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Translating, modifying, and validating the Adult Picky Eating Questionnaire for use in China

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Abstract

Objective: The aim of this study was to translate, modify, and validate the Adult Picky Eating Questionnaire (APEQ) for use in China.

Methods: Based on standard procedures, the APEQ was translated into Chinese. Four items were added in the final Chinese version of the APEQ (C-APEQ). For testing the psychometric properties of the C-APEQ, a total of 1069 participants (17–24 years; 52.57% women) were recruited from two universities in mainland China.

Results: Exploratory factor analysis and confirmatory factor analysis supported the previous four-factor structure of the APEQ. Findings also showed that the C-APEQ had adequate internal consistency ($\alpha=0.874$) and test-retest reliability ($ICC=0.778$). The C-APEQ demonstrated strong measurement invariance across gender. Furthermore, the C-APEQ composite score presented positive and significant correlations with eating disturbance, psychological distress, and psychological inflexibility. It also showed a negative and significant correlation with food-related life satisfaction.

Conclusion: Findings suggested that the Chinese version of the APEQ demonstrated sound psychometric properties. Thus, the C-APEQ can be a useful tool in future studies to accurately assess picky eating among adult population and explore the relationships between picky eating and other physical and psychological outcomes in a Chinese context.

Keywords

Picky eating; Adult Picky Eating Questionnaire; Chinese; Validation

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1. Introduction

Picky eating (PE) refers to the consumption of a limited variety of food through the avoidance of both familiar and unfamiliar foods (Taylor, Wernimont, Northstone, & Emmett, 2015). Foods avoided by picky eaters, often based on aversions to their sensory properties, generally include foods that are widely accepted by an individual's peers. Previously considered a behavior restricted to childhood, an emerging literature has indicated that as many as one third of adult community sample participants in the United States endorse PE behaviors (Ellis, Galloway, Webb, & Martz, 2017; Kauer, Pelchat, Rozin, & Zickgraf, 2015). In the United States, PE has been associated with lower daily servings of fruits and vegetables and lower fruits and vegetables variety in college student and general adult samples (Ellis, Galloway, Zickgraf, & Whited, 2018; Zickgraf & Schepps, 2016), and adult PE is associated with considerable psychosocial morbidity (Wildes, Zucker, & Marcus, 2012). Adult PE is correlated with depressive symptoms, social eating anxiety, obsessive-compulsive disorder (OCD) symptoms, psychological inflexibility/experiential avoidance, and impaired eating-related quality of life (Ellis et al., 2017; Kauer et al., 2015; Wildes et al., 2012; Zickgraf, Franklin, & Rozin, 2016). These patterns suggest that PE behavior might be related to individual differences in the ability to tolerate, or the tendency to avoid, food-related physical or psychological experiences that might be uncomfortable.

These recent findings suggest that PE is an important influence on adult eating behavior. In addition, severe PE is one of three patterns of eating disturbance (i.e. selective/neophobic eating, low appetite/low eating enjoyment, and fear of negative consequences of eating such as choking or vomiting) that can lead to symptoms of Avoidant-Restrictive Food Intake Disorder (ARFID; American Psychiatric Association, 2013; Thomas et al., 2017). ARFID is a new diagnostic category added to DSM-5 to capture avoidant or restrictive eating disturbances not driven by the shape and weight concerns typical of other eating disorders, that lead to insufficient caloric and/or nutritional intake and/or psychosocial impairment (American Psychiatric Association, 2013).

