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## **WORKING PAPER**

### **Can Fat Taxes and Package Size Restrictions Stimulate Healthy Food Choices?**

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August 2013  
2013/847

### **Abstract**

Consumers prefer bonus packs, as opposed to price discounts, for healthy foods, but they want a price discount rather than a bonus pack for indulgent foods (Mishra & Mishra, 2011). This study conceptually replicates and extends this finding to show that consumers are more responsive to changes in price than to changes in package size for indulgent food options, whereas they are more responsive to changes in package size than to changes in price for healthy food options.

Keywords: sales promotion, packaging, price, food, vice, virtue

## 1 Research Background

We extend research by Mishra and Mishra (2011), who study consumers' preferences for price discounts or bonus packs for indulgent and healthy options (see Table 1 for an overview of the studies). Consumers generally prefer a bonus pack to a price discount, because bonus packs offer gains, whereas price discounts represent reduced losses (Diamond & Sanyal, 1990). Mishra and Mishra (2011) show that consumers prefer a bonus pack to a price discount for healthy options but prefer a price discount to a bonus pack for indulgent options. They explain this latter finding by noting the difficulty of justifying the purchase of unhealthy food: Consumers cannot devise good reasons to purchase a bonus pack of unhealthy options, but a price discount mitigates their consumption guilt. For healthy options, consumers prefer the bonus pack, because they do not suffer from guilty feelings or a need to justify a larger purchase.

“Insert Table 1 here”

We offer three extensions. First, in addition to price discounts and bonus packs, we consider price premiums and package reductions, which reflect recent public policy efforts. Second, our research setting confronts participants with a different choice problem. Whereas Mishra and Mishra (2011) asked participants to choose between price or bonus promotional offers for the same indulgent or healthy product, the participants in our study choose between healthy and indulgent food options, while the relative value of both options varies. Third, we take a range of value-increasing and -decreasing levels into consideration (−80% to +80%), instead of keeping the promotion level constant at +20% (Mishra & Mishra, 2011).

Even with these unique approaches, we replicate their findings: Decreasing the price is more effective for promoting unhealthy food, whereas a larger package size is more useful for promoting healthy food. These findings hold for interventions focused on decreasing the value of a product too. Specifically, increasing the price of an unhealthy food option is more

likely to sway preferences in the direction of healthy food options than is decreasing the package size.

## **2 Method**

The 235 participants (78 men;  $M_{\text{Age}} = 32.40$ ,  $SD = 13.80$ ) were recruited through the University's online research panel between the fifth and the twelfth of November, 2012 and completed an online questionnaire that consisted of four trials that presented one indulgent and one healthy food option simultaneously (i.e., chocolate cookie–granola bar, muffin–fruit salad, chocolates–raisins, and chocolate bar–vegetable bowl). For each trial, participants indicated which product they would buy on an 11-point scale (1 = unhealthy food option, 11 = healthy food option). Each food option costs 2.5 euro for about 200 grams in a real retail environment, and this information appeared clearly on the first page of the questionnaire, such that participants had a clear idea of the reference value of all options. We manipulated relative values by changing the price or package size of either the indulgent or the healthy option. We used eight relative value levels; one option offered 20%, 40%, 60%, 80%, 120%, 140%, 160%, or 180% of the value of the other option (which equaled the reference value). The experiment thus used a 2 (changed value product: indulgent vs. healthy)  $\times$  2 (value-changing intervention: price vs. package size)  $\times$  8 (level of change in relative value: 20%–180%) design, with 32 conditions. Participants completed four trials, each of which represented a different condition.

## **3 Results**

Because each participant completed four conditions, we ran a multilevel regression model with the intention to select the option of which the value was altered as the dependent variable and the product type, type of intervention, extent to which the value changed, and all two- and three-way interactions as the independent variables. A similar analysis was run separately for men and women in our sample. As women are generally more concerned with

physical appearance, weight and dieting than men (Crocker et al., 2003; Rozin, Bauer, & Catanese, 2003), while they at the same time rate snacks and chocolate more as comfort foods than men (Wansink, Cheney, & Chan, 2003), both sexes may respond differently to a trade-off between healthy and indulgent food options, and elements influencing this trade-off. When considering the entire sample, the analysis yielded a significant three-way interaction effect ( $\beta = -.03$ ,  $t(904) = -3.91$ ,  $p < .001$ ); an interaction that persists when separately considering men ( $\beta = -.03$ ,  $t(292) = -1.93$ ,  $p = .055$ ) and women ( $\beta = -.03$ ,  $t(603) = -3.12$ ,  $p = .002$ ) (see Table 2 for the parameter estimates). This finding suggest that men and women responded in a similar manner to changes in price and package size of healthy and indulgent food options (a more detailed analysis of other gender differences is provided in the online appendix).

