2 and 4 only include employment information on residential parents and their spouses.

previous literature to guide this classification process. First, the mechanism used to classify children as participating will be outlined. Second, types of nonparticipants will be presented. Third, patterns of participation will be detailed and pattern-types will be discussed.

Prior to identifying patterns of participation it is necessary to construct an assignment mechanism to classify children as nonstandard child care participants and nonparticipants. The variable which classifies families and children as likely participating in nonstandard child care must be constructed since this variable is not actually observed in the ECLS-B. While many surveys gather data about employment, few ask questions about the time of day during which adults are employed. The ECLS-B collects rich information on both parents and their children. Notably, the ECLS-B asks questions about parental work schedules, specifically asking, "Which of the following best describes the hours you usually work at your main job?," allowing them to choose between: regular daytime shift (6 am to 6 pm), regular evening shift (2pm to midnight), regular night shift (9pm to 8am), rotating shift (changes days to evenings/nights), split shifts (two daytime shifts), or some other shift. Few surveys additionally collect detailed information about primary child care use, the concurrence of which allows me to construct a classification mechanism. Finally, the ECLS-B follows a birth cohort of children from 9 months of age until kindergarten entry, collecting parental employment and child care participation information through all waves. Due to the combination of employment and child care questions and the panel nature of the data, the ECLS-B is uniquely suited for this current research.

Children will be classified as participating in nonstandard child care if a number of qualifications are met: (1) the parental respondent(s) reports mostly working outside of the hours of 6am to 6pm, (2) the child's primary source of child care is nonrelative care, relative out-of-home care, or center-based care, (3) that the parent works for as many or more hours as the child participants in care, and (4) if there is no spouse in the household, the parental respondent does not live with another adult who may potentially be caring for the child while the parent works. The third assumption is necessary to define 'participation' since child care questions used in the ECLS-B do not specify if care is used during work hours, but will be eased later during robustness checks. *Figure 5* illustrates the variables used to identify parents who concurrently (1) work nonstandard hours, (2) use nonparental child care to care for their children during the same number of hours they work, and (3) have no other adult present in the household to care for their child.

The first variable used in the construction of the classification mechanism is the parental nonstandard-hour work variable. This variable is constructed from a survey question that queries "Which of the following best describes the hours you usually work at your main job?" If the answer is 'regular evening', 'regular night', or 'rotating shift', then the parent is determined to be working nonstandard hours for the purposes of this study.[60] The second variable used in the construction of the classification mechanism is the primary child care variable.[61] This variable is pre-generated from several survey

[60] Respondents who reply 'some other shift' are excluded from the analysis.

[61] Two separate primary child care variables come pre-generated in this dataset. The first is 'Primary child care – most hours per week' where the child's primary child care is calculated based solely on the total number of hours the child participates in each arrangement. The second, 'Primary child care' is the primary child care type as reported by the parent in the parent interview. The correlation between these two

questions that assess the number of child care providers that the child participates in during the week and the number of hours during that week that the child spends with each provider. An aggregated count is then completed where one provider is designated as the primary provider. The third variable considers whether another adult lives in the home that could be providing care for the child while the parent works nonstandard hours. If it is another parent, then they also are asked if they work 'regular evening', 'regular night', or 'rotating' shift; if it is not another parent then the child must be excluded as a participant. If a child meets all qualifications – has a parent who works nonstandard hours, uses nonparental child care as a primary source of care while the parent works, and no other adult lives in the home who can care for them during nonstandard hours – then the child is classified as participating in nonstandard child care.

While the ECLS-B offers a relatively large sample size, it is also the case that approximately 50 percent of maternal respondents during the 9-month wave reported no employment hours last week; this significantly decreases the sample size of participants in the first wave. In addition, given that the respondents are not asked what source of care they use for their child when they are working, it is necessary to identify nonstandard child care participants by applying strict assumptions about the number of hours per week that parents work and use child care. A second drawback with using the ECLS-B to identify participants in nonstandard child care is that the survey neither records children's times of entry into or exit out of child care,[62] nor is the exit hour when parents start or end

variables is high, .997 suggesting that children have relative stability in their child care provider regardless of error in parental reporting.

[62] During the kindergarten waves of data collection, child care providers are questioned regarding time of entry and exit for child participants who use before- and after-school care only. This information will be

a work shift known.[63] For this reason, it is possible to identify *likely* nonstandard child care participants. Finally, it may also be the case that some parents use nonstandard child care for reasons other than working (e.g. schooling, errands, or personal time). The ECLS-B does not directly question respondents about use of nonstandard child care in general, so these individuals would not be recognized as using nonstandard child care within this framework.[64]

Reference groups

Once the classification mechanism is constructed and the participant group is identified then several reference groups can be constructed. *Figure 6* illustrates the mechanisms for classifying a child as participating in nonstandard child care or as belonging to one of the four reference groups. *Participates* is always set equal to one when the previously discussed qualifications are met. *Participates* is set equal to zero when children are identified as belonging to one of the reference groups. Since there are four separate reference groups, it is necessary to make four versions of the participant indicator. $Participates_1$ equals zero for Nonparticipants – all other children in the sample who are not participants. This reference group will be the primary group used in the comparative analysis. One policy-relevant sub-group are those children whose parents are employed. For this second reference group, children whose parents are employed and who are not participants, $Participates_2$ equals zero and they will be labeled the Employed

used in cross-sectional robustness checks to compare participants and nonparticipants for the last wave only.

[63] If parents report working "some other schedule" than 'regular daytime', 'regular evening', 'regular night', 'rotating shift', or 'split shift' then they are asked to specify that schedule. Unfortunately, that information is not provided in the restricted-use version of the ECLS-B data.

[64] The number of individuals this may exclude is unknown. Research suggests that most mothers (78 percent) use nonparental child care for employment-related reasons, as measured when the child is 3-years of age (Brooks-Gunn et al., 2002).

Nonparticipants (ENP) group. A second policy-relevant sub-group are those children who use standard hours of nonparental child care while their parents work. For this third reference group, children whose parents are employed and use nonparental care during daytime (standard) hours, $Participates_3$ equals zero and they will be labeled the Standard Shift and Nonparental Care (SaNP) group. A final policy-relevant sub-group are those children with one parent who works nonstandard hours while the other parent provides child care. For this forth reference group, children whose parents work nonstandard hours and use parental child care during these hours, $Participates_4$ equals zero and they will be labeled the Nonstandard Shift and Parental Care (NSaP) group.

Pattern identification

Aside from the complexity surrounding classification of participants and nonparticipants in nonstandard child care is the longitudinal ability to switch from being classified as a participant in one wave of the ECLS-B to being classified as a nonparticipant in the next. *Figure 7* demonstrates all of the potential participation patterns that a child could experience through four waves of the ECLS-B. The child's participation status (participant/nonparticipant) is indicated for each wave. As *Figure 7* shows, there are sixteen potential patterns of participation across the four waves of the ECLS-B.

These sixteen patterns are able to be placed into three different categories of participation patterns: static, switchers, cyclers. Static categories of participation patterns are those children who never alter their participation classification: always-participants and never-participants. Switcher categories of participation patterns are those who switch once during the four-wave course. If a child starts as a participant and switches to a

nonparticipant, or vice versa, for the remainder of the waves this child's pattern of participation category is referred to as a switcher. The final category, and most dynamic of the categories of participation patterns, is the cycler. Children whose participation pattern fits the cycler category are those who alter their participation classification two or more times through the four waves of the ECLS-B. Half of the patterns fit this category, as shown in *Figure 7*.

The classification mechanism *Participates* will then be altered to reflect the categories of participation patterns over the four waves. To reflect these changes, the variable *Participates* will be relabeled: $Participates^{STATIC}$, $Participates^{SWITCHER}$, and $Participates^{CYCLER}$. Each $Participates^{CATEGORY}$ variable will be set equal to one when the child has been classified as a participant in nonstandard child care in a particular pattern of waves. For example, if a child participates in nonstandard child care across all four waves, then that child will have a value of unity for the variable $Participates^{STATIC}$, and a value of zero for the variables $Participates^{SWITCHER}$ and $Participates^{CYCLER}$.

Empirical Model

To lay the groundwork for the probit and Cox proportional hazard regression analyses, this section will begin by presenting the descriptive statistics for groups of children based on nonstandard child care participation classification, as described above. Descriptive statistics include the following: total and wave-by-wave count of child-observations in each of the participant (static, switcher, cycler) and reference groups (Nonparticipants, ENP, SaNP, NSaP), means for child and parent characteristics in each of the participant and reference groups, and (when applicable) statistical significance from two-sample t-tests weighing the difference of the means across participant and

reference groups. Finally, I perform probit and Cox proportional hazard regression analyses which (1) estimate likelihoods of nonstandard child care participation given a specified matrix of child and parental characteristics (2) test which characteristics are associated with protracted spells of participation or nonparticipation.

Summary statistics

Tables 21, 22 and *23* provide information regarding the distribution of child and parent characteristics across participant and nonparticipant groups. These tables provide the group means, as well as signify statistical significance of two-sample t-tests that evaluate the differences between the group means for each child or parent characteristic.

Probit regression model

To augment the simple descriptive statistics, probit regression analysis is performed in the following section. Separate regressions using all nonstandard child care participants will be run restricting the sample to mirror the four reference groups previously described. Equation (1) is shown as follows:

$$\text{Equation 1: } Participates^{CATEGORY}_{is} = \beta_1 Characteristic_{is} + \mathbf{\Phi}_s + \varepsilon_{is}$$

where *i* indexes individuals and *s* indexes state of residence. The variable *Characteristic* represents various demographic characteristics for the child and parent. These include: gender, race and ethnicity, number of siblings, presence of multiple births (e.g. twins), birth weight, marital status or primary parent, education attainment of primary parent, family income, and income as related to the Federal Poverty Level. $Participates^{CATEGORY}$ is equal to one when the child is classified as a participant in one of the categories of

participation patterns.[65] The coefficient of interest is β_1 which can be interpreted as how various child and parent characteristics are associated with particular categories of participation patterns. By regressing $Participates^{CATEGORY}$ onto the matrix of child and parental characteristics I will estimate the likelihood of individuals with that characteristic being classified into one of the categories of participation patterns. **Φ** represents state fixed effects, to control for the macro economic and social environments within-state. Standard errors are adjusted for individual-level clustering.