PE research had been previously limited by methodological issues related to the inconsistent measurement of the construct. More recently, the development of comprehensive and psychometrically sound measures has provided support for PE research to progress. Most past PE research in both children and adults has relied on single item self-report or parent-report measures (Taylor et al., 2015; Zickgraf & Schepps, 2016). Short subscales aimed at measuring PE have focused item content on food neophobia and limited food variety (Hunot et al., 2016; Wardle, Guthrie, Sanderson, & Rapoport, 2001; Wildes et al., 2012; Zickgraf & Ellis, 2018); however, they likely exclude other important aspects of PE attitudes and behavior. Thus, the Adult Picky Eating Questionnaire (APEQ; Ellis et al., 2017) was created to measure additional dimensions of adult PE, and has been used to further operationalize the construct and better understand related psychosocial outcomes (Ellis, Schenk, et al., 2018; Ellis, Zickgraf, Galloway, Essayli, & Whited, 2018). The APEQ was developed using qualitative data from self-identified picky eaters for item development and factor analytic procedures in a general adult U.S. sample. The factor structure has also been confirmed in a sample of US college students (Ellis, Schenk, et al., 2018). The measure includes four subscales that assess 1) rigid behaviors and attitudes related to meal presentation or

preparation; 2) food variety and food neophobia; 3) disengagement and avoidance of mealtimes; and 4) rejection of bitter and sour tasting foods (Ellis et al., 2017).

The psychosocial and nutritional correlates of adult PE have only been studied in Western societies. However, recent research has shown PE to be common, and related to negative effects on growth and dietary nutrients, in Chinese children (Xue, Lee, et al., 2015; Xue, Zhao, et al., 2015). No literature regarding PE in adults exists in the context of China, which may be partially due to the lack of a valid measure. Considering the significance of PE behaviors and ARFID, and potential cultural differences in this construct, there is a need for a valid Chinese measure for assessing adult PE. The present study aimed to translate and test the psychometric properties of a self-report measure of adult PE for use in China by evaluating the factor structure of the C-APEQ, reliability, convergent validity, and measurement invariance across gender. It was hypothesized that the Chinese version of the adult PE measure would be positively associated with psychological distress, and psychological inflexibility, and negatively related to food-related satisfaction, with medium effect sizes, and to other disordered eating symptoms with a small-medium effect, as has previously been reported in adult US samples (e.g., Ellis et al., 2017; Kauer et al., 2015; Wildes et al., 2012; Zickgraf & Ellis, 2018; Zickgraf et al., 2016). As discussed above, a better understanding of the correlates of adult PE will help researchers understand how PE becomes associated with eating disorders and psychosocial factors that may maintain rigid eating patterns. Further study of the relationship between adult PE and psychological inflexibility/experiential avoidance may be particularly important as this construct represents a potential treatment target (e.g., Ellis et al., 2017). We also explored the psychometric equivalence of the APEQ for men and women. Although previous US research suggests that there are no gender differences in the prevalence of adult PE, measurement invariance needs to be established before research on gender differences in the prevalence, features, or correlates of PE can be conducted in Chinese samples.

2. Methods

2.1. Participants and procedure

The study protocol was approved by Hunan University and participants' informed consents were also obtained. A sample of 1069 undergraduate students (52.57% women) from Bohai University (in northern China) and Huzhou Normal University (in eastern China) were involved in the first-round survey. Their ages ranged from 17 to 24 years with a mean (*SD*) of 20.11 (1.01). The participants' body mass index (BMI) based on self-reported height and weight ranged from 14.30 to 36.89 kg/m², with a mean (*SD*) of 21.11 (3.10). After four weeks, a second-round survey was administered to a subsample of 101 participants from the first-round survey. The 101 participants were freshmen majoring in psychology in the two universities surveyed. All information was obtained using paper-pencil surveys.

2.2. Questionnaire translation and modification

According to the standard procedures (Brislin, 1970), the Adult Picky Eating Questionnaire (APEQ; Ellis et al., 2017) was translated into Chinese by three Chinese doctoral students with a high level of English proficiency. The back translation was then conducted by a fourth

bilingual (English, Chinese) doctoral student who had no previous knowledge about the APEQ. The back-translated version was then reviewed by the developer of the APEQ. After iterative modifications, the 16 items of the Chinese version of the APEQ (C-APEQ) were finalized. Following the recommendation in the APEQ development paper (Ellis et al., 2017) that additional items should be tested in future studies to bolster the psychometric properties of the two-item Taste aversion subscale, four items considered in the original APEQ development paper aimed at assessing aversion to tastes and textures were included (and noted in Table 1) in the current study. Past research has indicated that picky eaters reject foods based on texture (e.g., mushy), not just flavor (e.g., bitter), and the additional items primarily focus on texture rejection/acceptance (Boquin, Moskowitz, Donovan, & Lee, 2014). Thus, a 20-item version of the C-APEQ was advanced to subsequent validation procedures.

