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Habit formation in children: Evidence from incentives for healthy eating

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ARTICLE INFO

Article history: Received 9 September 2014 Received in revised form 26 October 2015 Accepted 18 November 2015 Available online 3 December 2015

JEL classification: J13 I18

I28

Keywords: Habit formation Incentives School lunch Field experiments

ABSTRACT

We present findings from a field experiment conducted at 40 elementary schools involving 8000 children and 400,000 child-day observations, which tested whether providing short-run incentives can create habit formation in children. Over a 3- or 5-week period, students received an incentive for eating a serving of fruits or vegetables during lunch. Relative to an average baseline rate of 39%, providing small incentives doubled the fraction of children eating at least one serving of fruits or vegetables. Two months after the end of the intervention, the consumption rate at schools remained 21% above baseline for the 3week treatment and 44% above baseline for the 5-week treatment. These findings indicate that short-run incentives can produce changes in behavior that persist after incentives are removed.

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Currently, there is vigorous debate about when it is either effective or appropriate to incentivize positive behaviors in children. Opponents of the use of incentives argue that extrinsic rewards crowd out intrinsic motivation and results in outcomes being worse after the end of the incentive period than prior to the introduction of rewards (Deci et al., 1999), and there is, indeed, evidence of such effects in studies conducted by economists (see Frey and Jegen, 2001 for a review). However, arguments against the use of incentives sometimes overlook the role that habit formation can play in promoting long run behavioral change. Dictionary.com defines a habit as "an acquired behavior pattern regularly followed until it has become almost involuntary." If this habit formation process occurs while individuals are incentivized to engage in a behavior, then short-term efforts that encourage children to engage in a

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http://dx.doi.org/10.1016/j.jhealeco.2015.11.004 0167-6296/© 2015 Elsevier B.V. All rights reserved. particular activity can, if sufficient to overcome any crowding out of intrinsic motivation, result in positive behavior change even after the incentives are removed.

In this paper, we examine the role of incentives in promoting healthy eating behaviors in children. We focus on fruits and vegetables since inadequate consumption of fruits and vegetables is widely seen as an important contributor to suboptimal health worldwide, and increases the risk for cardiovascular diseases, stomach cancer and colorectal cancer. Achieving high rates of fruit and vegetable consumption among children has proved a considerable challenge and has been the focus of a number of recent schoolbased interventions.

We implemented an incentive program at 40 elementary schools in Utah in which children could receive a special token each day as a reward for consuming at least one serving of fruits or vegetables. The tokens were worth \$0.25 and could be spent at the school store, school carnival, or book fair. Schools were randomly assigned to implement the incentives for a period of either 3 or 5 weeks. We observed detailed fruit and vegetable consumption

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data at these schools before, during, and for 2 months after the intervention ended. This experimental design allows us to examine whether the increase in fruit and vegetable consumption that we observe during the incentive period persists once the incentives are removed.

1. Background

The results of this paper complement other recent studies that examine the impact of incentives on children's in-school food choices. Just and Price (2013) provided incentives for 5 days over a 2–3 week period and found lingering effects during the first 2 weeks after the intervention, but these did not persist 4 weeks after the intervention. Belot et al. (2013) provided students with stickers and little gifts for choosing healthy lunch items for a period of 4 weeks and find that the rewards increased fruit and vegetable consumption during the incentive period (though these effects vary by how the rewards are provided and the age and gender of the child). They find little evidence that the changed behavior persists 6 months after the end of the rewards period. List and Samek (2015) provided low income school students with a small prize as a reward for choosing a healthier snack (dried fruit) over a less healthy snack (a cookie). They observed a large impact of incentives on the children's choices that persisted even after the incentives were removed, especially when incentives were combined with a health message

Studies of habit formation in domains other than school children's food choices have yielded mixed effects. Charness and Gneezy (2009) randomly assigned college students to one of three conditions: no incentive for gym attendance, \$25 to attend the gym one time, or \$25 to attend the gym one time plus \$100 to attend the gym another 8 times. Their key finding was that, consistent with habit formation, subjects in the high incentive treatment group had higher gym attendance (about 0.6 more visits per week) during the post-incentive period than those in the low incentive and no incentive groups.

