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When Mothers' Work Matters for Youths' Daily Time Use: Implications of Evening and Weekend Shifts

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Abstract Drawing upon the work-home resources model, this study examined the implications of mothers' evening and weekend shifts for youths' time with mother, alone, and hanging out with peers unsupervised, with attention to both the amount and day-to-day consistency of time use. Data came from 173 mothers who worked in the long-term care industry and their youths who provided daily diaries. Multilevel modeling revealed that youths whose mothers worked more evening shifts on average spent less time with their mothers compared to youths whose mothers worked fewer evening shifts. Youths whose mothers worked more weekend shifts, however, spent more time with their mothers and exhibited less consistency in their time in all three activity domains compared to youths whose mothers worked fewer weekend shifts. Girls, not boys, spent less time alone on days when mothers worked weekend shifts than on days with standard shifts. Older but not younger adolescents spent more time hanging out with friends on evening and weekend shift days, and their unsupervised peer time was less consistent across days when mothers worked more evening shifts. These effects adjusted for sociodemographic and day characteristics, including school day, number of children in the household, mothers' marital status and work hours, and time with fathers. Our results illuminate the importance of the timing and day of mothers' work for youths' daily activities. Future interventions should consider how to increase mothers' resources to deal with constraints on parenting due to their work during nonstandard hours, with attention to child gender and age.

Keywords Adolescence · Daily diary · Nonstandard work schedules · Time use · Maternal employment · Work-home resources model

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Introduction

There is increasing evidence that *when* parents work—rather than just whether or how much they work—has implications for youths' development. Research on parents' work has moved from a focus on employment status and work hours toward considering parents' work schedules as risks or supports to parenting and, in turn, youths' behavior and adjustment. This line of inquiry is important given that the rise of a 24–7 economy and limited labor market opportunities have pushed more workers into nonstandard hours, that is, outside 8 a.m.–5 p.m. Monday–Friday (Presser 2003). In 2010, 29% of all U.S. workers had nonstandard schedules, a trend that is predicted to increase (Alterman et al. 2013). Moreover, data from the 2010 Census showed that 68% of U.S. low-income mothers with children ages 6–12 years worked nonstandard schedules (Enchautegui et al. 2015).

In prior research, nonstandard work schedules often have been treated as a stable work characteristic (e.g., Strazdins et al. 2006). However, not only do nonstandard work schedules vary across individuals, but shifts also may vary day-to-day for a given employee (Gassman-Pines 2011; Gerstel and Clawson 2015). Indeed, in a recent study, 50% of mothers reported working *both* standard and nonstandard shifts (Dunifon et al. 2013). To capture the dynamic nature of work schedules, we studied work shifts over 8 consecutive days to capture changes in standard daytime, evening, and weekend shifts. Specifically, we examined the implications of mothers' evening and weekend shifts (relative to standard daytime shifts) for how their adolescent-age children spent their time. We focused on mothers' work shifts because the dominant evidence suggests that mothers are still primary caregivers in most families even when they are employed (Bianchi 2009; Cabrera et al. 2000; Craig 2006; Roeters and Gracia 2016). Mothers typically spend more time with their children and do more monitoring and orchestration of children's activities than do fathers, and mother-child time has been more strongly linked to children's development than father-child time (Bianchi 2009; Cabrera et al. 2000; Craig 2006). Evening and weekend shifts were of interest because they represent mothers' lack of availability during times when their children are out of school and have the most free time to engage in developmentally enriching or potentially risky activities.

This study is grounded in the work-home resources model (ten Brummelhuis and Bakker 2012) which posits that demands in the work domain can deplete personal resources (e.g., energy, time) and diminish performance in the family domain. We extended this model to examine how evening and weekend shifts—that can drain mothers' parenting resources—were linked to their children's daily time use. Prior research has focused on how parents' work conditions affect their individual well-being. We know less about how parents' work conditions—particularly work schedules—affect their children, which requires a more elaborated model. Although some studies have examined emotional contagion or crossover of parents' work stress to the well-being of family members (Crouter et al. 1999), there is limited research linking mothers' work schedules to their children's daily activities. Given changing workplace needs and a trend of increasing numbers of jobs with nonstandard schedules (McMenamin 2007), however, it is necessary to examine whether and how nonstandard shifts have implications for how their children spend their time.

This study focused on daily time use of youths 9 to 17 years of age. Previous studies examining nonstandard shifts have focused on mothers with young or middle-childhood-age children (Gassman-Pines 2011; Strazdins et al. 2006). Compared to children, however, youths have more autonomy in structuring their daily lives (Hill and Holmbeck 1986) and therefore distinct concerns may arise with respect to mothers' work demands during this period (Zaslow et al. 2005). Although youths' daily lives include structured activities such as attending school, U.S. youths have a considerable amount of free time—up to 50% of their waking hours (Larson and Verma 1999). Although for some, free time may represent opportunities for building personal and social competencies, for others free time may be used poorly as when youths miss out on developmentally enhancing opportunities (i.e., "waste time") or when they engage in risky activities (Larson and Verma 1999; McHale et al. 2001). In this study, we built on prior research which has examined the adjustment implications of youths' time with mother, time alone, and unsupervised time hanging out with friends, three mutually exclusive activity domains that may be linked to mothers' shift work.