2.3. Measures

2.3.1 Adult Picky Eating Questionnaire—The APEQ (Ellis et al., 2017), from which the C-APEQ was translated, is a 16-item self-report measure that was designed for assessing adult PE. It has four subscales (i.e., meal presentation, food variety, meal disengagement, taste aversion), and the mean of the four subscales produces a composite score. An example item is, “I have a strong preference toward specific food presentation”. Each item is scored on a 5-point Likert scale from 1-“Never” to 5-“Always,” with higher scores reflecting higher levels of PE attitudes and behaviors. The APEQ has demonstrated sound psychometric properties in US adult and college student samples (Ellis et al., 2017; Ellis, Schenk, et al., 2018).

2.3.2. Eating Attitude Test-26—The Eating Attitude Test-26 (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) is a 26-item self-report measure assessing eating disturbance. An example item is, “I am terrified about being overweight”. Each of the items in the EAT-26 is scored on a 6-point Likert scale, which, after a recoding procedure suggested by Garner et al. (1982), yields a response score ranging from 0 (never) to 3 (always). The higher of the total scores of the EAT-26 reflect greater levels of eating disturbance. In the current study, the Chinese version (Wang et al., 2015) was used. The Cronbach's alpha for the EAT-26 was 0.856 in the current sample.

2.3.3. Satisfaction with Food-related Life Scale—The Satisfaction with Food-related Life Scale (SWFL; Grunert, Dean, Raats, Nielsen, & Lumbers, 2007) is a 5-item self-report measure assessing life satisfaction with food-related life. An example item is, “My life in relation to food and meals is close to my ideal”. Each item is scored on a 6-point Likert scale from 1-“strongly disagree” to 6-“strongly agree,” with higher scores reflecting higher levels of satisfaction with food-related life. In the current study, as there was no Chinese version of the SWFL, we followed the same translating procedures as obtaining the C-APEQ to translate the SWFL into Chinese. The Cronbach's alpha for the Chinese version of the SWFL was 0.896 in the current sample.

2.3.4. Kessler Psychological Distress Scale—The Kessler Psychological Distress Scale (K10; Andrews & Slade, 2001) is a 10-item self-report measure assessing

psychological distress. An example item is, “During the last 30 days, about how often did you feel nervous?”. Each item is scored on a 5-point Likert scale from 1-“None of the time” to 5-“All of the time,” with higher scores reflecting greater levels of psychological distress. In the current study, the Chinese version of K10 (Xu et al., 2013) was used. The Cronbach's alpha in the present sample was 0.922.

2.3.5. Acceptance and Action Questionnaire-II (AAQ-II)—The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) is a 10-item self-report measure assessing psychological inflexibility and experiential avoidance. In this case, psychological inflexibility is defined as intentional avoidance of potentially negative physical or emotional states (e.g., experiential avoidance). An example item is, “I worry about not being able to control my worries and feelings”. Each item is scored on a 5-point Likert scale from 1-“Never true” to 7-“Always true,” with higher scores reflecting greater levels of psychological inflexibility, or experiential avoidance. In the current study, the Chinese version (Zhang, Chung, Si, & Liu, 2014) was used. The Cronbach's alpha for the AAQ-II was 0.932 in the current sample.

2.4. Data analysis

Data analyses were carried out using R version 3.50 (R Core Team, 2018). The percentage of values missing for the 20 items of the C-APEQ ranged 0.47% to 1.50%. As the missing was far less than the recommended cut-off value of 5% (Schafer, 1999), we did not impute values for the missing data. The total sample was randomly split into halves, with data from one half ($n=531$) used for exploratory factor analysis (EFA) and data from the other ($n=538$) for confirmatory factor analysis (CFA). Using the psych package (Revelle, 2014), EFA was conducted based on polychoric correlations (Baglin, 2014), with ordinary least square estimator (Lee, Zhang, & Edwards, 2012) and Oblimin rotation. The number of factors was determined by parallel analysis (Horn, 1965).

