Available online: http://journal.ipb.ac.id/index.php/jgizipangan
ISSN 1978-1059 EISSN 2407-0920
J. Gizi Pangan, November 2024, 19(3):187-196
DOI: https://doi.org/10.25182/jgp.2024.19.3.187-196

Research Article

The Relationship Between Authoritative Parenting Style, Oral Sensory Processing, and Eating Behaviour Related to Picky Eaters among Toddlers in Klang Valley, Malaysia

Mohd Shah Kamarudin[1], Nur Hana Hamzaid[1*], Mohd Razif Shahril[2], Hasnah Haron[2], Masne Kadar[1], Nik Shanita Safii[3]

[1]Center for Rehabilitation & Special Need Studies (iCaRehab), Faculty of Health Sciences, Universiti Kebangsaan Malaysia Kuala Lumpur Campus, 50300 Kuala Lumpur, Malaysia
[2]Center for Healthy Ageing & Wellness (H-CARE), Faculty of Health Sciences, Universiti Kebangsaan Malaysia Kuala Lumpur Campus, 50300 Kuala Lumpur, Malaysia
[3]Center for Community Health Studies (ReaCH), Faculty of Health Sciences, Universiti Kebangsaan Malaysia Kuala Lumpur Campus, 50300 Kuala Lumpur, Malaysia

Article History:
Received *10-06-2024*
Revised *27-07-2024*
Accepted *17-09-2024*
Published *29-11-2024*

Keywords:
authoritative, child eating behaviour, oral sensory sensitivity, parenting and picky eaters

***Corresponding Author:**
tel: +60389215555
email: hanahamzaid@ukm.edu.my

ABSTRACT

This study aimed to examine the relationship between authoritative parenting style, oral sensory processing, and eating behaviour related to picky eaters among children aged 3 to 5 years. A cross-sectional study was conducted with 99 mother/father-child dyads from several Klang Valley nurseries and kindergartens. Online survey data collection, including the Child Eating Behaviour Questionnaire (CEBQ), the Child Sensory Profile 2 Questionnaire (CSP-2) (Oral Domain), the Parental Style Dimension Questionnaire (PSDQ), and a demographic questionnaire. Appointment-based collection of anthropometric measurements (weight and height) was conducted. Pearson correlation was used to determine the relationship between eating behaviour (picky eaters), oral sensory processing, and authoritative parenting scores, independent t-test to determine nutrition status and eating behaviour, and chi-square test to examine picky eater status and oral sensory processing classification. Results show that the prevalence of picky eaters is 45.5%. Picky eaters scored low in food responsiveness and food enjoyment but high in satiety response and slowness in eating. There was only an association between picky eating behaviour and oral sensory processing ($r=0.22$, $p=0.003$), but no correlation between these indicators and authoritative parenting styles ($p>0.05$). No significant difference was found in nutrition status between non-picky eaters and picky eaters ($p>0.05$). According to this study, nearly one out of two children is a picky eater, which is defined by less enjoyment of food, less responsiveness to food, eating slowly, and feeling full quickly. This research is likely to aid in the development of more targeted intervention programmes for picky eaters.

INTRODUCTION

Picky eating is one typical nutritional issue among children under five (Taylor *et al.* 2019). Although there is variance in the description of picky eaters, most researchers identify the following elements: lack of variety in food consumption, fear of trying new foods (neophobia), and refusal to eat commonly consumed foods, which all interfere with the child's daily routine (taking a long time to eat) (Taylor *et al.* 2015). Consequently, this poses a challenge for parents in providing food, which eventually impacts the nutritional status of children (Antoniou *et al.* 2016; Xue *et al.* 2015). Children who are picky eaters are more likely to be underweight and stunted than those who aren't (Taylor *et al.* 2019; de Barse *et al.* 2015; Tharner

et al. 2014). Grulichova *et al.* (2022) showed in a long-term study that children who are picky eaters at a young age are slightly lighter and shorter than those who are not by age 15.

