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7th Annual PhD workshop Experimental Development Economics-Lab in the Field

Exploring the moderating effect of health education on attraction effects: an experimental application on healthy food consumption.

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Outline

- Introduction
- Theorectical framework
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Introduction

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- The attraction effect was cerebrated as **one of the most promising interventions** in choice theory 40 years ago and several studies found that this phenomenon exists across a broader range of fields, such as lottery, political elections, tourism and advertisments (Huber et al., 1982; Lichters et al., 2015).
- However, some reserachers argue that the attraction effect **only occurs in hypothetical settings and lacks social implications** (Frederick et al., 2014; Yang and Lynn, 2014).
- Moreover, previous studies did not pay much attention to **the moderating or mediating factors of attraction effects** that are the key to undertand when and where the effectiveness of the attraction effect becomes stronger or weaker and how to make good use of the attraction effect to induce human behavior (Huber et al., 2014).

Introduction

- In this study, we designed a lab experiment and recruited 537 student participants from Guangdong Medical University of China to study **the impact of the attraction effect on healthy food choices.**
- We also investigated **the moderating roles of health education on the effectiveness of the attraction effect.**
- The paper's contribution is threefold:

1. **Focus on real consumption setting:** This is the first study to design an experiment to explore the attraction effect in a realistic setting of food consumption.

Introduction

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2. Focus on healthy food choices: We explore the possibility of helping people make healthy decisions concerning food consumption, **when healthy food is more expensive than unhealthy options (a very common phenomenon)**.

3. Combining health education and attraction effects: Health education is an effective mean for providing sufficient health knowledge and thereby promote a change towards more healthy behavior (Jensen, 1992; Schmitz and Jeffery, 2000); however, its limitations are similarly well documented, with people often finding it difficult to break their unhealthy behaviors despite being well informed about the negative health aspects.

Theorectical framework

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Attraction effect

- The addition of a third option, a “decoy”, can **alter individuals’ initial preferences** from the original choice set.
- **This violates the rational axiom of regularity**, namely that the addition of a new option cannot increase the probability of choosing an option in the original choice set (Luce, 1959). For instance, people prefer A to B originally, after adding the option C, people now prefer B to A due to the influence of option C.

Theorectical framework

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1. Assume that the attributes 1 and 2 are used to envaluate the options.

2. Target option is better on attribute 2 and compeitor is better on attribute 1.

3. To promote more individuals to choose the target option, the decoy should be fully inferior to the target food but not competitor. Therefore, we also call the decoy option is assymetrically dominated option.

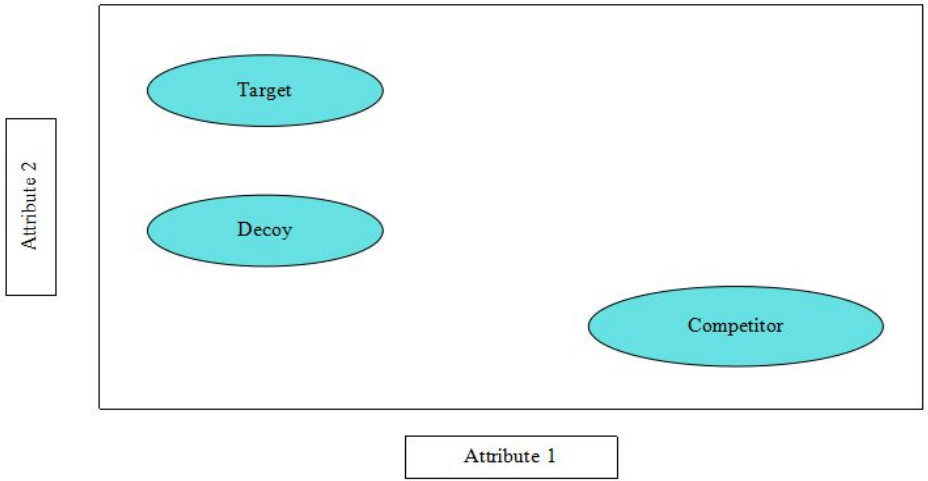

Figure 1: Relative attribute strength of different options

Hypothesis one

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Given a target food and a competitor's food, where the target food is healthier and the competitor's food is less expensive, adding a decoy food which is similar to the target food on price but less healthy than the target food will motivate individuals to purchase more of the target food.

Theorectical framework

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Health education

- Aims at bringing about behavioral changes in individuals, groups, and larger populations from behaviors that are presumed to be detrimental to health, to behaviors that are conducive to present and future health (Simonds, 1976).
- However, the impact of education when it comes to inducing healthy food choices may be overstated. **The link between health knowledge and behavior in unreliable, and expecting health education alone to change the health behavior is not seen to be a successful solution** (Wansink, 2013).

