



## Economic and health effects of fruit and vegetable advertising: Evidence from lab experiments

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### ABSTRACT

This study investigates consumer response to various types of advertising for fruits and vegetables—a food category which health officials uniformly agree is significantly under-consumed in the United States. Using an adult, non-student subject pool of 271 participants in an economic experiment, consumers' response to different types of fruit and vegetable advertising is measured empirically. This study finds that broad-based advertising, which is generic advertising for the entire fruit and vegetable category, increases consumer willingness to pay by an average of 24.6%. The simulation model shows that broad-based advertising for fruits and vegetables, either alone or as a hybrid with individual commodity-specific campaigns (e.g., apple advertising), would reduce average caloric intake per person by approximately 1800 kcal per year. The results of this study may contribute to new public policy initiatives that aim to reduce diet-related illnesses and obesity, which have become increasingly prevalent in the United States.

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### Introduction

The United States has the highest obesity rate of any country in the world with 26.7% of the population being classified as obese (OECD Health Data, 2005; Doheny, 2010). Moreover, obesity rates have significantly increased: nearly doubling in adults and tripling in children in the past 30 years (Cutler et al., 2003; Hill et al., 2003; Grady, 2010). Some have called this increase a medical crisis (Hensrud and Klein, 2006). Medical science has shown that being obese or overweight poses significant health risk for serious diseases such as diabetes, heart disease, hypertension, stroke, and certain types of cancer (Andreyeva et al., 2004). A recent article indicates that the costs of this problem in the United States are immense, approaching \$150 billion a year to deal with medical costs associated with these illnesses (Lillis, 2010).

A key factor mentioned for contributing to obesity is the steady decline in consumption of healthy foods like fruits and vegetables.

Per capita fruit and vegetable consumption has declined by 12.5% and 7.6%, respectively, in the past 15 years (USDA, Economic Research Service, 2010). Health providers and nutritionists agree that reversing or mitigating this trend in fruit and vegetable consumption may be an effective means to lessen the obesity problem.

There are two types of advertising used to promote consumption of fruit and vegetables, defined generically: (1) “commodity-specific” programs for individual fruits and vegetables, e.g., the recent campaign for carrots (see <http://www.babycarrots.com>) and (2) “broad-based” programs that promote the consumption of all fruits and vegetables collectively (e.g., the voluntary U.S. program called *Fruit and Veggies—More Matters* campaign, the Australian *Go for 2&5*<sup>®</sup> campaign and the United Kingdom's *5-A-Day* campaign). However, expenditures on commodity-specific and broad-based advertising are just a fraction of the advertising budgets for less healthy foods. For example, food, beverage, candy and restaurant advertising was \$11.26 billion in 2004, which is more than 100 times the advertising budget for fruits and vegetables, and this does not include the other (non-advertising) marketing expenditures for less healthy foods and beverages (CP-EHNCU, 2005).

Evidence in medical studies (Bazzano, 2006; Tohil, 2005) suggests that increasing fruit and vegetable consumption can be a successful dietary weight management strategy to prevent obesity by reducing overall energy density of the diet, promoting satiety, decreasing total energy intake, and increasing nutritional quality

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of a diet (Ledikwe et al., 2006; Rolls et al., 2004, 2005). Also, empirical evidence suggests that a considerable amount of diet-related disease and associated health care costs can be prevented by a higher intake of fruits and vegetables (Gundgaard et al., 2003). The results of these studies have prompted the World Health Organization to target increasing fruit and vegetable consumption as a global public health nutrition priority (World Health Organization, 2003a,b, 2004).

In this paper, we measure the impact of broad-based advertising, commodity-specific advertising, and two hybrid programs that include broad-based and commodity-specific advertising across eight selected fruits and vegetables. We use experimental methods to elicit consumers' willingness to pay (WTP) for various fruits and vegetables subject to either broad-based or commodity-specific advertising. The WTP estimates based on the advertising treatments are used in an equilibrium displacement model of U.S. food demand to simulate the impact of fruit and vegetable advertising on consumption of ten food categories and on per capita caloric intake.

We are interested in three questions regarding the impact of broad-based and commodity-specific advertising on increasing demand for fruits and vegetables:

- (1) Would commodity-specific, broad-based, and/or hybrid advertising increase the demand for fruits and vegetables?
- (2) Which type of advertising would have the largest impact on fruit and vegetable demand?
- (3) What would be the impacts of the effective fruit and vegetable advertising programs on caloric intake?

Using an adult, non-student subject pool of participants in the economic experiment, we empirically measure how consumers respond to different broad-based and commodity-specific advertising campaigns for various fruits and vegetables.

