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Influence of Health Risk Perception on Purchase Intention of Bottled Beverages

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ABSTRACT
In 2020, China's soft drinks market exceeded RMB 570 billion, of which over 400 billion came from bottled beverages. In China's beverage market, 16 to 25-year-olds are the most dominant consumer group. However, with the development of the times and the rise in health awareness, the perceived health risks of younger people may affect the beverage industry. This paper delves into the impact of consumer health risk perception on consumer trust and purchase intention through questionnaires. A total of 144 valid questionnaires were collected. The questionnaire was tested for reliability and validity using SPSS, and the research model was analyzed using AMOS to investigate the mediating role of consumer trust. This paper also demonstrates through component comparison tests that consumer perceptions of health risks are not a fixed objective criterion but can be influenced, which sets the stage for the future development of the beverage industry.

Keywords: *perceived risk, consumer trust, health awareness, purchase intentions，consumer behavior.*

1. INTRODUCTION

Over the past few decades, the quality of life of the Chinese people has improved dramatically due to the country's rapid economic growth. In terms of diet, people's dietary needs have gradually shifted from simply considering whether they can get enough to eat to pursuing nutritional balance. In other words, people's demand for food has been upgraded from a simple need for survival to the pursuit of personalisation, diversity and high quality.

In 2020, China's soft drinks market exceeded RMB 570 billion, of which more than 400 billion come from bottled beverages, and the main consumer group will be young people aged 16 to 25 [1]. Moreover, more than 90% of them are concerned about their sub-health condition [2]. Data from different sources show that university students are an important demographic group for promoting healthy eating behaviour. They use the internet, receive information in the fastest way possible, and organize their diet independently of family life and parents [3]. Moreover, healthy eating is becoming a trend among young people. In recent years, health care has become a popular topic of discussion among young people today, and the phrase "making goji berries in a thermos" has become popular in online communities. What can be seen is that young people in China are becoming concerned about eating healthy and are avoiding, to varying degrees, foods that are not good for their health. This change in health attitudes will undoubtedly have an impact on the bottled beverage market. However, studies on healthy eating among Chinese university students have shown that their criteria for judging whether food is healthy and whether they stick to a healthy diet at a given meal are vague [4]. This makes it necessary to examine the criteria by which they judge whether a drink is healthy or not and how different elements influence their judgement.

This paper will investigate the relationship between health awareness, consumer trust and willingness to buy bottled beverages among Chinese university students through a questionnaire survey. A comparative experiment will be conducted to investigate whether their health consciousness can be influenced.

2. RESEARCH HYPOTHESIS AND EXPERIMENTAL DESIGN

2.1. Theoretical analysis and hypothesis formulation

Under the supervision and management of the Food Safety Law of the People's Republic of China, bottled beverages purchased through regular channels can be

trusted not to cause harm to the body [5]. The Health risk perception discussed in this paper is a personal level judgment of consumers that beverages are in some way beneficial or harmful to the maintenance of health.

The health risk perception discussed in this paper can be considered a perceived risk, which is the potential concern of consumers about unpredictable or unforeseen adverse outcomes that may occur during the purchase of a product [6]. Perceived risk does not refer to the actual existence of risk but rather to the subjective feelings of the individual consumer. Related research proves that perceived risk significantly impacts consumers' purchase intention, and consumers will try to choose a purchase method or product with lower perceived risk [7]. Some scholars point out that perceived risk is a prerequisite for trust, and if there is no risk, then there is no need to build trust [8]. Therefore, a large number of studies have concluded that perceived risk is the antecedent of trust, and trust is the result of perceived risk. Only when consumers perceive minimal acceptable risk will they develop trust in the target products and services and make a final purchase decision. In the discussion of this paper, it can be understood that when consumers' expectations about the possible health effects of beverages influence their trust in the product, it further influences their purchase decisions. In the bottled beverage market chosen for this paper, factors that typically influence consumer Health risk perceptions include calories, food additives, nutritional elements, and freshness. Based on these studies and discussions, Table 1 shows the hypotheses in this paper:

Table 1. Hypotheses

Hypothetical No.	Hypothetical content
H1	Health risk perceptions have a significant negative impact on consumer trust.
H2	Consumer trust has a significant positive effect on the willingness to purchase bottled beverages.
H3	Consumer trust has a mediating role in the relationship between Health risk perceptions and purchase intention

2.2. Construction of the research model

Based on the summary of previous studies, this paper combines the characteristics of bottled beverages, proposes research hypotheses, and constructs a model of the effect of health cognition on purchase intention of the role of health awareness. Health risk perception is divided explicitly into four dimensions: calories, food additives, nutritional elements and freshness, and consumer trust is the mediating variable to explore the factors influencing the purchase intention of bottled beverages. Figure 1 illustrates the relationship between the effects of these variables.