Beginning with youth's time spent with mother, social capital theory highlights the importance of family resources —especially time with parents—in youth development and adjustment (Coleman 1988). Mothers' investments of time with children can provide both human and social capital (Kalil et al. 2014), and prior research has established links between time spent with mothers and youth adjustment (Milkie et al. 2015). Nonstandard shifts—which take mothers away from home when their children are not attending school, may, however, limit mothers' opportunity to spend time with their children. Further, beyond the time they actually spend with their children, nonstandard shift work limit mothers' ability to organize extracurricular activities for their children and/or supervise their children's out-of-school activities, and thus may be associated with youths' spending more time alone or hanging out with friends without adult supervision. Although some solitude may facilitate the developmental tasks of individuation and identity formation, spending more time alone can involve negative emotional states including feelings of alienation, and has been associated with internalizing symptoms (Larson 1990). In addition, although spending time with friends is a central activity in adolescence, doing so in the absence of adult supervision has been linked to risky and antisocial behavior (Osgood et al. 1996; Posner and Vandell 1999; Vazsonyi et al. 2002). In this study we examined the links between mothers' shiftwork and these three significant activity domains, testing whether nonstandard shifts were linked to spending less time with mothers but more time alone and in unsupervised hanging out with peers.

As noted, both evening and weekend shifts may make it more difficult for mothers to directly supervise and orchestrate their children's activities during non-school hours, but there may be nuanced differences between evening and weekend shifts in terms of mothers' parenting resources. Evening shifts are typically defined as work between 4 p.m. and midnight (Presser 2003). Late evening

hours are typically reserved for rest and sleep, and thus working in the evening may disrupt diurnal rhythms and increase fatigue (Gassman-Pines 2011). Working on weekends, however, may be less stressful for mothers given that there may be fewer demands at home, such as needing to help with children's homework or supervising bed and wakeup times, compared to school days, or around work, such as negotiating rush hour traffic. Moreover, mothers may be able to get help from other adults (e.g., spouse, relatives, neighbors, and friends) to monitor and support their children's activities on weekends, unlike on weekdays when most people are typically working. Taken together, evening shifts may deplete mothers' parenting resources to organize and supervise children's daily time use, but weekend shifts may not negatively affect parenting resources due to the difference in the timing of the work. Such differences may be observed with more variations in children's daily time use between mothers' evening shifts and standard shifts than between weekend shifts and standard shifts.

Prior research has also suggested different effects of evening and weekend shifts, mostly on time with children. Mothers' late evening and night schedules were linked to less time with children (Han et al. 2010; Wright et al. 2008), but this negative association was not found for weekend shifts (Gassman-Pines 2011). Likewise, there may be greater differences in time alone and time hanging out with friends when comparing mothers' evening and standard shifts than when comparing weekend and standard shifts. Evening shifts may increase youths' time alone because of mothers' limited availability or because mothers are less able to orchestrate youths' involvement in out-of-school activities such as by providing transportation (Fagan 2001). On weekends when they have shift work, however, it may be easier for mothers to enlist other adults to transport and monitor their children's activities such that youths spend less time alone. Furthermore, evening hours may provide more opportunities for hanging out with peers with no adults present due to the availability of peers after school, coupled with the lack of availability of adults (Osgood et al. 1996). In contrast, weekend days may afford fewer opportunities for youths to hang out with friends to the extent, for example, that youths sleep late or lack transportation to places where peers congregate. Thus, evening shifts may be linked to youths' spending less time with mothers and more time alone and hanging out with friends compared to standard daytime shifts, but such differences may be less apparent when comparing weekend shifts against standard shifts.

Another important question is whether youths' gender and age play roles in the associations between mothers' work shifts and their daily time use. With respect to gender, prior research reveals that girls are more autonomous than boys in organizing daily activities that build social capital. Girls tend to spend more time with mothers than do boys (Lam et al. 2012) and spend less time alone and more time socializing on weekends than boys (Meeks and Mauldin 1990). Girls also tend to engage in less unstructured and unsupervised socializing overall than do boys (Goldstein et al. 2005). Moreover, in prior research, the negative links between mothers' working nonstandard hours (i.e., at night or late evening) and youths' risky behaviors were more pronounced for boys (Han et al. 2010). There are also age-related differences in youths' daily time use. With age comes increasing autonomy, including choosing activities and increasing time alone and time with peers; concomitantly, time with mother also declines with age (Hill and Holmbeck 1986; Lam et al. 2012; Larson 1990). These age-related changes, in combination with limited maternal involvement due to nonstandard shifts, may have negative implications for older adolescents (Han et al. 2010). Therefore, we examined the moderating roles of youths' gender and age to examine whether mothers' evening and/or weekend shifts had more negative implications for the time use of boys and older adolescents compared to girls and younger adolescents.

Lastly, we moved beyond the focus on the amount of time youths spent in particular activities and contexts—the focus of most prior research—to also examine day-to-day *consistency* in youths' time use. Prior literature highlights the significance of consistent routines in positive youth development (Harris et al. 2005), and shows that consistency is more closely related to some measures of adjustment than is average duration of activities (Fuligni and Hardway 2006). In this study, we operationalized consistency in time use in terms of less daily fluctuation around the person mean of each measure of time use. For example, a youth who spent time with mother for 1, 4, and 2.5 h across 3 days exhibits less consistency than a youth who spent 2, 2.5, and 3 h. Both youths spent an average of 2.5 h per day with their mothers, but the second was more consistent. Mothers' work shifts, specifically, how frequently mothers worked one kind of shift over a week may have implications for consistency in their youths' time use during the week. For example, we would expect that the more often a mother works evening shifts, the more consistent will be her child's time use, because the regularity in the mother's schedule may make it easier to set arrangements for the child's after school hours. Nonetheless, consistency in time use may also depend on the amount of free time youths have on a given day. Youths typically have more free time on weekends than on weekdays during the school year, which may mean that more weekend shifts by mothers are linked to less consistent time use in their children. We analyzed our diary data using multilevel modeling with heterogeneous variance (Hedeker and Mermelstein

2007; Hoffman 2007), which provides a parsimonious and powerful approach to modeling day-to-day consistency in time use while simultaneously accounting for mean levels of time use across days. This approach allowed us to examine whether and how evening shifts and weekend shifts were simultaneously and independently linked to both mean levels and day-to-day consistency in each of the three domains of youths' time use. For example, by modeling time with mother in a single analytic model, we were able to examine whether mothers' evening shifts predicted more consistency as well as lower levels of time with mother.

