

Key Words

Nutrition Label, Policy, Consumer Behavior, Causal Inference, Randomized Controlled Trial (RCT)

Special thanks to

SURF Organizing Team, Xi'an Jiaotong Liverpool University
Dr. Yixing Tian, College of Economics and Management - China Agricultural University
Dr. Ken Cheng, Assistant Professor, Academy of Pharmacy - Xi'an Jiaotong Liverpool University
Dr. Bo Jiang, Assistant Professor, International Business School of Suzhou, Xi'an Jiaotong Liverpool University
Shuran (Rikky) Xing, Bioinformatics Scientist, Bio-Techne (U.S.)

SURF Supervisor

Dr. Shuyang Si

Shuyang.Si@xjtlu.edu.cn

Economics Department, XJTU

SURF Team Members

Jiaran Zeng
Jiatao Wang
Yuansen Tang
Chenzhe Zhang
Shangyu Gong

jiaran.zeng19@student.xjtlu.edu.cn
jiatao.wang19@student.xjtlu.edu.cn
yuansen.tang19@student.xjtlu.edu.cn
chenzhe.zhang20@student.xjtlu.edu.cn
shangyu.gong20@student.xjtlu.edu.cn

Economics and Finance, Year 3
Economics and Finance, Year 3
Economics and Finance, Year 3
Economics and Finance, Year 2
Economics and Finance, Year 2

1 Introduction

The prevalence of obesity in China has increased rapidly over the past decade. About half of adults and fifth of children are overweight or obese (Wang et al., 2021). China has made many efforts to address the obesity problem, and the "Health China 2030" national strategy was launched in 2016 to develop a comprehensive national strategy for obesity prevention and treatment. To make recommendations for the government, our team focuses on the impact of nutrition labeling education on the consumption of prepacked food and the results will allow us to provide guidelines for promoting healthy diet choices in Suzhou.

2 Nutrition Label & Nutrition Label Awareness

Chinese law and regulations require that product packaging must include a nutrition table for (1) Energy and four core nutrients,

(2) Protein; (3) Fat; (4) Carbohydrates; and (5)Sodium.

The table reports how many nutrients a food contains per certain amount and the Nutrient Reference Value (NRV%). NRV% indicates the percentage of a nutrient contained in a certain amount of food that can provide the daily needs for an healthy adults.

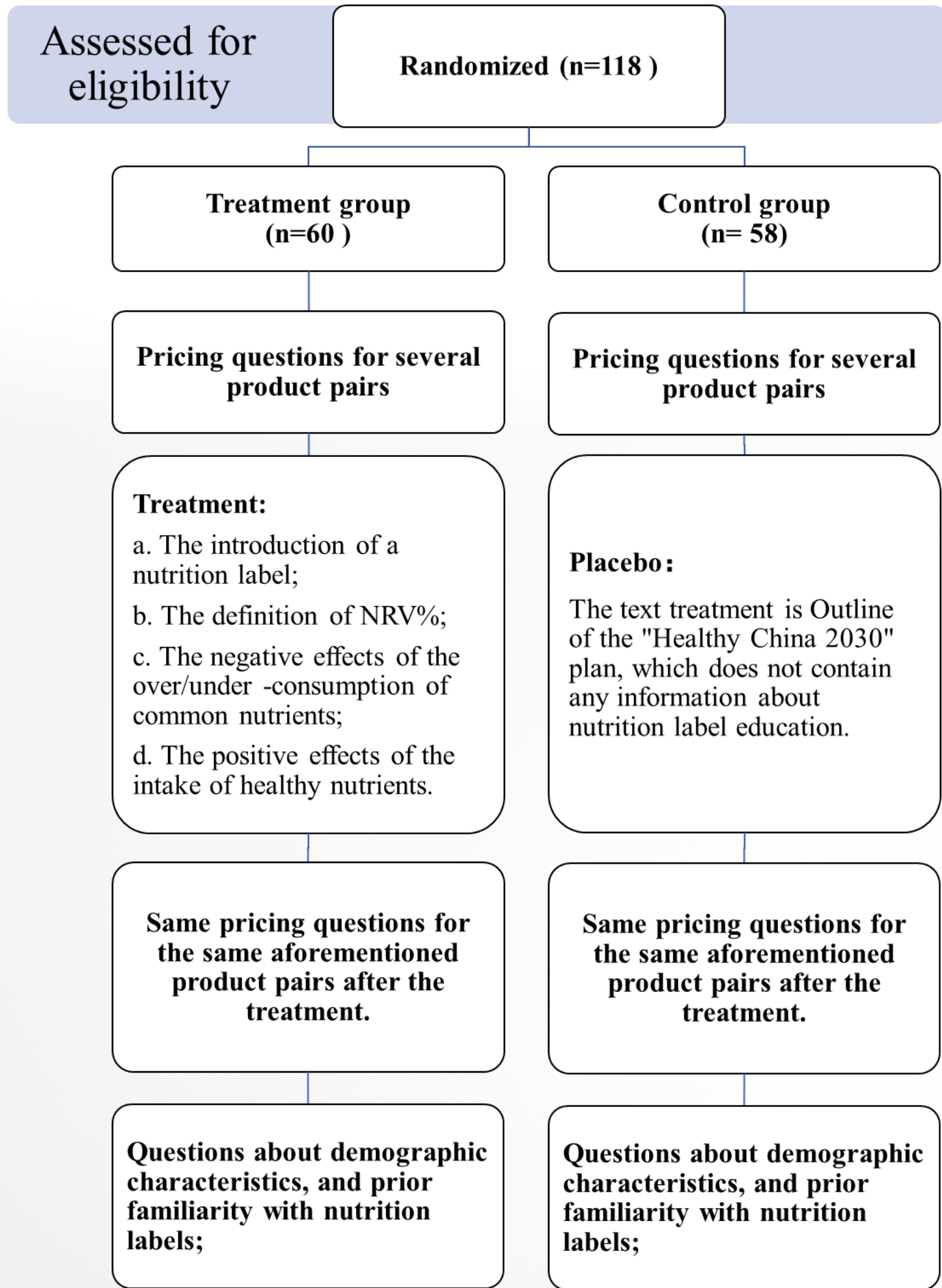
Previous studies have found that the nutrition label utilization rate is quite low among Chinese consumers. For example, a study in Beijing found that 70% of participants claimed to rarely or never use nutrition labels when purchasing food (Liu, 2015).

