Parents' Work Hours, Availability during the Day and Adolescent Weight Gain

Molly A. Martin
Adam M. Lippert
Pennsylvania State University

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Abstract

We explore the extent to which mothers' employment, as well as the joint employment patterns of fathers and mothers, predicts adolescent weight change. We hypothesize that time spent in paid employment affects parents' ability to be home with their child before and after school, which in turn affects adolescents' weight-related routines. In particular, we study whether adolescents usually eat breakfast on weekdays, their hours of screen time, and how often they eat dinner with parents. Finally, we explore the extent to which these routines and parents' availability predicts adolescent weight change. We use Add Health data because it is the only study to have data on parents' availability before and after school. In large measure, our findings support our hypotheses. Further, we find that the joint labor force participation of mothers and fathers (not just the labor force participation of mothers) is significant for these associations.

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Extended Abstract

Research Problem and Significance

The prevalence of overweight and obesity has increased dramatically among youth since the 1980s (2006). This shift has significant consequences for youth who become overweight or obese. Obese adolescents are more likely to be diagnosed with diabetes, hypertension, orthopedic disorders, sleep disorders, increased cholesterol levels, and gall bladder disease (Barlow and Dietz 1998). Further, overweight and obese adolescents frequently experience psychosocial problems (Dietz 1998) and discrimination in school (Crosnoe 2007; Gortmaker et al. 1993). Finally, the risk of being overweight during adulthood is much greater for persons who were overweight as adolescents (Whitaker et al. 1997).

Several scholars have asserted that families play a key role in the management of a healthy weight (Davison and Birch 2001; French, Story and Jeffery 2001). Given the important role that mothers play in managing the home and children's nutrition and activity, several scholars hypothesize that the rise in obesity among youth corresponds with the secular rise in women's paid employment. Researchers indeed find a positive correlation between mother's employment and BMI (Anderson, Butcher and Levine 2003; Cawley and Liu 2007; Fertig, Glomm and Tchernis 2009; Morrissey, Dunifon and Kalil 2011). These studies, however, focus on children in early and middle childhood. *Our study is one of the few studies to explore whether and how maternal employment is significant for adolescent weight*.

There are several reasons to expect the associations to differ when children are in adolescence. First, adolescence are more independent than younger children (Steinberg and Morris 2001) and, thus, less influenced by their parents' work hours. Yet many studies have

found numerous positive associations between parental supervision and involvement and adolescent well-being (Duncan, Duncan and Strycker 2002; Muller 1995). We expect that these benefits carry over to nutrition- and activity-related behaviors. Second, a higher percentage of mothers work when their children are in adolescence relative to earlier in their child's life course. *Thus, maternal work is a common exposure for adolescents, but we know less about the association between maternal paid work and adolescent weight.*

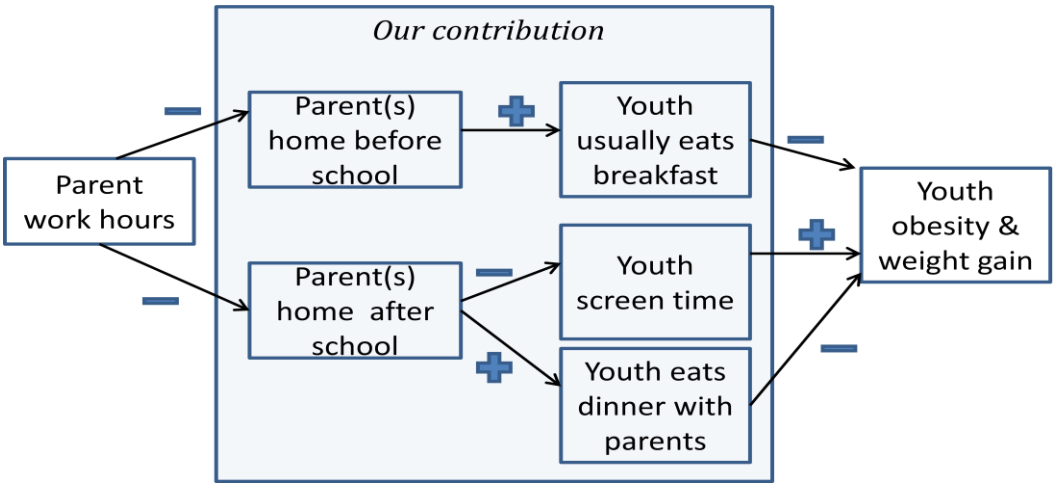
Given the greater involvement of mothers in the paid labor force during adolescence, we also think it is advisable to study parental work together, as a unit. Prior studies, if they consider father's employment, conceptualize it in an additive relationship to mother's employment. Yet, we would argue that both maternal and parental work decisions are made jointly. Further, given that adolescents need less care-giving and focused attention, it is likely that the social expectation and pressure to have a mother (versus father) present in the home is somewhat mitigated. *Thus we research both parental employment (i.e., the joint patterning of paternal and maternal work) and maternal employment.*

