

Beyond the MBG Plate: The Influence of Food Preferences and Food Neophobia on Students' Food Consumption Behavior

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Abstract

The Free Nutritious Meal Program (Makan Bergizi Gratis/MBG) is a national strategic policy in the food and nutrition sector aimed at improving the quality of human resources from school age. Based on studies from Bappenas, the presidential special envoy for Food Security, and several credible news sources, food waste in Indonesia remained substantial in 2025. Indonesia ranks 4th in food waste globally, resulting in national economic losses of up to IDR 500 trillion per year. Part of this food waste is contributed by the Free Nutritious Meal Program (MBG). Therefore, minimizing food waste in the MBG Program is important. One way to minimize MBG food waste is by understanding the preferences and consumption behavior patterns of students receiving MBG. To date, evaluation of the MBG program has been dominated by nutritional and food distribution approaches, while studies based on students' consumption behavior remain relatively limited. This condition indicates the urgency of research to produce scientific evidence supporting the strengthening of MBG policy based on food consumption behavior. This study aims to examine the effect of food preference on the consumption behavior of MBG recipient students, with food neophobia as a mediating variable. This study also aims to elaborate on other factors shaping the consumption behavior of MBG recipient students, as well as to develop a model of consumption behavior for MBG recipient students. The study employs a mixed-method approach. The quantitative approach was conducted through a questionnaire survey, with data analyzed using SEM-PLS. Meanwhile, the qualitative approach was conducted using the ZMET technique (interviews using images). The results show that food preference has a significant positive effect on consumption behavior, both directly and through the mediation of food neophobia, while food neophobia has a significant negative effect on consumption behavior. Qualitative findings through ZMET confirm that visual appeal and nutritional content are the main drivers of student preference, while poor food quality and safety are the main triggers of food neophobia and potential food waste.

Keywords: Food Preference; Food Neophobia; Consumption Behavior; MBG.

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INTRODUCTION

The Free Nutritious Meal Program (MBG) is Indonesia's national strategy to combat malnutrition and stunting among school-age children (Agustini, 2025; Aspani & Faeni, 2025; Sari, 2025). This program aims to improve nutritional status and address the malnutrition that remains a challenge in Indonesia (Andin et al., 2024). The provision of nutritious food

through MBG has been shown to improve physical health, such as body weight and BMI, and to have a positive impact on mental health, concentration, and students' academic performance (M.Pd et al., 2025; Prasetyo et al., 2025). Based on a Bappenas study (Bappenas, 2021), food waste in Indonesia reaches 1.1 to 1.4 million tons per year. Of that amount, approximately 451,000-603,000 tons is edible food, meaning food that is actually still fit for consumption. The presidential special envoy for Food Security, Muhamad Mardiono, stated that food waste in Indonesia remained substantial in 2025. Indonesia ranks 4th in food waste globally, resulting in national economic losses of up to IDR 500 trillion per year due to this waste (Catherine & Damarjati, 2025).

In addition, 2024 data from the National Waste Management Information System (SIPSN) shows that 39-40% of waste in Indonesia comes from food scraps (Rembang City Government, 2025). A Bappenas study notes that between 2000 and 2019, food loss and food waste in Indonesia reached 23-48 million tons per year, equivalent to 115-184 kg per capita per year (Bappenas, 2021), with economic losses of IDR 213-551 trillion per year, or around 4-5% of GDP (Dewi, 2023). These findings confirm that food waste remains a serious challenge in Indonesia. Part of this waste originates from the Free Nutritious Meal Program (MBG). Various cases across several Nutritious Meal Service Units (SPPG) show that MBG food waste remains high in several regions, such as Makassar (Sambas, 2025), Sidoarjo (Najibah, 2025), Rembang (Rembang City Government, 2025), Aceh (Hendra, 2025), Cianjur and Bogor, West Java (Linda, 2025; Umam, 2025), Bombana, Southeast Sulawesi, and East Sumba, NTT (Linda, 2025). This condition is driven by mismatches between the food and students' tastes, as well as boredom with monotonous menus.

Therefore, studying student preferences in MBG consumption is very important. Accordingly, the urgency and problem formulation of this study lie in the persistent food waste problems occurring within the MBG program. This study therefore seeks to elaborate on the factors causing the continued high level of food waste in Indonesia's MBG program. In addition, this study also seeks to examine the determinant variables causing food waste, as well as to develop a model of consumption style among MBG recipient students. It is hoped that these findings can produce recommendations for factors that can be targeted for intervention to reduce food waste in Indonesia's MBG program. Food preference plays an important role in reducing food waste, as demonstrated by various studies linking consumer choice with waste management strategies. Studies in China and Spain show that higher dietary preference scores can significantly reduce household food waste (Gracia & Gómez, 2020; Zhang et al., 2009). Digital initiatives such as Re-Food have also been developed to align consumer preferences with food waste reduction efforts (Pramana et al., 2021). On campuses, data-driven approaches to predicting food preferences show that optimizing food variety and production can reduce waste by up to 28% (Turker, 2025). Thus, integrating consumer preference into food sustainability strategies is key to effective waste management (R. & S., 2024). Food neophobia, characterized by reluctance to try new or unfamiliar foods, significantly affects children's eating behavior and dietary patterns. Studies show that this phenomenon is observed in children, with a prevalence of 59.1% (Krupa-Kotara et al., 2024). Maternal food neophobia also plays an important role, as it is inversely correlated with children's nutrient intake. This indicates that a mother's reluctance toward new foods can negatively affect the dietary diversity and preferences of her children (Poyraz & Ciftci, 2025). In addition, food neophobia is associated with reduced adherence to healthy dietary patterns, such as the Mediterranean diet. Higher neophobia is closely related to lower fruit and vegetable consumption (Białek-Dratwa et al., 2022a). Visual and sensory factors, such as attractive food presentation, can increase children's willingness to try new foods, underscoring the importance of psychological and environmental strategies in addressing food neophobia (Di Nucci et al., 2023). Therefore, efforts to understand and reduce food neophobia are key to promoting healthy eating habits in children (Tan et al., 2024).

