Journal of Pediatric Nursing 69 (2023) 1–5

Contents lists available at ScienceDirect

Journal of Pediatric Nursing

journal homepage: www.pediatricnursing.org

The Chinese version of the Child Food Neophobia Scale and its reliability and validity in preschool children

Wen Luo, Qian Cai, Rong Chen, Yue Yin, Xin-xin Sun, Ye-peng Cai, Hui-zi Song, Yi-ran Zhang, Yuexia Liao *

School of Nursing, School of Public Health, Yangzhou University, Yangzhou, Jiangsu, China

ARTICLE INFO

Article history:
Received 2 September 2022
Revised 16 November 2022
Accepted 9 December 2022

Keywords:
Preschool children
Food neophobia
Scale
Reliability
Validity

ABSTRACT

Objective: To translate the English version Child Food Neophobia Scale (CFNS) into the Chinese version and test its reliability and validity in preschool children.
Methods: To create the Chinese version of the CFNS, it was translated, back-translated, and cross-culturally adapted. The use of the Chinese version of CFNS by 575 parents of preschool children in two kindergartens in Yangzhou City was investigated using cluster sampling to assess the reliability and validity of the scale.
Results: The Chinese version of CFNS has nine items in total. The scale-level average content validity index (S-CVI/Ave) is 0.983. Exploratory factor analysis (EFA) extracted 2 common factors, and the cumulative variance contribution rate was 49.437%. Confirmatory factor analysis (CFA) showed that the 2-factor model was well fitted. The Cronbach'α coefficient of the scale was 0.759, the Cronbach'α coefficients of the two factors were 0.735 and 0.713, the split-half reliability was 0.788, and the test-retest reliability was 0.756.
Conclusion: The Chinese version of the Child Food Neophobia Scale has good reliability and validity in preschool children and can be used as an assessment tool for food neophobia in preschool children in China.
Practice implications: This study has gone through a rigorous translation process, and the CFNS may support future exploration of food neophobia in preschool children. Food allergy factors in the results may be the next step in the research, and several studies are still needed to understand the relationship between food allergy and food neophobia.

Introduction

Food neophobia was first proposed by Pliner (Pliner & Hobden, 1992) in 1992. It refers to the refusal or fear of eating new foods, which is a resistance to novel foods (Harris, 2018). Originally, this behavior was considered as a safety protection mechanism (Armelagos, 2014), denying the intake of a food in order to protect oneself from the potential harm of the new food when it is presented. Since food is relatively safe in modern society, researchers have begun to explore the mechanisms and relationships between sensory, texture, individual sensitivity and food neophobia, enriching the understanding of food neophobia and providing a theoretical basis for different perspectives.

Food neophobia is most common in children aged 2–6 years (Lafraire et al., 2016), and studies in various countries have found that about 10.8% to 30.1% of children suffer from food neophobia (Anjos et al., 2021; Hazley et al., 2022; Kozioł-Kozakowska et al., 2018; Szakály et al., 2021). Food neophobia will have effects on food preference, growth and development, physical health and mental health in children. Studies have found that food neophobia is negatively correlated with children's food preferences (Kähkönen et al., 2021) and affects their dietary intake (Mohd Nor et al., 2021). Food neophobia in children is associated with a lower intake of fruits and vegetables (Etuk & Forestell, 2021; Taylor et al., 2015) and protein(Perry et al., 2015), resulting in decreased overall diet quality (Kaar et al., 2016). Food neophobia will affect the intake of nutrients in children and into adulthood, leading to malnutrition. Malnutrition jeopardizes the growth and neurobehavioral development of children, leading to growth retardation, anemia, and even impaired intellectual development (Tesema et al., 2021). In Sarin's prospective study, significant associations were found between food neophobia and ω-3 (n-3) fatty acids, higher levels of inflammatory markers in the blood, and fasting serum insulin, leading to an increased risk of cardiovascular disease and type 2 diabetes (Quick et al., 2014; Sarin et al., 2019). In addition, children's food neophobia may be associated with children's approach/withdrawal tendencies (Moding & Stifter, 2016), which will lead to limited social functioning and psychological difficulties (Kutbi et al., 2019), etc. Food neophobia is often associated with genes and genetics, child's temperament, family, environment and other factors.

