



## Paying people to eat or not to eat? Carryover effects of monetary incentives on eating behaviour



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### ABSTRACT

There is no evidence comparing head-to-head the effects of monetary incentives to act and to abstain from acting on behaviour. We present an experiment, conducted between June and September 2012, that directly compares the effects of those two different monetary incentive schemes on eating behaviour: we evaluate incentives to eat against incentives not to eat. A large number of participants ( $n = 353$ ) had bowls of sweets next to them while they watched different videos over two experimental sessions that were two days apart. Sweets eating was monitored and monetary incentives to eat or not to eat were introduced during one of the videos for participants randomly allocated to these conditions. Our results show that, while both types of incentives were effective in changing sweets-eating behaviour when they were in place, only incentives not to eat had significant carryover effects after they were removed. Those effects were still significant two days after the monetary incentives had been eliminated. We also present some additional results on personality and health-related variables that shed further light on these effects. Overall, our study shows that incentives not to eat can be more effective in producing carryover effects on behaviour in domains like the one explored here.

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### 1. Introduction

The use of incentives to motivate people lies at the heart of economics (Smith, 1776; Barnard, 1938; Camerer and Hogarth, 1999; Laffont and Martimort, 2002). Recently, financial incentives have been used in a variety of research and policy contexts to induce behaviour change in health-related settings, such as smoking cessation (Volpp et al., 2006, 2009), dieting (Volpp et al., 2008; John et al., 2011; John et al., 2012; Kullgren et al., 2013), exercising (Charness and Gneezy, 2009), and the consumption of fruit and vegetables (Cooke et al., 2011). These studies have typically found that monetary incentives are able to induce significant changes in health behaviour, at least in the short run (Marteau et al., 2009; Gneezy et al., 2011; Volpp et al., 2011; Galizzi, 2014).

Behavioural research, however, has also uncovered a series of

effects and principles that are more complex than the mere impact on the targeted behaviour. Financial incentives, in particular, have been associated to unintended effects and 'hidden costs' (Fehr and List, 2004) such as the crowding out of intrinsic motivation (Frey and Oberholzer-Gee, 1997; Deci et al., 1999; Fehr and Falk, 2002); changes in social norms or individual beliefs about social norms (Gneezy and Rustichini, 2000a,b; Heyman and Ariely, 2004); the interaction with reciprocity (Fehr and Gächter, 1997; Rigdon, 2009; Dur et al., 2010); reputational concerns (Benabou and Tirole, 2006; Ariely et al., 2009a); or social comparison (Gächter and Thoni, 2010; Greiner et al., 2011).

Studies have also started exploring the unintended 'spillover' effects of incentives on behaviours other than the ones directly targeted (Wisdom et al., 2010; Dolan and Galizzi, 2014, 2015), or the conditions under which they adversely lead to 'choking under pressure' (Ariely et al., 2009b). To complicate things further, existing studies have examined either incentives to act or to abstain from acting in certain ways, but not both of them together in the same study. This makes it difficult to compare systematically the consequences of these different incentive schemes, including what

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happens when they are removed.

Such a comparison is of key interest for health policy purposes, as in real world applications incentives will often need to be removed at some point, and both paying to act and paying to abstain from acting could have potential backfire effects once removed. For example, we could pay people not to eat fat foods for some time and then remove the incentive. This could result in reduced calorie intake if the intervention helps people build up healthier eating habits, but, based on what we know about motivation, it could also potentially increase the consumption of calorie dense foods if it undermines people's intrinsic motivation to control their eating in the absence of incentives. An alternative option would be, for instance, to pay people to eat low-fat food items and then remove the incentive. The precise results of these alternative interventions would depend on many factors, but in order to be able to compare directly the merits of incentives to act and to abstain from acting, we need a clean comparison using exactly the same target behaviour and environment.

To the best of our knowledge, this paper presents the first controlled head-to-head study of the effects of monetary incentives to act and to abstain from acting on behaviour. We focus on eating behaviour, which is an issue of significant health policy relevance, and which has already received attention in previous studies of incentives (Jeffery et al., 1993; Cooke et al., 2011; Grubliauskiene et al., 2012; Remington et al., 2012; Wengreen et al., 2013). In particular, we look at sweets eating because it is an ambivalent, stylised health-related behaviour: while eating sweets is a pleasurable, tempting activity, it may be potentially harmful, and even unwanted at a meta level. Many other risky health behaviours, such as alcohol drinking and unsafe sex, share this same common feature of being ambivalent activities. Incentives for sweets eating, moreover, can be readily manipulated in the lab.