Examining food preference and children's psychological behavior in consuming MBG is key to reducing MBG food waste in Indonesia. In addition, knowledge related to the model of MBG consumption behavior is also a crucial factor that needs to be understood in order to formulate more targeted policies for MBG issues in Indonesia. Accordingly, this study combines quantitative and qualitative approaches to capture factors that cannot be accommodated by quantitative research alone.

The state of the art and novelty of this study are as follows. First, the Free Nutritious Meal Program (MBG) is a relatively new public policy that is still being implemented in stages in Indonesia, so scientific studies evaluating MBG from the perspective of consumption behavior and food psychology remain limited and are dominated by nutritional and food distribution approaches (Hadi et al., 2025; Pambudi, 2024). This study specifically examines consumption behavior in the context of MBG by positioning food preference as the independent variable and food consumption behavior as the dependent variable. This study also differs from previous research that was general in nature and not tied to public policy (Qibtiyah & Dharmmesta, 2024). Second, this study examines food neophobia as a mediating variable between food preference and consumption behavior. Unlike previous studies that generally examined direct relationships between variables, this study offers a new mechanism for explaining how MBG menu preferences translate into consumption behavior (Soma et al., 2024). Third, this study uses a mixed-method approach (quantitative and qualitative) to obtain a more comprehensive understanding, differing from previous studies that generally used only a qualitative approach (Agustini, 2025). This study adopts the Zaltman Metaphor Elicitation Technique (ZMET) as its qualitative method, representing a methodological novelty in the study of nutritious food consumption behavior in Indonesia. Unlike previous studies that used conventional interviews, questionnaires, or sentiment analysis (Agustini, 2025; Sianturi, 2025), ZMET enables the elicitation of latent meaning, emotion, and psychological resistance toward the MBG menu.

METHODOLOGY

This study uses a mixed-method approach that combines quantitative and qualitative methods to produce more comprehensive and accurate findings. The quantitative approach is used to test the relationships between variables using SEM-PLS (Hair et al., 2017), while the qualitative approach uses the Zaltman Metaphor Elicitation Technique (ZMET) through interviews to elicit deeper meaning related to food preference and food neophobia. Generalization of the results is achieved through the integration of both methods, where the ZMET findings are not intended for statistical generalization but rather use analytical generalization to deepen conceptual understanding (Yin, 2018). The ZMET results, in the form of themes and a consensus map, are used to explain and reinforce the relationships between variables in the quantitative model, while generalization to the population is achieved through SEM-PLS analysis, which allows for statistical generalization (Hair et al., 2017). Thus, ZMET serves as an explanatory tool and SEM-PLS as a generalization tool, consistent with the explanatory sequential mixed-method approach (Creswell & Creswell, 2018).

The population in this study consists of students receiving the 'Free Nutritious Meal' program. The sampling technique used was purposive sampling, with the following criteria: (1) elementary/junior high/senior high school students who have regularly received the Free Nutritious Meal for at least 1-3 months; (2) actively enrolled in school during the study period; (3) consuming the MBG meal directly at school. The minimum sample size in this study is 100 respondents. This refers to the provision from Sugiyono (2019) that a feasible sample size in research ranges from 30 to 500, as well as the provision from Hair et al. (2017) that, as a rule of thumb for PLS testing, the minimum sample size is 10 times the maximum number of arrows pointing to a latent variable anywhere in the PLS path model. The number of arrows pointing to a latent variable in this study is only 3. Thus, with 3×10 , the minimum sample for this study

is 30 respondents. However, the researchers targeted 300 respondents for this study, in order to provide a better and more credible level of data accuracy.

The research variables used in the quantitative analysis include food preference as the independent variable, consumption behavior as the dependent variable, and food neophobia as the mediating variable. Variables were measured using a 5-point Likert scale, validated through reliability and validity testing (convergent & discriminant validity). The variable measurements in this study refer to Doan et al. (2025), Lagerkvist (2013), and Zamparo et al. (2023). Quantitative data analysis was conducted using the SEM-PLS method with software such as SmartPLS. This technique was chosen because this study includes a mediating variable, namely Food Neophobia, making this analytical model more appropriate (Hair et al., 2017).

The qualitative data analysis technique in this study uses the ZMET (Zaltman Metaphor Elicitation Technique) method. The ZMET technique is used in this study to deeply explore the food preference and food neophobia factors among students regarding the MBG menu. The 10 stages of the ZMET interview to be conducted are as follows (Hancock & Foster, 2019):

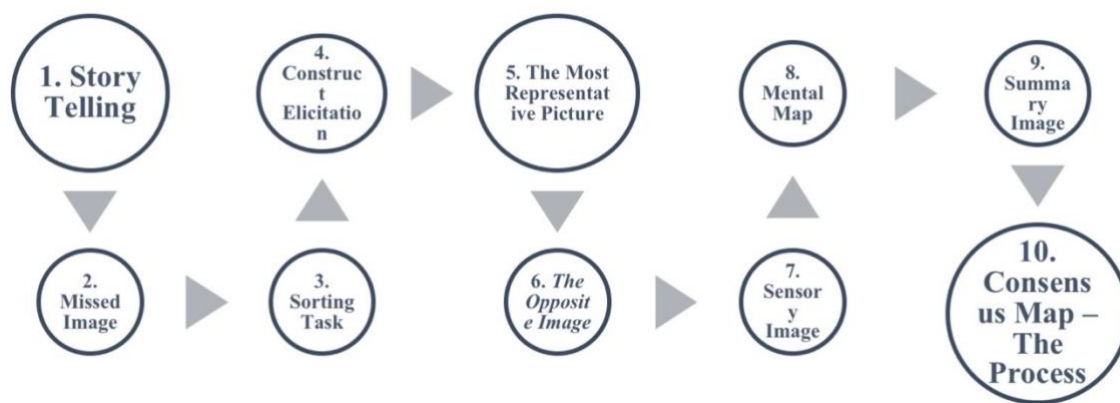


Figure 1. ZMET Stages

Before the interview, respondents were asked to collect 8-10 images representing their feelings, experiences, and reasons for liking or rejecting MBG food. The interview was then conducted using the 10 stages of the Zaltman Metaphor Elicitation Technique (ZMET) to uncover the symbolic meanings related to food preference and food neophobia. This process aims to identify preference patterns, sources of discomfort toward new foods, and emotional factors influencing students' consumption behavior. These findings form the basis for formulating more adaptive MBG menu recommendations that are better accepted by students.