* Corresponding author at: School of Nursing, School of public health, Yangzhou University, Jiang Yang Middle Road, Yangzhou, Jiangsu, China.
E-mail address: yxliao@yzu.edu.cn (Y. Liao).

https://doi.org/10.1016/j.pedn.2022.12.009
0882-5963/

Food neophobia is heritable, up to 78% (Cooke et al., 2007), and may also involve the influence of taste receptors, with different perceptions of sweet and bitter tastes (Feeney et al., 2011).Temperament is a relatively stable personality trait manifested early after birth. Having a more emotional child temperament has been shown to be associated with more frequent food refusal in children aged 3 to 6 years (Powell et al., 2011). The development of children's food preferences and rejection is influenced by parental characteristics and behaviors (Finistrella et al., 2012). Since early childhood food-related decisions and behaviors occur primarily in the home environment with parents present, factors such as parents' food preferences and beliefs, and the child's food exposure may bring about changes in food choices for the child. Parental pressure given at mealtimes and anxiety about feeding may trigger or reinforce negative eating behavior problems in children. Additionally, there are numerous factors that influence food neophobia, and it is particularly critical to evaluate and explore factors that can be appropriately intervened to reduce food neophobia in children.

To accurately assess child food neophobia, Pliner adapted the Food Neophobia Scale (FNS) (Pliner & Hobden, 1992) to the Child Food Neophobia Scale (CFNS) (Pliner, 1994) in 1994. The CFNS is commonly used and effective tool for assessing food neophobia in children. It has been translated into local languages and applied to children in Portugal (Gomes et al., 2018), Australia (Russell & Worsley, 2008), Italy (Laureati et al., 2015) and other countries to verify and explore the characteristics of CFNS, showing good reliability and validity. Currently, there are few studies on food neophobia in China. The Chinese versions of CFNS and FNS have been translated and validated in children aged 12–36 months (Zou et al., 2019) and college students (Zhao et al., 2020), respectively, and have intervened in food neophobia in college students (Tian & Chen, 2021). However, early childhood, a critical period for the development of food preferences and behavioral habits in children (Ventura & Worobey, 2013) and the age when food neophobia occurs frequently, has not been reported in China, so the prevalence of food neophobia in Chinese preschool children is unknown. As the previous Chinese version of CFNS had removed items due to age, the assessment of preschool children could not be conducted correctly. Therefore, the aim of this study was to cross-culturally translate the CFNS and examine its reliability and validity in preschool children, with a view to forming a suitable assessment tool for food neophobia in Chinese preschool children.

Methods

Participants

A total of 575 preschool children and their parents participated in the questionnaire survey from December 2021 to January 2022 in Yangzhou City, Jiangsu Province, China, using a cluster sampling method to select one public kindergarten in the county and one in the rural area. Inclusion criteria: ① preschool children aged 3 to 6 years; ② parents were able to read and understand, and participated voluntarily.

Materials

Socio-demographic questionnaire. Designed by the researcher's team after reviewing the literature, it included the child's gender, age, height, weight, place of residence, whether he/she was an only child, whether he/she had food allergies and three questions for parents about diet (a. Do you try to eat foods you have not eaten? b. Do you prepare foods for your child that he/she has not eaten? c. Do you prepare foods for your child that you do not like?).

Child Food Neophobia Scale. The scale was developed by Pliner in 1994 (Pliner, 1994) to assess children's willingness to taste new foods. There are 10 items in total, using a Likert 7-point scale (1 = strongly disagree, 7 = strongly agree) with a total score range of 10 to 70. Scores above the 75th percentile of the sample were defined as having food neophobia (Laureati et al., 2015). The CFNS has been widely used to assess food neophobia in preschool children in several countries (Gomes et al., 2018; Russell & Worsley, 2008; Szakály et al., 2021) and has shown good reliability and validity.

Chinese Preschoolers' Eating Behavior Questionnaire (CPEBQ). The questionnaire was developed by Yang (Xian-jun et al., 2012) et al. in 2012 by studying the development and application of the Children's Eating Behavior Scale in various countries and combining the characteristics of eating behavior and food culture of preschool children in China. There are 38 items, 7 dimensions, using the Likert 5-point scale (1 = never, 5 = always). We used the "picky eating" subscale in this study, and the score of the subscale was divided by the total number of items, and the higher the score, the higher the tendency of picky eating.

