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## Psychological determinants of saving meal behavior

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### ABSTRACT

Based on the theory of planned behavior, the study built the concept model of psychological variables on saving meal behavior, and developed the measure instruments of research variables through large sample analysis. Then the structure equation model was applied to explore cause links between psychological variables and saving meal behavior. According to results of the study, both the intention and the perceived behavioral control could exert influence on saving meal behavior, while the perceived behavioral control has more explanation power; both the attitude and the subjective norm have the direct effect on the intention, while the attitude's impact is more significant. In order to promote the saving meal behavior, management implications are discussed at last.

### KEYWORDS

Saving meal; Psychological variables; Theory of planned behavior; Green consumption.



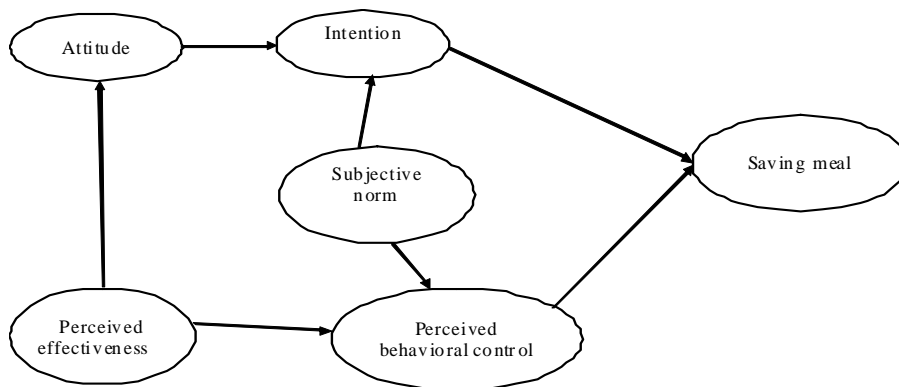
## INTRODUCTION

With the development of society and economy, people’s living standard and the quality of diet are gradually improved, while food waste becomes more common than before. According to the statistics of Food and Agriculture Organization (FAO) in 2011, 1.3 billion tons of food was wasted around the world, accounting for one third of global food production. In developed countries, consumers tend to buy more food than their demand. Meanwhile, food waste is also getting serious in China. One survey released that approximately 81% Chinese consumers could not finish their meal in the case of dining out, 53% of them would think about packing and bringing residue back when it was a large surplus of food, and 28% of them would never consider it at all.

Food waste can cause the environmental pollution. On the one hand, food waste will produce a large quantity of kitchen waste, which will do harm to environment and people’s health; on the other hand, disposal of kitchen waste needs to spend a lot of manpower, financial and material resources, and it is another kind of resource waste. Therefore, we should encourage and promote the behavior of saving meal. Saving meal refers to people cherish and make full use of all kinds of edible food and drinks, and also avoid any unnecessary waste. Literature review reveals that the extant studies on saving meal behavior are mainly about qualitative analysis of the current situation and discussions on influencing factors. In this study, a conceptual model was put forward based on the theory of planned behavior (TPB) and the measuring scale was self-developed through a large sample survey. After that, the structural equation model was applied to explore relationships between psychological variables. At last, management implications were discussed.

## LITERATURE REVIEW AND HYPOTHESIS

Among the consumer behavior research, the most popular behavioral model is the theory of planned behavior (TPB). According to this theory, behaviors are shaped by intentions, which in turn are driven by consumer attitudes toward that behavior, and also by subjective norms and perceived behavioral control. Besides, perceived behavioral control exerts direct influence on behavior<sup>[1]</sup>. Perceived behavioral control refers to consumers’ perception of their ability to perform a given behavior, reflecting the expected resistance or promotion when the behavior is implemented. In the context of collectivist culture, which advocates "interdependence self" and "social orientation", social outcomes and images are very important elements of perceived customer value. Others’ evaluation and group norms are key factors affecting the purchase decision<sup>[2]</sup>. Therefore, in the collectivist society subjective norms maybe have a direct impact on perceived behavioral control of saving meal. In addition, perceived effectiveness, which refers to the judgment about the effectiveness of behavioral results, was added in the conceptual model to test its influence on attitudes and perceived behavioral control. Finally, the conceptual model of psychological variables of saving meal was constructed as shown in Figure 1.