Theorectical framework

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- For instance, people normally make more than 200 food related decisions every day but they are not fully aware of 90% of these, which implies that individuals use quick and instinctive thinking rather than reason and deliberation on 90% of their food decisions. **While health education is helpful for improving health knowledge, it can thus be seen to influence as little as 10% of food decisions.**
- Therefore, in addition to improving healthy food choices, how to intervenve people's quick and instinctive thinking is also important. We expect that an intervention that both affects individuals' intuitive and deliberated thinking will be much better to promote health behaviors.

Hypothesis two

There is a positive interaction effect occuring between health education and attraction effects concerning increasing the number of target food selected. In other words, the participants who receive health education will choose more of target food than others who do not receive health education.

Experiment

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Partcipants and design

- The experiment is a 2x2 between-subject design that applies the decoy option and health education as between-subject factors.
- For power calculation, assuming a power of 80% (i.e. $t_k = t_{0.8} = 0.85$), a significance level of 0.05 (i.e. $t_\alpha = t_{0.05} = 1.65$); as the proportion of participants (p) in each group is identical, a sample of 556 equally divided by four groups would enable us to identify minimum standardized effect sizes of 0.3 (i.e. MDES).

Experiment

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- Keeping all valid (i.e. non-missing) observations yielded a sample of 537 participants. They valuntarly signed up for the experiment by filling in an online registration form. In this form, participants were asked to fill in their demographic information including age, gender, monthly food expenses, education level, health status, height, and weight.

Experiment

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- Regarding the arrangement of the experiment, this is an in-class event. Four one-hour sessions were arranged on one day between 3pm and 8pm, with each session structured identically and participants are able to choose to attend the most convenient one for them based on their schedules.
- Participants are randomly allocated to four different groups. The participants from the control group neither receive health education nor the intervention of adding the decoy option; the participants from treatment group one receive the intervention of adding the decoy option; the particpants from treatment group two receive health education; the participants from treatment group three receive both health education and the intervention of adding the decoy option.

Experiment

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Procedures:

- The experiment is hybrid online and offline.
- Use their mobile devices to complete all experimental tasks.
- Before the actual experiment, participants were asked to read the experimental rules and instructions carefully. And then, they need to sign the consent form.
- At the beginning of the experiment, they were required to read an article about healthy food choices and answer three questions directly relating to this article. Each correct answer to a question was rewarded with one Yuan.

Experiment

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5. Participants are required to go through four rounds of purchasing game, and participants had 10 Yuan to spend on purchasing food per round.

6. A randomly determined payment was applied to incentivize participants' real purchasing behaviors.

7. At the end of the experiment, participants were asked to rank the food options displayed in each round of shopping based on their healthiness and tastes respectively.

Experiment

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Food choices setting

1. T：Target food; C: Competitor; D: Decoy

2. Totally four rounds of shopping, the first two rounds do not involve no-buy option, but the second two rounds involve this.

3. To avoid high farmilarity of food, food products that are commonly consumed by individuals were not included in the experiment, such as the biscuits that students can conveniently buy in the university's supermarkets.

4. We used the same kind of food products per round.

A（T）	*Coconut Milk Matcha Biscuits 160g/package* 	1 If you purchase this product, you will get this product and the residual money of 9 Yuan.	Calories (kcal): 216 Sugars (g): 0 Fat (g): 23.5 Protein (g): 5.8
B（C）	*Milk Flavor Biscuit 160g/package* 	0.5 If you purchase this product, you will get this product and the residual money of 9.5 Yuan.	Calories (kcal): 633 Sugars (g): 45 Fat (g): 30 Protein (g): 0
C（D）	*Nanyi Chocolate Blackcurrant Biscuits 160g/package* 	1 If you purchase this product, you will get this product and the residual money of 9 Yuan.	Calories (kcal): 298 Sugars (g): 20 Fat (g): 23.5 Protein (g): 0
No-buy option		If you choose the no-buy option, you will get the full amount of 10 Yuan.	

Experiment

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Manipulations and measures---decoy options

- Compared to the target option, each decoy option is similar in price but less healthy; compared to the competitor, each decoy option is more expensive but healthier.

Manipulations and measures---health education

- **Both articles related to healthy food choices and mentioned the importance of healthy diets; however, the article without health education describes some common knowledge about healthy food choices** (such as low/zero sugar drinks are recommended in place of high-sugar soft drinks), **at a level low enough to not play an effective role in educating people. Contrarily, the article with health education introduces the negative consequences about unhealthy diets** (such as memory loss and rejuvenation of the population with hypertension and diabetes in China) **and gives fairly detailed suggestions about keeping healthy diets** (such as less than 5g salt per day).