Prior research has sought to explore possible mechanisms by which maternal employment affects child weight. Several scholars have turned to time use data to explore how mother's care-giving activities and time spent with the child matter (Cawley and Liu 2007; Fertig et al. 2009). A study by Morrissey et al. (2011) has explored the shifts that women work and found that working nonstandard shifts does not help explain this association. We extend upon the study by Morrissey et al. (2011), agreeing with their focus on *when parents are work*. But take that kernel one step further: we investigate when parents are home. In particular, with unique data in the Add Health study, we explore the extent to which parents are home when children are home – before and after school. We predict that parents home before school are more likely to

encourage children to eat breakfast, which research has shown is associated with a healthy weight (Cho et al. 2003). Also, parents who are home after school can help monitor and minimize adolescents' screen time and are more likely to be able to share an evening meal with their child as a family. Both of these adolescent routines have been shown to predict adolescent weight (Utter et al. 2003; Videon and Manning 2003).

Our conceptual model of the processes we explore is presented below.

Figure 1. Conceptual Model



Hypotheses

Based on our theoretical expectations and prior research we predict the following:

Hypothesis 1: Parents who work more are less likely to present in the home in the morning before school or in the afternoon after school.

Hypothesis 2: Parents' availability in the home provides supervision, role modeling and direct instruction to facilitate healthier routines among their adolescent children, including eating breakfast, engaging in fewer hours of "screen time," and eating dinner more frequently with parents.

Hypothesis 3: As found in prior research, we expect these healthy routines are associated with smaller weight gains as adolescents age.

Data

Add Health is a United States school-based sample of 20,745 1994-1995 7^{th} -12^{th} graders from over 140 high schools and middle schools (Udry, 2003). The original sample, which was followed up in 1995-1996, 2001-2002 and 2007-2008, includes oversamples of Cubans, Puerto Ricans, Chinese, and high socioeconomic status African Americans (Harris et al., 2003). Our analysis relies on the Waves 1 and 2. By Wave 3, Add Health respondents are no longer adolescents.

We restrict our sample to adolescents reporting living with a "residential mother," though this need not be a biological mother. This restriction is made because the parent work hours and availability are contained in the in-home student survey sections of "residential mothers" and "residential fathers." Further, this allows us to respond to the key theoretical and policy debate – what mothers do and how this influences children's health. We also drop adolescents who did not have a valid sampling weight and do not have complete data on the analytic variables. Our final sample is 2,781 adolescents.

Measures

Adolescent Overweight. We first calculate the adolescent's BMI using their interviewer-measured Wave 2 height and weight and their self-reported Wave 1 height and weight. We convert these values into age- and sex-specific BMI z-scores U.S. Centers for Disease Control and Prevention guidelines (Ogden et al. 2002). We then classify adolescents as overweight (BMI $\geq 85^{th}$ percentile) or obese (BMI $\geq 95^{th}$ percentile) versus normal weight or underweight. We also calculate the simple difference in BMI z-scores between Waves 1 and 2.

Parent work hours. For each residential parent, adolescents responded to the question "Approximately, how many hours s/he work for pay?" For adolescents with one residential parent, we simply use the data available for that parent. For those with two residential parents, it is the sum of their work hours. We created a flag variable for those who did not have a working parent (=1) and a count of work hours for those that have working parents. Some models focus on mother's employment and uses an identically-constructed flag variable to indicate she does not work and a second variable with the count of her work hours, for those who work for pay. In supplementary analyses, we also created the log of work hours and quintiles of work hours for both the total parent and mother work hours.

