

When incentives backfire: Spillover effects in food choice

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Outline

- Obesity and Child Food Choice
- Role of Incentives
- When incentives backfire: Spillover effects in food choice

Health, Obesity and Eating Habits

- Obesity is a major public health concern, leading to chronic conditions (Pi-Sunyer, 1993)
 - high blood pressure,
 - diabetes, etc.
- **Major components of the problem:**
 - habitual consumption of high quantities of low-nutrient, high-calorie foods
 - Individuals are more likely to eat familiar foods, and the tendency to consume an unhealthy diet is learned at a young age (Smith and Tasnadi, 2007)
 - Habits are learned in the home, which may lead to a cycle of unhealthy behaviors (Campbell et al., 2007)

Need to Address Decision-Making by Children and Adolescents

- Lack of proper nourishment, such as **not meeting RDA for F/V**, affects health and hampers growth, can result in poor school performance (Whitaker et al., 2006)
- 17% of nation's youth have BMI at or above recommended 95th percentile (NIH, 1998)
- Children from **low income families** are at higher risk!

“Teachable Moment”

- **Teachable moment**: children consume food outside of the home on a regular basis
 - School Lunch
 - USDA sponsored food programs



Incentives motivate behavior change

- Agents value even small incentives to shift health behavior – weight loss, smoking cessation, medication adherence (Volpp et al., 2008; 2009, etc.)
- Incentives are a way to encourage healthier food choices

List and Samek (JHE, 2014)

- 1,500 children in experiment with choice between cookie or fruit



cookie

or



dried fruit



pens
(orange)



eatstrong wristband
(all colors)

Gifts today



fruit keychains



ducky
(all colors)



trophy

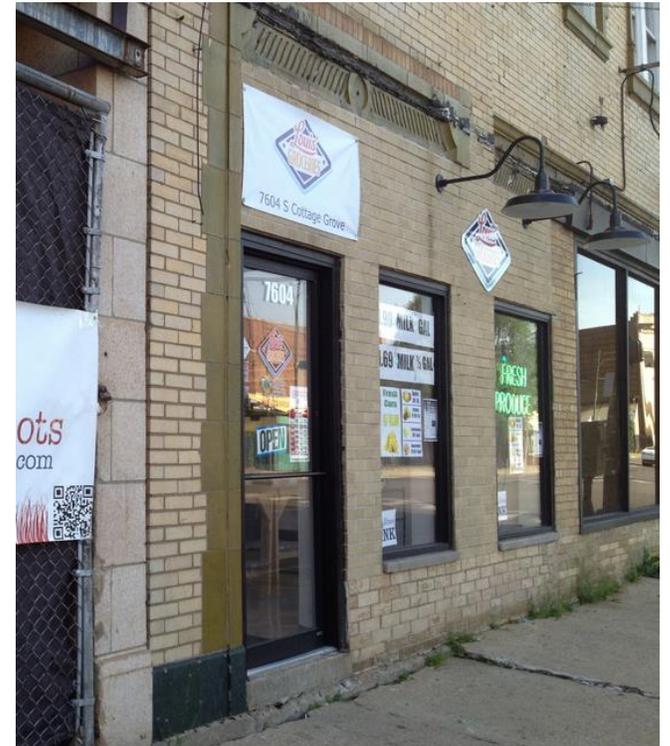
- In control group: **17%** of children consume the healthy snack
- Treatment group (with incentive): **75%** of children consume the healthy snack

List and Samek (PFR, 2015)

- Children in school lunchroom can select white milk (less sugar) or chocolate milk (added sugar)
- Treatment group: we provide an incentive to choose white milk (glow-in-the-dark bracelet)
- White milk selection increases from 16% (control group) to 40% (treatment group), with no change to consumption

List, Samek and Zhu (WP 2016)

- In low-income grocery store, offer \$1 incentive for purchasing at least 5 cups of fruits and vegetables
- 200 participants, track behavior for 8 months
- Control group purchases 0.34 cups of produce
- Treatment group purchases 1.59-2.24 cups



Do incentives always work?