营养成分表		
项目	每 100 克	NRV%
能量	1898 千焦	23%
蛋白质	9.2 克	15%
脂肪	13.3 克	22%
碳水化合物	73.5 克	25%
钠	785 毫克	39%

Nutrition Table		
Item	per 100 g	NRV%
Energy	1898 kj	23%
Protein	9.2 g	15%
Fat	13.3 g	22%
Carbohydrates	73.5 g	25%
Sodium	785 mg	39%

3 Research Design

We propose to use Randomized Control Trial (RCT) experiment to study the effect of nutrition label education on consumer healthy diet choices. We ask consumers to reveal their willingness to pay for a healthier product given an identical conventional product available in the market. Our research design is as follows.



Our survey instrument has four main parts:

- Questions on demographic characteristics (age, education, income, etc.), and prior familiarity with nutrition labels;
- Valuation questions for six product pairs before the treatment;
- Two different text treatment for the control group and experiment group;
- Same valuation questions for the same aforementioned product pairs after the treatment.

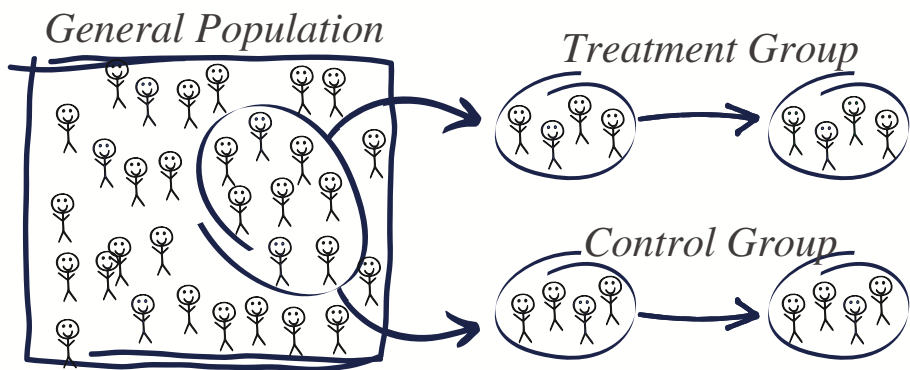
6 Limitation and Future Plan

Due to the time constraint and budget limit, we only collected 118 survey responses (excluding the 50 pilot survey responses), more survey responses are appreciated for this kind of project. In the survey setup, we had to ask survey takers to reveal their willingness to pay for a product, the self-reported WTP may be biased. A more detailed treatment (educational program of nutrition label) may be carried out.

References

Liu, R., Hoefkens, C., & Verbeke, W. (2015). Chinese consumers' understanding and use of a food nutrition label and their determinants. Food Quality And Preference, 41, 103-111. doi: 10.1016/j.foodqual.2014.11.007
Wang, Y., Zhao, L., Gao, L., Pan, A., & Xue, H. (2021). Health policy and public health implications of obesity in China. The Lancet Diabetes & Endocrinology, 9(7), 446-461. https://doi.org/10.1016/s2213-8587(21)00118-2

4 RCT Baseline Comparison



A randomized controlled trial (RCT) randomly draws participants from the population, and then randomly assigning the participants into the treatment and control groups. We compare the outcome between the control and treatment groups to assess the treatment effect.

A successful randomization is critical for an RCT experiment, we use baseline comparison of the demographic variables between the treatment and control groups to determine if our randomization is successful or not.