Cox proportional hazard model

In a Cox proportional hazards model, I am interested in comparing two groups with respect to the hazard of each experiencing some event. In order to understand the hazard for each group, I estimate a hazard ratio through a log-rank test. Specifically, a hazard ratio can be understood as the ratio of the total number of observed events compared to the total number of expected events in two independent groups. In this case, I am interested in understanding the hazard for children who display a variety of characteristics and who reside with parents who display a variety of characteristics. For instance, what is the hazard of a child participating in nonstandard child care at any point between birth and kindergarten entry for those with married parents compared to unmarried parents. The Cox proportional hazards regression model is shown in Equation (2), as follows:

Equation (2): $h(t) = h_0(t) \exp (b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12})$,

[65] Alternatively, this variable was broken into the sixteen distinct patterns as a robustness check using a constructed variable $Participates^{PATTERN}$.Due to the low number of observations in each pattern, no estimates were produced, resulting in exclusion from the presented analyses.

where h(t) is the expected hazard at time t, and $h_0(t)$ is the baseline hazard representing the hazard of participating in nonstandard child care when all of the predictors are set equal to zero. Predictors used in the Cox proportional hazards regression model include the following: X_1 represents the age of the child, X_2 represents the age of the parent reported in the first wave, X_3 represents the gender of the child, X_4 represents the gender of the parent, X_5 represents the birth weight of the child, X_6 represents if the child was one of multiple births (e.g. twins), X_7 represents the number of siblings the child has, X_8 represents the race of the child, X_9 represents the education level of the parent reported in the first wave, X_{10} represents the marital status of the parent reported in the first wave, X_{11} represents the family income reported in the first wave, and X_{12} represents the family income with respect to the Federal Poverty Level in the first wave.

Policy-relevant sub-groups

Four versions of the specified empirical model are used. Model 1 examines nonstandard child care participation among all households. This model will serve as the primary model to observe differences between participants and an unrestricted sample of nonparticipants. Models 2, 3, and 4 narrow the examination to policy-relevant sub-groups: households with a parental respondent who is employed, parents who are employed and use nonparental child care (during either standard or nonstandard hours), and parents who are employed during nonstandard hours and use parental or nonparental child care. Using four models, whose sample restrictions simulate the classification mechanisms of the participant and reference groups previously outlined, allows me to compare multiple groups of nonparticipants to uniquely-defined participants.

Results

To lay the groundwork for the main analyses, this section begins by presenting descriptive statistics for groups of children based on nonstandard child care participation classification. Descriptive statistics include the following: total count of child-observations in each of the participant (any, static, switcher, and cycler) and reference groups, means for child and parent characteristics in each of the participant and reference groups, and (when applicable) statistical significance from two-sample t-tests weighing the difference of the means across participant and reference groups. Finally, I perform probit regression analysis to estimate likelihoods of nonstandard child care participation given a specified matrix of child and parental characteristics, and Cox proportional hazards regression analysis to estimate the hazard of participating in nonstandard child care across groups of children reporting a variety of child and parental characteristics.

Who participates in nonstandard child care?

Table 21 provides information regarding the distribution of demographic, economic, and occupational characteristics for children who have been classified as participating in nonstandard child care. Two-sample t-tests weigh the difference in means between children who participate in various longitudinal patterns of nonstandard child care as compared to the primary reference group of nonparticipants. Mean value differences from *Table 21* illustrate a number of trends. Children who participate in any nonstandard child care are more likely than children who do not participate to be older, have fewer siblings, identify as black, use more weekly child care arrangements and for more hours per week, and to use specific types of child care as their primary care arrangement (center-based, relative, nonrelative, and multiple sources of care). These

findings suggest that parents who work nonstandard hours find it difficult to arrange consistent child care services and therefore must shuffle between multiple arrangements to fill the time that they are at work.

Table 22 provides information regarding the distribution of demographic, educational, and employment characteristics for parents of children who have been classified as participating in nonstandard child care. Children who participate in any longitudinal pattern of nonstandard child care are more likely than children who do not participate to have parents who are younger, lower skilled (complete only high-school degree or less), work two or more jobs, work evening-only or rotating shifts, have family income that falls below the Federal Poverty Level, and fall into specific marital categories where there is no spouse in or at the home (separated, divorced, and never married). These findings, coupled with those from *Table 21*, suggest that many parents who use nonstandard child care are single heads-of-household and are holding two jobs, perhaps in rotating nonstandard-hour shifts. One position may be during normal daytime 'standard' hours while the other is not, thus the need for multiple child care arrangements that fall outside the time of 6am to 6pm.

To test these employment assumptions, I take advantage of the occupational data retained in the ECLS-B. Occupation data in the ECLS-B is collected on parents of focal children and reported across 25 major occupation categories, as reported in the U.S. Census. The summaries for these occupations can be found across participant and reference groups in *Table 23*. Parents who work nonstandard hours, regardless of parental or nonparental child care use, are more likely to work in service occupations (food preparation, healthcare support, building and grounds cleaning, or personal care and

services), Production, and Transportation and Materials moving. This finding is unsurprising given previous discussions of parental skills and income. Parents of participants are less likely than all other reference groups to work in Managerial occupations.

How do nonstandard child care participants compare to nonparticipants?

Given that no previous research has identified children who participate in nonstandard child care over time, it is useful to (1) allow this group to be defined as broadly as possible, devoting the bulk of the results discussion to comparing participants in all longitudinal patterns of participation to the unrestricted sample of nonparticipants and to (2) reserve the remainder of the discussion for identifying significant changes that occur in associations between *Participates* and the covariates as the reference group of nonparticipants becomes more narrowly defined.

Table 24 contains the marginal probability effects from the probit regression results from Equation 1 using all four models. Model 1 is the focus of this discussion and estimates participation from an unrestricted sample of children. This model allows me to compare participant children to the broadest sample of nonparticipants – all other children who are not strictly classified as participating in nonstandard child care. Due to the longitudinal nature of the data, all independent variables are captured from the first wave of the survey in order to avoid endogeneity concerns. Significant differences appear across virtually all covariates in this model.

Parent's age is highly statistically significant, where for each additional month of age a child is .02 percentage points less likely to participate in nonstandard child care in any pattern of participation. Marital status of the parent is also highly correlated with all

longitudinal patterns of participation. Parents who are separated (1.04 percentage points), divorced (1.13 percentage points), and never married (1.27 percentage points) more likely to use any pattern of nonstandard child care. Parents with only a high school degree are .24 percentage points more likely to use nonstandard child care, and parents who have some college are .28 percentage points more likely to use any pattern of nonstandard child care. None of these findings are surprising given that McMenamin (2007) reported that these groups were more likely to work nonstandard hours overall, regardless of parental status. There are several potential reasons for the disconnection in lower-skilled nonstandard-hour workers not selecting nonstandard child care. First, it could be the case that lower-skilled workers are also younger and therefore less likely to have children to enroll in child care. In results not shown, I include interactions between education achievement and age of parents. The coefficients on these interactions indicate no relationship between the age and skill of the worker that correlate with selection of nonstandard child care. Second, it could be the case that medium-skilled workers are paid higher wages than their lower-skilled counterparts who are employed during nonstandard hours and can therefore afford different child care options. Child care literature suggests that lower-wage parents have to piece together child care, using more arrangements for smaller batches of time. In the end, child care availability and access may be a barrier for many parent working nonstandard hours.

Cox proportional hazards regression results

Moving to longitudinal models of participation, *Table 25* shows results for the Cox proportional hazards regression analysis. In this time-to-event analysis, the event outcome is participation in nonstandard child care. Since hazards are proportional over

time, the model does not need to control for wave. Hazard ratios close to one indicate that the predictor variable does not affect participation in nonstandard child care. Hazard ratios less than one indicate that the predictor variable is protective against participation in nonstandard child care. Hazard ratios greater than one indicate that the predictor is associated with an increased risk of participation in nonstandard child care.

I find that children whose parents are older are 1.027 times more likely to enter kindergarten without participating in nonstandard child care. Children whose parents have completed high school are 1.393 times more likely to participate in nonstandard child care at some point between birth and kindergarten entry than children whose parents did not complete high school. Children with parents who are separated, divorced, or never married are far more likely to participate in nonstandard child care at some point before kindergarten entry than their counterparts with married parents. In particular, children with parents who are separated are 1.231 times more likely to participate in nonstandard child care at some point between birth and kindergarten entry than children with married parents; children with divorced parents are 1.081 times more likely to participate in nonstandard child care at some point than children with married parents; and children with parents who were never married are 5.331 times more likely to participate in nonstandard child care at some point than children with married parents. These findings are in line with those reported in the probit regression analysis.

Policy-relevant nonparticipant sub-groups

Turning attention to policy-relevant sub-groups, I will start by examining changes in estimates reported in *Table 26*. Looking to the probit regression estimates in *Table 26*, I first compare point estimates in Model 1 to those in Model 2. In Model 2, I am

comparing children who participate in any longitudinal pattern of nonstandard child care to all nonparticipants whose parents are employed. Significant differences between the two models include parent's education and family income below the Federal Poverty Level. Specifically, Model 2 shows that children whose parents have a bachelor's degree are 2.4 percentage points less likely to participate in nonstandard child care than those with less-than-a-high-school degree. Model 2 also shows that children whose family income falls below the poverty line are .3 percentage points less likely to participate in nonstandard child care. Comparing point estimates in Model 1 to those in Models 3 and 4, I find no qualitative differences. In Model 3, children who participate in nonstandard child care are more likely to reside with younger parents who are low-skilled and unmarried. In Model 4, children who participate in nonstandard child care are more likely to reside with younger parents who are low-skilled and unmarried with incomes below the Federal Poverty Level. From a policy perspective this is a concern if lower-wage, lower-skilled parents are disproportionately employed in nonstandard-hour positions and face additional child care obstacles. In combination, not only does this create employment barriers but also poses potential well-being risks for their children when quality, reliable care is not available.