Using the lavaan package (Rosseel, 2012), CFA was conducted with the WLSMV estimator. Model fit was evaluated using the comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR), and cutoffs for acceptable fit were evaluated based on Hu and Bentler's (1999) recommendations (i.e., RMSEA < 0.08, CFI > 0.90, TLI > 0.90, and SRMR < 0.08). Furthermore, tests of measurement invariance across gender groups were conducted. According to previous literature (Chen, 2007; Cheung & Rensvold, 2002), CFI > 0.90 and RMSEA < 0.05 indicate measurement invariance across different groups.

Internal consistency of the C-APEQ was assessed by ordinal coefficient alpha (Zumbo, Gadermann, & Zeisser, 2007). A value of Cronbach's alpha should be at least 0.60 to be acceptable, and the good value is 0.70 or above (Nunnally & Bernstein, 1994). The intra-class correlation (ICC), as an indicator of test-retest reliability (Shrout & Fleiss, 1979), was used to assess the test-retest reliability. According to Anastasi (1988), an acceptable ICC value is 0.60, and 0.70 or above represents good test-retest reliability.

Finally, we further evaluated the convergent validity of the C-APEQ via correlations between the C-APEQ and eating disturbance, food-related life satisfaction, psychological

distress, and psychological flexibility. In terms of the general guidelines for the magnitude of correlations (Cohen, 1988), values of 0.10, 0.30, and 0.50 could be considered as small, moderate, and large correlations, respectively. All tests of significance were two-sided, and a $p < .05$ was considered statistically significant.

3. Results

3.1. Exploratory factor analysis

With the set of 20 items of the C-APEQ, the results of the parallel analysis (Appendix A) supported a four-factor structure. A four-factor EFA was conducted, and the 16 items from the original APEQ loaded on the intended factors (loadings > 0.30). Moreover, the additional four items added to the Taste aversion subscale strongly loaded on this subscale (factor loadings for EFA are presented in Table 1).

3.2. Confirmatory factor analysis

Based on the factor structure derived from EFA, a four-factor correlated model was evaluated using CFA. Results showed that the model fit for the four-factor correlated model was marginally acceptable, $\chi^2=610.375$ ($df=164$, $p < .001$), RMSEA=0.074 (90% CI: 0.068–0.080), CFI=0.908, TLI=0.894, and SRMR=0.059. Modification indices (MI) were examined, and the largest MI value (98.57) indicated that the error covariance between item 1 and item 5 needed to be freely estimated. Considering that both items include similar item content, the error covariance was freely estimated and the CFA was conducted again. Results showed that the modified four-factor correlated model had good fit, with $\chi^2=505.060$ ($df=163$, $p < .001$), RMSEA=0.065 (90% CI: 0.059–0.072), CFI=0.930, TLI=0.918, and SRMR=0.055. Furthermore, for testing the suitability of a composite score, a second-order four-factor model was assessed, and results showed the model fitted the data well, $\chi^2=493.420$ ($df=165$, $p < .001$), RMSEA=0.063 (90% CI: 0.057–0.070), CFI=0.933, TLI=0.922, and SRMR=0.055. The factor loadings and inter-factor correlations for CFA are shown in Table 2.

3.3. Tests of measurement invariance across gender groups

Given the evidence of adequate model fit for the modified four-factor correlated model for both male and female participants (see Table 3), tests of measurement invariance across gender for the full sample were conducted. As shown in Table 3, all values of the CFI and RMSEA were less than the suggested cut-off values (i.e., 0.010 for CFI, 0.015 for RMSEA), which supported strong measurement invariance for men and women.

3.4. Reliability

The ordinal Cronbach's alpha for the total scale of the C-APEQ was 0.874, with 0.763, 0.798, 0.788, and 0.673 for Taste aversion, Food variety, Meal presentation, and Meal disengagement, respectively. Furthermore, the ICC was 0.778, with 0.609, 0.614, 0.721, and 0.644 for the Taste aversion, Food variety, Meal presentation, and Meal disengagement, respectively. Therefore, the overall reliability for the C-APEQ was good, and all subscales of the C-APEQ showed either acceptable or good reliability.