In a replication and extension of this study, Acland and Levy (2015) observed a smaller post-incentive effect (0.26 visits per week), and found that the effect decayed over the course of the winter vacation and was highly concentrated in the upper tail of the post-treatment attendance distribution. Royer et al. (2015) also tested a similar intervention using adult workers at a Fortune 500 company and additionally tested the impact of giving workers access to a self-funded commitment contract. They found a weak persistence of gym use after the incentive was withdrawn among those provided with an incentive period), but substantially greater persistence (47%) among those who were provided access to the commitment contract. .

Schofield et al. (2015) examined the impact of individually oriented, purely altruistic, and a hybrid of competitive and cooperative monetary reward incentives on older adults' completion of cognitive exercises and cognitive function. All three incentive structures approximately double the number of exercises completed during the 6-week active experimental period relative to a no incentive control condition. More relevant to habit formation, cognitive exercise use did persist to some degree beyond the official end of the study in all conditions including the control, and persistence was greater in the altruistic and cooperative/competitive incentives than in the atomistic and control conditions.

Persistence of behavior change may be easier to achieve in some contexts than in others. Volpp et al. (2009) randomized smokers into a treatment group which offered a \$750 incentive (\$100 for completion of a program, \$250 for short-term cessation, and

\$400 for long-term cessation). This incentive resulted in a quit rate of 14.7% in the intervention group compared to 5.0% in the control group at 12 months. Six months after the long-term incentives were discontinued, the quit rates for the two groups were 9.4% and 3.6%, suggesting that if incentives are effective in helping an individual to stay smoke-free for 12 months, there is a reasonable chance they will develop habits that increase their likelihood of remaining smoke-free when incentives are withdrawn. In contrast, weight loss interventions have typically shown less evidence of habit formation. In two studies testing the use of lottery incentives and deposit contracts for weight loss (Volpp et al., 2008; John et al., 2011), incentives were highly effective in motivating weight loss during the incentive period, but participants regained most of the weight they had lost once the incentives ended.

One possibility for why smoking cessation is more persistent than weight loss is that weight loss involves a complex interplay between myriad decisions around food consumption and physical activity that happen at all points of the day with differing stimuli and constraints. With smoking, in contrast, guitting can be a simple decision to totally desist; one has to eat to live, but one does not have to smoke. Food choice in school cafeterias is in a few important ways a simpler behavior to change than either smoking or weight loss. Whether to take and consume fruits or vegetables in a school lunch is a relatively simple decision, and there are no immediate dire consequences to making either choice. A daily routine around a specific task such as getting a tray each day at the same time and changing one component of what is on the tray is far simpler than trying to change a whole host of elements required for more complex behavioral challenges like losing weight. There are no physiologic withdrawal symptoms for not consuming alternatives, as there is in smoking, and there is just one choice environment without myriad different stimuli and constraints, as with obesity more generally. As such, we would predict that habits can potentially form more easily when it comes to fruit and vegetable consumption during school lunches than for weight loss itself

Although the studies just mentioned have examined habit formation in the sense of persistence of desired behaviors once incentives are removed, most or all of these studies are ambiguous about the exact mechanism that produces the effect. 'Classic' habit formation refers to, to requite the Dictionary.com definition, "an acquired behavior pattern regularly followed until it has become almost involuntary." A behavior becomes a habit, according to this definition, much as a particular path through the woods becomes easier to follow, and more difficult to depart from, as it is cleared by repeated usage. However, there is an alternative possible account of many experimental results purporting to show habit formation. It is possible that subjects acquired information-e.g., in the exercise studies, about where the locker room was and how to sign in, or about their own (latent) love of exercise. Although such learning would produce persistence once incentives were removed, it is unclear whether such persistence should be labeled habit formation.

Whether persistence varies as a function of habit formation provides a clue about which mechanism, if either, is operative. If persistence is the result of learning, one would expect the behavior to persist even after a brief intervention which would be, presumably, sufficient for learning to occur. If persistence is the result of more classic habit formation, in contrast, we would expect duration to make an important difference, because repeating a pattern of behavior more should cause it to become more ingrained. The duration required for a habit to form is likely to depend on the nature of the task, how difficult it is to learn, how much effort it takes, and whether it provides ongoing positive or negative feedback. Download English Version:

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