The prevalence of picky eaters among children varies by age and geographical region between 23.8 and 49.6 % (Goh & Jacob 2012; Li *et al.* 2017; Machado *et al.* 2016). In Malaysia, between 31 and 54 % of children five to ten years old are reported as picky eaters (Hanapi & Teng 2022; Joseph-Louise & Tan 2020). Chilman *et al.* (2021) found cognitive factors features as intrinsic traits of picky eater children. Sensory sensitivity to taste, smell, and texture was discovered to have a strong connection with picky eaters and food neophobia (Kutbi *et al.* 2019). According to previous studies, children reject certain foods because they dislike their flavour or texture (Pellegrino & Luckett 2020). In their research, Farrow and Coulthard (2012) discovered an association between picky eaters and taste sensitivity, tactile sensitivity, and total sensory sensitivity. It was also shown that taste sensitivity could predict the behaviour of picky eaters, and one study suggested that sensitive children at the age of four are more likely to become picky eaters by the age of six (Steinsbekk *et al.* 2017a).

In addition, picky eaters are affected by social environmental factors, which include prenatal experience, peer impact, weaning practise, and parenting styles (Lafraire *et al.* 2016). The majority of intervention studies focused on children using parents as mediators, as they play a crucial role in controlling food availability within the home environment (Garcia *et al.* 2020; Kaur *et al.* 2020; Sandvik *et al.* 2019). Parenting style looks at the interaction between parents and child throughout all domains. According to Chilman *et al.* (2021), parenting style and feeding practices can either raise or decrease the likelihood that a child would be a picky eater.

Prior research also shown that there ia a strong negative association between picky eaters and authoritative parenting style (Macinnes 2012; Leuba *et al.* 2022; Podlesak *et al.* 2017). Additionally, it has been demonstrated that those who are picky eaters have poorer nutritional status than their peers (Antoniou *et al.* 2016; Taylor *et al.* 2019). Similar to the relationship between oral sensory and picky eaters, the majority of studies demonstrated a good association between the two (Farrow & Coulthard 2012; Nederkoorn *et al.* 2015; Johnson *et al.* 2015). Giving a clearer understanding of the interplay between sensory processing and authoritative parenting style will aid in creating strategies to address the problem of picky eaters. Therefore, this study aims to determine the association between oral sensory processing, eating behaviour, and authoritative parenting style in children aged 3 to 5 years. In addition, differences in nutritional status and eating behaviour between non-picky and picky eaters children were examined.

METHODS

Design, location, and time

This cross-sectional study was carried out in the Klang Valley. This study was approved by the Research and Ethics Committee of The National University of Malaysia (UKM) with the ethical code UKM PPI/111/8/JEP-2021-746. Prior to choosing the subjects, an information sheet with a detailed methodology of the study and a consent form was provided to all via the online Google form. To ensure that the privacy of each subject is protected, a code is assigned to each subject, and personal information is not disclosed during the data analysis process. The collected information is also used exclusively for this study.

Sampling

This study included a group of healthy children between the ages of 3 and 5 years. The participants in this study consist of children, whereas the respondents are their mothers or fathers. The proportionate cluster sampling method was used to select nurseries and kindergartens. Four federal agencies provided the lists of nurseries and kindergartens. These nurseries and kindergartens were then categorised as Government Nurseries (GN), Private Nurseries (PN), Government Kindergartens (GK), and Private Kindergartens (PK). Using a random number generator, 22 nurseries and kindergartens were chosen (7 GN, 8 PN, 3 GK, and 4 PK). Four to five children are chosen at each nursery and kindergartens based on the promptest parental answer to the offered questionnaire link. A total of 99 mother/father-child dyads participated in this study, based on the sample calculation (Sharma *et al.* 2020) and taking into consideration 10% dropout factors. Acceptance requires the child's parents to live with them and aware their

nutrition and behaviour. Children with autism, down syndrome, delayed global development, dyslexia, or eating disorders were excluded. This information was self-reported by parents and screened by the research team.

Data collection

The collection of data was performed both physically and online. While anthropometric data was collected physically, demographic information and questionnaires were collected online using gogle form platform. The online survey links were distributed to the parents by the teachers or administrators of nurseries and kindergartens. The parents of the selected children completed all the demographic information and questionnaires.

Anthropometry measurement. Children's weight and height were measured using standard scales and stadiometers. WHO Antro software was used to calculate growth z-scores based on WHO guidelines (WHO 2011; WHO 2006).