3.5. Convergent validity

As shown in Table 4, the C-APEQ composite score showed a positive and small to medium association with eating disturbance ($r=0.200, p < .01$), and it had positive and moderate associations with psychological distress ($r=0.389, p < .01$) and psychological inflexibility ($r=0.411, p < .01$). It was negatively correlated with food-related life satisfaction, with a small to medium size of correlation ($r=-0.193, p < .01$). Furthermore, the subscales of the C-APEQ were similarly correlated with these eating-related and psychosocial measures except for a non-significant correlation between Meal presentation and food-related life satisfaction. In addition, the C-APEQ composite score had non-significant and negligible correlations with gender and BMI, as was the case in the original US validation sample. In sum, the overall correlation pattern was in the expected directions and magnitudes.

4. Discussion

In the current study, we translated, modified, and validated the Chinese version of the APEQ in a large sample of Chinese young adults. Because there is still a lack of research on adult PE in China, and because PE, as one of the core symptoms of ARFID, is associated with both physical and psychological morbidity in US samples, it is necessary to develop assessments for PE in the adult Chinese population. Our findings supported the four-factor structure of the APEQ, as well as the good reliability and construct validity of this tool for assessing PE. It was also found that the C-APEQ demonstrated strong measurement invariance across male and female gender identity. Thus, it is relatively safe to use the C-APEQ in future studies for exploring gender differences in PE in a Chinese context.

In addition to validating the 16-item APEQ, the C-AEPQ included some modifications intended to strengthen the original, as recommended by the developers. We bolstered the two-item Taste Aversion subscale by adding and testing four additional items related to the taste and texture aversion/sensitivity that is commonly reported among picky eaters (Taylor et al., 2015). The additional items performed as expected, strengthening the subscale, and EFA and CFA supported the previous four-factor structure of the APEQ (Meal Presentation, Food Variety, Meal Disengagement, and Taste Aversion). Moreover, a second-order model supported the suitability of using the C-APEQ composite score.

The C-APEQ presented significant associations in expected extents and directions with related eating and psychosocial measures, supporting the construct validity of the C-APEQ. This is the first finding in a Chinese adult sample linking PE to impairment (i.e., low eating-related life satisfaction). These findings suggest that, as in adult samples in the US, PE might be most strongly linked to the psychosocial impairment, rather than the significant weight-loss symptoms of ARFID (APA, 2013). As in previous adult and college student samples in the US, the C-APEQ was unrelated to BMI in this Chinese undergraduate sample. However, more research is needed to further understand associations between severe adult PE and possible nutritional deficiencies, which this study did not address.

The finding that PE is related to a measure of psychological inflexibility indicates a potential direction for intervention development research. Acceptance and commitment therapy (ACT), which aims to enhance patients' ability and willingness to tolerate uncomfortable

sensations, thoughts, and feelings, has demonstrated efficacy for the treatment of a variety of psychological disorders, including binge eating disorder (e.g., Katterman, Kleinman, Hood, Nackers, & Corsica, 2014), and the development of ACT-based interventions for weight loss via changes in eating behavior is an active area of research (e.g., Forman & Butryn, 2015). Beyond ACT, existing evidence-based interventions aimed at reducing avoidance and managing uncomfortable emotional states may apply to food-related avoidance with some modifications (e.g., Barlow et al., 2017). For example, repeated exposure to avoided stimuli is an efficacious treatment for anxiety that has been adapted to treat ARFID patients with PE (Thomas & Eddy, 2019). Because disgust has been shown in analogue samples to habituate more slowly than fear, exposure-based treatments for adult PE might need to incorporate distress tolerance and self-regulation skills to enhance acceptability and effectiveness (Olatunji, Wolitzky-Taylor, Willems, Lohr, & Armstrong, 2009).