The stages in ZMET are as follows: (1) Story Telling: participants explain the meaning of the images they selected; (2) Missed Image: participants describe images they could not find, along with their meaning; (3) Sorting Task: participants group images based on meaning; (4) Construct Elicitation: the researcher conducts laddering to explore constructs in depth; (5) The Most Representative Picture: participants select the image that best represents their opinion; (6) The Opposite Image: participants describe an image that contrasts with the topic; (7) Sensory Image: participants represent the topic through the five senses; (8) Mental Map: the researcher maps the relationships between respondents' constructs; (9) Summary Image: participants compile a collage (summary of images) and narrate the connections between images; (10) Consensus Map – The Process: the researcher compiles a consensus map from the respondents.

Interpretation of the ZMET interview results was carried out through ten interrelated stages. The story telling and missed image stages were used to identify initial meanings,

perceptions, and unmet expectations regarding the MBG menu. The sorting task stage grouped images into preference categories (liked and disliked), while construct elicitation (laddering) explored the attribute-consequence-value relationships to understand the deeper reasons behind acceptance or rejection of the food. Next, the most representative picture and the opposite image were used to identify dominant perceptions and gaps between actual conditions and student expectations. The sensory image stage revealed sense-based perceptions, such as taste, aroma, and appearance, that influence food preference and food neophobia. These results were then organized into a mental map to illustrate the relationships between constructs at the individual level, which were subsequently summarized through the summary image.

In the final stage, all findings were integrated into a consensus map to identify common patterns in student perception, which formed the basis for drawing out the main themes and interpreting consumption behavior toward the MBG program. The qualitative interviews using the ZMET method involved 10 respondents (2 elementary, 3 junior high, and 5 senior high school students) receiving MBG. The cross-level selection aimed to capture differences in perception, preference, and consumption experience based on age. This approach produced a more comprehensive understanding of food preference and food neophobia, and supported the formulation of more appropriate MBG menu recommendations.

RESULTS AND DISCUSSION

Quantitative Results and Discussion

Respondent Characteristics

Table 1. Respondent Characteristics

Respondent Characteristics	Number	Percentage (%)
School Level		
Elementary School	50	16.76
Junior High School	96	32
Senior High School	154	51.33
Total	300	100
Gender		
Male	133	44.33
Female	167	55.67
Total	300	100
Domicile		
East Java	177	59
West Java	10	3.33
Central Java	8	2.67
Yogyakarta)	58	19.33
Jakarta	20	6.67
Outside Java	27	9.00
Total	300	100

Measurement Model Evaluation (Outer Model)

Validity Test

This study uses two validity tests: convergent validity and discriminant validity. Table 2 shows the results of the convergent validity test, while Table 4 shows the results of the discriminant validity test. Joseph et al. (2017) state that the results of convergent validity

testing can be seen from the AVE and factor loading values. An acceptable AVE value is ≥ 0.5 , and an acceptable factor loading value is ≥ 0.708 .

Table 2. Convergent Validity Test

Variable	Item	Convergent Validity Test	
		AVE	Factor Loadings
Food Preference	FP1	0.303	0.469
	FP2		0.484
	FP3		0.792
	FP4		0.780
	FP5		0.550
	FP6		0.351
	FP7		0.092
Food Neophobia	FN1	0.357	0.750
	FN2		0.825
	FN3		0.294
	FN4		0.629
	FN5		0.590
	FN6		0.260
Consumption Behavior	CB1	0.694	0.881
	CB2		0.840
	CB3		0.894
	CB4		0.870
	CB5		0.654

Source: Processed primary data (2026)

Based on the convergent validity test results, Table 2 shows that several measurement items have factor loading values below 0.5, namely items FP1, FP2, FP5, FP6, FP7, FN3, FN4, FN5, FN6, and CB5. However, in social research, factor loading values between 0.40-0.70 can still be considered for removal from the scale by examining the Average Variance Extracted (AVE) results if they exceed the recommended threshold (Hair et al., 2017). Therefore, only the items FP1, FP2, FP6, FP7, FN3, and FN6 were removed from the measurement to examine the Average Variance Extracted (AVE) results. The AVE test results can be seen in Table 3.

Table 3. Average Variance Extracted (AVE) Test Results

Variable	AVE
Food Preference	0.586
Food Neophobia	0.514
Consumption Behavior	0.694

Source: Processed primary data (2026)

After removing items FP1, FP2, FP5, FP6, FP7, FN3, FN4, FN5, FN6, and CB5 from the measurement, Table 3 shows that the AVE results for all constructs in this study meet the minimum criterion of ≥ 0.5 (Hair et al., 2017). The next validity test conducted was the discriminant validity test using the Fornell-Larcker criterion. According to Hair et al. (2017), discriminant validity is considered good if the square root of the AVE for each construct is higher than its highest correlation with other constructs. Table 4 shows that the square root of the AVE for each construct is higher than the highest correlation with other constructs, thus satisfying the Fornell-Larcker criterion.

