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The behavioralist as nutritionist: Leveraging behavioral economics to improve child food choice and consumption

John A. List[a], Anya Savikhin Samek[b,*]

[a] University of Chicago and NBER, United States
[b] University of Wisconsin-Madison, United States

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ABSTRACT

We leverage behavioral economics to explore new approaches to tackling child food choice and consumption. Using a field experiment with >1500 children, we report several key insights. We find that incentives have large influences: in the control, 17% of children prefer the healthy snack, whereas introduction of small incentives increases take-up of the healthy snack to ~75%. There is some evidence that the effects continue post-treatment, consistent with a model of habit formation. We find little evidence that the framing of incentives (loss vs. gain) matters. Educational messaging alone has little effect, but we observe a combined effect of messaging and incentives: together they provide an important influence on food choice.

1. Introduction

While many interventions to improve nutrition have been geared toward adults, there is a growing need to address nutritional decision-making among children and adolescents. Lack of proper nourishment, such as not meeting the recommended daily allowance (RDA) requirements for fruits and vegetables, affects health and hampers growth among children and can contribute to lack of concentration and energy, resulting in poor performance in school (Whitaker et al., 2006; Jyoti et al., 2005; Weinreb et al., 2002).[1] Yet, American children consume less than 20% of the recommended amount of whole grains and just 10% of the recommended amount of dark green and orange vegetables and legumes (Just et al., 2007). The tendency to consume an unhealthy diet is learned at an early age and persists throughout adulthood, as individuals are more likely to eat familiar foods (Smith and Tasnadi, 2007). These habits are often learned in the home, which may create a cycle of unhealthy behaviors (De Bourdeaudhuij, 1997; Campbell et al., 2007; Dowda et al., 2001). Moreover, choosing to consume high quantities of low-nutrient, high-calorie foods and beverages habitually leads to obesity, a growing problem among adults and children.[2] Importantly, children from low-income families are at higher risk (Cole and Fox, 2008; Neumark-Sztainer et al., 1996).

Academics have recognized the food choice problem and have begun to take important steps in understanding its causes and consequences. For example, interventions for adults by the U.S. Department of Agriculture and the U.S. Department of Health and Human Services have included providing advice about healthy choices and requiring labeling of foods (Welsh et al., 1993). Likewise, interventions that include nutritional education for children have shown some progress in terms of increases in fruit and vegetable consumption (Reynolds et al., 2000; Perry et al., 1998; Nicklas et al., 1998).[3] Behavioral economics has touched nearly every field in economics, yet one important area with many

* Corresponding author. Tel.: +1 773 609 0425.
E-mail address: anyasamek@gmail.com (A.S. Samek).

[1] In another study, Belot and James (2011) find that healthier school meals improve educational outcomes in some subject areas.

[2] 17% of the nation's youth have body mass indices (BMIs) at or above the recommended 95th percentile (National Institutes of Health, 1998; Ogden et al., 2002, 2010).

[3] These studies included featuring nutrition education as a primary component, and employed the National Cancer Institute's (NCI) "5 a Day for Better Health" initiative. Our study, on the other hand, uses a short educational message.

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unresolved questions is that of food choice. Food choice is also an area where the insights gained from behavioral economics might produce the highest social benefits.

In this study, we conduct a large-scale field experiment to explore how behavioral economics can be leveraged to improve child food choice. Our experiment revolves around one major behavioral tenet: some people have reference-dependent preferences, wherein utility depends on changes relative to a neutral reference point rather than absolute levels. In certain cases, such people will exhibit behavior consistent with a notion of *loss aversion*, an insight gained from Kahneman and Tversky's (1979) prospect theory. The field experiment methodology is ideal in this setting because it allows us to infer the causal effects of treatment (see, for example, other field experiments in health economics; Okeke et al., 2012). Our experiment also investigates the impact of using short educational messaging, delivered at the point of decision either with or without incentives, on food choice. Finally, our experiment explores the effect of delivering the intervention for differing lengths of time, which has direct policy implications.

