

Title: Mothers' nonstandard working hours, economic hardship, and child wellbeing

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Specific aim and significance. The implications for children and families of mothers working nonstandard shifts (i.e. working outside the hours of M-F 9-5) are increasingly well understood. Much of the evidence suggests mothers' nonstandard work is associated with poorer outcomes for children in a variety of domains, including cognitive skills, socioemotional development, and risk for overweight/obesity (1). The majority of this research has focused on one policy and cultural context: the United States. Arguably the United States has limited work-family and safety net policies for children and their parents relative to other Western countries. Therefore, findings from the United States may not generalize to the United Kingdom, where a dramatic expansion in services for families with young children started in the early 2000s.

The existing research suggests that the effects of nonstandard working hours are not distributed equally across families, but are particularly pronounced for low-income families (2). This may be because economic resource limitations place additional challenges on low-income workers with nonstandard working hours and their families. Unfortunately, very little research focuses on the economic wellbeing of mothers who regularly work such nonstandard schedules. This limits our understanding of the mechanisms that explain the adverse effects on children. One of the aims of our paper addresses this gap by providing a clearer picture of the economic wellbeing, broadly defined, of mothers working nonstandard schedules.

A recent review identified family income as one of the primary potential moderators of the impacts of nonstandard employment on child outcomes (1). Because nonstandard shift work is hypothesized to affect child outcomes via impacts on family resources and processes, children in families experiencing economic hardship may be at higher risk for negative outcomes when parents work nonstandard shifts. Current evidence on nonstandard work's effects on child wellbeing among low-income families is minimal. However, the existing research consistently finds significant effect sizes of parental nonstandard schedules on children's behavioral and cognitive outcomes among low income families (3-6). These studies lay the groundwork for our investigation of the relationship between nonstandard work schedules and economic hardship and their joint influence on child wellbeing. We extend the literature by taking a more nuanced approach to the study of economic hardship by examining three dimensions: income poverty, material deprivation, and subjective financial stress. These three dimensions may overlap and occur together, but they are distinct and can be experienced independently of each other (7). Lastly, we focus on different markers of cognitive wellbeing and behavioral skills at school entry due to their importance in setting children up for trajectories of success (8) in both psychological and economic wellbeing (9).

The goal of this study is to delineate the associations between maternal nonstandard work schedules across early childhood and children's verbal, spatial, and behavioral skills at age 5. We explore whether mother's nonstandard work experiences alongside economic hardship are related to child outcomes. We focus on three distinct dimensions of economic hardship: income poverty, material hardship, and subjective financial stress.

Data and methods. We use the Millennium Cohort Study (MCS) which is an ongoing longitudinal cohort study of 9-month infant survivors born in the United Kingdom between September 2000 and January 2002. Data for this study used the first three waves when cohort members were on average 9-months, 3-years, and 5-years. In each wave, we use interview data from the mother, who is normally the main respondent.

Independent variables: All independent variables were assessed in the first three waves of data with the exception of subjective financial stress. Mothers who indicated being in paid work were asked if they regularly (daily/weekly) worked each type of nonstandard work schedule: evening (6 p.m.-10 p.m.), night (10 p.m.-7 a.m.), and weekends (Saturday and/or Sunday). Mothers were categorized as working a *nonstandard* schedule if they were employed and indicated working any of the three aforementioned nonstandard working times (reference = standard). We used three markers of economic wellbeing. *Income poverty* was a derived binary variable indicating if a family had equivalised net family income below 60% of the national median. We constructed a *material hardship* measure using information from five items: behind on utility bill payments, inability to afford a warm, waterproof coat for the focal child, problems with damp, overcrowding, and lack of heating. We then constructed a dichotomous indicator that was equal to 1 if a family reported at least one of these five material deprivation experiences. We created a dichotomous indicator, defining *subjective (severe) financial stress* as “finding it quite difficult” and “finding it very difficult”, which are the two highest responses on a Likert scale asking how well the household was managing financially.

Dependent variables. All outcome measures were assessed at age 5. To assess *verbal ability* we used the British Ability Scales (BAS) Naming Vocabulary test. We had two measures of *spatial ability*: the BAS Picture Similarities and Pattern Construction tasks. *Socioemotional development* was assessed using the Strengths and Difficulties Questionnaire from which we used the externalizing, internalizing, and total difficulties scales. All outcome measures were standardized to have a mean of 0 and a standard deviation of 1 to ease interpretability.