- Incentives may backfire because they can act both as *prices* and *signals*
 - Incentives can signal about the difficulty of the task or the quality of the incentivized good (Benabou and Tirole, 2003; Nelson, 1970; Shapiro, 1983; Milgrom and Roberts, 1986; Gneezy et al., 2011)
 - Incentives that are “too small” may decrease intrinsic motivation (Gneezy and Rustichini, 2000)
- These are all “direct” effects
 - A limitation of the literature is that it has not considered “spillover” effects of peers

Spillover effects

- Consider paying students to choose a healthy snack at school
 - The direct effect of the incentive program should increase take-up of the healthy snack
- When incorporating peers, there could be two types of spillover effects
 - Observing peers' actions: If I see my friends pick the healthy snack, I may think this snack is delicious and healthy
 - Observing peers' incentives: If I see my friends incentivized to choose the snack, it may convey "bad news" (e.g., snack is a bad quality)
- The magnitudes of these effects may vary with the proportion of children incentivized

Our paper

- We conducted a field experiment in a school lunchroom that lets us measure the overall effect of incentives and decompose it into its direct effect and its spillover effects
- 1,600 children in grades K-8 in a low-income Chicago neighborhood participated in our experiment (9 elementary schools)
 - We offered children the choice of grapes or a cookie at the lunch table
 - We varied the proportion of children at the school lunch table who were incentivized to choose grapes
 - We allowed children to “change their mind” after observing their friends
 - We varied whether the incentive was private or public information

Experiment Design (Artefactual Field)

- We conducted the experiment after children had collected their lunch trays and sat down to eat at their table, as they normally do.
 - Children typically sit in groups of 3-10 per table, based on friendships
 - Children always get the same school-provided lunch (no choice)
- Experiment implemented at table level (one RA per table)
 - Each child selected one cookie card and one grape card from a card deck
 - Each child could choose an additional dessert, cookies or grapes, by placing the corresponding card down on the table
 - Stage 1: simultaneous selection of dessert
 - Stage 2: 20 seconds to “change your mind” after seeing what others picked

The cards

Different decks had different numbers of each kind of grape card

Cookie



If you play this card, you will get **one cookie**

Your tray #: _____

Some Grapes



If you play this card, you will get **some grapes**

Your tray #: _____

Grapes + Token



If you play this card, you will get **some grapes + a token to be used for prizes**

Your tray #: _____

Random assignment to treatment

- Whether or not child is incentivized (can't see card when you choose)
- Proportion of children incentivized at the table (0%, 11-80%, or 100%)
- Whether in “public” or “private” treatment
 - In “public” treatment, cards are played face-up and can observe the incentive
 - In “private” treatment, cards are played face-down so the type of dessert selected is observed, but not the incentive

Summary of treatments (N=1,771)

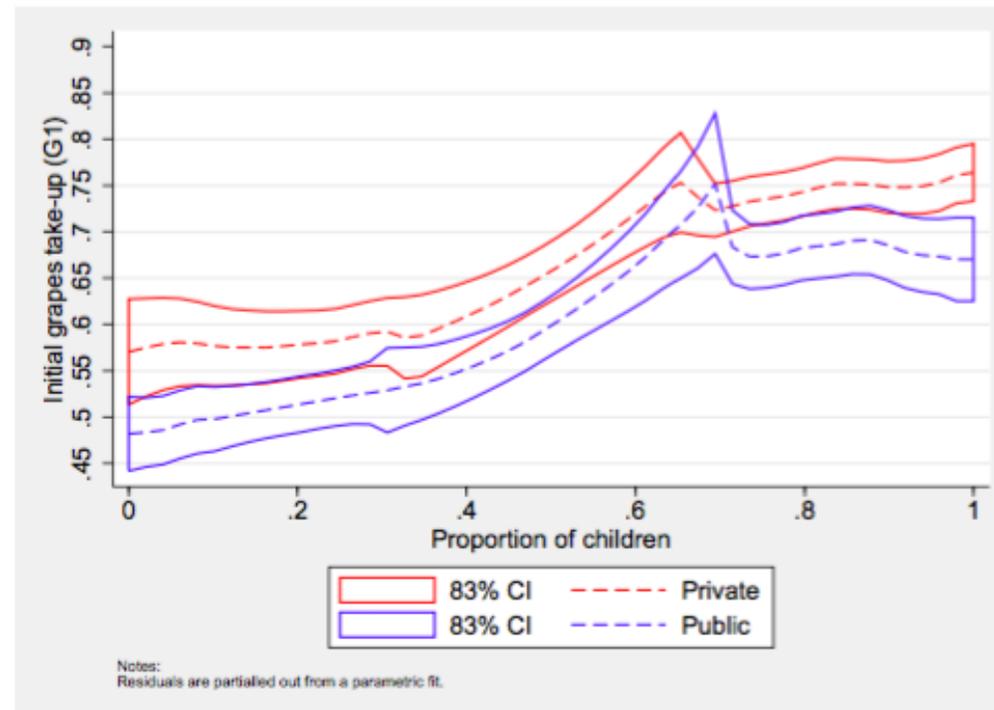
	0% Incentive (No Incentive Control) – Deck 1	50% Incentive – Deck 2	100% Incentive (Full Incentive Control) – Deck 3
Decisions are Private	22 tables 130 subjects	64 tables 430 subjects	50 tables 318 subjects
Decisions are Public	44 tables 268 subjects	73 tables 454 subjects	31 tables 171 subjects