Eating behaviour measurement. Child Eating Behavior Questionnaire (CEBQ) from Wardle *et al.* (2001), which has been translated and validated by Ong (2015), was used to identify the eating behaviour of children. The CEBQ consists of 35 questions with eight primary constructs that can be separated into two categories: food approach, which refers to good reactions, and food avoidance, which refers to negative emotions during eating. The behaviour that promotes food intake is food responsiveness (7 questions), enjoyment of food (3 questions), emotional overeating (3 questions), and the desire to drink (3 questions). In contrast, the activity that prevents food intake is the satiety responsiveness (5 questions), slowness in eating (4 questions), emotional undereating (4 questions), and food fussiness (6 questions). Each question requires a response on a 5-point Likert scale: never (1), rarely (2), sometimes (3), often (4), and always (5). A high mean score for each dimension suggests that the behaviour is intense. The construct utilised in the CEBQ to evaluate the behaviour of picky eaters is food fussiness, which consists of six questions. Children are considered picky eaters if their mean value is three or higher (Steinsbekk *et al.* 2017b).

Parenting style measurement. Parenting style is evaluated using the Parenting Style Demention Questionnaire (PSDQ). Robinson *et al.* (2001) created the PSDQ, which initially comprised 62 items and was later reduced to 32 items. The purpose of the PSDQ is to assess Baumrind's original three parenting styles: authoritative (15 questions), authoritarian (12 questions), and permissive (5 questions). Each item is rated on a 5-point Likert scale, with one representing never and five representing always. A high score on the style domain reflects the most prominent parenting style. A Malay-English bilingual speaker translated the PSDQ into Malay and back into English before giving it to parents. These results were evaluated by experts to ensure each question's meaning had not changed. The three dimensions' Cronbach's alpha values after the reliability test were 0.90 for authoritative, 0.77 for authoritarian, and 0.48 for permissive. The authoritative and authoritarian domains had high Cronbach's alpha values, while the permissive domain had a low value (below 0.75). The permissive domain value obtained from other studies was equally low, ranging between 0.64 and 0.67 (Rahmawati *et al.* 2022; Yaffe 2018; Oliveira *et al.* 2018; Robinson *et al.* 2001).

Oral sensory processing measurement. The Child Sensory Profile 2 (CSP-2) is a tool for assessing children's sensory processing based on Dunn's Model (Dunn 2014). The CSP-2 evaluates children in six sensory domains (oral, touch, visual, auditory, movement, and body position) and three sensory-related behaviours (conduct, social emotional and attentional). Based on the assessment, children were divided into four sensory pattern categories (seeking, avoiding, sensitivity and registration). The evaluation was conducted using a 5-point Likert scale, where one represents almost never, and five represents almost usually. This study applied primarily the oral sensory processing aspect, which consisted of only ten questions because most picky eater children reject food due to its taste or texture (Farrow & Coulthard 2012; Kutbi *et al.* 2019). Zulkifli (2023) has translated this questionnaire into Malay, and Cronbach's alpha value is satisfactory (0.85). Dunn's Model categorises a zero score of up to seven as less than others, eight to 24 as just as the majority of others, and 25 to 50 as more than others (Dunn 2014).

Data analysis

IBM SPSS Statistics 20.0 (IBM Corp. Armonk, NY, USA) was used for statistical testing. For descriptive evaluation, frequency, mean, standard deviation, and percentage were

measured for socio-demographic data, nutritional status, picky eaters' prevalence, oral sensory processing, and parenting style. A Pearson correlation test determined the association between eating behaviour (picky eaters), oral sensory processing, and authoritative parenting scores. Regarding nutritional status and children's eating behaviour, an independent t-test was performed to determine the differences between picky and non-picky eaters. The Chi-square test examined the association between non-picky and picky eaters and the classification of oral sensory processing.

RESULTS AND DISCUSSION

Socio-demographic data

Most subjects were female (56.6%) with an average age of 4.02±0.70 years, and all were of Malay ethnicity (100%). The prevalence of picky eaters was 45.5% overall, with a mean score of 2.94±0.36. The proportion was greater than the 31.8% revealed in a research conducted in Kuala Selangor for children aged 5–6 years, and lower than the 53.4% observed in children aged 5–10 years in Kuala Lumpur. As for the parents' background, the average age for fathers was 33.37±7.91 years; 98.2% were employed, and 58.6% had tertiary education. While the average age for mothers was 33.07±4.81 years, 86.9% were employed, and 69% hold a university degree. Half of the respondents (49.5%) have a monthly household income below USD 1,013.87 (RM4,850). Regarding parenting style, all parents employed an authoritative approach. The socio-demographic characteristics of the subjects are detailed in Table 1.