We drew upon a sample of mothers employed in a specific context—the long-term care industry. Employed mothers in this industry provide direct care to patients in nursing homes, and they are characterized as low-income, hourly workers. Shift work is common in this industry. Most prior studies have used a national dataset that includes a wide range of occupations to examine the prevalence and implications of nonstandard shifts. Focusing on mothers in a specific work context is important, because it can provide industry-specific policy implications for employers. Furthermore, work shifts in the long-term care industry often vary and are unpredictable to meet the needs of patients (Keller 2009), and thus provide an ideal opportunity to examine how variability in mothers' work shifts is linked to consistency in their children's time use.

More specifically, this study addressed three hypotheses. First, we hypothesized (H1) that mothers' evening shifts would be linked to youths' spending less time with mothers and more time alone and hanging out with friends compared to youths whose mothers worked standard daytime shifts, but that such differences would be less apparent when comparing weekend shifts against standard shifts. Second, we hypothesized (H2) that the potential negative effects of evening shifts would be more apparent for boys than for girls in the form of less time with mother, more time alone, and more unsupervised time with peers as compared to youths whose mothers worked standard shifts. Third, we hypothesized (H3) that the potential negative effects of evening shifts would be more pronounced for older than younger adolescents such that the former would spend less time with mother and more time alone and more unsupervised peer time. Capitalizing on the strengths of our daily diary design—that involved collecting information on eight consecutive days about when mothers started and ended their work and how much time youths spent in activities each day, we examined the associations within and between mother-youth dyads. At the *within-person* (WP) level, we asked whether, on days when mothers worked evening shifts, youths spent less time with mothers and more time alone and hanging out with peers unsupervised compared to days when their mothers worked standard shifts. Aggregating multiple days of information

for each person, we also tested *between-person* (BP) associations, that is whether youths whose mothers worked more evening shifts also spent less time with mothers and more time alone and hanging out than youths whose mothers worked fewer evening shifts. BP associations reveal how mothers' work shifts and youths' time use are linked, on average, and provide a more accurate picture of what life is like for the mother-adolescent dyad than generalizations about the past week or month. By using the BP work shift variables as predictors of WP level variance in time use, we also were able to explore whether greater frequency of particular work shifts have different implications for day-to-day consistency in youths' time use. We expected that mothers' working *more* weekend shifts would be linked to less consistency in youths' time spent with mother, alone, and hanging out with friends as compared to mothers' working fewer weekend shifts, but *more* evening shifts would be linked to more consistency in youths' time use compared to when mothers worked fewer evening shifts. Our novel analytic approach allowed us to simultaneously examine how both the mean level of time use and day-to-day consistency of time use were related to mothers' work shifts, toward a more comprehensive understanding of how mothers' work shifts may influence their children's activities.

Method

Participants

Data came from employed mothers and their adolescent-age children who participated in a study on workers in the long-term care industry. Occupations included licensed practical nurses, registered nurses, and certified nursing assistants. Among employees who completed baseline interviews for the larger study, 389 parents who had children aged 9–17 were eligible to participate in the daily diary component of the study, the focus of the current analyses. Of these, 220 (56%) parents agreed to participate, and 182 parents provided responses on 8 days via diary telephone interviews in the period of October 2009 to August 2011 (82.7% participation rate). Adolescent-age children of the 182 parents also completed diary phone interviews on the same evenings as their parents. The long-term care industry is comprised mostly of female workers and, given that only eight fathers completed the daily phone interviews, the father-child dyads were dropped from the analyses. In addition, one mother-youth dyad mistakenly completed their diaries on different days so this dyad was also excluded. The final sample consisted of 173 mother-youth dyads that collectively provided 1382 days of data on their daily experiences. On all 8 diary days 62% of mothers and 64%

of youths completed interviews; 17% of both mothers and youths completed interviews on 7 days, and a very few (6.3%) completed interviews on 3 or fewer days. Given that we sampled busy, working families, the completion rates (approximately 80% for 7–8 days) are considered high.

The mean age of mothers was 38.49 years (SD = 6.35), and 62% were White, 15% were Hispanic, and 12.7% were African American. The sample was primarily working class as indexed by education and income: 53.76% of mothers had completed some college or technical school, 30.64% were high school graduates, and 9.83% were college graduates, and mean annual household income fell in the range of $40,000–$44,999. Nearly half (49.13%) were married, 15.03% were cohabiting, and 35.84% were single. Mothers had an average of two children (SD = 1.12). Youths averaged 13.03 years of age (SD = 2.21), and 52.02% were girls.

Procedure

Thirty work sites were recruited from a U.S. long-term health and specialized care organization using a non-probability sampling method with specific selection criteria, including support from the site's management, worksite size, and logistical support for data collection. A subset of employees who completed the baseline interviews at the workplace were invited to participate in a home interview if they were a parent of a child aged 9–17 who lived at home at least 4 days a week. In the home interviews, interviewers provided a brochure that described the daily diary study, introducing the objectives and procedures. Consent forms were obtained from mothers and assent from youths. The diary interviews were then scheduled for eight consecutive evenings. Trained interviewers conducted computer-assisted telephone interviews with mothers and youths (separately). If mothers were working evening shifts, alternative interview times (e.g., after work, during a break, or the next morning) were arranged. The diary calls averaged 20 min for mothers and 15 for youths, and each dyad received $150.