Summary of results

- Incentives increase the fraction of incentivized children choosing grapes from about 50% to about 75% (direct effect)
- About 5% of children revise their snack choice when they observe the snack choices of others (indication of spillovers)
- The “total” effect of incentives varies by proportion incentivized and public/private treatments

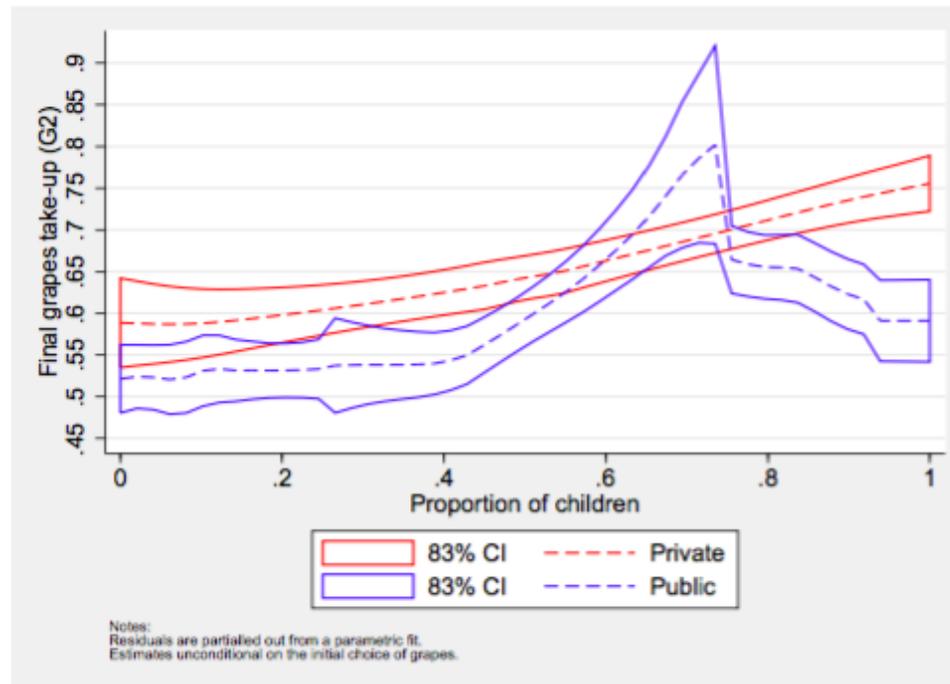
Initial grape choice

- This figure plots the semi-parametric total effect of table proportion incentivized on a dummy variable indicating the initial choice of grapes
- Increase in proportion of children choosing grapes as the proportion incentivized increases



Final grape choice

- Differences between public/private apparent in second stage choice
 - In private, proportion choosing grapes increases with increase in incentive probability
 - In public, proportion choosing grapes increases but begins to decrease when all or almost all kids are incentivized



Conclusion

- The direct effects of incentives are large, increasing grapes take-up by about 50%.
- However, the spillover effects of incentives are also large, especially the negative effect caused by observing peers' incentivized choices.
- When peer incentives are visible, the positive effect of seeing peers choose grapes is more than offset by the negative effect of seeing peers incentivized to pick grapes.
- The overall effect of incentives (i.e., combining the direct and spillover effects) is positive when half or two thirds of children are incentivized, but declines beyond that, to the point that take-up of grapes for the 100% incentivized group is not statistically different from that of the 0% incentivized group.

Implications

- The possibility of negative spillover effects that counteract the positive direct effects of incentives should not be overlooked.
- Since these negative spillover effects can occur in response to learning about peers' incentives, it may be preferable not to make incentives public, when possible, although this may not be feasible in many settings.
- Spillover effects of this kind may occur in environments where the value of the incentivized action is not well-known (e.g., adoption of new technologies or new behaviors).
- Separately measuring spillover effects and how these effects vary with the fraction treated is important for understanding how experimental results may scale-up when introduced more broadly.