5. Limitations

Several limitations in the current study must be noted. As previously observed in a United States college student sample (Ellis, Schenk, et al., 2018), no clear relationships between adult PE and BMI appeared to exist in the present sample; however, reliance on BMI derived from self-reported height and weight could bias these results (Stommel & Schoenborn, 2009) and future research should include lab measurements of height and weight. As demonstrated in a general adult sample, more nuanced relationships between BMI and certain forms of PE may exist (Ellis, Schenk, et al., 2018). Another major limitation of the current study is that our sample only involved Chinese undergraduate students from two universities, which limits its generalizability. As a result, the C-APEQ should be used cautiously in other populations (e.g., treatment-seeking eating disordered sample, general adult samples), and it is highly recommended that the psychometric properties of the C-APEQ be tested in both clinical and more representative general samples. Finally, in the current study, we did not test the discriminant validity of the C-APEQ which, however, should be examined in future studies for a comprehensive evaluation of the validity of the C-APEQ.

6. Conclusion

Overall, the current study demonstrated that the Chinese version of the APEQ had good psychometric properties. Thus, the C-APEQ can be a useful tool in future studies to accurately assess PE among adult population and explore the relationships of PE with other physical and psychological outcomes in a Chinese context.

Appendix A.: Parallel analysis

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Table 1

Factor loadings and inter-factor correlations for EFA ($n=531$).

	Taste aversion	Food variety	Meal presentation	Meal disengagement
18. I avoid foods that are mushy or slippery. ^a	0.641	-0.134	-0.010	0.063
20. I prefer only sweet or salty foods that do not have a significant amount of other flavors. ^a	0.639	0.075	0.067	-0.029
19. I prefer only pureed or smooth foods. ^a	0.557	-0.063	-0.003	0.161
8. I reject sour foods.	0.538	0.155	-0.005	0.034
4. I reject bitter foods, even if they are only slightly bitter.	0.535	0.167	-0.010	-0.058
17. I prefer textures that are hard, dry or crunchy. ^a	0.521	0.043	-0.030	-0.107
2. I eat a limited number of items from each food group.	0.040	0.741	0.185	-0.026
6. My usual diet lacks a variety of food groups.	0.074	0.722	0.060	-0.094
13. I eat from a very narrow range of foods (fewer than 10 different foods).	0.019	0.707	-0.149	0.174
10. I do not like trying new foods.	-0.010	0.531	-0.143	0.256
1. I have a strong preference toward specific food presentation.	-0.152	0.054	0.656	-0.100
5. I prefer foods of a particular color.	0.071	-0.075	0.594	0.002
12. I am sad or disappointed when food is not prepared/cooked in the "right way".	0.104	-0.017	0.586	0.068
9. I cringe, cry, or gag after seeing or eating certain foods.	0.012	0.057	0.474	0.338
14. I am immediately suspicious of food and feel the need to carefully inspect the majority of food.	0.111	0.070	0.460	0.183
16. I will not eat a food if I saw someone else touch it.	0.152	0.194	0.420	-0.061
15. I eat foods in a specific sequence.	0.152	0.052	0.379	0.146
11. I avoid mealtimes.	0.023	0.026	0.010	0.912
3. I am often disengaged/uninvolved when sitting at the table for mealtime.	0.134	0.137	0.131	0.457
7. I usually feel that I have something better to do than eating.	0.045	0.071	0.092	0.312
Eigenvalue	5.95	2.03	1.45	1.21
Variance%	11.96	11.57	10.75	8.57
Correlation matrix	1	2	3	4
1. Taste aversion	1			
2. Food variety	0.501	1		
3. Meal presentation	0.322	0.277	1	
4. Meal disengagement	0.439	0.431	0.132	1

Note: Item loadings > 0.30 are in bold type.

^a Newly added items in the C-APEQ.

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Table 2

Factor loadings and inter-factor correlations for CFA models ($n=538$).