Conclusion and Policy Implications

This paper is the first to identify children who participate in, and parents who use, nonstandard child care. Despite extensive shift work literature which has detailed characteristics of workers who are employed during nonstandard hours, few have identified both how parents care for their children during nonstandard hours of work and how this shifts over time. Despite the fact that research in child care literature has

distinguished between children who participate in nonparental versus parental child care, it has failed to consider *when* children participate in care. Therefore, the findings presented here are the first to jointly consider not only *when* children participate in nonparental child care over time but also *how* children are cared for when their parents work nonstandard hours.

Results examining how children participate in nonstandard child care over time reveal distinctions between participants and nonparticipants, dependent on the reference group identified. Using the broadest group of nonparticipants as a reference group, I find that children who participate in nonstandard child care at any time are more likely to reside with a younger, unmarried parent who is low-skilled. When the participant group is restricted to children who participate in nonstandard child care across all waves, participants are less likely to be white and have a family income below the Federal Poverty Level. Restricting the participant group to those who switch between participation and nonparticipation exactly once across the waves significantly alters the findings; switchers are more likely to reside with a single female parent and to be a twin. Finally, restricting the participant group to children who cycle between participation and nonparticipation multiple times across the waves reveals additional differences; cyclers are more likely to reside with a single male parent and less likely to be a twin. Restricting the analysis to policy-relevant sub-groups of nonparticipants leave the analyses qualitatively similar.

Numerous policy implications are raised by findings presented here. Given that children who participate in nonstandard child care are older than those who typically participate in standard hours of nonparental child care, it may be necessary for child care

providers who care for these children to offer different services during the evenings and overnight. Older children require assistance with homework and one-on-one engagement with school work which is historically provided by a parent. Child care providers may need inducement to change what services are offered and when they are offered to meet the needs of these children who participate in evening and overnight care. Sleeping conditions may also need to be monitored to ensure that children are in an environment which is conducive to establishing and maintaining proper rest cycles. If children aged five to twelve attend school during the day and nonparental child care in the evenings or overnight, it is likely that little communication occurs between children and parents. It may also be necessary to encourage nonstandard child care providers to establish improved communication with parents so that early signs of cognitive, behavioral, or physical developmental issues can be identified and addressed early on.

While requiring changes to nonstandard child care providers could be effectively performed by state-level agencies who oversee child care facility licensure, increasing requirements may also cause some providers to find it is no longer in their interest to offer services during nonstandard hours. It may also be the case that too few providers offer services to meet the demand of parents. To counter this, employers who choose to employ workers during evening and overnight hours could be required to offer additional benefits to workers who are employed during these shifts, including a form of child care subsidy, which would be paid to facilities to ensure new standards are put in place that meet the needs of children who use the services. Alternatively, federal minimum wage guidelines could require a differential wage for those working second and third shift positions which would buffer against child care providers who set increased rates for

offering mandated enhanced services. Or, as Tekin (2007) has previously suggested, state agencies could alter child care subsidy allocation mechanisms to ensure that accepting providers offer facilities which meet the demands of nonstandard-hour workers.

The findings presented here offer an important and unique first look at children who participate in, and parents who use, nonstandard child care; however, there are some limitations to the current research. While the ECLS-B does ask questions of parental work shift and child care use during work hours, this is not a substitute for an indicator of nonstandard child care use. Future research should collect information on known users of nonstandard child care. In addition, occupation data used in the ECLS-B is less than detailed. McMenamin (2007) outlines workers' responses for why they work nonstandard hours, reasons that could allow for a causal understanding of the relationship between nonstandard employment and child care. Shift work literature frequently concludes that the causal arrow between parental nonstandard-hour work and nonstandard-hour child care use is unknown. In particular, do parents choose to work nonstandard hours and fit child care needs around those hours, or choose to avoid nonparental child care and therefore work nonstandard hours to meet this preference?

Beyond limitations of the data and this current research, there are additional questions which should be the focus of future research that ties into evaluations from the shift work and child care literatures. Both child care and shift work literatures have assumed nonstandard child care participants are homogenous with some other group of children: nonparental child care participants and children whose parents work nonstandard hours and use parental care, respectively. However, I find that this assumption does not hold when I evaluate sub-group differences in children's

demographic, household economic, and child care characteristics. Both child care and shift work literatures have used this assumption of homogeneity beyond analyses that assess the demographic features of children and their families – research considering child outcomes comprises a growing segment of both bodies of research. Future research should reexamine child outcome findings, with a renewed focus on understanding the relationship between participation in nonstandard child care and child well-being. In addition, McMenamin (2007) concludes that growth in the number of parents working nonstandard hours over the last twenty years has been predominately driven by parents who have flexibility in setting their work schedules. While these parents may also use nonstandard child care, they are opting into choosing care arrangements that work for the time they prefer to work; the well-being outcomes for their children likely look significantly different than those for children whose parents have little choice over the shift that they work.