Translation and cross-cultural adaptation

The researcher contacted the original author of CFNS, explained the content and significance of the study, and obtained the English version of the scale and the authorization for Chinese translation. The Chinese translation of the scale was carried out strictly following Brislin translation-back translation procedure (Brislin, 1970).

a. Translation: A graduate student majoring in nursing and English translated the scale into Chinese (version A1 and A2, respectively). Draft A was determined after discussion by the research team.

b. Back-translation: Then another graduate student in nursing and English (who have not been exposed to the original scale) back-translated the Chinese into English (version B1 and B2), respectively. Two nursing teachers who are familiar with the Chinese translation were invited for comparison and discussion, forming back-translated version B.

c. The original scale, the translated version A and the back-translated version B were compared and discussed, and the translated version of the scale was revised and adjusted. An associate chief pediatrician proficient in English was invited to join to consult the differences between the scale and the original scale. After proper adjustment, the initial Chinese version C of the scale was formed.

d. Six experts (one pediatric nursing expert and five pediatric clinical experts, all with deputy senior titles or above) were invited to evaluate according to the Chinese cultural background and comprehensibility of the items, and then adjusted to form the Chinese CFNS version D.

Pre-experiments. 30 parents who met the inclusion and exclusion criteria were selected from the pediatric outpatient clinic of a tertiary care hospital in Yangzhou City in December 2021 and were pre-surveyed and interviewed using the Chinese CFNS version D (not included in the formal sample). Examining the scale for semantic ambiguities and unintelligible items. Parents' feedback was recorded and modified to form the Chinese version of CFNS (see Table 1). The results showed that parents indicated that the content descriptions were clear and the semantics were easy to understand.

Data collection

The surveyors and teachers of the kindergarten classes explained the significance of the survey and the requirements for completing the questionnaire in the WeChat parent groups, obtained informed consent from the parents of the participating children, distributed the questionnaire and collected it in a timely manner. Two weeks later, 20 parents of the children in the sample were randomly selected to conduct the questionnaire again to assess the test-retest reliability of the scale.

Statistical analysis

Data were double entered using Epidate 3.1 and statistically analyzed using SPSS 26.0 and Amos 26.0 software. The measurement data in this study conformed to a normal distribution and are therefore described using the mean ± standard deviation ($\bar{x}\pm s$); the counting

Table 1
Original items of the CFNS and Chinese translation.

English	Chinese
1. My child will constantly sampling try new and different foods.	我的孩子会不断地尝试新的和不同的食物。
2. My child does not trust new foods.	我的孩子不信任新的食物。
3. If my child doesn't know what is in food, he/she won't try it.	如果我的孩子不认识是什么是食物，他/她就不会尝试。
4. My child likes foods from different countries.	我的孩子喜欢吃不同国家的食物。
5. Ethnic food looks too weird to eat.	对我的孩子来说，具有民族特色的食物看起来太奇怪了以至于拒绝尝试。
6. At dinner parties, my child will try a new food.	我的孩子会在聚会中尝试新的食物。
7. My child is afraid to eat things he/she have never had before.	我的孩子不敢吃以前从未吃过的食物。
8. My child is very particular about the foods he/she will eat.	我的孩子对他/她将要吃的食物非常挑剔。
9. My child will eat almost anything.	我的孩子几乎什么都吃。
10. My child likes to try new ethnic restaurants.	我的孩子喜欢尝试新奇且具有民族特色餐厅的食物。

data is described in percentage (%). Independent sample t-test and Pearson correlation analysis were used for item analysis to test the reliability of the scale or individual items. The scale validity was evaluated by content validity, structural validity, and criterion-related validity. Content validity uses Content Validity Index (CVI) as a quantitative index to measure the reasonableness and appropriateness of content. In order to illustrate the degree of agreement between the results of the scale and the theory assumed in the design of the scale, EFA and CFA were used to evaluate the structural validity. The criterion-related validity was analyzed by Pearson correlation analysis, which is the reference standard for measuring the validity of the test. The scale reliability was evaluated using internal consistency reliability, test-retest reliability, and split-half reliability. Differences were considered statistically significant at $P < 0.05$.

Results

Basic information of participants

A total of 690 questionnaires were distributed and 622 were collected, with a recovery rate of 90.1%. Excluding invalid questionnaires with incomplete data or inconsistent information, 575 valid questionnaires were recorded, with an effective recovery rate of 92.4%. There were 575 preschool children included, 314 males (54.6%) and 261 females (45.4%); age (4.61 ± 0.91) years; height (112.86 ± 8.06) cm; body weight (21.11 ± 4.28) kg. Questionnaires were mainly completed by mothers (78.4%).