Table 4. Discriminant Validity Test Results

	Consumption Behavior	Food Neophobia	Food Preference
Consumption Behavior	0.833		
Food Neophobia	-0.532	0.717	
Food Preference	0.422	-0.302	0.765

Source: Processed primary data (2026)

Reliability Test

The next test conducted was the reliability test. Cooper & Schindler (2014) state that the reliability test is conducted to determine the extent to which the measurement instrument used in the study is consistent in measuring. The reliability testing in this study uses the rule of thumb from Hair et al. (2017), examining composite reliability ≥ 0.7 . Table 5 shows that the reliability test results in this study have values ≥ 0.7 , so it can be said that all constructs in this study have good reliability (Hair et al., 2017).

Table 5. Reliability Test Results

Variable	Composite Reliability	Description
Food Preference	0.802	Reliable
Food Neophobia	0.805	Reliable
Consumption Behavior	0.918	Reliable

Source: Processed primary data (2026)

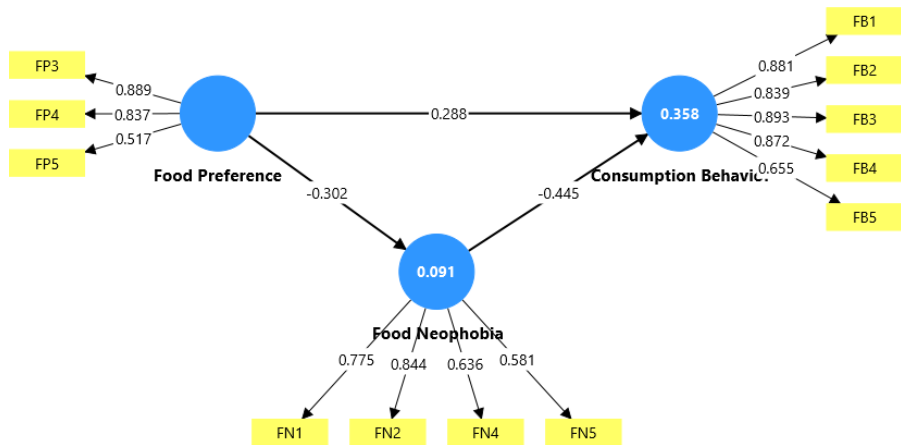


Figure 2. Outer Model

Structural Model Evaluation (Inner Model)

R Square Testing

Table 6. R Square Test Results

Variable	R Square	R Square Adjusted
Consumption Behavior	0.358	0.354
Food Neophobia	0.091	0.088

Source: Processed primary data (2026)

An R Square value of 0.358 for the Consumption Behavior variable indicates that Food Preference and Food Neophobia are able to explain 35.8% of the variance in Consumption Behavior, while the remainder is influenced by other variables outside the research model. Meanwhile, an R Square value of 0.091 for the Food Neophobia variable indicates that Food Preference is only able to explain 9.1% of Food Neophobia, while the remainder is explained by other factors outside the study. Based on Joseph F. Hair Jr.'s criteria, these values indicate that the model's ability to explain Consumption Behavior is classified as moderate, while its ability to explain Food Neophobia is classified as weak.

Hypothesis Testing

Table 7. Hypothesis Test Results

Hypotheses	Path	β	Mean	SD	T statistics	P values	Significance
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Direct effect							
H1	Food Preference → Consumption Behavior	0.288	0.288	0.048	5.935	0.000	Supported
H2	Food Preference → Food Neophobia	-0.302	-0.309	0.055	5.444	0.000	Supported
H3	Food Neophobia → Consumption Behavior	-0.445	-0.447	0.056	8.008	0.000	Supported
Indirect Effect							
H4	Food Preference → Food Neophobia → Consumption Behavior	0.134	0.138	0.031	4.324	0.000	Supported

Based on the bootstrapping test results in Table 7 regarding the direct and indirect effects between variables, the following findings were obtained:

1. H1: The test results show that Food Preference has a positive and significant effect on Consumption Behavior, with $\beta = 0.288$, T-statistics = 5.935, and P-values = 0.000 (< 0.05). Thus, H1 is supported.
2. H2: The test results show that Food Preference has a negative and significant effect on Food Neophobia, with $\beta = -0.302$, T-statistics = 5.444, and P-values = 0.000 (< 0.05). Therefore, H2 is supported.
3. H3: The test results show that Food Neophobia has a negative and significant effect on Consumption Behavior, with $\beta = -0.445$, T-statistics = 8.008, and P-values = 0.000 (< 0.05). Thus, H3 is supported.
4. H4: The test results show that Food Preference has a significant indirect effect on Consumption Behavior through Food Neophobia, with $\beta = 0.134$, T-statistics = 4.324, and P-values = 0.000 (< 0.05). Therefore, H4 is supported.

H1: The Effect of Food Preference on Consumption Behavior

The hypothesis testing results show that Food Preference has a positive and significant effect on Consumption Behavior ($\beta = 0.288$, T-statistics = 5.935, P-values = 0.000). This result indicates that the higher the alignment between students' food preferences and the MBG menu, the more positive their consumption behavior. This means that students who like the taste, type, variety, or appearance of the food provided in the MBG program tend to be more willing to consume, finish, and accept the food. This finding indicates that the success of the MBG program does not depend solely on the nutritional value of the food provided, but also on the extent to which the menu offered matches students' tastes and preferences.

According to Montoya & Alcaraz (2016), food preference is also influenced by regional culture and habits. For example, children in certain regions may be accustomed to corn rice, fish, or spicy/sweet-flavored foods (Ellrott, 2012). Therefore, an MBG menu that adapts to local culture is likely to be better accepted than a menu that differs too much from everyday eating habits.

In addition, eating experiences from childhood influence current food preferences (Ellrott, 2012). Children accustomed to eating vegetables, milk, or healthy food from an early age will more easily accept the nutritious menu in the MBG program compared to children accustomed to consuming instant food or high-sugar snacks (Wadhera et al., 2015).