**Figure 1 : Conceptual model of psychological variables of saving meal**

The domestic and foreign research on green consumption behavior shows that the attitude is inconsistent with behavior, so the influence of green consumption attitudes towards green behavior is not yet conclusive. But researchers have found that green consumption attitudes generally have a significant positive impact on the intention of green consumption<sup>[3]</sup>. Therefore, it is reasonable to infer that consumer attitudes towards saving food are able to predict the intention of saving meal. Hypothesis 1 was proposed as follow:

H1: The attitude on saving meal has a direct and positive impact on saving meal intention.

Perceived effectiveness in this study refers to the customers’ perception of the effect on environmental protection from their own behavior of saving meal. If consumers believe that their food saving behavior would have a positive effect on environmental protection, it means a higher level of perceived effectiveness. Recognizing the contribution of the behavior, customer attitudes of saving meal may be further improved, so hypothesis 2 is proposed as follow:

H2: Perceived effectiveness of saving meal has a direct and positive impact on saving meal intention.

Perceived behavioral control is closely related to consumers' past experience and is affected by the perception effectiveness<sup>[4]</sup>. Future behavior are often affected by results of past behavior, and the obstacle perception to perform saving meal behavior would diminish if customers recognize the positive effect and the value of this behavior in the past, therefore, perceived effectiveness may have a positive effect on perceived behavioral control. Hypothesis 3 is proposed as follow:

H3: Perceived effectiveness of saving meal has a direct and positive impact on perceived behavioral control.

A large number of studies show that intention can predict behavior effectively. Hines et al. analyzed plenty of relevant literature and found environmental protection intention had a significant impact on environment friendly behavior<sup>[5]</sup>. Chan explored Chinese consumers green consumption behavior, and found that the intention to buy green products had a significantly effect on green purchasing behavior<sup>[6]</sup>. Thus, people who have the intention to perform saving meal behavior are more likely to put this idea into practice. So hypothesis 4 is presented as follow:

H4: The intention of saving meal has a direct and positive impact on saving meal behavior.

Subjective norm refers to the affirmative or negative attitudes from referents when he/she performs a certain behavior. In other words, it means the predicted pressure on a certain action. When important people or reference group members tend to perform saving meal, he/she will have a higher intention to execute saving meal. Therefore, the hypothesis 5 is proposed as follow:

H5: Subjective norm has a direct and positive impact on saving meal intention.

Individuals will face compliance pressure of saving meal, when important people or the reference group members not only appeal to perform saving meal but also really do it. Besides, the convenience of saving meal is likely to be enhanced if an exemplary role is set among reference group<sup>[7]</sup>, and it may have a positive impact on the perceived behavioral control. So the hypothesis 6 is proposed as follow:

H6: Subjective norm has a direct and positive impact on perceived behavioral control of saving meal.

As the perception of obstacle or promotion of saving meal, perceived behavioral control will directly affect the behavior of having meal. Customers would like to perform saving meal when they feel smaller obstacles and greater promotions. So the hypothesis 7 is proposed:

H7: Perceived behavioral control has a direct and positive impact on saving meal behaviors.

## SCALE AND SAMPLE

### Scale development

Churchill put forward that there are three major sources of scale items: extant items, developing items based on the concepts and literature, and summarizing items from interviews with experts and scholars<sup>[8]</sup>. Scale items in this research are from the first and the second sources. There are six variables in the conceptual model, namely perceived effectiveness, attitude, intention, subjective norm, perceived behavioral control and behavior of saving meal, and all of them are one-dimensional variables according to related research and literature. Among these variables, items of attitude, intention, subjective norms and behavior of saving meal are developed from extant scales that applied in many studies. Items of perceived effectiveness and perceived behavioral control were self-developed based on the literature and concepts of the variables. All items are measured on a 5-point Likert scale from 1=totally disagree to 5=totally agree. Finally, the scale of consumer saving meal behavior and psychological variables was developed as shown in TABLE 1.

### Sample

In this study, questionnaires were sent and collected through the website, China Internet Survey Community (<http://h.cnniresearch.cn/>), which is an official investigation community operated by China Internet Network Information Center (CNNIC). 10911 questionnaires were collected online, and 10,783 questionnaires were valid.