Appendix: Tables and Figures

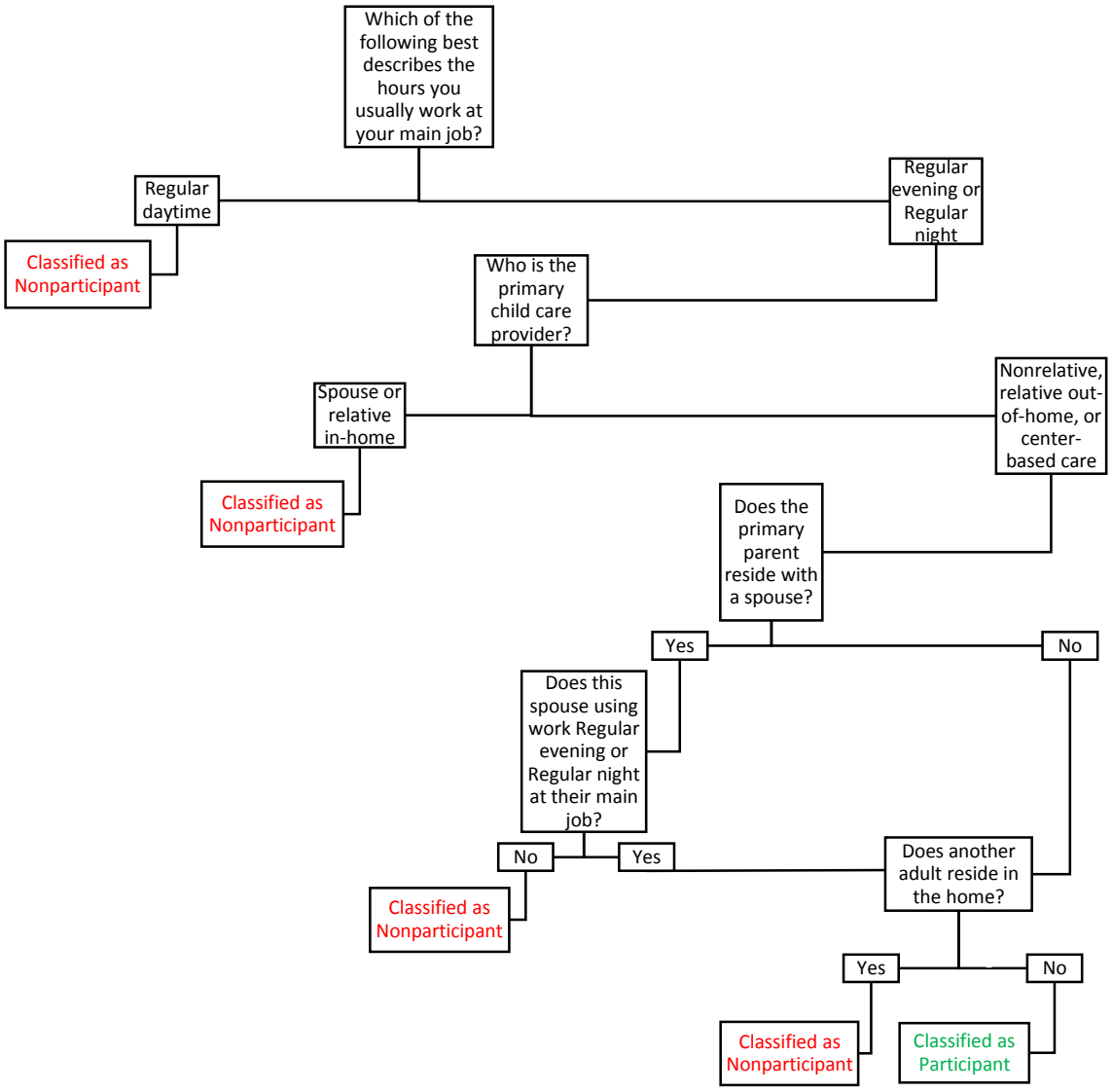


Figure 5: ECLS-B Classification Schema

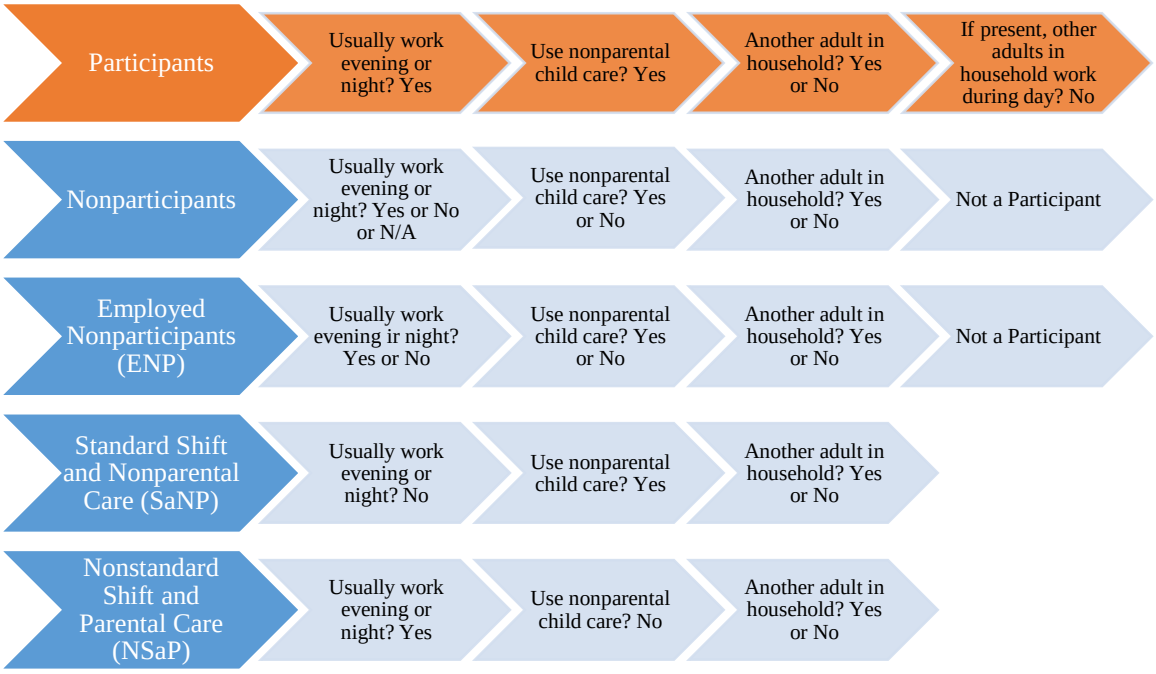


Figure 6: Classification of Participant and Reference Groups

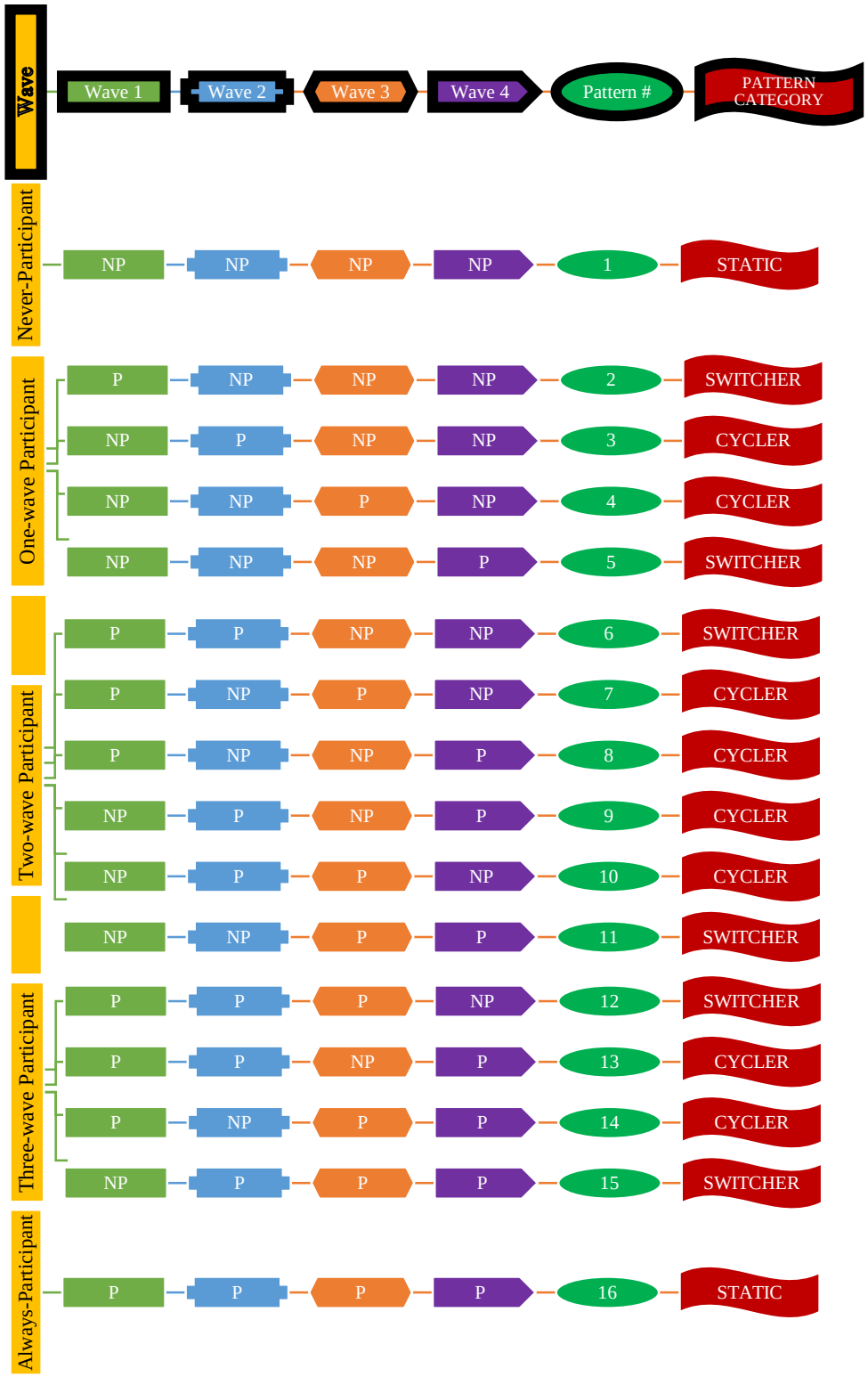


Figure 7: Patterns of Participation in Nonstandard Child Care

Key: = Wave 1 Status = Wave 2 Status = Wave 3 Status
= Wave 4 Status =Pattern = Participant's Pattern Category

Table 20: Summary Statistics for Children and Their Households in the ECLS-B

Variable	Range	9-Month Wave	2-Year Wave	Preschool Wave	Kindergarten 1	Kindergarten 2
Employment characteristics (%)						
Employed	0-1	0.529 (0.499)	0.551 (0.498)	0.596 (0.491)	0.622 (0.485)	0.638 (0.481)
Work evening shift	0-1	0.068 (0.251)	0.110 (0.313)	0.091 (0.287)	0.073 (0.260)	0.061 (0.240)
Work overnight shift	0-1	0.017 (0.129)	0.043 (0.202)	0.046 (0.209)	0.048 (0.213)	0.032 (0.176)
Work rotating shift	0-1	0.029 (0.168)	0.051 (0.219)	0.066 (0.248)	0.056 (0.230)	0.058 (0.234)
2 or more jobs	0-1	0.032 (0.175)	0.066 (0.249)	0.083 (0.275)	0.079 (0.269)	0.092 (0.289)
Age of child (months)	7-85	10.470 (1.959)	24.392 (1.211)	52.383 (4.089)	64.729 (3.712)	74.094 (2.481)
Age of parent (years)	15-83	28.295 (6.359)	29.599 (6.534)	32.199 (6.824)	33.355 (6.999)	34.173 (6.960)
Female child (%)	0-1	0.489 (0.500)	0.489 (0.500)	0.492 (0.500)	0.493 (0.500)	0.458 (0.498)
Female parent (%)	0-1	0.985 (0.091)	0.984 (0.091)	0.983 (0.092)	0.982 (0.094)	0.980 (0.093)
Parent respondent's race / ethnicity (%)						
White	0-1	0.414 (0.493)	0.423 (0.494)	0.435 (0.496)	0.406 (0.491)	0.464 (0.499)
Black	0-1	0.158 (0.365)	0.155 (0.362)	0.151 (0.358)	0.154 (0.361)	0.166 (0.373)
Hispanic	0-1	0.205 (0.404)	0.202 (0.402)	0.198 (0.398)	0.201 (0.401)	0.174 (0.379)
Other	0-1	0.220 (0.415)	0.217 (0.412)	0.215 (0.411)	0.236 (0.425)	0.195 (0.396)
Parent respondent's education (%)						
Less than High School	0-1	0.189 (0.391)	0.172 (0.377)	0.153 (0.360)	0.152 (0.359)	0.151 (0.358)
High School	0-1	0.283 (0.451)	0.303 (0.460)	0.280 (0.449)	0.280 (0.449)	0.263 (0.441)
Some College	0-1	0.285 (0.452)	0.281 (0.450)	0.309 (0.462)	0.306 (0.461)	0.318 (0.466)
Bachelor's Degree	0-1	0.241 (0.428)	0.244 (0.430)	0.257 (0.437)	0.263 (0.440)	0.268 (0.443)
Parent respondent's marital status (%)						
Married, spouse present	0-1	0.670 (0.470)	0.677 (0.468)	0.900 (0.300)	0.672 (0.469)	0.697 (0.460)
Separated	0-1	0.023 (0.150)	0.021 (0.144)	0.017 (0.131)	0.031 (0.173)	0.036 (0.187)
Divorced	0-1	0.037 (0.189)	0.043 (0.202)	0.027 (0.163)	0.071 (0.257)	0.067 (0.251)
Widowed	0-1	0.003 (0.058)	0.005 (0.070)	0.005 (0.066)	0.005 (0.071)	0.007 (0.083)
Never married	0-1	0.270 (0.444)	0.251 (0.434)	0.034 (0.181)	0.224 (0.417)	0.214 (0.410)
Child care characteristics						
Weekly arrangements (#)	0-4	0.563 (0.771)	0.589 (0.709)	0.948 (0.835)	0.643 (0.755)	0.465 (0.692)
Hours per week (#)	0-133	15.892 (20.140)	32.675 (15.429)	28.381 (17.833)	19.891 (15.255)	17.147 (14.548)
Primary child care [not restricted to parental work hours] (%)						
Center care	0-1	0.081 (0.273)	0.155 (0.362)	0.448 (0.497)	0.275 (0.447)	0.152 (0.359)
Relative care	0-1	0.255 (0.436)	0.177 (0.382)	0.128 (0.334)	0.156 (0.364)	0.159 (0.366)
Nonrelative care	0-1	0.159 (0.366)	0.151 (0.358)	0.077 (0.267)	0.062 (0.240)	0.058 (0.234)
Parent care	0-1	0.496 (0.500)	0.512 (0.500)	0.202 (0.402)	0.463 (0.499)	0.628 (0.483)
Federal Poverty Level (%)						
Below FPL	0-1	0.235 (0.424)	0.233 (0.423)	0.243 (0.429)	0.242 (0.429)	0.248 (0.432)
Family income ($)	1-35,000	12,192 (6,473)	12,981 (7,246)	25,906 (14,218)	26,288 (14,740)	26,593 (15,100)
Got married (%)	0-1	--	0.039 (0.194)	0.061 (0.239)	0.016 (0.124)	0.047 (0.212)
Got single (%)	0-1	--	0.019 (0.136)	0.039 (0.192)	0.062 (0.242)	0.023 (0.150)
Moved (%)	0-1	--	0.224 (0.417)	0.335 (0.472)	0.186 (0.389)	0.090 (0.286)
Number of Observations		**10,688**	**9,835**	**8,941**	**7,022**	**1,917**

Note: Calculations from the ECLS-B. Primary child care totals are calculated based on total hours spent across all child care arrangements throughout the week, regardless of if the child was in the care setting during parental work hours of not. Standard deviations are in parentheses.