H2: The Effect of Food Preference on Food Neophobia

The test results show that Food Preference has a negative and significant effect on Food Neophobia, with $\beta = -0.302$, T-statistics = 5.444, and P-values = 0.000 (< 0.05). Therefore, H2 is supported. This result indicates that the higher the alignment between students' food preferences and the food provided, the lower their level of Food Neophobia. Conversely, if students' food preferences are low or the food is considered unsuited to their tastes, students' tendency toward Food Neophobia will increase.

The negative β coefficient (-0.302) indicates an inverse relationship between the two variables. This means that students who like the taste, appearance, aroma, or type of certain foods tend to be more open to accepting food and are less likely to feel afraid or hesitant toward the food provided. Conversely, students with low food preference tend to be more selective and show rejection toward food they consider unfamiliar.

This finding is consistent with the studies of Rozin & Vollmecke (1986) and Costa et al. (2020), which explain that Food Neophobia is related to individuals' tendency to reject unfamiliar food, while positive experience and preference toward food can increase food acceptance.

H3: The Effect of Food Neophobia on Consumption Behavior

The test results show that Food Neophobia has a negative and significant effect on Consumption Behavior, with $\beta = -0.445$, T-statistics = 8.008, and P-values = 0.000 (< 0.05). Thus, H3 is supported. This result indicates that the higher students' level of Food Neophobia, the lower their consumption behavior toward food in the Free Nutritious Meal (MBG) program. Conversely, the lower the level of Food Neophobia, the better students' consumption behavior toward the food provided.

Food Neophobia (FN) is a fear of or reluctance toward new food that can influence students' consumption behavior in the MBG program. This negative effect shows that students with high FN levels tend to avoid unfamiliar menu items, such as certain vegetables, fruits, or side dishes (Bialek-Dratwa et al., 2022b; Rioux, 2020). As a result, students become more selective in choosing food, do not finish the food provided, and even reject certain menus, which can increase the potential for food waste at school. FN also causes students to prefer food that is already familiar and commonly consumed at home, thereby limiting their acceptance of the variety of nutritious menus in the MBG program. This is consistent with the studies conducted by Jezewska-Zychowicz et al. (2021) and Karaağaç & Bellikci-Koyu (2023).

FN levels are influenced by individual factors such as genetics, sensory sensitivity (such as smell perception), and early experiences with food (Karaağaç & Bellikci-Koyu, 2023; Rioux, 2020; Sorokowska et al., 2022). In addition, studies conducted by Ayoughi et al. (2022) and Kutbi (2020) show that FN is influenced by environmental factors such as parental feeding practices; for example, pressure to eat can increase FN in children. Conversely, gradual exposure to new foods can reduce FN. FN is also influenced by demographic factors (Sahrin et al., 2023). FN is more common among individuals with lower education levels, higher BMI, and certain age groups, such as children and adolescents (Jezewska-Zychowicz et al., 2021; Sahrin et al., 2023). Therefore, the gradual introduction of new menus, nutrition education, and attractive food presentation are needed to help reduce Food Neophobia and improve students' consumption behavior in the MBG program.

H4: The Effect of Food Preference on Consumption Behavior through Food Neophobia

The test results show that Food Preference has a significant positive indirect effect on Consumption Behavior through Food Neophobia, with $\beta = 0.134$, T-statistics = 4.324, and P-values = 0.000 (< 0.05). Thus, H4 is supported. This result indicates that students' food preference is able to influence their consumption behavior through their level of Food Neophobia. This means that the higher the alignment between students' food preferences and the menu in the Free Nutritious Meal (MBG) program, the lower students' tendency toward Food Neophobia, resulting in better consumption behavior toward the food provided. Conversely, if students' food preference is low or does not match the menu provided, the level of Food Neophobia tends to increase, and students' consumption behavior toward MBG food becomes lower.

Qualitative Results and Discussion

The researchers conducted ZMET interviews with 10 participants, consisting of 5 senior high school students, 3 junior high school students, and 2 elementary school students, to obtain qualitative data. The interview process consisted of the following 10 stages:

Step 1: Story Telling Results

Table 8. Story Telling Results

Reasons for Liking the MBG Menu	
Image	Story Telling Results
	Healthy food, cute menu, favorite menu, clean, filling, appearance, appetizing, sufficient nutrition, adequate portion, seasoning, good combination, fresh, togetherness, practical, matches taste, unique menu, happy, like, delicious, beneficial, advantageous, MBG given to many groups, nusantara flavor, nutrition fulfilled, can suggest menu, associated with blue
Reasons for Rejecting the MBG Menu	
Image	Story Telling Results
	Fishy smell, pale, strange, messy, not a favorite menu, tough texture, wasteful, nutrition crisis, unpleasant odor, poor combination, does not match taste, dislike the MBG menu, spoiled, poisoning, inconsistent rules, unrestricted rules, forced rules, terrifying, clown, unclear rules, absurd, nutrition not guaranteed, menu needs evaluation, too little, needs more quantity, MBG is funny

Step 2: Missed Image

At this stage, participants were asked to describe images they could not find and explain the meaning of the images described. Participant 1 revealed that there was an image he could not find, namely an image of a boiled potato menu combined with carrots and dumpling skin. Participant 1 explained that he did not like this menu because it tasted bland. In addition, Participant 3 also recounted an image she could not find, namely an image of the MBG goat curry menu. According to her, this menu has a very strong smell if not processed properly.

Step 3: Sorting Task

The third step, Sorting Task, asked participants to group the images they considered similar into one category. Participants were then asked to name each group of images. The results of the image groupings were as follows.