Table 1: Baseline Comparison Between Control Group and Treatment Group					
Variable	Control		Treatment		Difference
	# of Obs.	Mean	# of Obs.	Mean	
Age ¹	70	1.86 (0.16)	78	1.90 (0.13)	-0.40 (0.2)
Gender ²	70	0.37 (0.49)	78	0.44 (0.5)	-0.64 (0.8)
Education Level ¹	70	5.60 (0.16)	78	5.80 (0.17)	-0.19 (0.20)
Household Sides	58	1.45 (0.19)	78	1.79 (0.20)	-0.34 (0.28)
Income ¹	58	3.00 (0.19)	78	2.67 (0.27)	0.33 (0.35)
Self-reported Health Eating Score	35	3.03 (0.14)	39	3.00 (0.15)	0.26 (0.207)
Average Score ³	35	0.32 (0.04)	39	0.38 (0.05)	-0.6 (0.06)

Notes: Standard errors in parentheses. Significance codes: *5% level, **1% level, and ***0.1% level. All errors are our own.
1. Age, Education Level, and Income are categorized sequentially.
2. Gender, Male = 1 and Female = 0.
3. Average score is the average score of three nutrition test questions. Test question 1 asks survey taker to convert calories into Kj. Test question 2 asks if survey takers know the meaning of NRV%. Test question 3 require survey taker to identify the required items to be included in nutrition label by law.

As shown in Table 1 above, we find no significant difference between the control and treatment group in baseline comparison, our randomization was successful.

5 Analysis Result and Discussion

Our main variable of interest is the survey taker's revealed willingness to pay for the healthier product(Product 2) conditional on knowing the fair market price of the conventional product (Product 1) and is defined as follows,

$$Y_{i,t} = WTP_{i,t}^{Product\ 2} | Price^{Product\ 1}$$

To estimate the treatment effect of nutrition label education on survey taker's revealed willingness to pay for the healthier product, we estimate the following regression specification for all six product pairs in our survey following (Twisk et al., 2018),

$$Y_{i,t} = \alpha + \beta_1 Time + \beta_2 Time \times treatment_i + \gamma' Control_{i,t} + \epsilon_{i,t}$$

The control variables included are Age, Gender, Education, and Income.

The coefficient of the interaction term of Time and Treatment captures the treatment effect of nutrition label education on survey taker's revealed willingness to pay for the healthier product within each of the product pairs we analyze, the results are shown in Table 2a and Table 2b.

Our results indicates that after receiving an education of nutrition label, consumers are willing to pay more for the healthier product in

- Product Pair 2, healthier means lower sodium in NRV%,
- Product Pair 5, healthier means lower fat in NRV%,
- Product Pair 6, healthier means higher vitamin in NRV\$.

We also dig into the survey effect and treatment effect on consumer's nutrition knowledge using the same regression specification above. The results are shown in Table 3.

We find that the survey takers does not only absorb nutrition knowledge from our treatment reading material, but also from by simply taking the survey. As shown in Table 3, survey takers are also able to learn the meaning of NRV% simply by reading the survey questions. Our results indicates that nutritional label education do have effects on Chinese consumers, but more detailed analysis should be carried out for robust results.

Table2a: Effect of Education on Consumer Willingness to Pay			
	(1) Product Pair 1 (Calories)	(2) Product Pair 2 (Sodium)	(3) Product Pair 3 (Protein)
Treatment (β_2)	-0.111 (0.117)	0.235* (0.129)	-0.0043 (0.293)
Control	Y	Y	Y
R ²	0.02	0.0431	0.0658
# of Obs.	128	130	128

Notes: Standard errors in parentheses. Significance codes: *5% level, **1% level, and ***0.1% level. All errors are our own.

Table2b: Effect of Education on Consumer Willingness to Pay			
	(4) Product Pair 4 (Dietary Fiber)	(5) Product Pair 5 (Fat)	(6) Product Pair 6 (Vitamin)
Treatment (β_2)	0.0727 (0.112)	0.391* (0.235)	1.233* (0.0948)
Control	Y	Y	Y
R ²	0.0678	0.0589	0.0948
# of Obs.	130	130	129

Notes: Standard errors in parentheses. Significance codes: *5% level, **1% level, and ***0.1% level. All errors are our own.

Table3: Nutrition Knowledge Test ¹				
	(1) Average Score	(2) Nutrition Question 1	(3) Nutrition Question 2	(4) Nutrition Question 3
Treatment Effect (β_2)	0.376*** (0.0647)	0.398*** (0.101)	0.497*** (0.0878)	0.206** (0.0921)
Survey Effect (β_1)	0.115** (0.0571)	0.105 (0.0892)	0.265*** (0.0774)	-0.000386 (0.0812)
Control	Y	Y	Y	Y
R ²	0.362	0.198	0.418	0.0508
# of Obs.	147	147	148	148

Notes: Standard errors in parentheses. Significance codes: *5% level, **1% level, and ***0.1% level. All errors are our own.

1. Average score is the average score of three nutrition test questions. Test question 1 asks survey taker to convert calories into Kj. Test question 2 asks if survey takers know the meaning of NRV%. Test question 3 require survey taker to identify the required items to be included in nutrition label by law.

References (cont.)

Twisk J, Bosman L, Hoekstra T, Rijnhart J, Welten M, & Heymans M. (2018). Different ways to estimate treatment effects in randomised controlled trials. Contemporary Clinical Trials Communications, 10(80–85), 80–85. https://doi-org.ez.xjtlu.edu.cn/10.1016/j.conctc.2018.03.008