Measures

Mothers' work shifts

During each call, mothers reported, for the past 24 h period or from around 7 p.m. on the prior day for the first call, what time they started and ended work. We first divided the 24 h day into three time frames: (1) 8 a.m. to 4 p.m., (2) 4 p.m. to 12 a.m., and (3) 12 a.m. to 8 a.m. When the majority of work hours occurred between 4 p.m. and 12 a.m. on a weekday, the shifts were coded as evening shifts (0 = *not evening shift*, 1 = *evening shift*; Presser 2003). Work

between 12 a.m. and 8 a.m. on a weekday was classified as night shift. In the larger study on which this study was based, however, employees who worked only night shifts were excluded due to potential differences in the set of policies, regulations, and work activities. Those who worked some day and night shifts were included (Berkman et al. 2015) but the 9 days classified as night shifts were excluded from the analyses due to lack of power to detect effects. Most evening shifts were clearly distinguished from standard shifts, with greater than 70% of the work hours falling into an evening shift time frame. For a few cases with a similar split between evening and standard shifts hours, two independent scorers manually checked the start and end time of each shift. If a shift ended after 6 p.m., it was recoded to evening shift because most standard shifts ended by 6 p.m. in our data and also in other studies (Han et al. 2010). Weekend shifts were defined as working any hours on Saturday and/or Sunday (0 = *not weekend shift*, 1 = *weekend shift*). One-third (34.21%) of weekend shifts occurred during evening hours, and these were coded as weekend shifts to distinguish weekday vs. weekend work effects, consistent with prior research (Gassman-Pines 2011). Each mother received a score (0, 1) each workday for each shift variable. We included the scores for the two nonstandard shifts in one model and treated the third, standard daytime shift as the reference group. Thus, at the WP level, the independent effects of evening shifts and weekend shifts were compared to standard shifts, defined as the majority of work hours on a given workday occurring between 8 a.m. and 4 p.m., Monday-Friday. We summed across all days to construct the BP evening or weekend shift variables such that higher scores indicated that mothers worked more evening or weekend shifts throughout the week, respectively.

Youths' daily time use

Time use questions were adapted from the Daily Inventory of Stressful Events—Youth Version (McHale et al. 2012). Telephone interviewers called youths in the evening (interview start time averaged around 7 p.m.) and asked how much time they had spent in a list of activities outside of regular school hours, since the prior evening call (or since this time yesterday, for the first call day). *Time with mother* was created by summing responses to items about how much time youths spent with their mother (a) eating meals, (b) doing chores at home, (c) doing school or learning activities, (d) just hanging out or talking, and (e) doing any other activities, like watching TV, playing games, or going someplace. Similarly, time with father was also created summing time youths spent with their fathers on the same set of activities and used for supplementary analyses examining the associations between mothers' work shifts

and youths' time with father and also to account for its potential role in the association between mothers' work shifts and youths' time use. For youths of single mothers, we imputed missing responses in time with father to 0 h. *Time alone* was measured by one item: "How much time did you spend alone (other than time spent sleeping)?" Time alone captures time in a range of contexts, including at home and in public settings. Importantly youth could report spending time alone when others were nearby and available for interaction (e.g., watching TV at home when others were in the house; *sitting alone at a coffee shop*). *Time hanging out with friends* was measured by asking, "How much time did you spend hanging out with your friends *with no adults around*?" All three measures were coded as total hours per day.

Moderators and covariates

Youths' gender (0 = *female*, 1 = *male*) and age were tested as moderators as well as included as covariates in all models. Youths' depressive symptoms score, measured via the Children's Depression Inventory (CDI, Kovacs 2001), was included as a covariate, given prior research showing its links with youths' time use (Rubin 1993). During the home interviews, youths rated 26 symptoms on a 3-point scale, e.g., I am sad, *once in a while* (1), *many times* (2), and *all the time* (3). The responses were summed so that higher scores indicated more depressive symptoms ($M = 33.96$, $SD = 6.91$, *Range* = 26–62, alpha = .88). Type of day (0 = *non-school day*, 1 = *school day*) and season (0 = *school year*, 1 = *summer vacation*) were controlled, because such daily and seasonal contexts may change youths' time investments (Crouter and McHale 1993). We also controlled for mothers' marital status (0 = *single*, 1 = *married or cohabiting*), highest level of education (1 = *grade 1 through 8* to 5 = *college graduate or more*), typical work hours per week, and the number of children living at home. Youths' daily phone interview start times were included as a covariate because their chances of reporting how much time they spent in activities can be different based on the timing of the call. This information was also considered in conjunction with when mothers started their evening shifts. If the youths' interview started prior to the mothers' evening shift, we created a variable to indicate the reversed order of interviews that day; 22 were coded as 1 (*youths' interview started before mothers' evening shift*) and the rest coded as 0 (*youths' interview did NOT start before mothers' evening shift*). All continuous variables were centered at the sample mean.

Data Analyses

We conducted multilevel modeling with heterogeneous WP variance, using Proc Mixed in SAS 9.4. This technique allowed us to simultaneously examine WP (level 1) and BP (level 2) differences in youths' time use as a function of mothers' work shift (Raudenbush and Bryk 2002). The level 1 equation is:

$$Y_{di} = \beta_{0i} + \beta_{1\,to\,4}(\text{WP Covariates}_{di}) + \beta_5(\text{WP Evening Shift}_{di}) + \beta_6(\text{WP Weekend Shift}_{di}) + e_{di}$$

where Y_{di} denotes the amount of time use in a given domain on the dth day for the ith person, β_{0i} denotes the person mean, and β_5 and β_6 indicate how time use changed on evening shift and weekend shift days, respectively, compared to standard shift days. At level 2, each number (#) of evening and weekend shifts was included as a BP variable. For example, the person mean is expressed as:

$$\beta_{0i} = \gamma_{00} + \gamma_{01\,to\,09}(\text{BP Covariates}_i) + \gamma_{010}(\text{BP Evening Shifts}_i) + \gamma_{011}(\text{BP Weekend Shifts}_i) + u_{0i}$$

where γ_{00} denotes the adjusted sample mean of time use (intercept), γ_{010} and γ_{011} indicate the effects of working more evening or weekend shifts, respectively, and u_{0i} indicates random deviation of the person from the sample mean. Using the BP work shifts as predictors, consistency in time use was modeled in the random effects of multilevel models as:

$$\sigma_{ei}^2 = \alpha_0 \text{Exp}\left((\alpha_1(\text{\# of Evening Shift}_i) + \alpha_2(\text{\# of Weekend Shift}_i)\right)$$