	First-order	Second-order
Taste aversion		0.716
8. I reject sour foods	0.680	
19. I prefer only pureed or smooth foods. ^a	0.677	
4. I reject bitter foods, even if they are only slightly bitter	0.660	
20. I prefer only sweet or salty foods that do not have a significant amount of other flavors. ^a	0.644	
18. I avoid foods that are mushy or slippery. ^a	0.601	
17. I prefer textures that are hard, dry or crunchy. ^a	0.346	
Food variety		0.794
2. I eat a limited number of items from each food group	0.750	
13. I eat from a very narrow range of foods (fewer than 10 different foods)	0.773	
10. I do not like trying new foods	0.677	
6. My usual diet lacks a variety of food groups	0.571	
Meal presentation		0.744
14. I am immediately suspicious of food and feel the need to carefully inspect the majority of food	0.724	
9. I cringe, cry, or gag after seeing or eating certain foods	0.663	
12. I am sad or disappointed when food is not prepared/cooked in the "right way."	0.636	
16. I will not eat a food if I saw someone else touch it	0.579	
15. I eat foods in a specific sequence	0.578	
5. I prefer foods of a particular color	0.436	
1. I have a strong preference toward specific food presentation	0.401	
Meal disengagement		0.996
11. I avoid mealtimes		0.763
3. I am often disengaged/uninvolved when sitting at the table for mealtime		0.727
7. I usually feel that I have something better to do than eating		0.462

Correlation matrix	1	2	3	4
1. Taste aversion	1			
2. Food variety	0.552	1		

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Correlation matrix	1	2	3	4
3. Meal presentation	0.546	0.592	1	
4. Meal disengagement	0.716	0.805	0.724	1

Note:

^aNewly added items in the C-APEQ.

Table 3Fit indices for gender invariance test ($n=1069$).

Model	χ^2	df	CFI	TLI	RMSEA [90% CI]	SRMR	Scaled χ^2	CFI	RMSEA
Male	481.058**	163	0.944	0.935	0.064 [0.057, 0.070]	0.053	–	–	–
Female	530.187**	163	0.916	0.902	0.066 [0.060, 0.073]	0.058	–	–	–
Configural invariance	1012.268**	326	0.932	0.921	0.065 [0.061, 0.070]	0.055	–	–	–
Metric invariance	988.478**	342	0.936	0.929	0.062 [0.057, 0.066]	0.059	38.343**	0.004	–0.003
Scalar invariance	1105.853**	398	0.930	0.933	0.060 [0.056, 0.064]	0.056	69.11	–0.006	–0.002

Note: CFI=change in CFI relative to the preceding model; RMSEA=change in RMSEA relative to the preceding model.

**
 $p < .01$.

Table 4

Correlations with eating and psychology measures.

	Mean	SD	1	2	3	4	5	6	7	9	9	10
1. Taste aversion	2.43	0.68	1									
2. Food variety	2.50	0.82	0.424**	1								
3. Meal presentation	2.56	0.63	0.390**	0.381**	1							
4. Meal disengagement	2.27	0.74	0.428**	0.499**	0.413**	1						
5. APEQ composite score	2.46	0.52	0.773**	0.739**	0.777**	0.704**	1					
6. Eating disturbance	8.23	7.60	0.165**	0.129**	0.164**	0.121**	0.200**	1				
7. Food-related life satisfaction	20.89	4.50	-0.137**	-0.218**	-0.021	-0.307**	-0.193**	0.015	1			
8. Psychological distress	21.17	7.24	0.282**	0.281**	0.323**	0.290**	0.389**	0.286**	-0.240**	1		
9. Psychological inflexibility	19.88	8.83	0.291**	0.278**	0.352**	0.270**	0.411**	0.253**	-0.160**	0.631**	1	
10. Gender (male=1, female=2)	1.53	0.50	0.019	0.018	-0.086**	-0.061*	-0.044	0.213**	-0.019	0.070*	0.043	1
11. BMI	21.11	3.10	-0.007	-0.066*	-0.007	-0.081**	-0.030	0.080**	0.023	-0.014	0.040	-0.141**

Notes: APEQ=Adult Picky Eating Questionnaire; BMI=self-reported body mass index.

*
 $p < .05$.**
 $p < .01$.