Children's nutritional status, eating behavior and oral sensory processing

Weight, height and Body Mass Index (BMI) measures did not differ significantly between non-picky and picky eaters (Table 2). Nutritional status (weight-to-height, weight-for-age, height-for-age and BMI-for-age) between non-picky and picky eaters' children also did not demonstrate any significant difference ($p>0.05$). Prior research also produced inconclusive findings regarding nutritional status (growth charts) in children with and without picky eating habits (Ali & Ahmed 2022; Joseph-Louise & Tan 2020; Maranhão *et al.* 2017; Mascola *et al.* 2010; Rohde *et al.* 2017). In a study conducted by Mascola *et al.* (2010),

Table 1. Subject socio-demographic's characteristices

Variables		n (%) (N=99)	Mean±SD
Age			
	3 year old	23 (23.2)	4.02±0.70
	4 year old	51 (51.5)	
	5 year old	25 (25.3)	
Gender			
	Boy	43 (43.4)	
	Girl	56 (56.6)	
Picky Eaters Status			
	Picky eaters	45 (45.5)	3.13±0.32
	Non-picky eaters	54 (54.5)	2.78±0.32
Numbers of Sibling			
	Only child	11 (11.1)	
	>1 child	88 (88.9)	
Father's Age[a]			
	≤30 years old	17 (17.2)	24.06±11.52
	>30 years old	81 (81.8)	35.88±3.67
Father's education level			
	Primary school	2 (2.0)	
	Secondary school	39 (39.4)	
	College/ University	58 (58.6)	
Father's working status[a]			
	Working	97 (98.0)	
	Not working	1 (2.0)	
Mother's age[a]			
	≤30 years old	20 (20.2)	28.3±2.23
	>30 years old	78 (78.8)	34.68±2.81
Mother's education level			
	Primary school	1 (1.0)	
	Secondary school	29 (29.3)	
	College/ University	69 (69.7)	
Mother's working status[a]			
	Working	86 (86.9)	
	Not working	12 (12.1)	
Total income			
	Low-income (<USD1,013.87)	49 (49.5)	5336.4±3266.9
	High-income (>USD1,013.87)	50 (50.5)	
Parenting style			
	Authoritative	99 (100)	3.77±0.64

[a]Missing data; SD: Standard Deviation; USD: US Dollar

Table 2. Mean of anthropometric measures and nutritional status for non-picky eaters and picky eaters

Indexes	Non-picky eaters (n=54) Mean±SD	Picky eaters (n=45) Mean±SD	*p*
Weight (kg)	15.36±3.11	15.03±2.72	0.58
Height (cm)	99.84±6.43	98.97±5.62	0.48
BMI (kgm^{-2})	15.32±1.98	15.25±1.75	0.88
Weight-for-height[a]	0.14±1.31	-0.45±1.23	0.76
Weight-for-age	-0.35±1.19	-0.65±1.17	0.71
Height-for-age	-0.65±0.86	-0.65±0.89	0.46
BMI-for-age	0.77±1.37[a]	-0.38±1.26	0.10

[a]Missing data (There are 13 children between the ages of five years and one month, and five years and eleven months); T-test; BMI: Body Mass Index; SD: Standard Deviation

it was observed that children who were picky eaters had a limited range of food options, but their food consumption was nearly equivalent to that of non-picky eaters. As a result, there was no significant difference in their nutritional status. However, another study found that picky eaters had lower z-score values for the BMI-for-age indication compared to non-picky eaters (Chao 2018).