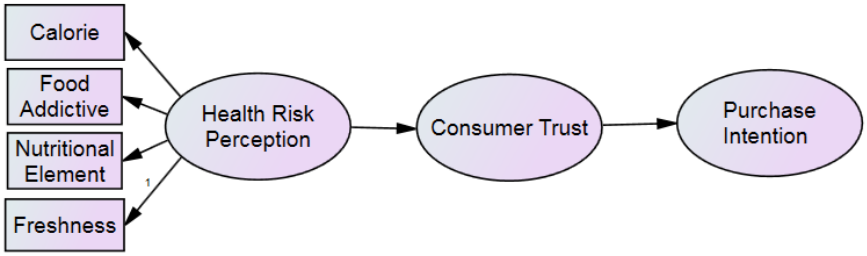

Figure 1 The Effect of Health Risk Perception on Purchase Intention of Bottled Beverages

2.3. Questionnaire design

The questionnaire design of this paper consists of two main parts. The first part is the test questions with the overall bottled beverages as the primary observation variable. This part includes the design of three scales: the Consumer Health risk perceptions Scale, the Consumer Trust Scale, and the Willingness to Purchase Bottled Beverages Scale. In the second part, considering that consumers may hold different health judgments on different types of bottled beverages, we conducted a study on consumer trust and purchase intention for carbonated beverages, functional beverages, tea-containing beverages and juice-containing beverages, respectively. The design of the questionnaire was completed by drawing on the studies of related scholars at home and abroad. The measures of consumer Health risk perceptions, consumer trust and consumer purchase intentions in this study were derived from relevant studies by Gefen (2003), Lin, Jiabao et al. (2015), Goetzke (2014) and Hjelmar (2011) [9, 10, 11, 12]. The scale was scored on a 5-point Likert scale, with 1 means strongly disagree, 2 means relatively disagree agree, 3 means generally agree, 4 means relatively agree, and 5 means strongly agree. Tables 2, 3, 4, show the design of the questionnaire questions to study the relevant dimensions.

Table 2. Consumer Health Risk Perceptions Scale

Dimensionality	Title Code	Title content
Calories	CL01	I think there are too many calories in bottled beverages that can lead to obesity
	CL02	I think bottled beverages are causing me to consume unnecessary calories
Food Additives	FA01	I think that some food additives in beverages can cause as yet unknown harm to my body
	FA02	I think there are too many artificial additives in beverages, some of which could be replaced with natural ingredients
Nutritional Elements	NE01	I think that the nutrients added to beverages may cause me to have a nutritional imbalance
	NE02	I believe that nutritional supplements through beverages are unnecessary
Freshness	FR01	I believe that bottled beverages stored for extended periods may have quality problems
	FR02	I think there is a risk of buying expired products when buying bottled beverages

Table 3. Consumer Trust Scale

Title Code	Title content
CT01	I believe that the bottled beverage manufacturer I have chosen is reliable.
CT02	I believe in the after-sales service of the bottled beverage manufacturer I have chosen.
CT03	I believe in the quality of the product of the bottled beverage I have chosen.

Table 4. Purchase intention scale

Title Code	Title content
PI01	When I have a need, there is a high probability that I will choose a bottled beverage.
PI02	I want to share bottled beverages with my friends and family.
PI03	I'm interested in trying different bottled beverages.

2.4. Questionnaire distribution and recovery

As described in the previous section, the target population of this survey was college students, and the survey method used random sampling. The questionnaire survey was conducted in cooperation with Henan University Youth Volunteer Association, with stations within Henan University and Zhengzhou University. Passing students were randomly invited to enter the experiment site for questionnaire survey and experiment. Considering that respondents may cope and muddle through when filling out online questionnaires in private, face-to-face guidance from volunteer interviewers helps to improve the quality of responses. A more formal experimental setting could also encourage participants to take the questionnaires and experiments more seriously. A total of 160 questionnaires were distributed and collected, 16 invalid questionnaires were excluded, and finally, 144 valid questionnaires were obtained, with a valid rate of 90%.

The main criteria for rejecting invalid questionnaires were: (1) the completeness of the questionnaire responses; (2) the authenticity and rationality of the questionnaire responses, for example, if some of the responses to the scale showed identical choices of all questions, the questionnaire was rejected as invalid.