Statistics data showed that this survey covered not only all provinces in mainland but also Hong Kong and Taiwan (24 respondents from Hong Kong and 19 from Taiwan), which means a good universality. Most respondents were from following provinces or municipalities: Guangdong, Shandong, Beijing, Jiangsu, Shanghai and Zhejiang, and the number of respondents were respectively 1741, 933, 810, 805, 550 and 542. And the total number was 5381, accounting for 49.9% in all respondents. These areas are Chinese developed regions, so the data mainly reflects the situation of consumers in these regions. From the gender perspective, men accounted for 78.4% of the sample and women only accounted for 21.6%. This can be attributed to the reason that internet community investigate is easy to attract people who are more interested in the internet or statistical survey, and men occupy a high proportion of them. It was reasonable that married people accounted for 44.6% and unmarried people accounted for 55.4%. From the angle of age, most respondents were from three sections, respectively between 26-35, 18-25 and 36-45years old.

## EMPIRICAL ANALYSIS

### Scale reliability analysis

Cronbach's alpha coefficient is the most popular indicator to evaluate the reliability. Researchers generally agree that if cronbach's alpha > 0.8, it means the reliability of questionnaire is good; if cronbach's alpha > 0.7, but less than 0.8, the

reliability of questionnaire could be accepted. This study applied the smart PLS software to test reliability of the scale. TABLE 2 shows the result. It can be seen that each cronbach's alpha coefficient are above 0.7, so the scale passed the reliability test and its reliability can be accepted.

**TABLE 1 : Scale of consumer saving meal behavior and psychological variables**

Dimensions	Contents	Source
Perceived effectiveness	PE1 Saving meal and avoiding food waste will help save energy and protect the environment.	Self-developed
	*PE2 Individual behavior of saving meal is very limited to improve the environment.	
	PE3 My previous behavior of saving meal can improve the environment more or less.	
Attitude	<i>AT1 In order to save energy, I decide not to waste food.</i>	Maloney (1975)
	AT2 It is necessary to avoid food waste.	
	AT3 Saving meal is a kind of positive lifestyle and should be strongly encouraged.	
Intention	IT1 I prefer to perform behavior of saving meal.	Chan(2001); Taylor and Todd(1995)
	IT2 I have the plan to perform behavior of saving meal from next month.	
	IT3 I will reduce the quantity of food waste from next month.	
Subjective norm	SN1 People who are influential for my actions consider I should put an end to food waste.	Venkatesh (2003)
	SN2 People who are important for me (such as friends) think I should try to avoid food waste.	
	<i>SN3 most people around me perform behavior of saving meal.</i>	
Perceived behavioral control	PBC1It is easy to calculate the required quantity when dining together, so as to achieve “order food as much as that we can finish”	Self-developed
	PBC2The amount of each meal that restaurants offered is reasonable when dining together, which is conducive to achieve “order food as much as that we can finish”	
	PBC3 Avoiding food waste is more economical.	
Saving meal	SM1 I rarely waste food.	Chan(2001)
	SM2 I had avoided food waste last month.	
	SM3 Last month I ate most of food without waste.	

**Note: item PE2 marked with \* is reverse items; items AT1 and SN3 marked in italics were deleted, because they did not meet the standard in the validation test.**

**TABLE 2 : Cronbach's alpha coefficient of variables**

	Perceived Effectiveness	Attitude	Intention	Subjective Norm	Perceived Behavioral Control	Saving Meal
Cronbach's Alpha	0.7017	0.8627	0.8588	0.7583	0.7926	0.7384

**Scale validity analysis**

After reliability test, the validity test of the scale should be carried out, which includes content validity and structure validity examination. The scale of this study was developed mainly based on the extant items and literature, and also was adjusted according to the discussion with several scholars and experts, thus the scale had good content validity.

Structure validity includes convergent validity and discriminant validity. According to the Hair's point of view, the evaluation criteria of convergent validity includes 3 points: first, all standardized indicator loading coefficient should be above 0.5, if it can be above 0.7, it is more ideal; second, composite reliability (CR) should be above 0.7; third, the average variance extracted (AVE) should be above 0.5<sup>[9]</sup>.