Reliability analysis of CFNS

In this study, the Cronbach's alpha coefficient of the CFNS scale was 0.759, the two factors were 0.735 and 0.713, respectively; a split-half reliability of 0.788 and a test-retest reliability of 0.756 after two weeks.

Item analysis of CFNS

Critical ratio method. The first 27% and the last 27% of the total CFNS scale scores were divided into two groups for independent sample *t*-test. The differences between the high and low subgroups for each item of the scale were statistically significant ($P < 0.001$)

The total correlation coefficient of the items. The correlation coefficients between each item and the total score ranged from 0.453 to 0.651 ($P < 0.001$).

Validity analysis of CFNS.

Content validity. Content validity of the scale was assessed by six experts, the Item-Content Validity Index (I-CVI) ranged from 0.833 to 1.000, and the scale-level average content validity index (S-CVI/Ave) was 0.983.

Structural validity. a. EFA The Kaiser-Meyer-Olkin (KMO) test value was 0.814 and Bartlett's spherical test reached a significant level ($\chi^2 = 1290.711$, $df = 45$, $P < 0.001$), indicating suitability for factor analysis. Factors were extracted using principal component analysis, factor rotation by maximum variance method, and factors with feature roots >1 were extracted as common factors. The results showed that two common factors were extracted, with a cumulative variance contribution of 49.437%. Except for item 9, all items of the scale had factor loadings >0.5 on the dimension to which they originally belonged, and since item 9 had a difference of <0.2 in the two common factors, it was deleted. The results are shown in Table 2. **b. CFA** The maximum likelihood method was used to estimate each parameter, and the results are shown in Table 3. The fit indices of the model met the reference standard and fit well.

Criterion-related validity. CFNS scale scores were moderately correlated with scores on the picky eating dimension of the CPEBQ, with a correlation coefficient of 0.494 ($P < 0.001$).

Descriptive analysis

In this study, the score of food neophobia in preschool children was 32.46 ± 6.48 (Mean ± SD) and 119 preschool children suffered from food neophobia (20.69%). Food neophobia scores were compared by grouping children by gender, place of residence, whether they were an only child, whether they had food allergies, and for three questions from parents about diet. The results of the study showed that the differences in food neophobia scores were statistically significant ($P < 0.05$) between the groups in the place of residence, having food allergies, do you try to eat foods you have not eaten? and do you prepare foods for your child that he/she has not eaten? (see Table 4).

Discussion

Understanding how eating patterns develop in childhood and the major processes that influence their shaping is essential for developing more effective intervention strategies to improve children's diets. Food neophobia is considered to be an important factor causing children's food preferences and directly influencing their food choices(Fletcher et al., 2017). A survey of children and adolescents in 15 provinces (Li et al., 2020) and preschool children in five provinces (Yi-yao et al., 2021) in China showed that insufficient intake of vegetables and fruits and the rate of meeting the dietary guidelines was low. Therefore, it is necessary to find out the possible influencing factors on food neophobia in children so that identify and take action as early as possible. In order to assess the current situation of food neophobia among preschool children in China and explore the factors that influence food neophobia in children, an instrument with good reliability and validity is required. This study strictly follows the principles of scale introduction, and after

Table 2
Results of the exploratory factor analysis of CFNS.

Items	Factor 1	Factor 2
3	**0.769**	0.015
7	**0.745**	0.162
2	**0.671**	0.163
8	**0.645**	0.097
5	**0.570**	0.183
10	0.202	**0.739**
1	0.141	**0.720**
6	0.143	**0.712**
4	−0.020	**0.686**
9	0.375	0.495

Table 3
Results of the confirmatory factor analysis of CFNS.

Items	χ^2/df	RMSEA	CFI	TLI	IFI
Fitting standards	≤3	<0.08	>0.9	>0.9	>0.9
Fitting results	2.126	0.044	0.972	0.961	0.972

注: χ^2/df: CMIN/DF; RMSEA: root mean square error of approximation; CFI: comparative fit index; TLI: Tucker-Lewis index; IFI: incremental fit index.

translation, back-translation and cross-cultural adjustment to form the Chinese version of CFNS scale, and test its reliability and validity in preschool children, which will be a useful supplement in children's eating behavior and nutrition. The validated questionnaire can be applied to preschool children in China. The questionnaire scores can be used to effectively identify children who have food neophobia or a tendency to be food neophobic, and it is expected that interventions can be found among the influencing factors to promote healthy eating behavior and improve the quality of diet.