σ^2_{ei} refers to the degree of daily variation around the person mean. The exponential function (Exp) was used to normalize the variance, such that a linear prediction model could be used, as well as to eliminate the dependence of the variance on the mean level of time use (Hoffman 2007). Each α indicates expected changes in the log of daily variation for every number increases in the work shift. This approach can estimate more robust variability than an individual standard deviation (iSD) approach because it is model-based and takes into account temporal dependence of data (i.e., day effect) as well as the effects of covariates on the mean level (Wiley et al. 2015). A positive α coefficient indicates less consistency in time use. For example, if the estimated α is 0.7, daily variation increases by Exp (0.7), about by 2 times with one increase in the BP work shift score.

Step 1 involved testing the main BP and WP effects of mothers' work shifts on the amount and consistency of youths' time use, after controlling for covariates. At Step 2, we included interaction terms with youths' gender to test its potential moderating effect. At Step 3, we included interactions with youths' age, to see whether the associations differed for younger (age 11, or 1 SD below the sample mean) vs. older adolescents (age 15, or 1 SD above). In the

Table 1 Links between maternal work shifts and youths' time with mother, alone, and hanging out with friends

	Time with mother (hours)		Time alone (hours)		Time with friends (hours)	
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)
Fixed effects						
Intercept, γ_{00}	3.30***	(0.36)	1.10***	(0.29)	1.66***	(0.43)
Youth age, γ_{01}	−0.08	(0.06)	0.21***	(0.05)	0.13†	(0.07)
Youth gender, boy (vs. girl), γ_{02}	−0.55*	(0.25)	0.08	(0.20)	−0.09	(0.29)
Youth depressive symptoms, γ_{03}	−0.02	(0.02)	0.04**	(0.01)	0.02	(0.02)
School day (vs. non-school day), β_1	−0.08	(0.20)	−0.34†	(0.18)	−0.66**	(0.20)
Summer season (vs. school year), γ_{04}	−0.32	(0.29)	0.27	(0.23)	0.45	(0.31)
Youth interview start time each day, β_2	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Interview time flag[a], β_3	−0.11	(0.48)	0.12	(0.55)	−0.35	(0.52)
Mother married/partnered (vs. not), γ_{05}	−1.42***	(0.30)	0.02	(0.24)	−0.12	(0.34)
Mother highest level of education[b], γ_{06}	0.17	(0.17)	0.13	(0.13)	−0.06	(0.19)
Mother part-time work (vs. full-time), γ_{07}	0.38	(0.25)	−0.05	(0.2)	−0.21	(0.28)
Number of children in the household, γ_{08}	0.07	(0.12)	−0.14	(0.09)	−0.11	(0.13)
Time with father						
BP, γ_{09}	0.72***	(0.09)	−0.03	(0.07)	−0.01	(0.11)
WP, β_4	0.54***	(0.06)	0.06	(0.06)	−0.05	(0.07)
Evening shift						
BP, γ_{010}	−0.36***	(0.10)	0.04	(0.09)	−0.10	(0.11)
WP, β_5	0.26	(0.26)	0.14	(0.27)	0.19	(0.26)
Weekend shift						
BP, γ_{011}	0.32*	(0.16)	0.11	(0.13)	−0.09	(0.18)
WP, β_6	−0.03	(0.25)	−0.28	(0.24)	0.15	(0.26)
Random effects						
Variance Intercept, σ^2_{u0}	1.61***	(0.31)	0.77***	(0.16)	1.57***	(0.29)
Variance Residual, α_0	2.18***	(0.27)	1.64***	(0.16)	1.34***	(0.20)
Exp (BP Evening Shift), α_1	−0.16**	(0.05)	0.00	(0.04)	−0.12*	(0.05)
Exp (BP Weekend Shift), α_2	0.30***	(0.08)	0.40***	(0.07)	0.35***	(0.09)

Note: Main predictors are bolded. Between-person (BP) predictors of evening/weekend shifts indicate the number of each shift; Higher scores indicate more evening/weekend shifts. Within-person (WP) predictors indicate that mothers worked evening hours/on weekends on a given day; Standard, daytime shift is the reference group. Only work days were included in the analyses. Numbers of observations differ by model due to missing values (ranged from 421–641 work days)

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$

[a] Interview time was flagged (1) if youths' interview started before mothers' evening shift

[b] Mothers' education was coded as 1 (= grade 1 through 8) to 5 (= college graduate or more)

case of significant interactions, we conducted follow-up tests using estimate commands in Proc Mixed.