SPSS 18.0 software was applied to test standardized indicator loading coefficient to purify items. If the test item's loading coefficient on all variables is less than 0.5 or more than 0.5 on at least two variables, this item should be deleted<sup>[3]</sup>. Test results showed that the indicator loading coefficients of AT1 on attitude and intention variable were above 0.5; the indicator loading coefficient of SN3 on all the variables was less than 0.5. Therefore, AT1 and SN3 didn't pass the test and was deleted. After that, the adjusted scale was tested again. Results showed that each item's loading coefficient on the corresponding variable was above 0.5, meanwhile its loading coefficients on other variables were less than 0.5. So, all of items were preserved. Smart PLS software was used to calculate variables' value of composite reliability (CR), and all of them were more than 0.5. AVE values were also calculated, and all of them were above 0.7. TABLE 3 shows the results of convergent validity, which reflect good convergent validity of the scale.

**TABLE 3 : Results of convergent validity**

Factor	Item	Indicator Loading	CR	AVE	AVE Square Root
Perceived Effectiveness	PE1	0.7362	0.8502	0.5108	0.7147
	PE2	0.6576			
	PE3	0.7481			
Attitude	AT2	0.8724	0.9161	0.7846	0.8858
	AT3	0.8363			
Intention	IT1	0.7673	0.9141	0.7801	0.8833
	IT2	0.6802			
	IT3	0.7323			
Subjective Norm	SN1	0.7830	0.8627	0.6809	0.8252
	SN2	0.7522			
Perceived Behavioral Control	PBC1	0.6003	0.8647	0.6151	0.7843
	PBC2	0.8367			
	PBC3	0.7731			
Saving Meal	GC1	0.8484	0.8554	0.6045	0.7775
	GC2	0.8218			
	GC3	0.6019			

**Note: AT1 and SN3 had been deleted.**

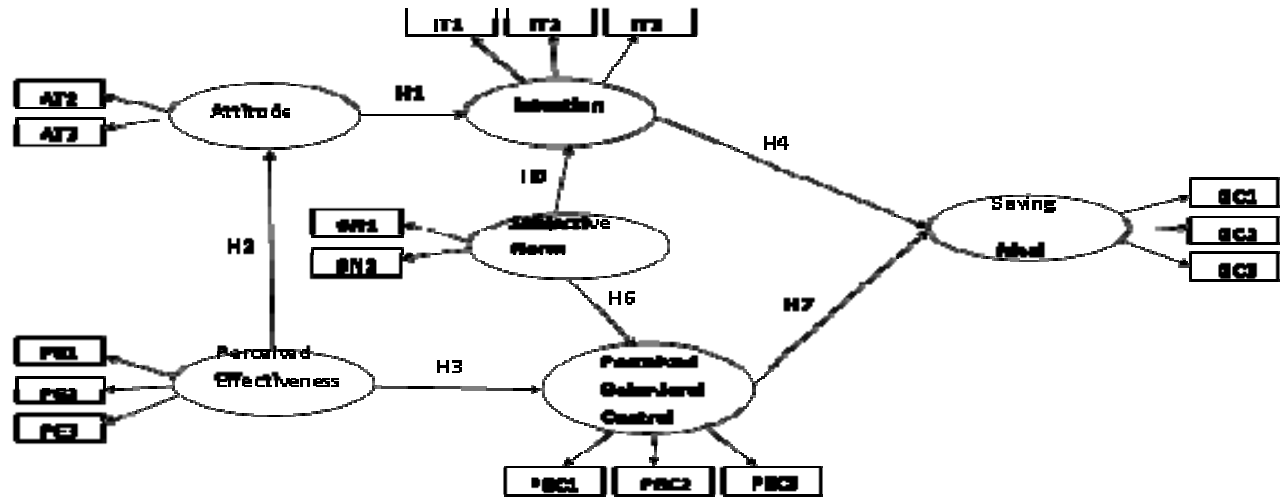
The method of evaluating discriminant validity is to compare whether the arithmetic square root of AVE is larger than the correlation coefficients of this variable with other variables<sup>[8]</sup>. TABLE 4 shows these coefficients. It is easy to find that each variable's arithmetic square root of AVE is larger than the correlation coefficients of this variable with other variables, so it could be concluded that the discriminant validity of the scale is good.