Table 21: Demographic Characteristics for Participants and Nonparticipants

Variable	Nonparticipants (N=9,982)	All Participants (N=654)	Static (N=150)	Switcher (N=304)	Cycler (N=200)
Age of child (months)	10.056 (2.282)	10.257 (2.570)*	10.131 (2.940)	10.285 (2.395)	10.256 (2.636)
Female child (%)	0.489 (0.500)	0.493 (0.500)	0.507 (0.502)	0.487 (0.501)	0.495 (0.501)
Siblings (#)	1.103 (1.150)	0.856 (1.122)***	0.780 (1.263)***	0.931 (1.113)**	0.795 (1.014)***
Child's race / ethnicity (%)					
White	0.423 (0.494)	0.292 (0.455)***	0.360 (0.482)	0.273 (0.446)***	0.270 (0.445)***
Black	0.148 (0.355)	0.319 (0.466)***	0.287 (0.453)***	0.299 (0.459)***	0.370 (0.484)***
Hispanic	0.205 (0.403)	0.213 (0.410)	0.207 (0.406)	0.227 (0.420)	0.200 (0.401)
Other	0.223 (0.416)	0.173 (0.379)***	0.140 (0.348)**	0.201 (0.401)	0.155 (0.363)**
Child care characteristics(#)					
Weekly arrangements	0.536 (0.761)	0.887 (0.858)***	1.160 (0.715)***	0.852 (0.909)***	0.730 (0.831)***
Hours per week	15.443 (20.538)	24.207(21.355)***	32.653(20.374)***	21.500(20.556)***	21.865(21.735)***
Primary child care [not restricted to parental work hours] (%)					
Center	0.076 (0.264)	0.129 (0.335)***	0.153 (0.362)***	0.125 (0.331)***	0.115 (0.320)**
Relative	0.259 (0.438)	0.384 (0.487)***	0.387 (0.489)***	0.395 (0.490)***	0.365 (0.483)***
Nonrelative	0.140 (0.347)	0.228 (0.420)***	0.433 (0.497)***	0.174 (0.380)*	0.155 (0.363)
Parent	0.516 (0.500)	0.244 (0.430)***	0.000 (0.000)***	0.290 (0.454)***	0.360 (0.481)***
Multiple	0.007 (0.086)	0.015 (0.123)**	0.027 (0.162)***	0.017 (0.127)*	0.005 (0.071)

Note: Calculations from the ECLS-B. All figures are weighted using the appropriate ECLS-B weight. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 22: Economic Characteristics for Participants and Nonparticipants

Variable	Nonparticipants (N=9,982)	All Participants (N=654)	Static (N=150)	Switcher (N=304)	Cycler (N=200)
Employment characteristics (%)					
Employed	0.492 (0.500)	0.693 (0.462)***	1.000 (0.000)***	0.586 (0.493)***	0.585 (0.494)***
Daytime shift	0.371 (0.483)	0.228 (0.420)***	0.000 (0.000)***	0.309 (0.463)**	0.275 (0.448)***
Evening shift	0.048 (0.214)	0.211 (0.409)***	0.480 (0.501)***	0.135 (0.342)***	0.125 (0.332)***
Overnight shift	0.016 (0.126)	0.055 (0.228)***	0.107 (0.310)***	0.033 (0.179)**	0.050 (0.219)***
Rotating shift	0.021 (0.144)	0.146 (0.353)***	0.360 (0.482)***	0.086 (0.280)***	0.075 (0.264)***
2 or more jobs	0.027 (0.161)	0.040 (0.196)**	0.047 (0.212)	0.040 (0.195)	0.035 (0.184)
Age of parent (years)	28.721 (6.579)	24.648 (6.226)***	24.700 (5.658)***	24.743 (6.527)***	24.435 (6.186)***
Female parent (%)	0.990 (0.101)	0.986 (0.117)	0.987 (0.074)	0.980 (0.139)	0.980 (0.140)
Parent respondent's education (%)					
Less than High School	0.187 (0.390)	0.242 (0.429)***	0.207 (0.406)	0.263 (0.441)***	0.235 (0.425)*
High School	0.266 (0.442)	0.415 (0.493)***	0.427 (0.496)***	0.411 (0.493)***	0.415 (0.494)***
Some College	0.266 (0.442)	0.289 (0.454)	0.313 (0.465)	0.263 (0.441)	0.310 (0.464)
Bachelor's Degree	0.279 (0.448)	0.054 (0.225)***	0.053 (0.225)***	0.063 (0.243)***	0.040 (0.197)***
Parent respondent's marital status (%)					
Married	0.691 (0.462)	0.123 (0.328)***	0.000 (0.000)***	0.181 (0.386)***	0.125 (0.332)***
Separated	0.027 (0.161)	0.046 (0.210)***	0.087 (0.282)***	0.026 (0.160)	0.045 (0.208)
Divorced	0.032 (0.175)	0.067 (0.251)***	0.053 (0.225)	0.069 (0.254)***	0.075 (0.264)***
Widowed	0.003 (0.054)	0.002 (0.039)	0.000 (0.000)	0.000 (0.000)	0.005 (0.071)
Never married	0.250 (0.433)	0.772 (0.420)***	0.860 (0.348)***	0.740 (0.439)***	0.755 (0.431)***
Federal Poverty Level (%)					
Below FPL	0.250 (0.433)	0.395 (0.489)***	0.373 (0.485)***	0.411 (0.493)***	0.385 (0.488)***
Family income ($)	11,773 (6,750)	10,857 (6,240)*	9,805 (4,728)*	11,418 (6,956)	10,690 (5,899)

Note: Calculations from the ECLS-B. All figures are weighted using the appropriate ECLS-B weight. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 23: Occupation Summary Statistics for Participants and Reference Groups

Variable	Nonparticipants (N=9,982)	All Participants (N=654)	Static (N=150)	Switcher (N=304)	Cycler (N=200)
Occupation Categories (%)					
Managerial	0.038 (0.190)	0.020 (0.140)**	0.033 (0.180)	0.013 (0.114)**	0.020 (0.140)
Business & Financial Operations	0.014 (0.117)	0.003 (0.055)**	0.000 (0.000)	0.007 (0.081)	0.000 (0.000)*
Computer & Mathematical	0.014 (0.118)	0.002(0.039)***	0.007 (0.082)	0.000 (0.000)**	0.000 (0.000)*
Architecture & Engineering	0.005 (0.071)	0.000 (0.000)*	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Life/Physical/Social Science	0.006 (0.079)	0.000 (0.000)**	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Community & Social Service	0.010 (0.098)	0.009 (0.096)	0.020 (0.141)	0.000 (0.000)*	0.015 (0.122)
Legal	0.007 (0.084)	0.002 (0.039)*	0.000 (0.000)	0.000 (0.000)	0.005 (0.071)
Education/Training/Library	0.039 (0.193)	0.026 (0.159)*	0.013 (0.115)	0.033 (0.179)	0.025 (0.157)
Arts/Design/Entertainment	0.006 (0.074)	0.006 (0.078)	0.007 (0.082)	0.007 (0.081)	0.005 (0.071)
Healthcare Practitioner	0.040 (0.196)	0.025 (0.155)**	0.033 (0.180)	0.020 (0.139)*	0.025 (0.157)
Healthcare Support	0.012 (0.109)	0.031(0.172)***	0.027 (0.162)	0.026 (0.160)**	0.040(0.197)***
Protective Service	0.003 (0.054)	0.005 (0.068)	0.013 (0.115)**	0.000 (0.000)	0.005 (0.071)
Food Preparation/Serving	0.019 (0.137)	0.058 0.234)***	0.113(0.318)***	0.040 (0.195)**	0.045(0.208)***
Building/Grounds Cleaning	0.009 (0.096)	0.023(0.150)***	0.040(0.197)***	0.026(0.160)***	0.005 (0.071)
Personal Care & Services	0.061 (0.240)	0.139(0.347)***	0.247(0.433)***	0.109(0.312)***	0.105 (0.307)**
Sales & Related Services	0.051 (0.220)	0.129(0.335)***	0.207(0.406)***	0.105(0.307)***	0.105(0.307)***
Office & Admin Support	0.112 (0.315)	0.123 (0.328)	0.127 (0.334)	0.132 (0.339)	0.105 (0.307)
Farming/Fishing/Forestry	0.003 (0.051)	0.003 (0.055)	0.000 (0.000)	0.003 (0.057)	0.005 (0.071)
Construction & Extraction	0.001 (0.035)	0.002 (0.039)	0.007 (0.082)*	0.000 (0.000)	0.000 (0.000)
Installation/Maintenance/ Repair	0.002 (0.048)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Production	0.025 (0.156)	0.046(0.210)***	0.073(0.262)***	0.033 (0.179)	0.045 (0.208)*
Transportation/Material Moving	0.008 (0.091)	0.025(0.155)***	0.033(0.180)***	0.023(0.150)***	0.020 (0.140)*
Military Service	0.001 (0.020)	0.003(0.055)***	0.000 (0.000)	0.003 (0.057)**	0.005(0.071)***
Retired/Disabled	0.427 (0.495)	0.202(0.402)***	0.000(0.000)***	0.257(0.438)***	0.270(0.445)***
Unemployed	0.081 (0.273)	0.115(0.319)***	0.000(0.000)***	0.158(0.365)***	0.140(0.348)***