The experiment developed in this paper allows us to shed some new light on the influence of advertising on fruit and vegetable consumption, and on combating obesity. We employ a simulation model in the analysis and are able to show the potential links between advertising programs, demand responses for fruits, vegetables, and other food groups, and changes in calories consumed in the United States. This paper also provides results that contribute to the literature examining the economic effects of generic advertising in several ways. First, very few studies have used experimental economics to evaluate consumer response to promotional efforts for agricultural products (a notable exception is Messer et al., 2009). Second, our research is the first to empirically measure the economic effects of both broad-based advertising and commodity-specific advertising. There have been numerous studies that have measured the market impacts of commodity-specific campaigns (e.g., Kaiser et al., 2003), but the economic effects of broad-based advertising campaigns have not been studied in detail. In addition, no study has investigated the efficacy of the two advertising approaches simultaneously or researched broad-based advertising effects with Americans. Finally, a non-hypothetical experiment, in which consumers respond to real economic incentives, is better able to replicate the real-world decision process than mere surveys or choice experiments (Friedman and Sunder, 1994; Rubinson, 2010).

The broader objectives of this paper are to provide empirical evidence on the relative effectiveness of broad-based and commodity-specific advertising and the potential effects of such promotional campaigns on obesity rates in the United States and to add some substance to the current debate in the industry.

While this research has some real world applicability limitations, the magnitude of our laboratory experiment results is largely consistent with the magnitude of the field findings of Pollard et al.

(2008), who find that a broad-based advertising campaign in Australia resulted in an increase in fruit and vegetable consumption. The similarity of findings reinforces our confidence that our results have a capacity to be generalized to real world settings and to help guide policy debate.

## Overview of fruit and vegetable promotion efforts

How best to increase fruit and vegetable consumption is, of course, a difficult question. Of the marketing tools offered by Goldberg and Gunasti (2007), promotion—or the relative lack thereof—is often suggested as the primary barrier to increasing fruit and vegetable consumption.

Research has examined the consumption effects of broad-based promotion programs for fruits and vegetables in Australia (Pollard et al., 2008) and in the United Kingdom (Capacci and Mazzocchi, 2011). Australia implemented a large-scale broad-based advertising campaign between 2002 and 2005 titled “Go for 2&5”, and research by Pollard et al. (2008) shows that it did increase adults' awareness of the nutritional benefits of eating more fruits and vegetables. Furthermore, the Australian program is estimated to have increased consumption of the mean number of servings of fruits and vegetables by 0.8 servings per day over the 3-year period when the advertising occurred (Pollard et al., 2008). Other research by Capacci and Mazzocchi (2011) disentangles information and price effects related to the 5-A-Day program in the United Kingdom; they found that the broad-based program increased fruit and vegetable consumption by between 0.2 and 0.7 portions per person using data between 2002 and 2006.

The U.S. fruit and vegetable industry has recently considered whether they should adopt a mandatory broad-based advertising for all produce marketed in the country in addition to the many commodity-specific programs that currently exist (National Fruit and Vegetable Research and Promotion Board, 2009). Whether commodity-specific or broad-based advertising efforts would lead to greater sales of fruits and vegetables has been widely debated among industry stakeholders (see Prevor, 2009), and there is no clear consensus among growers and packers on this issue. Some producers see commodity-specific programs competing with other commodity-specific programs for consumers' attention in a destructive game of advertising competition, whereas broad-based programs have the capacity to increase sales for all fruits and vegetables. Along similar lines, many industry stakeholders see various commodity-specific programs competing for the fixed quantity of fruits and vegetables that will be consumed; in this case, commodity-specific programs compete for a fixed amount of “stomach share” among consumers rather than trying to expand the total amount of fruit and vegetable consumption. Others in the industry are less supportive of broad-based advertising because the central message in these programs simply emphasizes an already well-known fact—that eating a diet rich in fruits and vegetables is good for your health—and believe that such promotion efforts will have little impact on the demand for these products.

Two other important issues in this debate revolve around the particular funding mechanisms for a broad-based advertising program. The first centers on which commodities would participate in such a program, and if the program should be limited to only fresh products (or also include processed fruit and vegetable products). Second, there has been an on-going discussion among stakeholders regarding who should pay for a broad-based advertising program. Given that there are potentially positive outcomes to both public and private interests, it is not clear what should be the relative contributions from industry and from the government, if any. Similar programs in Australia, Canada, and the United Kingdom receive some government support to conduct broad-based promotion

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