Good reliability and validity were shown in this study. Reliability reflects the stability and consistency of the results measured by the scale. The Cronbach's alpha coefficient of the CFNS was 0.759, and the two factors were 0.735 and 0.713, respectively, suggesting that the scale had good internal consistency. The split-half reliability was 0.788, and the test-retest reliability after two weeks was 0.756, indicating that the scale has good temporal stability. Validity reflects the validity of the scale. According to the test, the CVI value of each item of the CFNS is 0.833–1.000, the S-CVI/Ave was 0.983, and the results indicated acceptable content validity. In structural validity, two communal factors were extracted from EFA with a cumulative variance contribution of 49.437%, items 3, 7, 2, 8, and 5 indicating rejection of food, while items 10, 1, 6, and 4 indicating trust in food. The results are consistent with cross-cultural translations from Portugal (Gomes et al., 2018), Hungary (Szakály et al., 2021), etc. CFA showed that each fit index of the two-factor model met the reference standard and fit well. The criterion-related validity showed that the CFNS scores were moderately correlated with the scores of the CPEBQ for Picky Eating dimension, which had good validity.

A preliminary analysis of a sample of 575 children showed that the score of food neophobia in Chinese preschoolers was 32.46 (SD = 6.48), with a prevalence of 20.69%, which is lower than that of preschoolers in Lebanon (El Mouallem et al., 2021), Ireland (Hazley et al., 2022), and Finland (Kähkönen et al., 2021). This phenomenon may be due to the overall improvement of the education level of the parents in the sample, which may lead to the low prevalence of food neophobia among children. In addition, most parents were born after the 1990s and their increased ideological and cultural inclusiveness will lead their children to eat more novel foods. According to previous studies, childhood food neophobia will peak at the age of 6, while only 15.8% of 6-year-olds in our sample, which may affect our results. Interestingly, we also found the influence of food allergy of food neophobia, which is less common in the previous literature. Studies have investigated that food allergy can affect food preparation in most families (Bollinger et al., 2006), and various aspects of family life such as daily shopping and eating out produce food allergy-related anxiety (Feng & Kim, 2019), which may affect children's food neophobia through limited food choices. As the incidence of food allergy increases, it is necessary to continue to explore the association between food allergy and food neophobia to deepen the understanding of both, and to try to find targets for intervention.

Practice implications

There are few studies on food neophobia in China, and there are differences in dietary culture and feeding practices between countries. Therefore, it is necessary to investigate and carry out research on food neophobia among preschool children in China. According to the findings and conclusions of this study, the Chinese version of the CFNS can be applied to the study of food neophobia in Chinese preschool children, providing a practical evaluation tool for subsequent studies. Future research designs with large multi-center samples are needed to try to explore the prevalence and influencing factors of food neophobia in Chinese preschool children. Exploring the relationship between more variables and food neophobia in children on a solid basis, and try to find an effective intervention target.

Limitations

There are several limitations in our study. For this study, only parents of preschool children in some kindergartens in Yangzhou City were selected as subjects, and the sample representation was limited due to the small population in the urban area. In addition, the questionnaires were mostly filled out by parents, but it appears that we did not have many restrictions on the amount of time parents spent caring for their children and may not have been sufficiently informed about the children's diets. In general, the scale demonstrated good reliability and validity through rigorous cross-cultural translation and can be used in Chinese preschoolers. In the future, more studies are needed to determine diagnostic thresholds for scales that allow for comparability of results across countries, and to further investigate the relationship between food allergy and childhood food neophobia.

Conclusion

This study examined the reliability and validity of the Chinese version of CFNS in preschool children, and the results indicated that it could be used as an assessment tool for food neophobia in Chinese preschool children. The present study is a preliminary exploration of food

Table 4
Comparison of food neophobia scores by various sociodemographic characteristics ($N = 575$).