**TABLE 4 : Discriminant validity result**

	Perceived Effectiveness	Attitude	Intention	Subjective Norm	Perceived Behavioral Control	Saving Meal
Perceived Effectiveness	0.7147	0	0	0	0	0
Attitude	0.7078	0.8858	0	0	0	0
Intention	0.6706	0.8146	0.8833	0	0	0
Subjective Norm	0.5256	0.4860	0.5569	0.8252	0	0
Perceived Behavioral Control	0.6189	0.6258	0.6401	0.6335	0.7843	0
Saving Meal	0.5339	0.5871	0.6089	0.4878	0.6333	0.7775

**Structural equation model analysis**

Based on the concept of psychological variables in saving meal model and the hypotheses, smart PLS 2.0 was applied to test the structural equation model. Figure 2 shows this model.



**Figure 2 : Structural equation model of saving meal behavior**

TABLE 5 shows the running results. The results showed that all hypotheses passed the statistics test, and could be accepted. In addition it can be seen from TABLE 5 that the standardized path coefficients between attitude and intention, perceived effectiveness and attitude are very high, so the former variable has a very significant effect on the latter variable.

**TABLE 5 : Structural equation model path coefficient and hypothesis result**

Hypothesis Path	Standardized path coefficient	T value	Significant	Result
H1 Attitude→Intention	0.7121	8.3613	***	Accept
H2 Perceived Effectiveness→Attitude	0.7078	9.6001	***	Accept
H3 Perceived Effectiveness→Perceived Behavioral Control	0.3951	3.4212	***	Accept
H4 intention→Saving Meal Behavior	0.3448	2.9214	**	Accept
H5 Subjective Norm→Intention	0.2108	2.3714	*	Accept
H6 Subjective Norm→Perceived Behavioral Control	0.4258	3.6464	***	Accept
H7 Perceived Behavioral Control→Saving Meal	0.4126	3.4669	***	Accept

*\*p< 0.05, \*\* p<0.01, \*\*\*p<0.001*

According to the empirical results, the standardized path coefficients of each path in structural equation model were positive and passed significance test, therefore all hypotheses were accepted. The standardized path coefficients between saving meal attitude and saving meal intention(H1) was 0.7121, and the standardized path coefficients between subjective norm and saving meal intention(H5) was 0.2108. So, both attitude and subjective norm had direct impact on saving meal intention, and the impact of attitude was stronger. According to further calculation, 69.7% of the variance in intention could be accounted for attitude and subjective norm. Similarly, the standardized path coefficient between saving meal intention and saving meal behavior (H4) was 0.3448, and the standardized path coefficient between perceived behavioral control and saving meal behavior (H7) was 0.4126. Both saving meal intention and perceived behavioral control had direct positive impact on saving meal behavior, and the impact of perceived behavioral control was stronger. Further calculation showed these two variables could explain 47.1% of the variance in saving meal behavior.

**CONCLUSIONS AND IMPLICATIONS**

**Conclusions**

Through the empirical research results, we got the following basic conclusions:

Saving meal intention and perceived behavioral control directly exert impact on saving meal. If consumers have higher level of saving meal intention and perceived behavioral control, they will be more likely to perform saving meal. Perceived behavioral control is the main influence variable.

Saving meal intention is directly affected by the attitude and subjective norm. The attitude is the main influence factors. From the view of causality, attitude and subjective norm are the reasons of saving meal intention, and saving meal behavior is the consequences.

Saving meal attitude is affected by the perceived effectiveness. Perceived behavioral control is affected by the subjective norm and perceived effectiveness directly, and the effect of subjective norm is stronger.

### Management implications

Because perceived effectiveness exerts strong positive influence on saving meal attitude, and the attitude can in turn improve saving meal intention, therefore, when governments or nonprofit organizations advocate saving meal behavior, it is necessary to emphasize the effectiveness of this behavior, which can make consumers recognize the importance of saving meal behavior in environmental protection and enhance saving meal attitude.

Analytical results show that the subjective norm has direct effect on saving meal intention, which means that the reference group, especially the important reference group, such as family members and friends, could have an import impact on individual's intention. By strengthening the reference group internal communication, the individual member's intention of saving meal could be improved, such as using the social media to spread positive information of saving meal behavior and improve the faith of adopting this behavior.

This study found that perceived behavioral control of saving meal had significant influence on saving meal intention. Therefore, providing convenient external conditions will promote the behavior of saving meal. In addition, the Chinese society belongs to the high situation society, and the governments play an important role in shaping social public behaviors. So the government should also perform the behavior of saving meal, and it is very important to cultivate saving meal behavior culture in society.

### ACKNOWLEDGMENT

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