Table 9. Image Categories

No	Category	Indicator of Liking MBG	Indicator of Rejecting MBG
1	Taste Quality and Palatability	Delicious, like, happy, matches taste, favorite menu, nusantara flavor, appetizing, seasoning, good combination	Not a favorite menu, poor combination, does not match taste, dislike the MBG menu
2	Appearance and Visual Appeal of the Menu	Cute menu, unique menu, appearance	Terrifying, pale, strange

3	Food Quality and Freshness	Fresh, clean, cleanliness, fishy smell	Tough texture, spoiled, unpleasant odor, messy
4	Portion Adequacy and Eating Satisfaction	Filling, adequate portion, sufficient nutrition	Too little, needs more quantity
5	Nutritional Content and Health Benefits	Healthy food, nutrition fulfilled, sufficient nutrition, beneficial	Nutrition crisis, nutrition not guaranteed
6	Food Safety	Cleanliness, clean	Poisoning, spoiled
7	Convenience and Practicality	Practical	-
8	Social Impact and Program Value	Togetherness, advantageous, MBG given to many groups	Wasteful
9	Menu Evaluation and Development	-	Suggest menu, menu needs evaluation, increase quantity
10	Perception of MBG Program Policy/Rules	Associated with blue	Suggest menu, menu needs evaluation, increase quantity

Step 4: Construct Elicitation

In the fourth step, Construct Elicitation, the researcher conducted a laddering process to gain an understanding of the abstractions constructed by the participants. Based on the image groupings, respondents began to elaborate further on their statements regarding the group names, allowing the researcher to provide a more in-depth analysis, as follows:

Table 10. Construct Elicitation Results

Attributes	Consequences	Values
Category 1: Taste Quality and Palatability		Satisfaction, enjoyment, happiness, comfort, appreciation for personal preference, self-well-being
Reasons for Liking the MBG Menu		
Delicious, like, happy, matches taste, favorite menu, nusantara flavor, appetizing, seasoning, good combination	Food is more easily finished, students eat heartily, appetite increases, students more accepting of the MBG program, students feel satisfied after eating	
Reasons for Rejecting the MBG Menu		
Not a favorite menu, poor combination, does not match taste, dislike the MBG menu	Food tends not to be finished, risk of waste increases	
Category 2: Appearance and Visual Appeal		Enjoyment, positive experience, enthusiasm, curiosity, creativity
Reasons for Liking the MBG Menu		
Cute menu, unique menu, appearance, associated with blue	Attracts students' attention, generates curiosity, increases interest in trying the food, creates an enjoyable eating experience,	
Reasons for Rejecting the MBG Menu		
Pale, strange, terrifying	Students are reluctant to try food if its appearance is unappealing, affects perception of food quality	
Category 3: Food Quality and Freshness		Safety, comfort, health, trust, peace of mind
Reasons for Liking the MBG Menu		
Fresh, clean, cleanliness, fishy smell,	Increases trust in the food, adds comfort while eating, reduces concern about food quality	
Reasons for Rejecting the MBG Menu		
Unpleasant odor, spoiled, tough texture, messy	Decreases appetite, raises health concerns	
Category 4: Portion Adequacy and Eating Satisfaction		Well-being, satisfaction, productivity, health, comfort
Reasons for Liking the MBG Menu		
Filling, adequate portion, sufficient nutrition	Hunger decreases, energy is better maintained, eating needs are met, students can focus better on learning	
Reasons for Rejecting the MBG Menu		

Too little, increase quantity	Students still feel hungry if the portion is small	
Category 5: Nutritional Content and Health Benefits		
Reasons for Liking the MBG Menu		
Healthy food, nutrition fulfilled, sufficient nutrition, beneficial,	Supports growth, maintains physical health, adds energy, reduces the risk of malnutrition, supports learning activities	Health, a better future, quality of life, well-being, self-development
Reasons for Rejecting the MBG Menu		
Nutrition crisis, nutrition not guaranteed	Nutritional needs not met	
Category 5: Food Safety		
Reasons for Liking the MBG Menu		
Cleanliness maintained, clean	Reduces risk of illness, increases sense of safety while eating, increases trust in the MBG menu, increases program acceptance	Safety, self-protection, health, peace of mind
Reasons for Rejecting the MBG Menu		
Poisoning, spoiled	Affects health, distrust toward SPPG (Nutritious Meal Service Unit)	
Category 6: Convenience and Practicality		
Reasons for Liking the MBG Menu		
Practical	Easy to consume, saves time, makes it easier for students to eat at school	Efficiency, comfort, convenience
Category 7: Social Impact and Program Value		
Reasons for Liking the MBG Menu		
Togetherness, advantageous, MBG given to many groups, wasteful	Strengthens relationships among students, fosters a sense of togetherness, helps various groups of students, reduces family burden, encourages optimal use of food	Social concern, fairness, togetherness, empathy, responsibility
Category 8: Menu Evaluation and Development		
Reasons for Liking the MBG Menu		
Suggest menu, menu needs evaluation, increase quantity	Menu becomes more suited to students' needs, student satisfaction increases, the program improves, student complaints decrease	Continuous improvement, satisfaction, fairness, participation
Category 9: Perception of MBG Program Policy/Rules		
Reasons for Liking the MBG Menu		
Associated with Blue	A fresh, cheerful, and bright color	Certainty, fairness, trust, order, transparency
Reasons for Rejecting the MBG Menu		
Inconsistent rules, forced rules, unrestricted rules, unclear rules, absurd, clown, MBG is funny	Affects trust in the program, causes confusion, affects program acceptance, affects student compliance	

Step 5: Most Representative Image

Participant 1 chose an image of a cutely shaped MBG menu, because its attractive appearance was seen as increasing interest in eating. According to her, "Rice and side dishes shaped creatively will be more well liked than an ordinary presentation." Participant 2 chose an image of a nutritionally complete menu, because "A nutritious MBG menu can support children's growth and development so that they become healthy and intelligent." Participant 3 chose an image of a menu with an attractive appearance and good taste, because both were seen as increasing students' appetite. Participant 4 chose an image depicting differing views on the MBG Program, because some parties want the program discontinued, "but on the other hand, many people still need the benefits of the MBG program." Participant 5 chose a smiling emoticon with a thumbs-up as an expression of her liking for MBG.