Parents' availability before and after school. For each residential parent, adolescents indicated "How often is s/he at home when you leave for school?" The response options were "always," "most of the time," "some of the time," "almost never," "never" and "s/he takes me to school." We combined "always" and "s/he takes me to school" into one category and scaled the variables such that the greatest availability (i.e., "always") had the greatest value (=5). For adolescents with one residential parent, we simply use the data available for that parent. For those with two residential parents, we use the highest value across both two parents (i.e., the value for the parent who is most available). Similarly, adolescents indicated "How often is s/he at home when you return from school?" for each residential parent. The response options are identical except the last option is "s/he brings me home from school." We scaled and coded the variables in the same manner as we did for parental presence before school. Additional models utilize these scales to indicate the availability of the mother before and after school.

Adolescent weight-related routines. Adolescents were asked "What do you usually have for breakfast on a weekday morning?" and they could check from among a series of options,

including, for example, milk, cereal, eggs, and meat. AdHealth administrators note if the adolescent checked nothing. We use this item (in reverse) to indicate that the adolescent usually eats breakfast on weekday mornings. To calculate the adolescent's screen time, we sum their self-reported hours per week of watching television, watching videos, and playing video or computer games. The adolescents also report on "how many of the past 7 days was at least one of your parents in the room with you while you ate your evening meal." We use the full range of values, from 0 to 7.

Control variables. The models control for parents' education ordered categories (averaged in two parent families), the adolescent's age (measured in years), birth weight (measured in pounds), number of siblings, and dummy variables for whether they are female (=1) and the number of residential parents in Wave 1.

Statistical analysis

We use ordinal logistic regression to predict parents' availability before and after school and frequency of eating dinner with parents. We use logistical regression to predict whether youth usually eat breakfast on weekdays. We use OLS to predict screen time hours, BMI z-scores, and the difference in BMI z-scores across waves. We estimate a series of models to test our conceptual model, first predicting parents' availability before and after school first and then youth behavioral indicators (i.e., eating breakfast, eating dinner with parents, and screen time). Finally, we predict Wave 2 BMI z-scores and the difference in BMI z-scores across waves. All models are weighted and control for design effects.

Findings

Our descriptive statistics are presented in Table 1. It is worth noting that 8% of adolescents live in families where no parent is working, while 23% live in a family where the

mother does not work. American families work long hours, as is also indicated in Table 1.

Table 2 presents results from models predicting whether parents are available before and/or after school. As expected, parents who work longer hours are less likely to be home when their child leaves for school and returns. The associations are actually stronger between "parent" work hours versus mother's work hours.

Table 3 presents results from models predicting adolescents' weight-related routines. Parents' presence in the home before school is positively associated with children eating breakfast, while their presence after school is positively associated with eating family meals. Interestingly, parents' availability after school does not predict screen time. Yet mother's work hours is positively correlated with screen time.

Table 4 presents results from models predicting change in adolescents BMI z-scores between Waves 1 and 2 of the survey. Unfortunately we do not find any statistically significant patterns. Yet we attribute this to a few factors, especially given that the simple correlations suggest that we should see significant associations in the predicted direction. First, our sample is quite restricted given we rely on listwise deletion. Second, we are predicting change over a brief period of time – approximately one year. As noted below, we will explore alternative measures of weight in future analyses.

Future directions

As we further develop this manuscript, we plan to make several extensions. First, we plan to investigate potential nonlinearities in the association between parents' availability both before and after school and adolescent weight. Preliminary analysis suggests that there is a segment of youth for whom having a parent "always" available before or after school is problematic. Specifically, preliminary research suggests that having low-income parents who are "always"

available is positively associated with adolescent obesity. We expect that not all parents' present in the home will contribute to healthy weight habits for youth (either through role-modeling or direct interactions). We will also further investigate who these parents are and whether they are disabled or have a poor work history. Second, we will utilize multiple imputation to deal with missing data. We lose a tremendous amount of cases relying on listwise deletion. We expect to have more robust estimates once we use multiple imputation. Third, we plan to explore differences in these patterns by race/ethnicity and for Mexican youth, generation status (i.e., immigrant or not). Given the differential distribution of work and cultural expectations for mothers' time, we expect to find differences in these associations. In particular, we expect the results for mothers' work hours and availability to be stronger for Mexican youth – whether immigrant or native – and weaker for African American youth. Fourth, once we have multiply imputed the data, we will stratify our results by the number of residential parents in the home to test the extent to which these patterns differ given that the range and distribution of work hours is different for single versus dual parent families. Fifth, we will explore other methods of modeling change over time in weight between Waves 1 and 2 to ensure that we are capturing this change in the best manner.