Table 5. Reliability and Validity Tests of the Scale

Dimensionality	Title Code	Cronbach's α	Standardized factor loadings	AVE	CR
Calorie	CL01	0.857	0.847	0.75	0.86
	CL02		0.885		
Food_ Addictive	FA01	0.854	0.875	0.74	0.85
	FA02		0.852		
Nutritional_	NE01	0.818	0.776	0.70	0.82

Element	NE02		0.895		
Freshness	FR01	0.797	0.944	0.76	0.87
	FR02		0.798		
Consumer Trust	CT01	0.902	0.746	0.57	0.75
	CT02		0.759		
	CT03		0.7682		
Purchase Internet	PI01	0.901	0.727	0.52	0.74
	PI02		0.718		
	PI03		0.736		

3. EMPIRICAL ANALYSIS OF RESEARCH DATA

3.1. Reliability analysis and validity analysis

In order to ensure the validity of the research results, this paper used AMOS 24.0 to test the reliability of the questionnaire results according to Cronbach's alpha coefficient, an internationally used scale reliability test. The results are shown in Table 5. From Table 5, it can be seen that the Cronbach's alpha coefficient values of each latent variable for the 144 valid questionnaires are all greater than 0.7, which indicates that the reliability and validity of the measurement indicators in this study are high. Meanwhile, the standardised factor loadings of the four dimensions of Health risk perception, the mediating variable consumer trust, and the quantitative scale of purchase intention were all greater than 0.7, the composite reliability (C.R.) coefficients of each scale were all greater than 0.7, and the mean-variance response values were all greater than 0.5, indicating that the scales

This study had sufficient convergent validity, and the findings were credible.

3.2. The model test of the relationship between Health risk perception, consumer trust and purchase intention

The scale in this study was tested and can be considered to have good reliability and validity and can be used for structural equation modelling analysis based on the research hypotheses of the model proposed in this study. This study explored the mediation effect of trust in bottled beverage consumption on purchase intention in steps based on questionnaire data according to the mediation effect testing procedure proposed by Wen Zhonglin and Ye Baogjuan.[13] Firstly, model S1 of health risk perception and consumer purchase intention was constructed based on questionnaire responses from 144 visitors. y=cX+el to test the significance of the total effect of consumer Health risk perception c on consumer purchase intention; secondly, model S2 of health risk perception and consumer trust was constructed, and finally, a comprehensive model of consumer health risk perception, consumer trust and purchase intention was constructed based on the analytical framework of Figure A S3: $\begin{cases} M = aX + e2 \\ Y = c'X + bM + e3 \end{cases}$. The significance of a and b in the model is the mediating effect of consumer trust on consumer Health risk perception and purchase intention. In the integrated model S3, if c', a and b are significant and the signs of a b and c's are the same, then If c', a and b are significant, and the signs of a b and c's are the same, then the mediating effect of consumer brand trust is significant. In this paper, a structural equation model Figure 2 was constructed using AMOS 24.0 to verify the relationship between Health risk perceptions, consumer trust and willingness to purchase bottled beverages and analyse the model fit to determine whether the research hypothesis truly reflects the relationship between the variables.

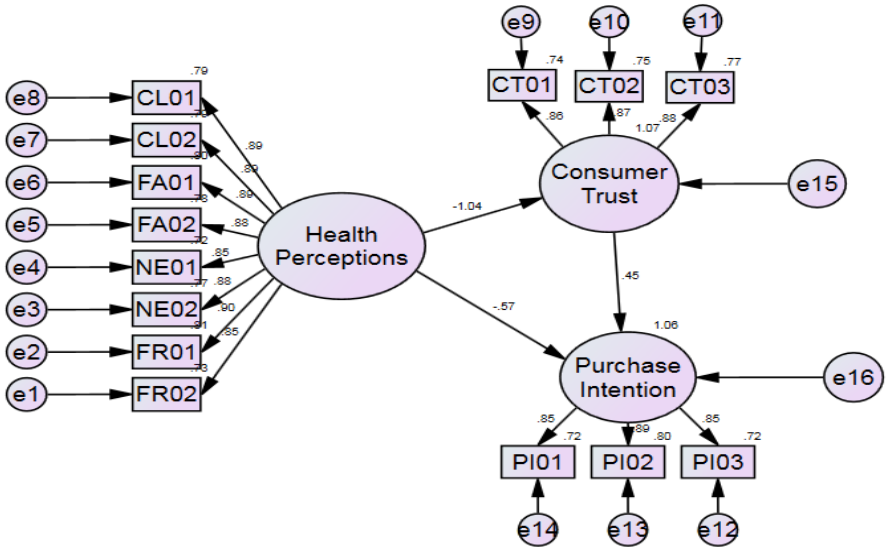

Figure 2 Graph of Structural Equation Model Test

In this study, eight internationally used evaluation indicators were used to test the model fitness, namely: absolute fitness indicators (CMIN/DF, RMSEA, GFI), value-added fitness indicators (IFI, CFI), and parsimonious fitness indicators (PGFI, PNFI, PCFI). The values of the model fitness indicators and the evaluation criteria are shown in Table 6, and in general, the model fitness is good, and the model construction has a good fit with the sample data.