Participant 6 chose an image of a nutritionally complete and balanced menu, because it "best represents the main goal of the MBG program" in meeting children's nutritional needs. Participant 7 chose an image of a nutritionally complete menu, because "the menu consists of protein, carbohydrates, vegetables, and fruit, which are considered to reflect balanced nutritious food." Participant 8 chose a poster image depicting the goal of MBG, namely making children healthy, giving them energy to learn, and improving their achievement. Participant 9 chose an image of a nutritious menu because "this image best depicts the hopes for the MBG Program." Participant 10 chose an image of the MBG menu, reasoning that "the menu looks complete, consisting of rice, chicken, tofu, vegetables, and fruit, so in my opinion it best depicts MBG."

Step 6: The Opposite Image

Participants 1, 2, 3, 9, and 10 chose images of fast food and junk food because, in their opinion, fast food is not nutritious, is unhealthy, and contains a lot of oil. This is clearly at odds with the food in the MBG program. Participant 4 chose an image of canteen food. According to her, students cannot choose the menu they want, and it is free from the government, whereas snacking at the canteen offers various choices but must be paid for. Participant 5 chose images of the canteen and micro, small, and medium enterprises (MSMEs). According to her, MBG can increase students' feeling of fullness, so their interest in buying food at the canteen or from MSMEs vendors decreases, because they feel their need to eat is already met. As a result, the income of canteen vendors and MSMEs around the school may decline. Participants 6 and 7 chose images of unhealthy and low-nutrition food because it does not meet students' nutritional needs. Participant 8 chose an image of a dirty or unhygienic kitchen, because the MBG program should provide food that is clean, safe, and nutritious for students.

Step 7: Sensory Image

Table 11. Sensory Image

Senses	Explanation
Sight	1) 1) Blue: Associated with the MBG logo, a clean and hygienic color, and because President Prabowo likes blue; 2) Various colors: The diversity of the MBG menu; 3) Gray: The color of the MBG food tray (ompreng); 4) White: The MBG kitchen is white and looks clean
Hearing	1) 1) Noisy: Because the MBG food tray is made of metal; 2) Clang: The noisy, echoing sound of the MBG food tray; 3) Wolf howling: MBG can be dangerous if someone gets food poisoning; 4) Loud: The sound of a dropped food tray is very loud
Smell	1) 1) Fragrant: MBG food smells fragrant because of the seasoning; 2) Fishy: Sometimes an MBG menu has a fishy smell; 3) Fresh: Because MBG is free and the fruit in MBG is refreshing
Taste	1) 1) Savory-salty: Many MBG menus have this taste; 2) Sweet: Much of the MBG fruit is sweet; 3) Salty and savory: Many MBG menus are salty and savory and make students energetic; 4) Sour: MBG menus that do not meet nutritional requirements

Touch	1) 1) Soft: Represents the care and affection in giving MBG; 2) Slightly hard and dense: Many MBG menus are dense; 3) Cold: MBG menus are often received cold; 4) Hot: Because the MBG menu is kept secret and students do not know it beforehand; 5) Warm: MBG provides nutritional intake to students; 6) Comfortable: Because the MBG menu is not monotonous and is appealing
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Step 8: Mental Map

At this stage, the researchers constructed a mental map based on the results of the sorting task (Table 8) and construct elicitation (the chain of attributes, consequences, and values) to illustrate the relationships between constructs that shape participants' thinking about MBG. The mental map shows two main, opposing paths shaping students' consumption behavior: an acceptance path and a rejection path toward the MBG menu.

The acceptance path begins with the construct of Menu Appearance and Visual Appeal (cute menu, attractive appearance), which triggers curiosity and interest in trying the food, as reflected in the choices of Participants 1 and 3 in Step Five. This construct is linked to Taste Quality and Palatability, which encourages food to be more easily finished and leads to values of satisfaction and comfort. In parallel, the construct of Nutritional Content and Health Benefits, predominantly chosen by Participants 2, 6, 7, 8, 9, and 10, is linked to Portion Adequacy and Food Safety, forming a path toward values of long-term health and well-being. These two paths reinforce each other and converge on the construct of Social Impact and Program Value, reflecting students' acceptance of MBG as a form of care and equity.

Conversely, the rejection path begins with the construct of poor Food Quality and Freshness, such as unpleasant odor and tough texture, which emerged in the sensory findings for smell and touch in Step Seven. This construct is linked to Food Safety, encompassing concerns about the risk of poisoning and spoiled food, and leads to distrust of the program, as reflected in the choices of Participants 6, 7, and 8 in Step Six, who selected images of unhygienic or low-nutrition food as their opposite image. This path is ultimately related to the construct of Perception of MBG Program Policy or Rules, such as rules that change frequently and are considered inconsistent, which contributes to some students' ambivalent attitude toward the program's sustainability, as shown by Participant 4 in Step Five.

Overall, this mental map indicates that Appearance and Visual Appeal, as well as Nutritional Content, are the central nodes most connected to other constructs, thus serving as the main drivers of students' food preference, while Quality, Freshness, and Food Safety are key nodes that trigger food neophobia when food conditions do not meet expectations.

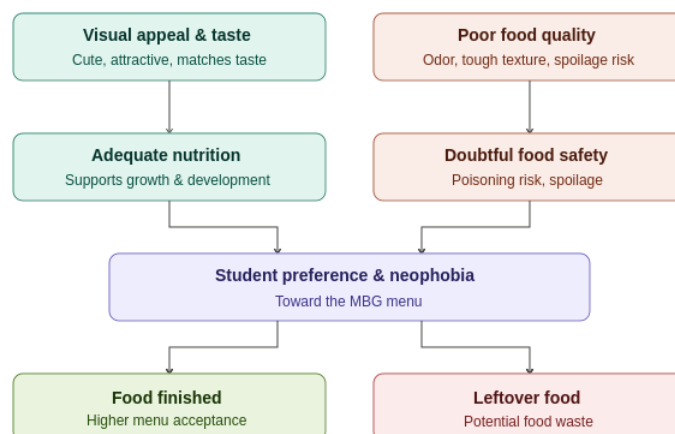


Figure 3. Mental Map

Step 9: Summary Image

At this stage, participants were asked to compile a collage from the images they had gathered and selected in the previous stages, including the most representative image, the opposite image, and the sensory image, and then to narrate the connections between these images in a complete story about their experience consuming MBG.