We conducted our field experiment in after school programs in the Chicago area, called 'Kids Cafes', which provide children from low-income families a USDA-sponsored free meal. Separately from this study, we conducted 24-h food recalls with a sub-set of children from the Kids Cafes and discovered that only 30–39% of children meet the RDA for fruit, while over 90% meet the RDA for grains.[4] Thus, in the field experiment, children were given a choice between a dried fruit cup (which we consider in this experiment as the healthier choice since it contributes to the RDA for fruit and does not contain added sugar) and a cookie (which we refer to as the less healthy choice since most children already meet RDA for grains, and cookies also contain added sugar).[5] Children were allowed to select only one item. We randomly assigned Kids Cafe sites to either receive a gain-frame incentive (in which the child received a small prize if and only if he/she selected and fully consumed a fruit cup), a loss-frame incentive (in which the child received a small prize but then it was taken away if he/she did not select and consume a fruit cup), a 3-min educational message delivered by the experimenter about the benefit of fruits vs. cookies, or a loss-frame incentive combined with the educational message.[6] In total, 1614 individual children and adolescents across 24 sites participated in the experiment, which lasted several weeks. We also observe children after the conclusion of treatment periods of varying lengths to explore whether the incentives or educational messages had an effect post-treatment.

We find several interesting insights. First, in the absence of incentives, about 17% of students choose the healthy snack. Yet, once an incentive is introduced, students are drawn to the healthy choice at a rate of nearly 80%. This more than four-fold increase is achieved with small incentives. Importantly, we find little evidence that a loss frame works better than a gain frame. Indeed, if anything we find some evidence that after treatment children in the gain treatment choose healthier options than those in the loss treatment.

Second, the educational message has little influence on food choice: even after providing information about the healthy choice, children are not persuaded to make the switch from cookie to fruit. This is surprising, since our educational message was crafted using the USDA *MyPyramid for Kids*[7] as a guide. Yet, what does work quite effectively is the combination of the educational messaging and loss-based incentives. In this case, not only do many children choose the healthy snack, but they ultimately consume the snack. Whereas in the education message treatment only 60% of the children who choose the fruit ultimately consume it, over 93% of children who received both the education message and incentive who choose the fruit consume it. Importantly, this effect spills-over to the post treatment period: upon returning a week after the experiment is completed, we find that children in the control group continue to choose the unhealthy snack at a low rate—around 12%. Yet, for those in the treatment that combines incentives and educational messaging, nearly twice as many children choose the healthy option.

These results suggest that there is an important place for educational messages, and that they have their greatest impact when combined with a small individual incentive. Finally, the findings have important implications for not only immediate choice, but suggest that longer-term impacts can be achieved with the correct mix of pecuniary and non-pecuniary incentives. Contrary to wide-spread concern that incentives may crowd out the intrinsic motivation to choose healthy foods, we do not find that incentives have a detrimental effect on food choice—rather, we find the opposite. While we focus specifically on the choice of a dessert, we propose that our findings on the positive impact of incentives could be generalized to other types of food choices that kids may face in the school lunchroom or in after school programs.

The remainder of our paper is organized as follows. Section 2 summarizes the underlying theoretical framework and related literature that motivates our design. Section 3 describes the experimental design and implementation. Section 4 summarizes the main results. Section 5 concludes.

2. Background

Our experiment involves an exploration of both non-pecuniary and pecuniary incentives. While the effect of information and standard pecuniary incentives on behaviors have been modeled for decades, the theory underlying why there might be behavioral differences between a standard (gain) incentive and "loss" incentive is less mainstream. Pioneered by Tversky and Kahneman's riskless framework (1991), the idea that losses and gains can yield different behaviors in our setting has its roots in prospect theory. Prospect theory conjectures that a value function exists that is (i) measured over deviations from a reference point assessed over some narrowly bracketed timeframe, (ii) convex for losses and concave for gains, and (iii) initially steeper for losses than for gains (Tversky and Kahneman, 1991). For our purposes, consider a representative agent who derives benefits and costs as follows:

$$V(c, c^r) = u(c) + R(c, c^r)$$

where u is utility over consumption, c is consumption and r is the value function of prospect theory. Let $u(.)$ be increasing and

[4] 283 consenting children from the same programs participated in the 24-h food recall surveys, which were administered by trained research assistants as part of a service to the Greater Chicago Food Depository. The data collected was translated into RDA by age. 30% of kids meet RDA for fruit if fruit juice is excluded, and 39% meet RDA for fruit if fruit juice is included. Grains included whole and refined grains.

[5] We refer to the cookie as the 'less healthy choice' and the fruit cup as the 'healthy' choice in the experiment. While using fresh fruit would be optimal (due to the high sugar content of dried fruit), it was not feasible because of the way the food operations are handled by the Greater Chicago Food Depository.

[6] Due to limitations placed on us by Kids Cafes, the randomization was done at the site level. Kids Cafes did not want different kids to receive different opportunities for incentives in the experiment. In addition, randomization at the site level reduces the likelihood of contamination.

[7] Information about MyPyramid is available here: http://www.cnpp.usda.gov/MyPyramidDevelopment.htm. Note that MyPlate replaced MyPyramid as the official USDA guide in June 2011, after our data collection had concluded.