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Incentives and children's dietary choices: A field experiment in primary schools ☆

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ABSTRACT

We conduct a field experiment in 31 primary schools in England to test the effectiveness of different temporary incentives on increasing choice and consumption of fruit and vegetables at lunchtime. In each treatment, pupils received a sticker for choosing a fruit or vegetable at lunch. They were eligible for an additional reward at the end of the week depending on the number of stickers accumulated, either individually (individual scheme) or in comparison to others (competition). Overall, we find no significant effect of the individual scheme, but positive effects of competition. For children who had margin to increase their consumption, competition increases choice of fruit and vegetables by 33% and consumption by 48%. These positive effects generally carry over to the week immediately following the treatment, but are not sustained effects six months later. We also find large differences in effectiveness across demographic characteristics such as age and gender.

1. Introduction

Poor nutrition is a primary cause behind the rising cost of health care in many developed countries.[1] According to the World Health Organization (2009) poor nutrition is related to three of the five highest risks for mortality in the world: high blood pressure; high blood glucose; and overweight and obesity. In response, policy makers have been pushing information interventions, such as the "5-a-day" campaign in the UK, to encourage people to develop better eating habits. However, the success of these campaigns has been moderate.[2]

This paper investigates how to incentivize school age children to consume healthier food. Recent evidence shows that incentives can motivate people to exercise (Acland and Levy, 2015; Charness and Gneezy, 2009), lose weight (Cawley and Price, 2013; Horwitz et al., 2013; Jeffery, 2012) and eat more fruits and vegetables (Just and Price, 2013; Loewenstein et al., 2016). While the evidence is encouraging, it remains an open question which incentives work best and for whom. We are particularly interested in changing the behaviour of two key groups: boys and children from low socioeconomic backgrounds. Both groups have been shown to have less healthy diets and are particularly resistant to change (see Belot and James, 2011, Muller et al., 2005, Perry et al., 1998 and Kelder et al.,

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[1] See Cawley (2015) for an overview of the costs of obesity.

[2] See Ciliska et al. (2000) for a review of many community based interventions. They appear to have been successful at informing people but have had less success in changing actual behaviour (see Robertson, 2008 and Verplanken and Wood, 2006).

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1995). We use insights from behavioural economics to investigate whether we can improve the intake of healthy foods overall and for these groups in particular by providing incentives to select fruit and vegetables during school lunches.

We conduct a randomized field experiment in 31 primary schools across England and implement, for four weeks, two incentive schemes: an individual based incentive and a competitive incentive. Our sample includes classes in year 2 (pupils aged 6–7) and in year 5 (pupils aged 10–11) to be able to investigate effects by age. In each treatment pupils were given a sticker for choosing or bringing in a fruit or vegetable at lunch. At the end of the week (Friday afternoon after lunch), each pupil had the opportunity to pick a larger prize. In the individual incentive scheme, if a pupil collected four stickers during the week she or he was allowed to choose a prize. In the competition, children were assigned to random groups of four, and only the pupil with the most stickers in each group was able to select a prize from the reward box. In the case of a tie, all children with the highest number of stickers in the group were eligible for a prize. The groups were revealed after lunch at the end of the week so children would not engage in strategic behaviour.

Using incentives to encourage healthy eating is a controversial idea. Indeed, there is evidence showing that rewarding children for eating fruit and vegetables can lead to those items being less preferred (using self-reports as a measure of preference; Birch et al., 1982, Birch et al., 1984, and Newman and Taylor, 1992). The idea of using a competition rather than an individual incentive is inspired by the recent evidence in behavioural economics showing that men tend to be more competitive than women (see Gneezy et al., 2003, Gneezy and Rustichini, 2004, and Booth and Nolen, 2012). To the best of our knowledge, competitive incentives have not yet been studied in the consumption of fruit and vegetables in the context of nutrition. While this might have potential to increase the consumption of fruit and vegetables, it also has the threat of being effective only for boys or more competitive children while discouraging others. We are primarily interested in the effects for immediate food intake, but also look at the build-up of short and long-run health habits once incentives are removed.