Results

Descriptive Results

We first examined means and standard deviations for mothers' work shifts and youths' time use. Of 695 work-days, mothers worked 155 evening shifts and 152 weekend shifts. Across the 8 study days, 37% of mothers worked one or more evening shifts ($M = 0.90$, $SD = 1.41$, range: 0–6), 59% of mothers worked one or more weekend shifts ($M = 0.87$, $SD = 0.83$, range: 0–3), and 71% of mothers worked one or more standard shifts ($M = 2.27$, $SD = 1.92$, range: 0–6). To check the degree of work schedule variability, we examined the percentages of mothers who worked only one shift across days: 5% of mothers worked only evening shifts, 4% of mothers worked only weekend shifts, and 28% of mothers worked only standard shifts. Thus, the majority of mothers' work shifts varied across just 8 days. There was little variability in mothers' weekly work hours: 32% of mothers worked 40 h, 27% of mothers worked 32 h, 17%

Fig. 1 Moderating effects of youth gender and age in the relations between mothers' work shifts and youths' time alone and hanging out with friends. *Note*: Panel 1 shows the moderating effect of youth gender in the within-person association between weekend shift and time alone; Panel 2 shows the moderating effects of youth age in the within-person associations of weekend shifts and evening shifts with time hanging out with friends; Panel 3 shows the moderating effect of youth age in the association of between-person level evening shift with day-to-day consistency in time hanging out with friends.
*$p < .05$, **$p < .01$
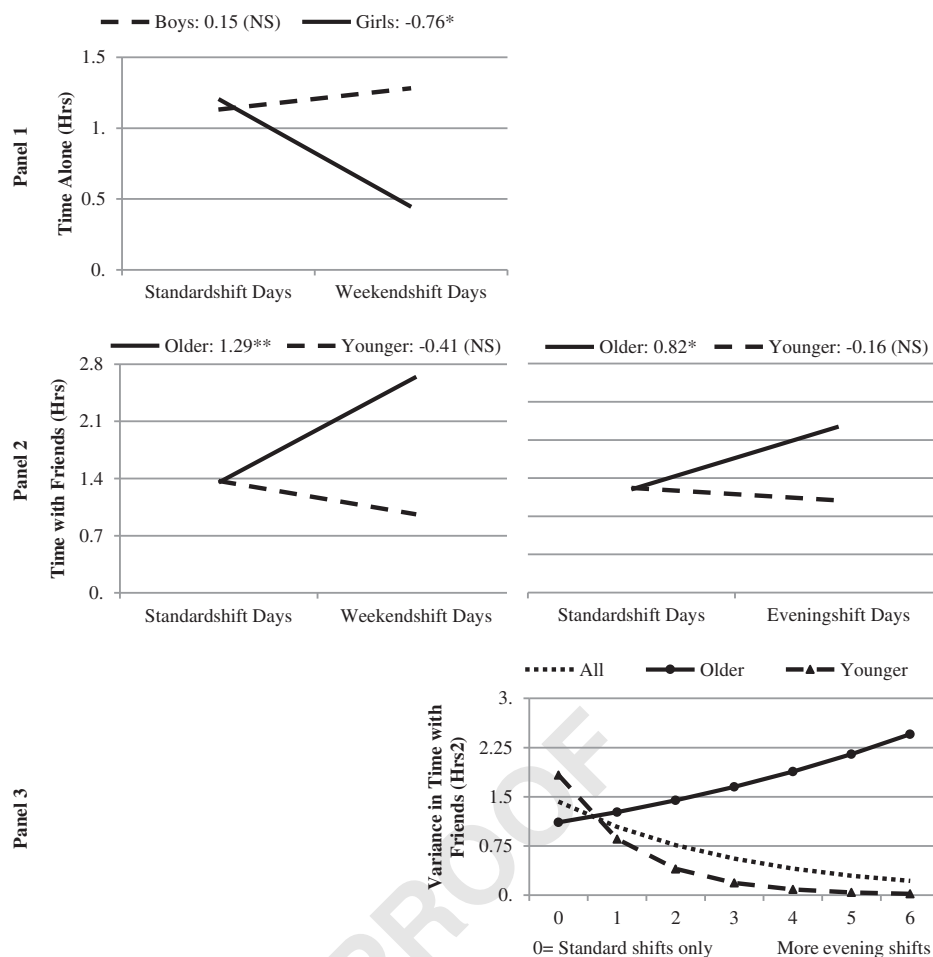
worked more than 32 and less than 40 h, 14% worked less than 32 h, and the rest 11% worked more than 40 and per week ($M = 36.72$, SD = 8.26). Considering the distribution of work hours, in the subsequent analyses we controlled for the potential effect of working part-time (work < 35 h/week, 41%) vs. full-time (work ≥ 35 h/week, 59%). Youths spent 2.36 h (SD = 2.04) with their mothers, 1.05 h (SD = 1.20) alone, and 0.88 h (SD = 1.14) hanging out with friends, per day, on average. There were no outliers in time use variables and skewness fell in an acceptable range between −3 and +3 (Kline 2005). WP level correlations between time use variables ranged from −.02 to .12, meaning that the three activity domains are statistically independent. However, time with mother was significantly correlated with time with father ($r = .38$, $p < .001$), suggesting some of these activities were shared between mother, father, and youth. To account for potential differences by shared family time, time with father was controlled in all models. Older youths spent more time alone, $r = .37$, $p < .001$, and hanging out with friends, $r = .28$, $p = .002$, but age was unrelated to time with mother. There were no gender differences in time use.

Links between Mothers' Work Shifts and Youths' Time Use

Table 1 shows results from multilevel models separately predicting time with mother, time alone, and time hanging out with friends, both in terms of the amount of time and day-to-day consistency in time use. Beginning with *time spent with mother*, girls and youths with single mothers spent more time with mother, on average, than boys and those in two-parent households. Time with father was also significantly and positively associated with time with mother at BP and WP levels. After adjusting for these covariates, results revealed significant main effects of mothers' evening and weekend shifts. At the BP level, youths whose mothers worked more evening shifts spent less time with mother than youths whose mothers worked fewer evening shifts: Each evening shift a mother worked was associated with a decrease of 22 min ($B = −0.36$, in hours) in youths' time with their mother per day, on average. Youths whose mothers worked more weekend shifts, however, spent *more* time with mother than youths whose mothers worked fewer weekend shifts ($B = 0.32$): Each

weekend shift was associated with a 19 min increase in mother-youth time per day, on average. At the same time, mothers' work shifts also explained consistency in mother-youth time across days. More evening shifts predicted more consistency, $\alpha_1 = -0.16$, whereas more weekend shifts predicted less consistency in time with mother, $\alpha_2 = 0.30$. For example, as shown in Table 1, when mothers worked standard shifts only, the adjusted daily mean time with mother was 3.30 h (intercept, γ_{00}). The degree of daily variation was 2.18 h (α_0), or a standard deviation of 1.48 h. When mothers worked two weekend shifts, however, the mean time with mother was 3.94 h ($3.30 + (0.32) \times 2$), and daily variance was 3.97 h ($2.18 \times \text{Exp}\ (0.30 \times 2)$), or a standard deviation of 1.99 h. There were neither main effects of work shifts at the WP level nor moderating effects of youths' gender or age.