Table 6. Model Fit Test

Evaluation Indicators	Adapted Criteria	Data test results
CMIN/DF	＜3	1.9
RMSEA	＜0.08	0.071
GFI	＞0.90	0.85
IFI	＞0.90	0.964
CFI	＞0.90	0.963
PGFI	＞0.50	0.599
PNFI	＞0.50	0.753
PCFI	＞0.50	0.783

3.3. Hypothesis testing on the mediating role of consumer trust

The results of the standardised path standardisation parameters and significance tests for the study model are shown in Table 7. The significance tests for the path coefficients are presented through the results of the table's C.R. values and P values. C.R. represents the critical ratio, and when the absolute value of the C.R. value is more significant than 1.96, a significance level of 0.05 has been reached. From Table 7, the total effect of health risk perception on consumers' purchase of bottled beverages in model S1 is -0.619, and E.L. reaches the 0.001 significance level, i.e. C is significant, so hypothesis 1 is valid. The standardised path coefficient of Health risk perception on consumer trust in model S2 is-1.089 and reaches the 0.001 significance level, i.e. a is significant, so hypothesis 2 is valid. In the total model S3, the standardised path coefficient of consumer brand trust acting on consumer intention is 0.465 and reaches a significance level of 0.001. That is, b is significant. The standardised path coefficient for the effect of Health risk perception on consumers' willingness to purchase is -0.51 and reaches a significance level of 0.001, i.e. c' is significant. a, b and c's all pass the significance test, and the signs of ab and c' are the same, so the mediation effect is significant and partially mediated, so hypothesis 3 is valid.

Table 7. Standardized Pathway Tests

Model	Path	Standardized Parameters	S.E.	C.R.	Significance
S1	Health Risk Perception → Purchase intention	-0.619	0.158	-3.924-	***
S2	Health Risk Perception → Consumer Trust	-1.089	0.88	-12.396	***
S3	Consumer Trust → Purchase Intention	0.465	0.141	3.292	***
	Health risk perception → Purchase intention	-0.51	0.193	-3.572	***
Note: * indicates p<0 05, ** indicates p<0.01, *** indicates p<0.001.					

Effect test To further reduce the bias of the mediating effect test due to the small sample size, the bias-corrected Bootstrap method was used to test the mediating effect further. The direct, indirect and total effects of consumer trust were tested by the AMOS bias-corrected non-parametric percentile Bootstrap method, and the results of the AMOS operation are shown in Table 8 at the 95% confidence interval. As shown in Table 8, the standardised path coefficients for the direct, indirect and total effects of tourist brand trust are the same as in Table 7, and the Bias-corrected 95% interval does not contain a zero value, validating the results of the analysis in Table 8.

Table 8. Effect Test

Effect	Path	Standardised path coefficients	Bias corrected 95％CI	
			Lower	Upper
Direct Effect	Health risk perception→Purchase intention	-0.569	-0.84	-0.294
	Health risk perception→Consumer Trust	-1.037	-1.095	-1.024
	Consumer Trust→Purchase intention	0.449	0.188	0.721
Indirect Effect	Health risk perception→Consumer Trust→Purchase intention	-0.507	-0.743	-0.194
Total Effect	————	-1.125	-1.264	-0.997

3.4. Discussion

This section confirms the suspicions raised in the first part of this paper's research: consumer perceptions that bottled beverages can be harmful to health have a significant adverse effect on their purchase intentions and that consumer trust mediates this effect. However, this alone is not sufficient to make constructive recommendations for the future of bottled beverages, and further investigation into whether consumer Health risk perceptions can be influenced is needed.