Note: Calculations from the ECLS-B. All figures are weighted using the appropriate ECLS-B weights. Major occupation codes are recorded as used in the U.S.Census. Occupation data is available on 99% of focal children's parents. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 24: Probit Regression Results, by Participation Category

Variable	***Model 1: All Participants***	***Model 2: Static Participants***	***Model 3: Switcher Participants***	***Model 4: Cycler Participants***
Age of child (months)	0.001	-0.000	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Age of parent respondent (years)	-0.002	0.000	-0.001	-0.001
	(0.001)***	(0.000)	(0.000)***	(0.000)**
Female child	0.001	0.002	-0.001	0.001
	(0.004)	(0.002)	(0.003)	(0.003)
Female parent respondent	0.011	0	0.199	-0.035
	(0.038)	--	(0.017)***	(0.014)**
Birth weight (pounds)	-0.002	0.000	-0.002	-0.001
	(0.002)	(0.001)	(0.002)	(0.001)
Multiple birth (twins)	0.001	-0.002	0.008	-0.011
	(0.007)	(0.004)	(0.004)*	(0.006)**
Number of siblings	-0.001	-0.001	-0.000	-0.001
	(0.002)	(0.002)	(0.002)	(0.001)
Child's race / ethnicity				
Black	-0.001	-0.009	0.003	0.005
	(0.007)	(0.004)***	(0.005)	(0.004)
Hispanic	-0.003	-0.008	0.006	-0.003
	(0.007)	(0.004)**	(0.005)	(0.004)
Other	-0.001	-0.010	0.008	-0.002
	(0.007)	(0.004)**	(0.005)	(0.004)
Parent respondent's education				
High school degree	0.024	0.008	0.011	0.010
	(0.006)***	(0.003)***	(0.004)***	(0.004)***
Some college	0.028	0.012	0.010	0.013
	(0.007)***	(0.004)***	(0.005)*	(0.004)***
Bachelor's degree	-0.005	0.007	-0.003	-0.004
	(0.010)	(0.007)	(0.007)	(0.007)
Parent respondent's marital status				
Separated	0.104	0.147	0.033	0.036
	(0.011)***	(0.011)***	(0.010)***	(0.007)***
Divorced	0.113	0.136	0.054	0.042
	(0.010)***	(0.011)***	(0.008)***	(0.007)***
Widowed	0.061	0	0	0.039
	(0.044)	--	--	(0.019)**
Never married	0.127	0.150	0.056	0.043
	(0.007)***	(0.011)***	(0.006)***	(0.005)***
Income				
Family income (10,000s of dollars)	0.009	-0.002	0.006	0.004
	(0.006)	(0.003)	(0.004)	(0.004)
Below Federal Poverty Level	-0.010	-0.007	-0.006	0.000
	(0.007)	(0.004)*	(0.005)	(0.004)
Number of observations	**10,492**	**9,470**	**9,898**	**9,738**

Note: Calculations from the ECLS-B. Dependent variable is participation in nonstandard child care where participation equals one and zero otherwise. Marginal probability effects are reported, along with household-cluster robust standard errors (in parentheses). Model 1 includes all children identified as participants and nonparticipants in nonstandard child care; Model 2 includes all children identified as participating in nonstandard child care through all observed waves and all nonparticipants; Model 3 includes all children identified as switching participation categories exactly once across all observed waves and all nonparticipants; and Model 4 includes any children identified as switching participation categories more than once across all observed waves and all nonparticipants. All models includes state and wave dummy variables. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 25: Cox Proportional Hazards Regression Results

Variable	***Parameter Estimate***	***P-Value***	***Hazard Ratio***	***Hazard Ratio Confidence Interval***
Age of child (months)	-0.027	0.201	0.973	0.933 – 1.015
Age of parent respondent (years)	-0.027**	0.032	0.973	0.950 – 0.998
Female child	-0.438	0.553	0.646	0.152 – 2.741
Female parent respondent	-0.071	0.595	0.931	0.717 – 1.210
Birth weight (pounds)	-0.053	0.591	0.948	0.782 – 1.150
Multiple birth (twins)	0.052	0.371	1.053	0.940 – 1.180
Number of siblings				
1	-0.200	0.240	0.818	0.586 – 1.143
2	-0.326	0.111	0.722	0.484 – 1.078
3	-0.062	0.793	0.940	0.593 – 1.492
4	-0.221	0.567	0.802	0.377 – 1.707
5	-0.225	0.710	0.799	0.244 – 2.614
Child's race / ethnicity				
Black	-0.240	0.192	0.787	0.549 – 1.128
Hispanic	-0.307	0.130	0.735	0.494 – 1.094
Other	-0.087	0.685	0.917	0.603 – 1.394
Parent respondent's education				
High school degree	0.332**	0.046	1.393	1.006 – 1.930
Some college	0.176	0.371	1.193	0.811 – 1.754
Bachelor's degree	0.067	0.880	1.070	0.446 – 2.569
Parent respondent's marital status				
Separated	0.255***	0.000	1.231	0.247 – 6.151
Divorced	0.254***	0.000	1.081	0.221 – 5.311
Widowed	-0.198	0.781	2.601	1.711 – 3.211
Never married	0.252***	0.000	5.331	0.170 – 4.241
Income				
Family income (10,000s of dollars)	0.062	0.377	1.001	1.000 – 1.001
Below Federal Poverty Level	-0.101	0.537	0.904	0.655 – 1.246
Number of observations	**10,218**			

Note: Calculations from the ECLS-B. Event outcome is participation in nonstandard child care. Parameter estimates are shown along with their p-values, as well as hazard ratios and their 95% confidence intervals. Model includes all children identified as participants and nonparticipants in nonstandard child care. Since hazards are proportional over time, the model does not need to control for wave. Hazard ratios close to one indicate that the predictor does not affect participation in nonstandard child care; hazard ratios less than one indicate that the predictor is protective against participation in nonstandard child care; and hazard ratios greater than one indicate an increased risk of participation in nonstandard child care. Comparison group for number of siblings is 0; comparison group for child's race is white; comparison group for parent's education is less than high school; and the comparison group for parent's marital status is married. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

Table 26: Probit Regression Results Using Alternative Comparison Groups

Variable	***Model 1: All Nonparticipants***	***Model 2: All Employed Nonparticipants***	***Model 3: All Nonparticipants Using Nonparental Care***	***Model 4: All Nonparticipants Working Shift Hours***
Age of child (months)	0.001	0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.002)
Age of parent respondent (years)	-0.002	-0.002	-0.002	-0.003
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Female child	0.001	0.002	0.003	0.005
	(0.004)	(0.006)	(0.006)	(0.009)
Female parent respondent	0.011	-0.027	-0.026	-0.026
	(0.038)	(0.042)	(0.050)	(0.062)
Birth weight (pounds)	-0.002	-0.002	-0.002	-0.004
	(0.002)	(0.003)	(0.003)	(0.004)
Multiple birth (twins)	0.001	0.002	0.001	0.004
	(0.007)	(0.009)	(0.010)	(0.014)
Number of siblings	-0.001	-0.001	0.001	-0.004
	(0.002)	(0.003)	(0.004)	(0.005)
Child's race / ethnicity				
Black	-0.001	-0.003	-0.008	0.007
	(0.007)	(0.009)	(0.010)	(0.013)
Hispanic	-0.003	-0.003	-0.005	-0.004
	(0.007)	(0.009)	(0.010)	(0.014)
Other	-0.001	-0.002	-0.001	-0.000
	(0.007)	(0.009)	(0.010)	(0.013)
Parent respondent's education				
High school degree	0.024	0.017	0.014	0.037
	(0.006)***	(0.008)**	(0.009)	(0.012)***
Some college	0.028	0.015	0.008	0.043
	(0.007)***	(0.009)*	(0.010)	(0.014)***
Bachelor's degree	-0.005	-0.024	-0.036	-0.005
	(0.010)	(0.013)*	(0.014)**	(0.020)
Parent respondent's marital status				
Separated	0.104	0.122	0.133	0.188
	(0.011)***	(0.014)***	(0.016)***	(0.022)***
Divorced	0.113	0.136	0.151	0.210
	(0.010)***	(0.013)***	(0.014)***	(0.020)***
Widowed	0.061	0.066	0.092	0.123
	(0.044)	(0.055)	(0.066)	(0.085)
Never married	0.127	0.157	0.176	0.237
	(0.007)***	(0.009)***	(0.010)***	(0.012)***
Income				
Family income (10,000s of dollars)	0.009	0.005	0.011	0.014
	(0.006)	(0.008)	(0.009)	(0.012)
Below Federal Poverty Level	-0.010	-0.003	0.002	-0.024
	(0.007)	(0.010)*	(0.011)	(0.014)*
Number of observations	**10,492**	**7,900**	**6,908**	**4,885**

Note: Calculations from the ECLS-B. Dependent variable is participation in nonstandard child care where participation equals one and zero otherwise. Marginal probability effects are reported, along with household-cluster robust standard errors (in parentheses).Model 1 compares all children identified as participants to all nonparticipants; Model 2 compares all children identified as participants to all employed nonparticipants; Model 3 compares all children identified as participants to all employed nonparticipants who use nonparental child care; and Model 4 compares all children identified as participants to all nonparticipants employed during nonstandard hours.. All models includes state and wave dummy variables. ***, **, * indicates that the difference between the participants and nonparticipants is statistically significant at the 0.01, 0.05, and 0.10 levels, respectively.

CHAPTER 5

CONCLUSION

The purpose of this study was to identify children and their parents who use nonstandard child care and explore how participation in that care influences child well-being. The findings from this study not only offer important insights into contemporary child care settings, but also have serious implications for education and social policy. Future research investigating nonstandard child care should continue where this dissertation leaves off.