We conducted a laboratory experiment in which participants had bowls of sweets next to them while they watched different videos over two sessions set two days apart. During the first session we introduced monetary incentives to eat or not to eat sweets from the bowl and monitored how that affected eating behaviour while the incentives were in place, after they were removed on the same day, and two days after they were removed.

The rest of the paper is organised as follows: Section 2 describes the method used; Section 3 presents the results obtained; Section 4 concludes with a discussion of the limitations and of the research and policy implications.

## 2. Method

### 2.1. Experimental design and procedures

The general methodology used in our experiment was to leave bowls of sweets (Jelly Beans) next to the participants while they watched different videos on individual computer screens during two experimental sessions set two days apart. Sweets eating was monitored throughout the two sessions, and monetary incentives to eat or not to eat sweets were introduced during one of the videos in the first session to observe their effects on eating behaviour.

Each participant watched a total of four different videos individually, with a bowl of Jelly Beans next to them (approximately 2.2 kcal and 1.14 g per Jelly Bean). Three of the videos were in the first experimental session, while the fourth video was in the second session. During the first video, we let participants take sweets from the bowl and eat them as they pleased. We explicitly told people that they could eat sweets from the bowl as they liked. Before starting the second video, we implemented one of the three following conditions and informed participants about it:

- 1) “Control” condition: Participants could keep on eating sweets as they liked during the next video.
- 2) “Eat” condition: Participants received £3 at the end of the session if they ate at least 10 Jelly Beans during the next video.
- 3) “Don’t Eat” condition: Participants received £3 if they did not eat any Jelly Beans during the next video.

Before the third and fourth videos, participants (in all the conditions) were informed again that they could eat sweets as they liked during the videos. Table 1 summarizes the structure of the different experimental conditions.

The first, third and fourth videos were approximately 10 min long and the second video approximately 5 min long. The main reason for the shorter length of the second video was that we hypothesized that 5 min would be enough to establish the incentive structure, and we wanted to avoid inducing people in the *Eat* condition to eat too many sweets, or a number of sweets that was too low for 10 min. In the other videos, 10 min provided more time to obtain good observations. All the videos were selected to be mildly boring, so that they tended to encourage sweets eating (Abramson and Stinson, 1977; Macht, 2008). The first video showed a bus journey through London filmed from inside the bus; the second video explained briefly the history of sweets in the UK (this topic was chosen to make the incentive manipulation during the second video a bit more coherent); the third video explained the bus system in London in the 1950s; the fourth video was a fragment from a documentary about animals.

After each video, the participants were asked to move to a different room where they answered a few simple questions about the content of the video and how they felt about it. Meanwhile, unbeknownst to them, the bowls of sweets were weighted with professional scales by the research assistants, and the measurements recorded to monitor eating behaviour. After answering the questions, subjects were asked go back to their computers for the next video, and also informed of any incentive that would be in place during the video.

This design was intended to allow for an analysis of the effects of the two different incentive schemes used while they were in place (during Video 2), immediately after they were removed (during Video 3), and also two days later (during Video 4). An obvious complication with the effects observed immediately after the incentives were removed is that the different amounts of sweets eaten during the video with incentives can affect subjects' appetite in the next video. Nevertheless, as the results will show, it is still possible to extract interesting insights from eating behaviour during Video 3. In addition, sweets-eating behaviour during Video 4 provides a clean test of the carryover effects of the monetary incentives used.

In the first experimental session, before starting with the first video, participants responded to various questionnaires intended to elicit additional personality and health-related information. The questionnaires included the following elements:

- 1) Big Five Inventory (John et al., 1991; John et al., 2008), to measure the Big Five personality dimensions (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness).
- 2) Health and Taste Attitudes Questionnaire (Roininen et al., 1999), which measures six factors that can be grouped into two main categories. The factors are: “Health Interest”, “Light Product Interest”, “Natural Product Interest”, “Craving for Sweet Foods”, “Using Food as a Reward”, and “Pleasure”. The first three factors can be grouped in the category “Healthiness” and the last three in the category “Taste”, which are intended to capture, respectively, attitudes towards the healthiness and the taste of food.
- 3) A question about the frequency of sweets intake.

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