“Insert Table 2 here”

Specifically, for indulgent options, changing the price exerted a greater effect than did adapting the package size. When indulgent food options became cheaper, they were more preferred over healthy options; when they were more expensive, participants preferred them less. However, limiting or expanding the package size had only a small effect on the choice likelihood for the indulgent option (see Figure 1). If the relative value of the indulgent option decreases by increasing its price, then the intention to choose this indulgent option over a healthy option (of a similar size with a relatively lower price) decreases substantially. However, when the relative value of the indulgent option decreases by decreasing its package size, then the intention to choose this indulgent option over a healthy option (of a relatively larger size with a similar price) does not decrease accordingly. The difference in effectiveness between a price and package size change was significant when the value of the indulgent option was less than 94.66% or greater than 176.00% of the reference value.

“Insert Figure 1 here”

Alternatively, for healthy food options, changing the package size, rather than the price, affected the likelihood of choice. When healthy food options increased in value because of their larger package size, but the price remained constant, consumers tended to select the healthy option. Altering the price of a healthy option did not affect its choice likelihood (Figure 2). The difference in the effectiveness of a change in package size compared with a change in price was significant when the value of the healthy option was at least 160.91% of its original value.

“Insert Figure 2 here”

Overall, for indulgent food options, adapting the price has a greater effect than adapting the package size, whereas for healthy food options, adapting the package size has a greater effect than adapting the price. These results replicate the findings of Mishra and Mishra (2011): Consumers prefer a price discount to a bonus pack for indulgent food options and a bonus pack to a price discount for healthy food options. In addition, we show that consumers are more responsive to a price premium than to a package reduction for indulgent food options, whereas they are more responsive to a package reduction than to a price premium for healthy food options.

Mishra and Mishra (2011) demonstrate preferences for different value-changing interventions for indulgent versus healthy food options with changes in value as small as 20%; our findings yield significant differences only for proportionally larger changes in value. However, the magnitude of the absolute reference price and package size is substantially smaller in our research. Therefore, proportionally larger changes in value are rather small in absolute terms, which may account for the absence of significant effects in the case of small changes in value.

## References

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Table 1. Method and Results of the Original Studies and Replication Study

| Study                  | Sample | Conditions   | Products                                                                                         | Change in value                         | Dependent Variable                                   | Results                                 |                                                                                                                                                                                                                                                                                 |
|------------------------|--------|--------------|--------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mishra & Mishra (2011) | 1      | 120 students | 2 (product type: indulgent vs. healthy)                                                          | tasty chocolates vs. healthy chocolates | + 20% on a reference offer of 35 chocolates for \$14 | choice for price discount or bonus pack | Preference for a price discount is higher in the indulgent vs. healthy condition.                                                                                                                                                                                               |
|                        | 2      | 323 students | 2 (product type: indulgent vs. healthy) $\times$ 3 (offer: regular, price discount, bonus pack)  | chocolates vs. raisins                  | + 20% on reference offer of 24 oz. for \$6           | purchase incidence (binary)             | Odds of selecting an indulgent (healthy) option are 3.125 (5.31) times larger in case of a price discount (package premium).                                                                                                                                                    |
|                        | 3      | 109 students | 2 (offer: regular price vs. bonus pack) + consumption guilt as moderator                         | cake and fruit salad                    | +20% on reference of 20 oz. for \$7.99               | willingness to buy each product         | Willingness to buy cake on a price discount (with a bonus pack) increases (decreases) as chronic guilt increases<br>Willingness to buy the fruit salad is higher with a bonus pack than with a price discount, irrespective of guilt.                                           |
|                        | 4      | 160 students | 2 (product type: indulgent vs. healthy) $\times$ 2 (justification: no-justification vs. control) | tasty chocolates vs. healthy chocolates | + 20% on a reference offer of 35 chocolates for \$14 | choice for price discount or bonus pack | For the indulgent option, preference for a price discount is diminished in the no-justification condition. For the healthy option, the majority chooses the bonus pack, irrespective of the justification condition.                                                            |
|                        | 5      | 199 students | 2 (offer: regular price vs. bonus pack) $\times$ 2 (altruism: donation vs. control)              | chocolates vs. raisins                  | + 20% on reference offer of 24 oz. for \$6           | willingness to buy each product         | Willingness to buy chocolates is higher with a price discount than with a bonus pack in the control condition, but not in the altruism condition.<br>Willingness to buy raisins with a bonus pack is higher than with a price discount, irrespective of the altruism condition. |