Table 3 shows the difference in each domain of eating behaviour for non-picky eaters and picky eaters. There were significant differences in the two domains of the food approach group between non-picky eaters and picky eaters, i.e. food responsiveness (t(2.973)=97, p=0.004 and enjoyment of food (t(4.167)=97,p=0.000). Picky eaters have a low mean score for both domains. This was consistent with the findings of previous research (Joseph-Louise & Tan 2020; Hanapi & Teng 2022). According to Tharner *et al.* (2014), children who are picky eaters are less receptive to eating, do not enjoy food, and eat slowly. This could be attributed to the association between picky eaters and parents who practice unresponsive feeding practices or exert excessive control over their children, diminishing the likelihood of food enjoyment (Finnane *et al.* 2017; van der Horst 2012). For the food avoidance group, there was a significant difference ($p<0.05$) in the satiety responsiveness domain (t(-2.6)=97, p=0.011), slowness in eating (t(-3.098)=97, p=0.003) and food fussiness domain (t(-11.479)=97, p=0.000). In these domains, picky eaters have a higher mean score than non-picky eaters. This finding aligns with previous research since it has been observed that children who exhibit picky eating habits tend to engage in food-inhibiting behaviour (Boquin *et al.* 2014). A positive link between the satiety responsiveness subscale and picky eating behaviour was also discovered in a study by Caton *et al.* (2014). Research has revealed that children who are picky eaters experience rapid satiety, resulting in reduced food consumption and potential failure to meet their daily nutritional

Table 3. Child eating behaviour mean differences of non-picky eaters and picky eaters children

Domains	Non-picky eaters (n=54) Mean±SD	Picky eaters (n=45) Mean±SD	*p*
Food approach			
Food responsiveness	3.26±0.93	2.74±0.78	0.01*
Enjoyment of food	3.90±0.83	3.25±0.70	0.01*
Emotional overeating	2.31±0.79	2.13±0.59	0.22
Desire to drink	2.64±0.67	2.56±0.64	0.56
Food avoidance			
Satiety responsiveness	2.63±0.69	2.98±0.67	0.01*
Slowness in eating	2.60±0.70	3.01±0.60	0.01*
Emotional undereating	2.80±0.62	2.91±0.61	0.35
Food fussiness	2.34±0.45	3.33±0.40	0.00*

*T-test significant for $p<0.05$; SD: Standard Deviation

requirements. The slowness in the eating of picky eaters indicates a lack of interest in food and a tendency to consume meals at a slower pace. Hanapi and Teng (2022) and Tharner *et al.* (2014) conducted similar findings, indicating that a notable attribute of picky eaters in children is the tendency to consume food at a slower pace.

Pearson's correlation was used to determine the association between eating behaviour- picky eaters and scores for oral sensory processing and authoritative parenting style. A positive correlation was discovered between oral sensory processing and eating behaviour- picky eaters (food fussiness domain), r=0.22, p=0.003 (Table 4). This finding is corroborated by prior research that has similarly identified a positive correlation between picky eating behaviour and oral sensory processing (Farrow & Coulthard 2012). The oral sensory processing score is thereafter categorised based on the standard categorisation of the form, which are . "Just Like the Majority of Others" and "more than others". "Just Like the Majority of Others" indicates that the child has a typical level of sensory processing, however "more than others" suggests that the child will exhibit heightened reactions to sensory stimuli. From the result, 58.1% of non-picky and 58.9% of picky eaters had a level of oral sensitivity 'more than others'. This ratio was practically almost the same between both groups (Table 5), and no significant relationship was found between these two indicators, X^2(1, n=99), p=0.50. Based on these findings, it is possible that oral sensitivity is not the primary determinant of picky eating behaviour in the population under study. Children who exhibit picky eating habits may have a predilection for specific tastes and textures of certain foods, which may not always be associated with oral sensitivity. Repeated exposure (and social influence (peers, parents, and family members) also play a role in the choice of this food (Chilman *et al.* 2021). This assertion is substantiated by the findings of Johnson *et al.* (2015), who observed no correlation between oral sensitivity and the consumption of several food groups except sugary beverages. A weak correlation was seen between the consumption of sweetened beverages and oral sensitivity.

In addition, there was no correlation between the eating behaviour of picky eaters and authoritative parenting style. Although the authoritative parenting style has been shown to have an inverted association with picky eaters (Podlesak *et al.* 2017), the prevalence of picky eaters in this study was more than half (56%), and all the parents were classified as authoritative parents. Previous research found a negative correlation between authoritative parenting and the behaviour of picky eaters, while authoritarian and permissive parenting have a positive relationship with the behaviour of picky eaters (Macinnes 2012). Podlesak *et al.* (2017) also obtained a comparable finding, where the positive link between picky eaters' behaviour was

Table 4. Association between eating behaviour-picky eaters, oral sensory processing, and authoritative parenting style