Discussion

This study is the first to identify children who participate in, and parents who use, nonstandard child care. While extensive shift work literature has detailed characteristics of workers who are employed during nonstandard hours, and research in child care literature has distinguished between children who participate in nonparental versus parental child care, this research has failed to consider *when* children participate in care. Therefore, the findings presented here are the first to jointly consider when children participate in nonparental child care and how children are cared for when their parents work nonstandard hours.

In the descriptive portrait chapter, results from the regression analyses reveal distinct differences between participants and nonparticipants, dependent on the reference group identified. Using the broadest group of nonparticipants as a reference group, estimates show that children who participate in nonstandard child care are more likely to be older and to reside with a higher-skilled, higher-income, single, black, male parent

who acts as a primary caregiver. Restricting the analyses to policy-relevant sub-groups, estimates conflict with those found in child care and shift work literatures; child care research fails to control for confounding factors of *when* child care is used, while shift work research fails to control for confounding factors of *how* parents care for their children when they work nonstandard hours. Occupation estimates concur with findings reported by McMenamin (2007) that employment during nonstandard hours is a function of the workers occupation, not preference.

In the chapter exploring the relationship between nonstandard child care participation and child well-being, results reveal distinct well-being differences between participants and nonparticipants, dependent on the age group identified. Using the broadest group of nonparticipants as a reference group, I find meaningful dissimilarities between participants and nonparticipants. Children ages 0 to 5 display poor parent-child attachment and are less likely to receive increased cognitive stimulation. Poor physical health reports associated with participation in nonstandard child care are singularly observed for children between the ages of 6 to 11. Children ages 6 to 11 also show decreased behavioral-emotional competency, less engagement with school, and increased likelihood of receiving special education services.

Restricting the analysis to policy-relevant sub-groups, estimates indicate that substantial differences emerge when comparing participants in nonstandard child care with children who participate in standard child care or who are cared for by one parent while the other parent works nonstandard hours. Supplementary analyses investigating the influence of hypothesized mechanisms reveal mechanisms associated with nonstandard child care participation. Estimates reveal that the relationship between

nonstandard child care participation and child well-being are likely driven by monthly care cost, number of arrangements and hours in care per week, and type of child care used.

Results examining how children participate in nonstandard child care over time reveal distinctions between participants and nonparticipants, dependent on the reference group identified. Across all patterns of participation, children are most likely to enter care at 9 months of age or 2 years of age, and least likely at 3 years of age. Children who participate in nonstandard child care do so the most often for one spell. Using the broadest group of nonparticipants as a reference group, I find that children who participate in nonstandard child care at any time are more likely to reside with a younger, unmarried parent who is low-skilled. When the participant group is restricted to children who participate in nonstandard child care across all waves, participants are less likely to be white and have a family income below the Federal Poverty Level. Restricting the participant group to those who switch between participation and nonparticipation exactly once across the waves significantly alters the findings; switchers are more likely to reside with a single female parent and to be a twin. Finally, restricting the participant group to children who cycle between participation and nonparticipation multiple times across the waves reveals additional differences; cyclers are more likely to reside with a single male parent and less likely to be a twin. Restricting the analysis to policy-relevant sub-groups of nonparticipants leave the analyses qualitatively similar.

Similarities exist across each of the separately presented analyses. First, children are more likely to participate in nonstandard child care as they age. Using cross-sectional data, I find that the average age of participants is between 4 and 5 years; using

longitudinal data, I find that fewer children enter nonstandard child care arrangements at 3 years of age than at any time between birth and kindergarten entry. Second, unmarried parents are more likely to use nonstandard child care than married parents. This finding is in-line with shift work literature that suggests two-parent households use nonstandard-hour employment to avoid using nonparental child care. Third, parents whose education is less than a Bachelor's degree are more likely to use nonstandard child care than those with a Bachelor's degree. This may be a function of decreased choice of jobs for low-skilled parents, or a function of the shift needs for particular occupations. Forth, children who participate in nonstandard child care are less likely to be white. This finding is concerning if children identified as minorities are disproportionately exposed to unstable and low-quality child care. Finally, children who participate in nonstandard child care are less likely to have family incomes below the Federal Poverty Level. While this finding suggests that parents may be earning a shift differential for working nonstandard hours, it is unclear if having higher monetary resources is beneficial to the child's well-being.

Policy Implications

There are serious policy implications raised by findings presented in this study. In the wake of the Great Recession, workers are increasingly finding employment during nonstandard hours; estimates presented here suggest that a significant proportion of these workers are parents and use nonstandard child care. Estimates further suggest that participation in nonstandard child care is nonrandom, where specific child and parent characteristics are associated with participation. Following the negative bias in participation are serious implications for specific groups of children. Children who

participate in nonstandard child care are older and require different services offered through nonstandard child care providers. School-age children require assistance with homework and one-on-one engagement with school work which is historically provided by a parent. Preschool-age children may or may not be receiving curriculum to prepare them for kindergarten entry. Policy responses could focus on improving the services offered through nonstandard child care providers, or they could turn to primary schools to offer remedial services.

Sleeping conditions in nonstandard child care setting are generally not regulated through state agencies that oversee licensure; neither are child-level hygiene practices. Requiring nonstandard child care providers to establish quiet rooms and encourage proper hygiene is one suitable policy response.

Parents, caregivers, and teachers of school-aged participants may not communicate with one another regarding the development of the child; developmental issues observed by one adult may or may not be conveyed to the others. One policy response is to mandate that nonstandard child care providers create communication plans with parents so that early signs of cognitive, behavioral, or physical developmental issues can be identified and addressed early on.

Alterations to regulation policies outlined above could be effectively administrated by state-level agencies who oversee child care facility licensure. However, increasing regulations may cause some providers to cease offering services during nonstandard hours. Given that too few providers offer services to meet the current demand for nonstandard child care, this policy solution may exacerbate the issues associated with participation. An alternative solution may include requiring employers

who use shift schedules to offer a benefit, such as a form of child care subsidy, that would be paid to facilities to ensure new standards are put in place that meet the needs of children who use the services.

Other policy responses have been identified in other studies. Federal minimum wage guidelines could require a differential wage for those working second and third shift positions which would buffer against child care providers who set increased rates for offering mandated enhanced services (Lehrer, 1989). Tekin (2007) has previously suggested that state agencies could alter child care subsidy allocation mechanisms to ensure that accepting providers offer facilities which meet the demands of nonstandard-hour workers.

Future Research

The findings presented here offer an important and unique first look at children who participate in, and parents who use, nonstandard child care; however, there are some limitations to the current research. While all datasets used here do record parental work shift and child care use during work hours, this is not a substitute for an indicator of nonstandard child care use. Future research should collect information on known users of nonstandard child care.

While both datasets used here record parental occupation, more detailed information is necessary, for a variety of reasons. Currently, the causal arrow between parental nonstandard-hour work and nonstandard-hour child care use is unknown; do parents choose to work nonstandard hours and fit child care needs around those hours, or choose to avoid nonparental child care and therefore work nonstandard hours to meet this preference? Matching occupation with nonstandard-hour employment would help us

understand the conditions surrounding parental selection of child care. In addition, neither dataset used in this study records employment in professional occupations. Parents employed in professional occupations who are required to work nonstandard hours (e.g. nurses, doctors) may be more or less likely to select specific types of care arrangements.

Beyond limitations of the data, there are additional questions which should be the focus of future research that ties into evaluations from the shift work and child care literatures. One focus should be on understanding how participation in various patterns and types of nonstandard child care differentially influence child well-being, both contemporaneously and as they age. A second focus should examine child care market responses to increased demand for nonstandard child care; in particular, when organizations add shift work positions, what is the response of local child care providers and how long does it take for them to respond? Continuing to push forward on research examining the use of nonstandard child care is an essential component in building social policy that reacts to evolving employment and child care environments.

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APPENDIX A.

FIGURE A: PREVALENCE OF SHIFT WORK 1985-2004

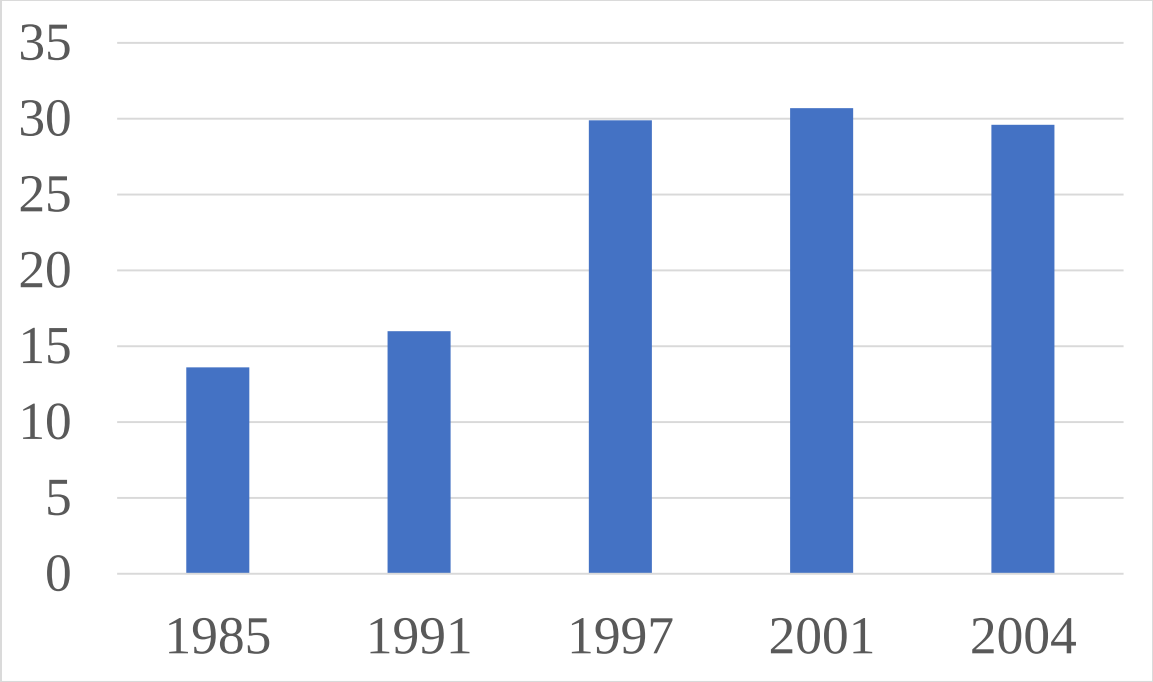


Figure A: Prevalence of Shift Work 1985-2004

Source: McMenamin (2007), BLS Monthly Labor Review

APPENDIX B.