|                               |   |                        |                                                                                           |                                                                                                                    |                                                                         |                                        |                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------|---|------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Huyghe & Van Kerckhove (2013) | 1 | 235 general population | 2 (product type: indulgent vs. healthy) $\times$ 2 (offer: price discount vs. bonus pack) | chocolate cookie vs. granola bar, muffin vs. fruit salad, chocolates vs. raisins, chocolate bar vs. vegetable bowl | ranges from -80% to +80% on a reference offer of 200 grams for 2.5 euro | choice for indulgent or healthy option | Likelihood of choosing the indulgent option increases (decreases) when it becomes cheaper (more expensive), whereas changing its package size does not affect its choice likelihood. Likelihood of choosing the healthy option increases (decreases) when its package size increases (decreases), whereas changing its price does not affect its choice likelihood. |
|-------------------------------|---|------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 2. Parameter Estimates for the Total Sample, and Men and Women Separately

|                                             | Total Sample |      |       |        | Men    |       |       |        | Women  |       |       |        |
|---------------------------------------------|--------------|------|-------|--------|--------|-------|-------|--------|--------|-------|-------|--------|
|                                             | B            | SE b | t     | p      | B      | SE b  | t     | p      | B      | SE b  | t     | p      |
| Intercept                                   | 5.537        | .407 | 13.60 | < .001 | 6.209  | .74   | 8.37  | < .001 | 5.215  | .494  | 10.55 | < .001 |
| Product type                                | -.702        | .602 | -1.17 | .244   | -.818  | 1.157 | -.71  | .480   | -.669  | .714  | -.94  | .349   |
| Type of Intervention                        | -2.189       | .588 | -3.72 | < .001 | -3.157 | 1.114 | -2.84 | .005   | -1.709 | .718  | -2.38 | .018   |
| Value                                       | .004         | .004 | 1.04  | .300   | -.003  | .007  | -.42  | .673   | .007   | .005  | 1.55  | .122   |
| Product type * Type of Intervention         | 3.057        | .860 | 3.56  | < .001 | 3.093  | 1.627 | 1.90  | .058   | 2.979  | 1.050 | 2.84  | .005   |
| Product type * Value                        | .012         | .005 | 2.23  | .026   | .015   | .010  | 1.43  | .154   | .010   | .006  | 1.59  | .113   |
| Type of Intervention * Value                | .018         | .005 | 3.33  | .001   | .028   | .010  | 2.83  | .005   | .013   | .006  | 1.99  | .048   |
| Product type * Type of Intervention * Value | -.030        | .008 | -3.91 | < .001 | -.028  | .015  | -1.93 | .055   | -.028  | .009  | -3.12 | .002   |

Figure 1. Estimated and Observed Intention to Select an Indulgent Option with Changes in Relative Values

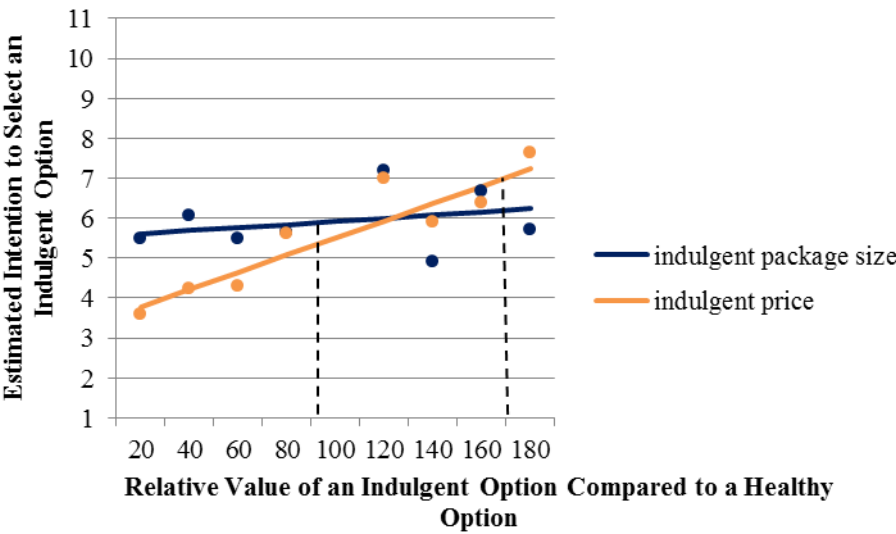


Figure 2. Estimated and Observed Intention to Select a Healthy Option with Changes in Relative Values