Turning to *time alone*, older adolescents and youths who reported more depressive symptoms spent more time alone, on average. There were no main effects of evening or weekend shifts, but there was a significant interaction between youths' gender and the WP weekend shift variable, $B = 0.91$, SE = 0.43, $p = .035$, predicting daily time alone. Panel 1 in Fig. 1 shows that, on days when mothers worked weekend shifts, girls (but not boys) spent less time alone compared to days when mothers worked standard shifts. Consistency of time alone was predicted by work shift such that more weekend shifts were linked to less consistency in youths' time alone. Gender was not a significant moderator at the BP level, nor did youths' age emerge as a significant moderator at the WP or BP levels.

With regard to *time hanging out with friends unsupervised*, youths spent less time hanging out with friends on school days compared to non-school days. Although there were no main effects of evening or weekend shifts, age moderated the effects of the WP evening shift, $B = 0.22$, SE = 0.11, $p = .037$, and weekend shift, $B = 0.39$, SE = 0.10, $p < .001$: Older adolescents spent more time hanging out with friends on days when mothers worked evening shifts or weekend shifts compared to days when mothers worked standard shifts, but these associations were not significant for younger adolescents (Panel 2 in Fig. 1). These effects translate into older adolescents spending 1 h and 17 min more unsupervised peer time on a weekend shift day and 49 min more on an evening shift day, as compared to their time use on a standard shift day. Consistency of time with friends also was predicted by work shift. More evening shifts were linked to greater consistency in hanging out time, but a significant interaction with youths' age also emerged, $\alpha = 0.20$, $p < .001$. Follow up of this interaction effect indicated that more evening shifts were linked to more consistency for younger adolescents' hanging out time, but to less consistency for older (Panel 3 in Fig. 1). More weekend shifts were linked to less consistency in time

hanging out ($\alpha = 0.28$, $p < .01$), and there was no significant moderation of youths' age. Youths' gender was not a significant moderator.

Finally, we conducted post hoc analyses to test whether mothers' work shifts were associated with youths' time with fathers. Neither evening shifts nor weekend shifts significantly predicted youth time with father at the WP or BP levels. Neither youth gender nor age was a significant moderator.

Discussion

Responding to the call for more nuanced understanding of nonstandard work schedules (Dunifon et al. 2013), this study examined the implications of standard daytime, evening, and weekend shifts in a sample of working mothers in the long-term care industry. In addition to its contribution to the work schedule literature, this study advances knowledge on whether and how mothers' work shifts are linked to their children's daily time use, building upon the work-home resources model (ten Brummelhuis and Bakker 2012). Focusing on adolescent-age children and using separate reports from mothers and youths allowed for stronger inferences about the implications of mothers' work for their children's daily activities. Moreover, our diary data across an 8-day period allowed us to show how different types of nonstandard shifts were tied in different ways to youths' time use. Consistent with the work-home resources model, more evening shifts were more likely to deplete mothers' shared time with youths and more weekend shifts were more likely to disrupt youths' consistent routines across days, suggesting the negative implications of nonstandard shifts for youths' daily activities overall. Finally, our research addressed the roles of youths' gender and age, and demonstrated that girls (but not boys) tended to spend less time alone on mothers' weekend shift days, and older (but not younger) adolescents were vulnerable to mothers' evening and weekend shifts in terms of daily increases and less overall consistency in unsupervised time with peers.

Our results showed that, at the between-person level, mothers' working more evening shifts was linked to youths' spending less time with mother overall. The negative association between more evening shifts and less time with mother was congruent with prior research with younger children (Han et al. 2010; Wright et al. 2008). It may be that mothers who work more evening shifts miss out on daily interactions with their children due to the work demands depleting their parenting resources (i.e., time, energy), which over time, may weaken their relationships. For instance, some research has shown that mothers who worked more years with late evening and night schedules had lower quality interactions with their children (Han et al.

2010; but see Davis et al. 2006). Utilizing daily diary data, we found negative implications of evening shifts across a shorter time frame. Note that mothers who worked more evening shifts were also more consistent across days in their *lower levels of* time with children. More consistency in this case is not positive, and should be interpreted such that frequent evening shifts may have interfered with mother-child relationships. We found no within-person associations of evening or weekend shifts with time spent with mother (but see below regarding interactions with WP shifts predicting other time domains). It may be that the effects of nonstandard schedules on mother-youth shared time accumulate across days, rather than being apparent at the daily level. This may reflect a possibility that mother-youth dyads can compensate for less time spent on evening shift days by spending more time on days with no evening shift; if mothers frequently work evening shifts during a week, they may not be able to catch up. This interpretation deserves further exploration.