Items		Frequency (percent)	food neophobia scores (Mean ± SD)	t/F	P
House location	Urban	19(3.30)	29.63 ± 7.17	3.492	0.031
	County	249(43.30)	32.02 ± 7.34		
	Rural	307(53.39)	33.00 ± 5.58		
Food allergy history	Yes	36(6.26)	29.47 ± 7.88	−2.879	0.004
	No	539(93.74)	32.66 ± 6.33		
Do you try to eat foods you have not eaten?	Never	23(4.00)	33.61 ± 5.80	9.421	<0.001
	Rarely	170(29.57)	34.07 ± 5.52		
	Sometimes	301(52.35)	32.23 ± 6.23		
	Frequently / Always	81(14.09)	29.63 ± 8.23		
Do you prepare foods for your child that he/she has not eaten?	Never	21(3.65)	35.48 ± 6.34	6.583	<0.001
	Rarely	114(19.83)	33.66 ± 5.06		
	Sometimes	342(59.48)	32.49 ± 6.21		
	Frequently / Always	98(17.04)	30.32 ± 8.14		

neophobia in Chinese preschool children. In the future, a more rational sampling method can be used to conduct a multi-regional and multi-center survey to further test the applicability of the scale and investigate the prevalence of food neophobia in Chinese children, explore the influencing factors of food neophobia in Chinese families, and adopt interventions to prevent or reduce food neophobia in children.

Authors' contributions

WL: designed the study and drafted the manuscript; WL, QC, RC, YY: Responsible for data collection; XXS, YPC: analyzed the data; HZS, YRZ: reviewed the paper; XYL: gave theoretical guidance and amendments. All authors have read and agreed to the published version of the manuscript.

Funding

This research was supported by Postgraduate Research & Practice Innovation Program of Jiangsu Province (project No. KYCXX21_3297) and the "Hu-Xin Fund" Project of Jiangsu Key Laboratory of Human-Veterinary Pathology (HX2004).

Declaration of Competing Interest

The authors declare that they have no competing interests in this section.

Acknowledgements

Not applicable.

References

Anjos, L. A. D., Vieira, D., Siqueira, B. N. F., Voci, S. M., Botelho, A. J., & Silva, D. G. D. (2021). Low adherence to traditional dietary pattern and food preferences of low-income preschool children with food neophobia. *Public Health Nutrition*, *24*(10), 2859–2866. https://doi.org/10.1017/s1368980020003912.

Armelagos, G. J. (2014). Brain evolution, the determinates of food choice, and the omnivore's dilemma. *Critical Reviews in Food Science and Nutrition*, *54*(10), 1330–1341. https://doi.org/10.1080/10408398.2011.635817.

Bollinger, M. E., Dahlquist, L. M., Mudd, K., Sonntag, C., Dillinger, L., & McKenna, K. (2006). The impact of food allergy on the daily activities of children and their families. *Annals of Allergy, Asthma & Immunology*, *96*(3), 415–421. https://doi.org/10.1016/s1081-1206(10)60908-8.

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, *1*(3), 185–216. https://doi.org/10.1177/135910457000100301.

Cooke, L. J., Haworth, C. M., & Wardle, J. (2007). Genetic and environmental influences on children's food neophobia. *The American Journal of Clinical Nutrition*, *86*(2), 428–433. https://doi.org/10.1093/ajcn/86.2.428.

El Mouallem, R., Malaeb, D., Akel, M., Hallit, S., & Fadous Khalife, M. C. (2021). Food neophobia in Lebanese children: Scale validation and correlates. *Public Health Nutrition*, *1-9*. https://doi.org/10.1017/s1368980021000082.

Etuk, R. E. O., & Forestell, C. A. (2021). Role of food neophobia and early exposure in children's implicit attentional bias to fruits and vegetables. *Appetite*, *167*, Article 105647. https://doi.org/10.1016/j.appet.2021.105647.

Feeney, E., O'Brien, S., Scannell, A., Markey, A., & Gibney, E. R. (2011). Genetic variation in taste perception: Does it have a role in healthy eating? *The Proceedings of the Nutrition Society*, *70*(1), 135–143. https://doi.org/10.1017/s0029665110003976.

Feng, C., & Kim, J. H. (2019). Beyond avoidance: The psychosocial impact of food allergies. *Clinical Reviews in Allergy and Immunology*, *57*(1), 74–82. https://doi.org/10.1007/s12016-018-8708-x.