TABLE B: FULL REGRESSION RESULTS FOR CHILDREN AGES 0 TO 5

Table B: Full Regression Results for Children Ages 0 to 5

Covariate	*Parental Aggravation*	*Frequency of Outings: Daily*	*Receipt of Special Education*	*Current Health: Very Good+*
NSCC	***0.154 (0.044)******	***-0.037 (0.010)******	***0.005 (0.011)***	***-0.012 (0.009)***
Child: Age	***0.251 (0.022)******	***0.019 (0.006)******	***0.064 (0.061)***	***-0.015 (0.005)******
Child: Female	***-0.072 (0.022)******	***0.001 (0.007)***	***-0.032 (0.007)******	***0.028 (0.004)******
Child: Black	***0.347 (0.043)******	***0.053 (0.009)******	***0.001 (0.015)***	***-0.055 (0.007)******
Child: Hispanic	***-0.015 (0.031)***	***0.061 (0.008)******	***-0.005 (0.013)***	***-0.113 (0.008)******
Child: Youngest	***0.108 (0.033)******	***0.007 (0.008)***	***-0.002 (0.011)***	***-0.016 (0.006)******
Mother: Age	***0.012 (0.012)***	***-0.002 (0.002)***	***0.005 (0.002)****	***-0.001 (0.003)***
Mother: Single	***0.210 (0.039)******	***-0.027 (0.011)******	***0.003 (0.013)***	***-0.002 (0.008)***
Mother: High School	***-0.158 (0.046)******	***0.047 (0.010)******	***-0.007 (0.010)***	***0.116 (0.011)******
Mother: Some Coll	***-0.105 (0.058)****	***0.063 (0.013)******	***-0.008 (0.009)***	***0.121 (0.011)******
Mother: BA+	***-0.183 (0.059)******	***0.135 (0.012)******	***-0.018 (0.014)***	***0.145 (0.010)******
Hhld: Income (1,000)	***-0.001 (0.001)******	***0.003 (0.000)******	***-0.001 (0.001)***	***0.001 (0.000)******
Hhld: Total Children	***0.202 (0.014)******	***-0.003 (0.004)***	***0.003 (0.004)***	***-0.009 (0.003)******
Hhld: Total Adults	***-0.059 (0.024)****	***0.006 (0.006)***	***0.005 (0.006)***	***-0.010 (0.005)****

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* All figures are weighted using the appropriate NSAF weight. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. Reference group for insurance coverage are those who are uninsured. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

APPENDIX C.

TABLE C: FULL REGRESSION RESULTS FOR CHILDREN AGE 6 TO 12

Table C: Full Regression Results for Children Age 6 to 12

Covariate	*Parental Aggravation*	*School Engagement*	*Behavioral Problems*	*Receipt of Special Ed*	*Current Health: Very Good+*
NSCC	***0.138 (0.095)***	***0.260 (0.109)*****	***0.331(0.092)******	***0.062(0.023)******	***-0.034 (0.014)*****
Child: Age	***-0.070 (0.078)***	***0.173 (0.101)****	***0.393(0.100)******	***0.073(0.022)******	***-0.017 (0.022)***
Child: Female	***-0.118(0.021)******	***-0.930(0.034)******	***-0.415(0.025)******	***-0.056(0.006)******	***0.031(0.005)******
Child: Black	***0.331(0.043)******	***-0.001 (0.070)***	***-0.113 (0.050)****	***-0.035(0.011)******	***-0.072(0.009)******
Child: Hispanic	***-0.022 (0.038)***	***0.219(0.060)******	***-0.175(0.042)******	***-0.027 (0.012)****	***-0.112(0.009)******
Child: Oldest	***-0.025 (0.051)***	***-0.049 (0.066)***	***0.059 (0.053)***	***-0.006 (0.012)***	***0.024(0.008)******
Mother: Age	***0.027 (0.018)***	***-0.006 (0.013)***	***-0.048(0.012)******	***-0.003 (0004)***	***-0.001 (0.003)***
Mother: Single	***0.385(0.037)******	***0.475(0.060)******	***0.417(0.060)******	***0.037(0.013)******	***-0.038(0.010)******
Mother: H.S.	***-0.196(0.072)******	***-0.523(0.062)******	***-0.319(0.049)******	***-0.066(0.014)******	***0.140(0.012)******
Mother: A.A	***-0.171 (0.076)****	***-0.595(0.069)******	***-0.287(0.058)******	***-0.056(0.015)******	***0.151(0.012)******
Mother: BA+	***-0.239(0.079)******	***-0.795(0.067)******	***-0.410(0.049)******	***-0.080(0.015)******	***0.179(0.013)******
Hhld: Income (1,000)	***-0.002 (0.003)***	***-0.002(0.001)******	***-0.002(0.001)******	***-0.003(0.001)******	***0.006(0.001)******
Hhld: Total Children	***0.206(0.014)******	***0.050(0.016)******	***-0.008 (0.019)***	***0.005 (0.004)***	***-0.009 (0.003)****
Hhld: Total Adults	***-0.061(0.021)******	***0.030 (0.028)***	***-0.019 (0.025)***	***0.010(0.003)******	***-0.014(0.004)******

Source: Author's calculations from the 1999 and 2002 NSAF, except special education receipt, which is drawn solely from the 2002 NSAF. *Note:* All figures are weighted using the appropriate NSAF weight. Standard deviations are in parentheses. Two-sample t-tests compare the difference in means from the participants group to each reference group. Reference group for insurance coverage are those who are uninsured. ***, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

APPENDIX D.

FIGURE D: NSAF CLASSIFICATION SCHEMA

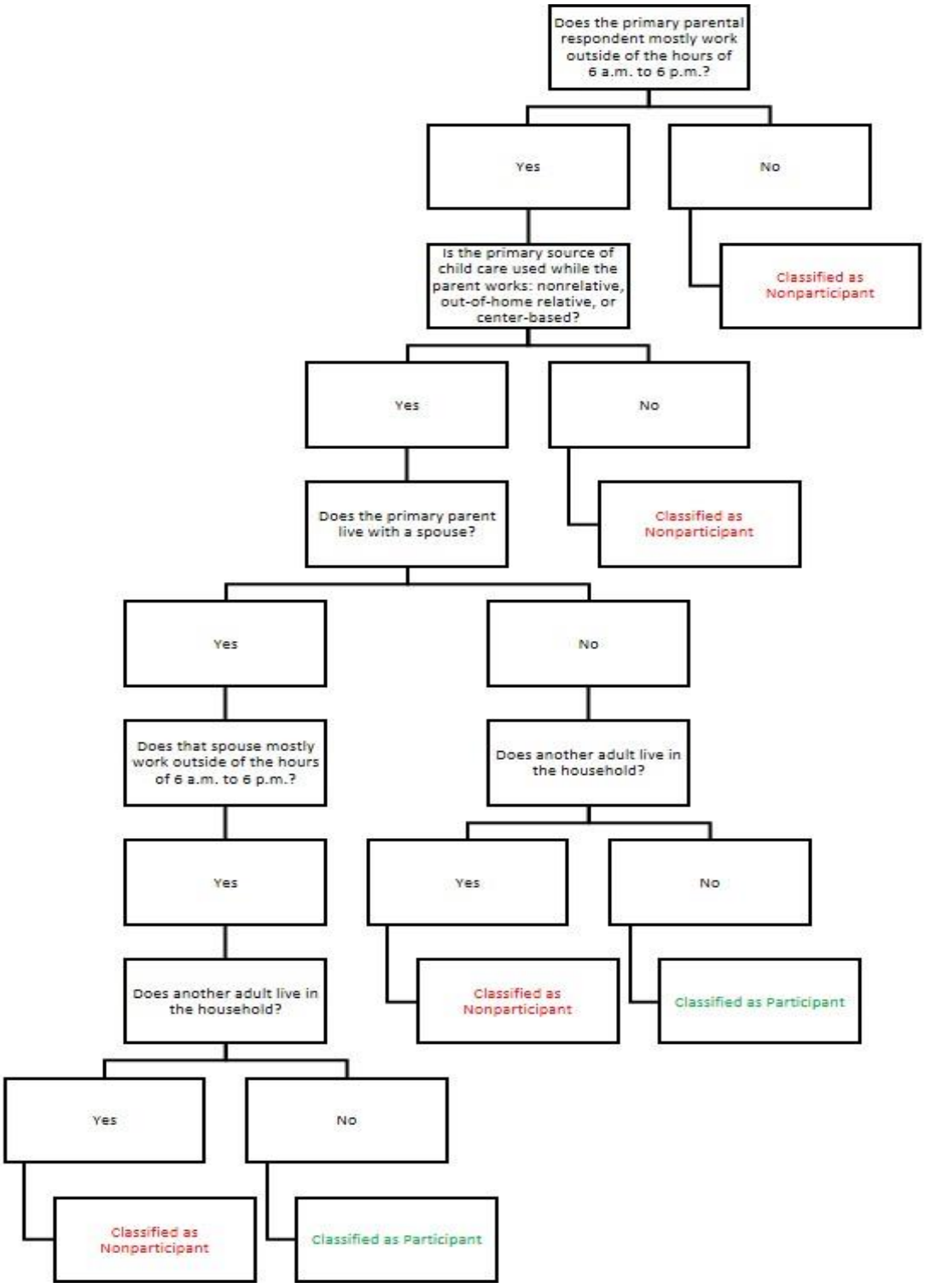


Figure D: NSAF Classification schema