4. EFFECT OF SWEETNESS PERCEPTION ON BEVERAGE HEALTH RISK PERCEPTION

4.1. Formulation of hypothesis

In the previous section of the study, it was found that consumers' perception of the health risks of beverages had a significant negative impact on their purchase intention. However, most consumers' perceptions of the healthiness of food are very subjective and are less likely to be based on objective and realistic information in the food ingredients list. For example, studies have found that consumers' subjective perceptions of food calories tend to be highly biased. Given the lack of objective criteria on the healthiness of food, influencing consumers' health perceptions is essential to increase consumers' purchase intention. Through interviews with participants in the previous set of experiments, it was found that 73.2% of them believed that sugar was the element in the composition of bottled beverages that had the most significant impact on health. Therefore, this section will address consumers' perceptions of the sugar content in beverages and formulate the hypothesis

H4: Consumers' perception of sugar content in beverages is significantly and negatively related to perceived health risks.

4.2. Experimental design methods and steps

A total of 170 students from Henan University were invited to participate in this experiment, their average age was 21 years old, and 57% were female. The experiment

used a simple one-way group design with two groups. The same four drinks with pre-deleted food nutrition charts were provided in both experimental groups, and all participants were randomly assigned to one of the groups. First, all participants in the experiment were told to take part in a beverage taste testing task. The difference was that the reference sugar water for group A was 5 g/100 ml of sugar water, while the reference sugar water concentration for rent B was 10 g/100 ml. Next, participants in both experimental groups were asked to fill in the health risk perceptions and purchase intention amounts of each of the four beverages scoring them from 1 to 7 (1: very harmful to health; very reluctant to buy; 7 very beneficial to health, very willing to buy). Thirdly, participants were asked to taste the four beverages and guess the sugar content of the four beverages, using the sugar water provided by the group as a reference if the sugar concentration was known. Finally, after tasting, participants in both groups were again asked to fill in the health risk perception scale and the purchase intention scale for these four beverages.

4.3. Results of the experiment

Table 9 shows the result of the independent samples t-test. It can trust that the health scores and purchase intentions of Group A and Group B before and after tasting and consumers' perceptions of the sugar content of the drinks when different concentrations of sugar water were used as a reference were different.

Table 9. Independent Samples T-test

Projects	Group	Score	SD	P
Health Score	Pre-test	2.871	1.1	***
	A	2.3925	0.9	***
	B	2.715	1.106	***
Purchase Intention	Pre-test	3.214	0.818	***
	A	2.985	0.969	***
	B	3.1525	0.946	***
Sugar content	A	9.43	0.952	***
	B	9.115	0.9785	***

A and B showed that the beverages were sweeter when they compared to lightly sweetened water, leading participants to perceive that the beverages contained more sugar. Overall, there was a significant decrease in participants' health ratings and purchase intention after perceiving the sugar content of the beverages. In contrast, there was a slightly lesser decrease in Group B, where the beverages were less sweet than Group A. This could also provide preliminary evidence for the speculation at this stage of the paper that consumers' perception of health risks can be influenced by their perception of sweetness, which affects consumption decisions.

5. CONCLUSION

Based on a summary of the current situation of bottled beverage consumption and related theories, this paper has constructed a model of the effect of health risk perception on willingness to consume bottled beverages, with consumer trust as the mediating variable. Through questionnaires and data analysis, the research hypothesis was supported. When consumers perceive possible health risks, their purchase intention to bottled beverages decreases, and consumer trust plays a mediating role in this relationship. With this in mind, the paper further investigates the role of sugar content in consumer perceptions of health risks for bottled beverages. A between-group experiment demonstrates that consumers' perceptions of sugar content can be influenced and that consumers' perceptions of sugar content can negatively affect consumers' health ratings and purchase intentions for the beverage. This suggests that amplifying the "health" signal is a possible future direction for bottled beverages as people become more conscious of healthy eating. Whether the packaging emphasises low sugar, low calorie or sweetness by highlighting the acidity in the flavouring, this may reduce consumers' perception of the product's health risks and increase their willingness to consume it.

Although this paper has drawn some valuable conclusions based on previous research, there are still some limitations and shortcomings due to some objective and subjective factors, which should be improved in future studies: First, the conceptual model constructed in this paper focuses on the role of health risk perception and consumer trust on the consumption intention of bottled beverages. Firstly, the conceptual model focuses on the role of health risk perception and consumer trust in bottled beverages. However, consumers are influenced by other factors such as brand preference, taste preference and price in making consumption decisions. These may affect the validity of the findings of this study

to a certain extent. Apart from this, only a simple experiment was conducted in this paper to investigate the influence of consumers' perception of sweetness. There is more to the flavour in beverages than just sweetness, and it is not just sugar and calories that affect consumers' perception of health risks. These are questions that need to be addressed in future research.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Yu Jin.

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