Finistrella, V., Manco, M., Ferrara, A., Rustico, C., Presaghi, F., & Morino, G. (2012). Cross-sectional exploration of maternal reports of food neophobia and pickiness in preschooler-mother dyads. *Journal of the American College of Nutrition*, *31*(3), 152–159. https://doi.org/10.1080/07315724.2012.10720022.

Fletcher, S., Wright, C., Jones, A., Parkinson, K., & Adamson, A. (2017). Tracking of toddler fruit and vegetable preferences to intake and adiposity later in childhood. *Maternal & Child Nutrition*, *13*(2). https://doi.org/10.1111/mcn.12290.

Gomes, A. I., Barros, L., Pereira, A. I., Roberto, M. S., & Mendonça, M. (2018). Assessing children's willingness to try new foods: Validation of a Portuguese version of the child's food neophobia scale for parents of young children. *Food Quality and Preference*, *63*, 151–158. https://doi.org/10.1016/j.foodqual.2017.09.002.

Harris, G. (2018). *Food neophobia: Behavioral and biological influences*, *193–217*.

Hazley, D., Stack, M., Walton, J., McNulty, B. A., & Kearney, J. M. (2022). Food neophobia across the life course: Pooling data from five national cross-sectional surveys in Ireland. *Appetite*, *171*, Article 105941. https://doi.org/10.1016/j.appet.2022.105941.

Kaar, J. L., Allison, L. B. S., Fell, D. M., & Johnson, S. L. (2016). Parental feeding practices, food neophobia, and child food preferences: What combination of factors results in children eating a variety of foods? *Food Quality and Preference*, *50*(12), 57–64.

Kähkönen, K., Sandell, M., Rönkä, A., Hujo, M., & Nuutinen, O. (2021). Children's fruit and vegetable preferences are associated with their mothers' and fathers' preferences. *Foods*, *10*(2). https://doi.org/10.3390/foods10020261.

Kozioł-Kozakowska, A., Piórecka, B., & Schlegel-Zawadzka, M. (2018). Prevalence of food neophobia in pre-school children from southern Poland and its association with eating habits, dietary intake and anthropometric parameters: A cross-sectional study. *Public Health Nutrition*, *21*(6), 1106–1114. https://doi.org/10.1017/S1368980017003615.

Kutbi, H. A., Alhatmi, A. A., Alsulami, M. H., Alghamdi, S. S., Albagar, S. M., Mumena, W. A., & Mosli, R. H. (2019). Food neophobia and pickiness among children and associations with socioenvironmental and cognitive factors. *Appetite*, *142*, Article 104373. https://doi.org/10.1016/j.appet.2019.104373.

Lafraire, J., Rioux, C., Giboreau, A., & Picard, D. (2016). Food rejections in children: Cognitive and social/environmental factors involved in food neophobia and picky/fussy eating behavior. *Appetite*, *96*, 347–357. https://doi.org/10.1016/j.appet.2015.09.008.

Laureati, M., Bergamaschi, V., & Pagliarini, E. (2015). Assessing childhood food neophobia: Validation of a scale in Italian primary school children. *Food Quality and Preference*, *40*, 8–15. https://doi.org/10.1016/j.foodqual.2014.08.003.

Li, L., Yi-Fei, O., Hui-Jun, W., Fei-Fei, H., Yun, W., Ji-Guo, Z., ... Bing, Z. (2020). Status of fruit and vegetable intake among children and adolescents in 15 provinces of China. *National Institute for Nutrition and Health*, *36*(01), 3–7.

Moding, K. J., & Stifter, C. A. (2016). Temperamental approach/withdrawal and food neophobia in early childhood: Concurrent and longitudinal associations. *Appetite*, *107*, 654–662. https://doi.org/10.1016/j.appet.2016.09.013.

Mohd Nor, N. D., Houston-Price, C., Harvey, K., & Methven, L. (2021). The effects of taste sensitivity and repeated taste exposure on children's intake and liking of turnip (Brassica rapa subsp. rapa); a bitter Brassica vegetable. *Appetite*, *157*, Article 104991. https://doi.org/10.1016/j.appet.2020.104991.

Perry, R. A., Mallan, K. M., Koo, J., Mauch, C. E., Daniels, L. A., & Magarey, A. M. (2015). Food neophobia and its association with diet quality and weight in children aged 24 months: A cross sectional study. *International Journal of Behavioral Nutrition and Physical Activity*, *12*, 13. https://doi.org/10.1186/s12966-015-0184-6.