Table 1. Unweighted descriptive statistics for final analytic sample (N = 2,781)

	Mean or Percent	S.D.		Mean or Percent	S.D.
Adolescent Weight			***Parent Characteristics, Wave 1***		
BMI z-score, Wave 2	0.23	1.09	No parent working for pay	8.4%	
BMI z-score, Wave 1	0.28	0.99	Total work hours	60.04	30.59
Difference of BMI z-scores (W2 - W1)	-0.04	0.62	Availability before school (range: 1-5)	4.36	1.17
			Availability after school (range: 1-5)	3.56	1.15
Adolescent Characteristics, Wave 1			Education level (range: 1-8)	5.19	1.83
Eats breakfast on weekdays	81.2%		One residential parent	24.4%	
Hours of screen time	21.72	20.54			
Days ate dinner with parents	4.87	2.40	***Residential Mother Characteristics, Wave 1***		
Female	50.9%		Not working for pay	22.7%	
Birth weight	7.25	1.40	Total work hours	28.81	19.35
Age	15.25	1.59	Availability before school (range: 1-5)	4.09	1.36
Sibling count	1.61	1.20	Availability after school (range: 1-5)	3.27	1.46
			Mother obese	16.4%	

Source: National Longitudinal Study of Adolescent Health, Waves 1 and 2 In-Home Survey

Table 2. Selected Coefficients from models predicting parent availability

	Available before school*		Available after school*	
Panel A. Combined Parent Data				
Parent does not work for pay	2.300	(0.64) **	0.491	(0.43)
Total work hours	-0.017	(0.01) **	-0.022	(0.01) **
Panel B. Data on Mothers				
Mother does not work for pay	2.243	(0.58 **	1.031	(0.53)
Total work hours	-0.020	(0.01)	-0.027	(0.01)

Source: National Longitudinal Study of Adolescent Health, Waves 1 and 2 In-Home Survey

Note: Standard errors in parentheses. * : $p < .05$, ** : $p < .01$

Models also control for parents' education, mother's obesity, adolescent's age, sex, sibship size, birth weight, and number of residential parents

* Models using data on mothers' paid work predict mothers' availability.

Table 3. Selected Coefficients from models predicting adolescents' routines

	Eats breakfast on weekdays		Hours of screen time		Days of dinner with parents	
Panel A. Combined Parent Data						
Parent does not work for pay	-0.525	(0.55)	-0.276	(3.88)	0.063	(0.40)
Total work hours	0.005	(0.01)	0.026	(0.06)	0.004	(0.00)
Availability before school	0.230	(0.10) *	--		--	
Availability after school	--		0.389	(0.70)	0.143	(0.06) *
Panel B. Data on Mothers						
Mother does not work for pay	-0.659	(0.50)	11.640	(3.63) **	0.236	(0.37)
Total work hours	-0.001	(0.01)	0.264	(0.08) **	0.005	(0.01)
Availability before school	0.225	(0.09) *	--		--	
Availability after school	--		-0.600	(0.62)	0.048	(0.06)

Source: National Longitudinal Study of Adolescent Health, Waves 1 and 2 In-Home Survey

Note: Standard errors in parentheses. * : $p < .05$, ** : $p < .01$

Models also control for parents' education, mother's obesity, adolescent's age, sex, sibship size, birth weight, and number of residential parents

Table 4. Selected coefficients from models predicting change in BMI z-scores (W2 - W1)

	Model 1		Model 2	
Panel A. Combined Parent Data				
Usually eats breakfast	0.003	(0.07)	0.010	(0.07)
Hours of screen time	0.002	(0.00)	0.002	(0.00)
Days of dinner with parents	-0.003	(0.01)	-0.001	(0.01)
Availability before school	--	--	-0.007	(0.01)
Availability after school	--	--	0.007	(0.01)
Panel B. Data on Mothers				
Usually eats breakfast	0.003	(0.07)	-0.007	(0.07)
Hours of screen time	0.002	(0.00)	0.002	(0.00)
Days of dinner with parents	-0.003	(0.01)	-0.002	(0.01)
Availability before school	--	--	0.037	(0.02)
Availability after school	--	--	-0.024	(0.02)

Source: National Longitudinal Study of Adolescent Health, Waves 1 and 2 In-Home Survey

Note: Standard errors in parentheses. * : $p < .05$, ** : $p < .01$

Models also control for parents' education, mother's obesity, adolescent's age, sex, sibship size, birth weight, and number of residential parents

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