Results

- Used simple estimates of the impacts of adding a decoy option, health education and the combination of health education and decoy option, on the number of target food selected per person:

$$Y_i = C + \alpha T_{i1} + \beta T_{i2} + \delta T_{i1} \times T_{i2} + \theta X_i + \varepsilon_i$$

- The panel regression model was ran with and without control variables respectively to investigate the impacts of the decoy option and health education on the number of target foods selected per participant.
- The panel regression was used separately for rounds one to two and rounds three to four; the reason i that previous research shows that in the purchasing situations with the no-buy option, most participants would like to choose this option (Lichters et al., 2017). **We therefore assume that it is useful to analyze the situations with and without the no-buy option separately to see the difference between them.**

Results

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- Taken together, the regression estimates are inconsistent with our original two hypotheses, namely, 1) adding a decoy is not able to induce individuals to choose more target food selected and even decrease the probability to purchase target food; 2) there is no positive interaction effect occuring between health education and attraction effects concerning increasing the number of target food selected.

- A significant difference between the rounds without and with the no-buy option was that all significant values changed to insignificant when the no-buy option was added. The reason is that no-buy option was mostly selected in rounds with no-buy option, although we already stated that the price of each product is 50% lower than the market price to motivate people to buy products.

Results

Why "negative decoy" (i.e. adding the decoy option causes the reduction of the number of target food selections in the situations without the no-buy option) happens?

- Do not understand the dominance relationship between the target option and decoy?---No.
- Whether adding the decoy causes to switch the original preference from the target food to the competitor?---No.
- The above findings also demonstrate that our decoys are appropriate.
- Final potential reason for "negative decoy", **which is that individuals would like to choose the decoy option for some reasons (e.g. taste) other than healthiness and price.** To examine this potential reason, we took the ranking of taste for the decoy food into account and ran the panel regression to explore the impact of the ranking of taste for the decoy food on the number of target food selected in rounds one and two respectively. ---Yes, this is the reason!

Discussion and conclusion

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- Varying the monetary incentivized choice framing between the purchasing rounds with and without the no-buy option shows that the attraction effect occurs in neither situation. Moreover, we even observe the “negative decoy”, in which adding the decoy option causes the reduction of the number of target food selections in the situations without the no-buy option.
- **Our results are therefore in line with the findings obtained by Frederick et al. (2014) as well as Yang and Lynn (2014), but contradict the more frequent conclusions drawn by previous studies showing the attraction effect as a promising tool to induce changes in preferences.**
- **Additionally, we found that combining health education and decoy options is more effective in promoting healthy food choice, while the interaction effect of health education and decoy option is fairly weak.**

Discussion and conclusion

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- We systematically studied the reason for “negative decoy” happening in our experiment and found that an important motivation for participants being less willing to purchase target options is that **some would like to choose the decoy once it is added.**
- Although our decoys added are appropriate under the theory of attraction effects, it is probable that this decoy will seem a more attractive option than the target food regarding other, unpredictable attributes, and will thus cause more people to choose the decoy and fewer people to choose the target food.

Discussion and conclusion

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It is believed that a “standard” decoy option is very dificcult to be found in reality because 1) making a decision on food choices is more complicated than other choices like a lottery situation, and individuals normally evaluate each food option by considering more than two attributes. For instance, if somebody wants to buy a box of chocolate, they would not only consider the price and healthiness of this food, but also whether the taste of the chocolate is good and the surface of the box looks attractive。

2) each real food must by nature have its own advantages compared to others otherwise it cannot retain its place in the market.

Discussion and conclusion

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Does it mean that the attarction effect does not exist in food consumption? Any solution?

- The key to ensuring the decoy option works in a real-life situation is **to make clear that the decoy option is inferior to the target option but not the competitor** (Doyle et al., 1999).
- One potential solution could be adding a decoy that is the same product as the target food, but to set the price of this decoy higher than the target food. Lichters et al. (2017) designed a decoy in this manner and thereby successfully promoted the sales of their target headphone.
- HOWEVER, such design is commonly used on muti-seller retail platforms but not for a single marketer.
- **Therefore, using alternative goods as decoys and broadening the choice sets would be more reasonable and realistic (Lichters et al., 2017).**

Discussion and conclusion

Suggestions for future research:

- Target other populations: non-student or students without the background of medical science.
- Explore the attraction effects out of the traditional theory (not only using two attributes to envaluate the options): For instance, it is possible to assume that provided four attributes, the target option is superior to the competitor on two attributes and the competitor is superior to the target option on the other two attributes. The decoy option should then by design be mostly inferior to the target option, inferior on three out of four attributes rather than on all attributes.
- Field experiment is needed to deeper understand the application of attraction effects in real-life (e.g. run a field experiment in the supermarket and observe how individuals spend their own money to make food decisions).

Q & A

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- We look forward to comments from all aspects!
- We look forward to working with the researchers who are interested in studying the health behavioral change!
- Don’t hesitate to contact me via email: chenyuzhanjiang@sina.com.

Thank you for your attention!