Pliner, P. (1994). Development of measures of food neophobia in children. *Appetite*, *23*(2), 147–163. https://doi.org/10.1006/appe.1994.1043.

Pliner, P., & Hobden, K. (1992). Development of a scale to measure the trait of food neophobia in humans. *Appetite*, *19*(2), 105–120. https://doi.org/10.1016/0195-6663(92)90014-w.

Powell, F. C., Farrow, C. V., & Meyer, C. (2011). Food avoidance in children. The influence of maternal feeding practices and behaviours. *Appetite*, *57*(3), 683–692. https://doi.org/10.1016/j.appet.2011.08.011.

Quick, V., Lipsky, L. M., Laffel, L. M., Mehta, S. N., Quinn, H., & Nansel, T. R. (2014). Relationships of neophobia and pickiness with dietary variety, dietary quality and diabetes management adherence in youth with type 1 diabetes. *European Journal of Clinical Nutrition*, *68*(1), 131–136. https://doi.org/10.1038/ejcn.2013.239.

Russell, C. G., & Worsley, A. (2008). A population-based study of preschoolers' food neophobia and its associations with food preferences. *Journal of Nutrition Education and Behavior*, *40*(1), 11–19. https://doi.org/10.1016/j.jneb.2007.03.007.

Sarin, H. V., Taba, N., Fischer, K., Esko, T., Kanerva, N., Moilanen, L., ... Perola, M. (2019). Food neophobia associates with poorer dietary quality, metabolic risk factors, and increased disease outcome risk in population-based cohorts in a metabolomics study. *The American Journal of Clinical Nutrition*, *110*(1), 233–245. https://doi.org/10.1093/ajcn/nqz100.

Szakály, Z., Kovács, B., Soós, M., Kiss, M., & Balsa-Budai, N. (2021). Adaptation and validation of the food neophobia scale: The case of Hungary. *Foods*, *10*(8). https://doi.org/10.3390/foods10081766.

Taylor, C. M., Wernimont, S. M., Northstone, K., & Emmett, P. M. (2015). Picky/fussy eating in children: Review of definitions, assessment, prevalence and dietary intakes. *Appetite*, *95*, 349–359. https://doi.org/10.1016/j.appet.2015.07.026.

Tesema, G. A., Yeshaw, Y., Worku, M. G., Tessema, Z. T., & Teshale, A. B. (2021). Pooled prevalence and associated factors of chronic undernutrition among under-five children in East Africa: A multilevel analysis. *PLoS One*, *16*(3), Article e0248637. https://doi.org/10.1371/journal.pone.0248637.

Tian, H., & Chen, J. (2021). Food neophobia and intervention of university students in China. *Food Science & Nutrition*, *9*(11), 6224–6231. https://doi.org/10.1002/fsn3.2575.

Ventura, A. K., & Worobey, J. (2013). Early influences on the development of food preferences. *Current Biology*, *23*(9), R401–R408. https://doi.org/10.1016/j.cub.2013.02.037.

Xian-jun, Y., Xun, J., Yu-Hai, Z., Li-Jun, S., Chang-Jun, W., & Lei, S. (2012). Development and evaluation of Preschooler's eating behavior scale. *Chinese Journal of Child Health Care*, *20*(08), 682–685.

Yi-yao, L., Chun-li, L., Fang Yue-hui, L., & Xiao-di, H. Y. -n. (2021). Effect of children's dietary behaviors on the consumption of vegetables and fruits among preschool children. *National Institute for Nutrition and Health*, *37*(07) 579-583+592.

Zhao, J. -B., Gao, Z. -B., Li, Y. -X., Wang, Y. -L., Zhang, X. -Y., & Zou, L. -Q. (2020). The food neophobia scale (FNS): Exploration and confirmation of factor structure in a healthy Chinese sample. *Food Quality and Preference*, *79*, Article 103791. https://doi.org/10.1016/j.foodqual.2019.103791.

Zou, J., Liu, Y., Yang, Q., Liu, H., Luo, J., Ouyang, Y., & Lin, Q. (2019). Cross-cultural adaption and validation of the Chinese version of the child food neophobia scale. *BMJ Open*, *9*(8), Article e026729. https://doi.org/10.1136/bmjopen-2018-026729.