

Double Trouble: Commingled Effects of High Fast Food and Sugar-Sweetened Drink Consumption and the Intervening Role of Physical Activity on Childhood Obesity

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Abstract

According to the World Health Organization, the high prevalence of childhood obesity is one of the most serious public health challenges of the 21st century. Approximately one-third of American children and teenagers are overweight or obese. As the prevalence of childhood obesity increased over the past three decades, so has fast food and sugar-sweetened drink consumption. One-third of children eat fast food on a daily basis, and 91% of children between the ages of 6 and 11 consume sugar-sweetened beverages daily.

Some have suggested that the high number of empty calories found in fast food and sugar-sweetened drinks is a significant contributing factor for childhood obesity. This research addresses the compensatory role of physical activity in offsetting the direct and indirect effects of fast food and sugar-sweetened beverage consumption on childhood obesity. We propose that the compensatory and intervening role of physical activity level is not consistent across the combination of fast food and sugar-sweetened beverage consumption. When consumption of both fast food and sugar-sweetened drinks are at higher levels, the calories burned from physical activity become less likely to be sufficient to compensate for the calories related to the children's consumption behavior. Thus, when sugar-sweetened beverage consumption is low, physical activity is proposed to more strongly compensate and mediate the effect on the likelihood of overweight / obese status. Yet, this intervening role of physical activity for the fast food → overweight / obese relationship should be attenuated when sugary beverage consumption is high.

Data used to test predictions are from the California Health Interview Survey (CHIS), a random-dial telephone survey that queries Californians on a wide range of health topics. CHIS uses a multistage sampling method. For this research, we focus on young school-aged children (i.e., ages 5 to 11). There were 4087 respondents in the sample used to test predictions. The binary dependent variable was whether the child was overweight or obese ('1') or normal weight or underweight ('0'). The main independent

variables were fast food meals consumed during the past week and the number of sodas and sugar-sweetened drinks consumed the previous day. For physical activity, an open-ended question asked about the number of days the child was physically active for at least 60 minutes during the past week.

As predicted, the interaction effect of fast food and sugar-sweetened drink consumption on obese/overweight likelihood was negative and significant ($b = -.05$, $p < .05$). As shown in an interaction plot, the effect of fast food consumption frequency on whether or not a child is likely to be overweight / obese was positive when sugar-sweetened drink consumption was at low levels (no consumption: $b = .09$, $p < .01$). However, this positive effect of fast food consumption was nonsignificant when sugar-sweetened drink consumption was at high levels (i.e., one standard deviation above the mean consumption level; $b = .03$, $p > .25$). In addition, a primary focus of the research is on the intervening, compensatory role of physical activity. Using Model 4 of the PROCESS algorithm, we found significant paths both to and from physical activity frequency suggesting the intervening role of exercise. Results show that there was an indirect effect for fast food consumption \rightarrow physical activity \rightarrow obesity likelihood (Indirect effect = .01, 95% bias-corrected bootstrap CI [.002, .01]). However, the positive indirect effect for sugar-sweetened beverage consumption \rightarrow physical activity \rightarrow obesity likelihood was not significant (CI [-.01, .01]). Results also support a conditional mediation effect; the extent to which physical activity mediates the relationship between fast food consumption and likelihood of being obese is dependent on sugar-sweetened drink consumption.

This pattern of results that combine the direct and moderating roles of fast food and sugar-sweetened beverage consumption, along with the counterbalancing role of physical activity, extend our current understanding of these potential drivers of childhood obesity and offer some potential implications for health policy. It seems clear that reduction in both fast food and sugar-sweetened drinks can have some favorable effects and that increases in physical activity also may have a positive impact. Yet, there is little research examining the more complex pattern of relationships suggested by our proposed model. There was a stronger effect of fast food consumption when sugar-sweetened beverages were consumed less frequently, suggesting the potential for the negative effect of fast food even when sugar-sweetened beverage consumption is kept at a minimal level. Children encountering the “double-trouble” associated with calorie-laden fast food and sugar-sweetened beverage consumption are prime targets for childhood obesity problems and targets for marketing-based interventions.

Keywords: *consumption, fast food, childhood obesity, physical activity, sugar-sweetened beverages*

Relevance to Marketing Educators, Researchers and Practitioners: Results have potential implications for marketers, the public health community, and policy makers interested in interventions to diminish the roles of fast food and sugar-sweetened drink consumption in efforts to improve childhood health through reductions in obesity.

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