

## The Effect of Television on the Amount and Quality of Food Children Consume

Jessica E. Todd  
[jtodd@ers.usda.gov](mailto:jtodd@ers.usda.gov)

Minh Wendt  
[mwendt@ers.usda.gov](mailto:mwendt@ers.usda.gov)

Diet, Safety, and Health Economics Branch  
Food Economics Division  
Economic Research Service, USDA  
1800 M Street NW  
Washington, D.C. 20036

***Poster prepared for presentation at the Agricultural & Applied Economics Association's 2010 AAEA, CAES & WAEA Joint Annual Meeting, Denver, Colorado, July 25-27, 2010.***

*Copyright 2010 by Jessica E. Todd and Minh Wendt. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided this copyright notice appears on all such copies.*

# The Effect of Television on the Amount and Quality of Food Children Consume

Jessica E. Todd and Minh Wendt

## Introduction

In experimental studies, children exposed to television food ads chose less healthy snacks and consumed more food overall, as compared with children exposed only to ads for toys (Borzekowski and Robinson, 2001; Halford et al., 2004, 2007). These findings, however, do not indicate that TV viewing causes a decrease in diet quality or an increase in weight. Other factors correlated with TV watching, such as neighborhood and parent and child characteristics, may be more to blame (Richmond et al., 2007).

## Objective

We estimate the effect of an additional hour of television on total calories and the quality of food consumed during a day for children 6 to 18 years old. This research is the first to use a first difference (fixed effects) estimation strategy to investigate the impact of television on daily food consumption among children in the United States.

## Data and Methods

### *Data*

**Table 1. Sample Characteristics, weighted means.**

<b>Variable</b>	<b>Mean</b>	<b>Standard Error</b>
Age (years)	11.9	0.06
Average calories per day (average from two days)	2088	25.3
Average hours TV viewed per day	2.8	0.07
<b>Observations</b>	<b>3080</b>	

Source: Author's tabulations using 1994-96 and 1998 CSFII, weighted means. Standard errors account for sampling design.

We use the 1994-96 and 1998 Continuing Survey of Food Intake by Individuals (CSFII), which collected dietary intake for 2 nonconsecutive days (24-hour periods), along with the number of hours of television and video the children watched on those days. The sample consists of 3080 children 6 to 18 years old for which these data are available; pregnant or lactating teens were excluded from the analysis.

**Table 2. Consumption and Diet Quality Measures, two-day means, children 6 - 18 years old, by average hours of television per day.**

	< 3.5 hours TV/day average	≥ 3.5 hours TV/day average	p-value (≥ 3.5 hours vs. < 3.5 hours TV)
<i>Consumption</i>			
energy (Kcal)	2058.21	2150.94	0.027
total fiber (g)	13.74	13.65	0.822
total fat (g)	74.34	80.01	0.001
total saturated fat (g)	26.76	28.67	0.005
sodium (mg)	3260.38	3498.38	0.004
calcium (mg)	945.03	893.87	0.015
energy from solid fat/added sugar (Kcal)	826.71	879.36	0.013
<b>observations</b>	<b>2,114</b>	<b>966</b>	

Source: author's tabulations using CSFII 1994-96, 1998 data and My Pyramid equivalents database. Weighed means, p-values based on standard errors that account for sampling design.

a. FAH = food prepared at home.

b. cup-equivalents per 1000 Kcal consumed (Guenther et al., 2007).

c. ounce-equivalents per 1000 Kcal consumed (Guenther et al., 2007).

### *Methods*

- Fixed effects estimation is employed by differencing 2 days of television viewing and dietary intake.
- Outcomes analyzed include total caloric intake, percent of calories from food at home, energy density, total fiber, fat, saturated fat, sodium, calcium, and calories from solid fat and added sugar.
- Fixed effects results are compared to OLS estimates.

## **Results and Discussion**

### *TV Viewing and Energy Intake*

Children who watch 3.5 hours or more of television per day consume more calories, total fat, saturated fat, and sodium than children who watch fewer hours. Regression results reveal that each hour of television adds almost 15 calories to daily intake. Over a year, an extra hour of television per day could lead to an additional 5,475 calories consumed and weight gain of up to 1.6 pounds (0.7 kilograms). The fixed effect estimate is 20 percent smaller than that found by OLS, which does not account for unobserved characteristics related to both television and energy intake.

The effect on energy intake is notable and could contribute significantly to energy imbalance—and consequently to weight gain—over the course of a year. Some research suggests that television may influence other factors that affect energy balance, such as metabolic rate (Kleges et al., 1993) and time spent being physically active. Excessive weight increases during childhood are of concern because of the potential for long-term negative impacts on adult health (Nieto et al., 1992; Dietz, 1998).

### *TV Watching and Diet quality*

Mixed results are found for the effects of TV on diet quality. One hour of TV increases sodium intake (46 milligrams) and decreases the total servings of dairy/milk per 1,000 calories consumed, but actually decreases the percent of calories from total fat and saturated fat. OLS finds an opposite effect on total and saturated fat intake.