Most participants, namely Participants 2, 6, 7, 8, 9, and 10, compiled collages placing an image of a nutritionally complete menu at the center of the story, surrounded by supporting images such as healthy children and learning activities, explained as a representation of the hope that MBG can support students' growth and academic performance. This collage was consistently accompanied by a contrasting image of fast food or junk food, which, according to participants, served to emphasize that the MBG menu is healthier than fast food.

Participants 1 and 3 compiled collages emphasizing a storyline from an attractive menu appearance to an expression of eating satisfaction, complemented by sensory images such as bright colors and fragrant aromas, illustrating how visual appeal and taste complement each other in shaping a positive eating experience. Participant 4 compiled a collage displaying both the pros and cons of MBG policy side by side, representing the public debate surrounding the program, while still emphasizing the importance of the program's benefits for those in need. Meanwhile, Participant 5 compiled a simple collage centered on a positive emotional expression in the form of a smiling emoticon alongside images of the canteen and MSMEs, which she described as illustrating how MBG provides a feeling of fullness while also affecting students' snacking activity around the school.

Overall, the summary images from all participants show a consistent storyline: visual appeal and taste open students' interest in trying the MBG menu, nutritional content strengthens acceptance and finishing of the food, while poor food quality and safety are the main sources of students' reluctance and the potential for leftover food.

Step 10: Consensus Map - The Process

In the final stage, the researchers integrated all findings from the ten participants into a consensus map to identify the key constructs that consistently emerged and were mutually agreed upon as determinants of students' food preference and food neophobia toward the MBG menu.

Based on the frequency of construct occurrence across all interview stages, from story telling, sorting task, construct elicitation, representative image, opposite image, and sensory image, to mental map and summary image, four core constructs were identified as points of consensus: 1) Menu Appearance and Visual Appeal, agreed upon as the initial trigger of students' interest in eating; 2) Nutritional Content and Health Benefits, the construct most widely agreed upon as representing the main goal of the MBG Program and a determinant of long-term acceptance; 3) Food Quality, Freshness, and Safety, agreed upon as the critical construct most often triggering rejection or food neophobia; and 4) Perception of Program Policy or Rules, which produced a divided consensus, as it was perceived ambivalently by some students.

This consensus map confirms that students' food preference toward the MBG menu is most strongly shaped by the combination of visual appeal and nutritional content, while the tendency toward food neophobia is most strongly triggered by issues of food quality and safety. This finding is consistent with, and reinforces, the results of hypothesis testing in the quantitative analysis, which show that food preference significantly affects consumption behavior, both directly and through the mediation of food neophobia. Thus, the integration of the ZMET and SEM-PLS findings provides a more comprehensive understanding of the mechanism shaping students' consumption behavior toward the MBG Program.

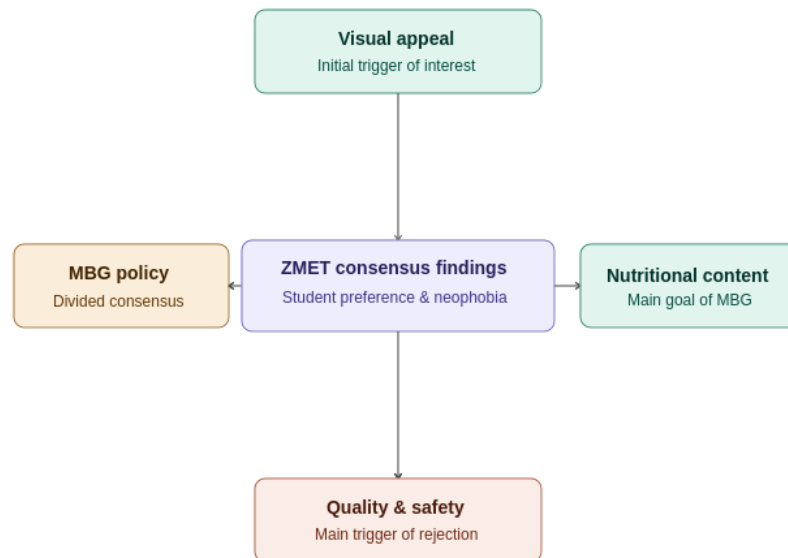


Figure 4. Consensus Map – The Process

CONCLUSION

Quantitatively, all research hypotheses were supported by the data. Food preference has a significant positive effect on consumption behavior ($\beta = 0.288$) and a significant negative effect on food neophobia ($\beta = -0.302$), while food neophobia has a significant negative effect on consumption behavior ($\beta = -0.445$). Food neophobia was also shown to significantly mediate the effect of food preference on consumption behavior ($\beta = 0.134$). This means that the more aligned students' preferences are with the MBG menu, the lower their reluctance to try the menu, resulting in better consumption behavior.

Qualitatively, the ZMET results from 10 participants show that students' preference for the MBG menu is most strongly shaped by visual appeal and nutritional content, while food neophobia is most strongly triggered by poor food quality and safety. The mental map illustrates two opposing paths: an acceptance path leading to finished food and a rejection path leading to leftover food, while the consensus map confirms four key constructs: visual appeal, nutritional content, food quality/safety, and perception of program policy.

The combination of these two methods reinforces and complements each other. The SEM-PLS findings statistically confirm that food preference and food neophobia influence consumption behavior, while the ZMET findings explain why and how this effect occurs, namely through visual appeal and nutrition as drivers, and food quality and safety as barriers. Thus, the quantitative results provide statistical evidence of the strength of the relationships between variables, while the qualitative results provide contextual understanding behind them, so that both approaches together produce a more complete picture of students' consumption behavior toward the MBG Program.

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