We find that the competitive scheme works well overall, with no negative effects for any subgroup. The results of individual incentives are mixed, and the scheme has no overall effect. The competitive treatment is more effective for all demographic groups and, overall, is nearly three times as effective at getting children to consume a portion of fruit or vegetable at lunch. If we focus on the specific group of children who did not consume fruit and vegetables every day before the intervention started, we find that the competitive scheme increases their likelihood of trying a fruit or vegetable at lunch by 48%.

Our second important finding is that incentives do not work in the same way for everyone. We find that, in general, girls, pupils from poorer socioeconomic backgrounds, and younger children respond more positively to competition than to the individual based incentive. The individual based incentive even appears to have a negative effect on younger children. Other subgroups, such as boys, older children, and pupils from wealthier socioeconomic backgrounds, respond positively to the competitive treatment, although the estimated effect is not significantly different from the individual scheme. Using a competitive incentive could improve effectiveness by increasing the choice and consumption among those groups that typically do not respond to health interventions.

The results presented in this paper are directly relevant for policy. We show that incentives do work in encouraging healthy dietary choices, at least in the short term. The differential effects by subgroup suggest that health incentives need to be evaluated at the individual level and, consequently, different policies may have to be developed for different subgroups or an incentive scheme other than the standard individual scheme may have to be considered. Furthermore, increasing the length of time an intervention is taking place is not the only way policy makers can increase the likelihood that positive behaviours are adopted: for instance, competitions could be more effective than individual based schemes at changing behaviour in the same time period.

The remaining part of the paper is structured as follows. In Section 2 we discuss the related literature. Section 3 presents the experimental design and Section 4 presents a simple conceptual framework and hypotheses that guide the analysis of the results. We present the results in Section 5 and conclude in Section 6.

2. Background and related literature

The most related paper to our work is by Just and Price (2013), who tested various individual incentive schemes in fifteen schools in two districts in Utah. They incentivized fruit and vegetable *consumption* at lunch over a span of two or three weeks. They compare the effectiveness of various individual incentive schemes (piece rate monetary payment, lottery, nickel – which were either immediate or delayed). While they find positive significant effects during the intervention period, they do not find evidence of medium run effects (they followed up for four weeks after the incentive was removed). In a follow-up study, Loewenstein et al. (2016) keep the incentive (a token with a value of 25 cents that could be redeemed at the school shop, school carnival, or book fair) constant but vary the length of time the incentives are in place (three or five weeks). They find the effect of the incentive persisted two months after it had been removed and the consumption rate was higher for the schools where the intervention lasted 5 weeks.

Our experiment has important design differences when compared to the two aforementioned studies. First, we incentivize *choice* of fruit and vegetables. Second, we compare individual and competitive schemes while they focused only on individual schemes. Third, we use a longer incentive period than Just and Price (2013). Fourth, we introduce a weekly prize that is relatively larger in value than our daily prizes. This means the incentive at the daily level is not independent of choices made on other days of the week. Finally, Loewenstein et al. (2016) did not have a control group, which, as we will see in our analysis, turned out to be important when estimating the longer term effects in our study; consumption of fruit and vegetables appears to follow an upward trend for our control group. Below, we will discuss our experimental design in detail and compare our findings to these two closely related studies.

More generally, our paper relates to the literature on behavioural anomalies underlying 'unhealthy' behaviours. Present-biased (hyperbolic) preferences, such as those discussed in Laibson (1997) and O'Donoghue and Rabin (1999), can explain unhealthy dietary choices despite an individual being fully aware of the effects of poor nutrition and the benefits of healthy eating: individuals may overweight the initial costs of eating healthier and (or) underweight the longer term benefits. In that context, using a temporary and effective incentive scheme to encourage healthier eating among children could lead to long term dietary habit changes.[3] Interestingly for our study, recent work has shown that boys, younger children, and children from poorer socioeconomic backgrounds are more impatient than other children[4]; this could explain why children with those demographic characteristics are less likely to make healthy dietary choices. In that context, providing immediate incentives to eat healthily may prove to be a powerful tool to get these groups to respond.

[3] Works by Kelder et al. (1994), Resnicow et al. (1998), and Singer et al. (1995) suggest that dietary habits appear to form in childhood and track into adulthood.

[4] See Delaney and Doyle (2012) for children from poorer socioeconomic backgrounds and Bettinger and Slonim (2007) for boys versus girls, and for older children versus younger ones.

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