The muted effect of TV on diet quality may be in part due to the fact that TV watching increases the percent of total calories from food at home (by 2.4 percent). Children watching TV are more likely to be at home, and food at home tends to be of better nutritional quality than food away from home (Guthrie et al., 2002).

The null impacts of TV watching on diet quality suggest that TV ads do not have a large impact on the types of foods children consume. However, the CSFII measure of hours of TV does not

distinguish TV, which contains ads, from videos, which usually do not. Perhaps there would be a stronger TV-watching/diet quality relationship if hours of television could be separated from hours of video.

**Table 3. Effect of Television on Consumption and Diet Quality, OLS and Fixed Effects Estimates.**

	<b>Fixed Effects Estimates<sup>a</sup></b>	<b>Cross Sectional Estimates<sup>b</sup></b>
Daily calories (Kcal)	14.764**	18.040**
Percent daily calories from food at home	2.361***	2.041***
Total fat (g)	0.159	0.902***
Percent daily calories from total fat	-0.201**	0.101*
Total saturated fat (g)	0.063	0.324**
Percent daily calories from saturated fat	-0.079**	0.024
Sodium (mg)	46.358***	46.915***
Percent of daily calories from solid fat and added sugar	-0.186	0.214**
Fruit density (cup-equivalents per 1,000 calories)	-0.002	
Grain density (ounce-equivalents per 1,000 calories)	0.031**	
Whole grain density (ounce-equivalents per 1,000 calories)	-0.002	
Dairy density (cup-equivalents per 1,000 calories)	-0.012**	

\* p <0.10; \*\* p <0.05; \*\*\* p <0.01

a. estimated via first differencing, regression includes intercept; additional control variables are indicators for changes in the day of the week of dietary intake and television viewing and changes in reason codes for unusual consumption (travel, special event, vacation, boredom, illness, being at home, being away from home, getting more exercise, being a weekend day).

b. estimated on two-day mean of outcome and hours of television; additional control variables are the child's age, indicators for whether the child is male, black, Hispanic, or other race/ethnicity, household size, annual income relative to the poverty line, household head characteristics (gender, race/ethnicity, age, education, employed, partnered, authorized to receive food stamps), whether or not the head received food stamps in the past 12 months, urbanity, region and year of interview.

### *Considerations for Future Research*

The data used in the study are now over 10 years old. While sedentary activities continue to fill a large part of children's leisure time, the nature of the activities have changed. Many children now spend as much or more time on the internet and playing video games as in watching TV. Future research should investigate the impact of TV on children's food consumption in this new environment, as well as the impact of other sedentary activities such as browsing the internet and playing video games.

More recent data on food intake and television viewing have been collected in the National Health and Nutrition Examination Survey (NHANES). However, in NHANES, TV viewing is given not in daily hours but as a monthly average. A future first step will be the collection of panel data on both food intake and the amount of time spent in TV viewing combined with other sedentary activities.

The views expressed are those of the authors and not necessarily those of ERS or USDA.

## References

- Borzekowski, Dina L. G. and Thomas N. Robinson, 2001. "The 30-second effect: an experiment revealing the impact of television commercials on food preferences of preschoolers," *Journal of the American Dietetic Association*, 101(1): pp. 42-46.
- Dietz, WH. Childhood Weight Affects Adult Morbidity and Mortality. 1998. *J Nutr.*; 128: 411S-414S.
- Guenther, Patricia M., Jill Reedy, Susan M. Krebs-Smith, Bryce B. Reeve, P. Peter Basitotis, 2007. "*Development and Evaluation of the Healthy Eating Index-2005: Technical Report*." Center for Nutrition Policy and Promotion, U.S. Department of Agriculture. Available at <http://www.cnpp.usda.gov/HealthyEatingIndex.htm>.
- Guthrie, Joanne F., Biing-Hwan Lin and Elizabeth Frazao, 2002. "Role of Food Prepared Away from Home in the American Diet, 1977-78 versus 1994-96: Changes and Consequences," *Journal of Nutrition Education and Behavior*, Vol 34(3): pp. 140-150.
- Halford, Jason C. G., Jane Gillespie, Victoria Brown, Eleanor E. Pontin and Terence M. Dovey, 2004. "Effect of television advertisements for foods on food consumption in children," *Appetite*, Vol. 42(2): pp. 221-225.
- Halford, Jason C.G., Emma J. Boyland, Georgina Hughes, Lorraine P. Oliveira and Terence M. Doveya, "Beyond-brand effect of television (TV) food advertisements/commercials on caloric intake and food choice of 5–7-year-old children," *Appetite*, Vol. 49(1): pp. 263-267.
- Nieto, FJ, Szklo M and Comstock GW. 1992. Childhood Weight and Growth Rate as Predictors of Adult Mortality. *Am J Epidemiol.*; 136: 201-213