In contrast, more weekend shifts were related to more time with mother, but with less consistency in time across days. Working more on weekends may be less demanding for mothers than evening shifts. At least in the long-term care industry, residents' families may be more likely to visit and provide attention and care to residents on weekends. In turn, lower weekend work demands may allow mothers to reserve energy for their children, as the work-home resources model suggests (ten Brummelhuis and Bakker 2012). This finding is consistent with the limited literature suggesting that weekend shifts do not disrupt shared time with children and family well-being (Gassman-Pines 2011; Presser 2003). Importantly, however, more weekend shifts also predicted less consistency in all three domains of youths' time use. Although working more weekend shifts might have allowed mothers to spend more time with children on average, it may alter youths' daily routines. Youths' more available but presumably less structured time throughout weekend shift days might have offered them more chances to deviate from their routines. Note that less consistency in time alone and unsupervised peer time may not be a negative in the sense that at least youths are not regularly spending their time in potentially less healthy contexts. However, given that we did not find significant effects of more weekend shifts on the amount of time spent in these activities, the findings on less consistency in the three time use domains suggest less regularity in youths' routines. Together, these results imply that mothers' work shifts may have different implications depending on outcomes of interest, and thus future research should include an array of individual and family outcomes to fully understand implications of when mothers work.

Gender and age moderation of *within-person* links demonstrated differences in girls' and older adolescents'

time use on evening and weekend shift days as compared to mothers' standard shift days. Importantly, in interpreting these findings, we were able to rule out stable individual differences (e.g., parenting style, long term work schedule experiences) as third variables that might otherwise explain these associations. With respect to gender, prior research suggests that girls may have stronger social orientations and executive functioning than boys, which may underlie girls' organizing social activities for themselves when their mothers work on weekends (Meeks and Mauldin 1990; Posner and Vandell 1999). Turning to age, older but not younger adolescents were more likely to exhibit increases in unsupervised time hanging out with friends on days when mothers worked evening or weekend shifts. This pattern may have emerged because mothers are more likely to grant older adolescents more autonomy to organize their free time than younger children (Zaslow et al. 2005), and older adolescents also have access to peers with greater autonomy about their time use during evening hours. Although too little time with friends may also have negative implications for adolescents, hanging out with friends without adult supervision has been linked to risky behavior in prior research (Osgood et al. 1996; Posner and Vandell 1999; Vazsonyi et al. 2002). Moreover, our findings were at the within-person level, meaning that older adolescents spent more time hanging out with friends than usual on days when their mother worked evening shifts or weekend shifts. Furthermore, older adolescents whose mothers worked more evening shifts exhibited less consistency in their time hanging out. These findings may indicate an increased risk of engaging in unstructured and unsupervised activities due to lack of mothers' supervision. Based on our results, older adolescents whose mothers work evening or weekend shifts may be targets for future family or workplace intervention or prevention programs.

Taken together, our findings suggest that future efforts should be directed at developing programs that increase mothers' resources to deal with constraints on parenting due to their work during nonstandard hours (ten Brummelhuis and Bakker 2012). Because mothers who work nonstandard shifts tend to have less knowledge about their children's whereabouts (Fagan 2001; but see Davis et al. 2006), workplace interventions to allow mothers to check in with children during break times may facilitate mother-child communications and monitoring. Interventions could also target increasing the predictability of work schedules, thereby allowing parents to more readily establish family routines that best support youth adjustment and development. In the case of mothers who have a spouse or another co-parent, programs aimed at developing effective communication and co-parenting strategies also may prove effective (Davis et al. 2006). An incentive for employers' helping to reduce employees' experiences of conflict

between work and family responsibilities is that this support could improve a company's bottom line through increased productivity and reduced absenteeism (Kossek et al. 2014). Finally, school and community programming should take into account the realities of the 24–7 economy in scheduling and providing supervised activities for adolescents of all ages.

Limitations

In the face of this study's contributions, some limitations imply directions for future research. First, although we collected data across multiple days, our data are correlational in nature and thus we cannot make causal inferences. Future studies may attempt to determine the causal role of maternal work schedules in youths' time use, such as increasing control over work schedule or work schedule predictability via randomized workplace interventions (e.g., Davis et al. 2015). Second, we focused on nonstandard shifts in the long-term care industry. Future research should target diverse industries because working nonstandard hours may have different implications depending on the nature of the industry and the occupations being studied. Note also that we had to make trade-offs of a more representative sample for more diary days. In doing so, the non-probability sampling method and potential selection into the study limit generalizability of our results to families with working mothers in the long-term care industry. Third, due to limited data we were unable to consider the roles of other adults. In our sample half of mothers were married and we accounted for time spent with fathers in our models in order to show how, regardless of fathers' availability, mothers' work schedules were related to youths' time use (though by imputing missing responses in time with fathers for youths with single mothers, we may underestimate father-youth-time). Future studies should consider the roles of other adults, including the importance of older siblings' care, kin and neighbor care in low-income families (Kossek et al. 2008; Taht and Mills 2012). Fourth, we did not have information about the larger contexts when time was spent alone. Time alone might have occurred in the home or outside of the home, with others around nearby or not; it was the youth's perspective that he/she was not in a social context. Future research could distinguish among the different contexts of time spent alone. Last, we included standard, evening, and weekend shifts given they were the variable shifts prevalent in this sample. Future work on night shifts is needed because some mothers may choose to work at night to be available to children during the day (Presser 2003); further, for older adolescents, maternal night shifts may provide more opportunities for time in unsupervised settings with peers—a high risk context.

In conclusion, this study extended previous knowledge on the implications of mothers' work shifts for their children by examining daily variations in work shifts and focusing on youths' daily time use. We may observe more variations in work schedules in years to come with an increase in shift workers in a range of occupations (McMenamin 2007), particularly low-income mothers who are trying to accommodate their work and family responsibilities (Hattery 2001). To fully examine implications of *when* parents work, future research should continue to examine variable work shifts and their long-term effects on youth, with attention to their gender and age. Although we may not be able to change the nature of the jobs that require nonstandard shifts, such research may advance understanding of how the times and days of parents' work are linked to youths' daily lives and family relationships, knowledge that can be used to develop family-focused interventions and workplace policies.

Compliance with Ethical Standards

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