Control variables. We included the following demographic characteristics from the 9-month interview: mother's education, mother's ethnicity, household size, relationship status, mother's age at birth, and country at sampling.

Analytic strategy. We explore associations between maternal nonstandard work when children are 9 months old, 3 years old, and 5 years old and children's verbal, spatial, and behavioral skills at 5 years. We conduct these analyses in two stages. First we test each time point at which we expect nonstandard work to exert particularly negative effects on development individually as well as its interaction with each of the economic hardship dimensions described above. Second we include all periods of nonstandard work in a single model to assess independent contributions of each wave of nonstandard work net of others. Below we present the more inclusive model. All models adjust for controls mentioned above.

Results. Table 1 presents results predicting 5-year outcomes from nonstandard work at each developmental period (3-year and 5-year) and simultaneously adjusting for other waves of working nonstandard work schedules. Regression models also interact material hardship with the developmental period of interest. Accounting for nonstandard work at other ages, nonstandard working at 3 years was associated with lower levels of verbal and spatial skills. Additionally, children of mothers who are working at nonstandard hours and experience material hardship simultaneously have more behavioral problems. Associations between nonstandard working at 5 years and child outcomes are less consistent and there are no significant interactions between work and material hardship at this age.

In results not shown, we conducted a similar exercise with income poverty and subjective financial stress. Similar to regressions adjusting for material hardship, we found children of mothers who worked nonstandard schedules at age 3 had lower levels of verbal and spatial skills at age 5. Unlike our results on material hardship, we found nonstandard working at age 5 to be associated with more behavioral problems, when adjusting for income poverty and financial stress separately.

However, there were no significant interactions between such work schedules and each dimension of economic hardship at any age.

Conclusion. We found children of mothers who work at nonstandard hours and experience material hardship to have more behavioral problems in early childhood. Equally we found a longitudinal association between nonstandard work schedules at age 3 and verbal and spatial skills at age 5. Our results shed light on the role of nonstandard work in the lives of children in the UK alongside understanding the nexus of distinct dimensions of economic hardship and nonstandard work.

References

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Table 1. Regression models predicting child wellbeing at age 5 from episodes of nonstandard work and material hardship, controlling for all other episodes of nonstandard work across early childhood

	<i>Verbal</i>	<i>Spatial</i>		<i>Behavior</i>		
	Naming Vocabulary	Picture Similarity	Pattern Construction	Externalizing	Internalizing	Total Difficulties
Work schedule						
<i>3 years</i>						
Working any nonstandard schedule (Ref: Standard)	-0.090** (0.032)	-0.10*** (0.031)	-0.066* (0.031)	-0.022 (0.035)	0.035 (0.036)	0.0032 (0.033)
Overall material hardship	-0.074 (0.056)	-0.13* (0.059)	-0.14* (0.055)	0.050 (0.057)	0.029 (0.057)	0.043 (0.056)
Nonstandard x material hardship	-0.086 (0.083)	0.14 (0.086)	0.068 (0.079)	0.22** (0.085)	0.20* (0.081)	0.26** (0.080)
n	6305	6297	6289	6314	6318	6302
<i>5 years</i>						
Working any nonstandard schedule (Ref: Standard)	0.0062 (0.026)	0.0083 (0.033)	-0.012 (0.030)	0.057 (0.031)	0.048 (0.031)	0.063* (0.032)
Overall material hardship	-0.019 (0.052)	0.028 (0.055)	-0.062 (0.047)	0.059 (0.055)	0.13** (0.048)	0.11* (0.052)
Nonstandard x material hardship	-0.083 (0.063)	-0.052 (0.074)	-0.044 (0.078)	0.045 (0.081)	0.029 (0.069)	0.041 (0.078)
n	6869	6861	6850	6873	6878	6858

Notes: Standard errors in parentheses. All outcomes are standardized with mean 0 sd 1. Sample conditional on complete information on employment at developmental period of interest and 9-month controls. Regression models include nonstandard work at all time points and baseline control variables.

*** p<0.001, ** p<0.01, * p<0.05