Variables	Eating behaviour-picky eaters r (*p*)	Oral sendory processing r (*p*)	Authoritative parenting style r (*p*)
Eating behaviour- picky eaters	-	-	-
Oral sensory processing	0.22 (0.003)*	-	-
Authoritative parenting style	-0.17 (0.09)	0.09 (0.36)	-

*Pearson correlation significant for p<0.05 (2-way pearson correlation)

Table 5. Classification of oral sensory processing according to picky eater status

Classification	Non-picky eaters (SD) (n=54)	Pikcy eaters (SD) (n=45)	X^2	*p*
Oral sensory processing			0.45	0.50
Just like the majority of others	24 (44.4%)	17 (37.8%)		
More than others	30 (55.6%)	28 (62.2%)		

*Chi-square test; SD: Standard Deviation

more frequent in permissive and authoritarian parenting than in authoritative parenting.

The authoritative parenting style is frequently related to food parenting strategies such as food consumption monitoring, absence of pressure to eat, or restriction, which is the greatest combination in minimising picky eater behaviour (Collins *et al.* 2014). However, according to a study, there is another parenting style that is similar to authoritative parenting which is known as the overprotective parenting style (van der Horst & Sleddens 2017). The overprotective parenting style exhibits the same high values in nurturing, structure, and behaviour control as authoritative parenting but also exhibits high values in eating pressure and restriction (access using food parenting practice). Since food parenting practice was not evaluated in this study, some of the parents in this study likely employed this parenting style, which may impact the picky eaters' status. Besides lack of variability in parenting styles in this study might have also contributed to the lack of association.

According to Lafraire *et al.* (2016), picky eaters are in a complex situation where the relationship between the many factors remains unclear. A study conducted by Chilman *et al.* (2021) categorised the components that contribute to picky eating into intrinsic (taste, smell, and texture; personality; gender) and extrinsic (parenting style and social environment). The reason for picky eaters could be a single issue or a combination of factors. This study identified only a correlation between the behaviour of picky eaters and the oral processing of sensory. No statistically significant association was observed between the picky eaters and the authoritative parenting style. This does not imply that parenting variables are irrelevant in assisting children with picky eating habits. It is crucial to highlight that the study on this topic is ongoing and that other factors, such as genetics and emotional or behavioural difficulties, may contribute to picky eating (Lafraire *et al.* 2016). A review by Kamarudin *et al.* (2023) determined that each situation of picky eaters is unique and proposed a multidisciplinary intervention approach (nutrition, sensory, parenting, and social and environmental) as the most effective way to assist children with picky eating habits.

This study has several limitations. Only one region, the Klang Valley, was surveyed for information, and only Malay respondents participated. Therefore, the findings of this study cannot be generalized to all Malaysian populations. All data collection was also conducted online, with parents providing their responses independently. Therefore, over-reporting and under-reporting of CEBQ and CSP2 may occur during the procedure. However, this is one of the earliest Malaysian studies to examine the association between picky eating, authoritative parenting, and oral sensory processing.

CONCLUSION

In the Malaysian perspective, the prevalence of picky eaters is at substantial 45.5%, despite the fact that the parents applies authoritative approach in parenting their child. A low food responsiveness score, less food enjoyment, rapid satiety and slow eating also characterised picky eaters. There was an association between the behaviour of picky eaters and oral sensory processing, but there was no association between these two indicators and authoritarian parenting style. There is no significant difference in the nutritional status between picky and non-picky eaters. However, the complex interactions between these elements were less studied. It is advised that future research focuses on food parenting practice, given that parents' eating behaviour significantly impacts children's eating behaviour. This study may aid in developing an intervention plan for picky-eater children. Suggestions for future research to assess food intake in order to better understand the correlation between nutritional status and picky eating behaviour.

ACKNOWLEDGEMENT

The authors express their gratitude to the National University of Malaysia for being supportive and to the Ministry of Higher Education for providing the grant under the Fundamental Research Grant Scheme.

DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflict of interest.

REFERENCES

Antoniou EE, Roefs A, Kremers SP, Jansen A, Gubbels JS, Sleddens EF, Thijs C. 2016.

Picky eating and child weight status development: A longitudinal study. J Hum Nutr Diet 29(3):298–307. https://doi.org/10.1111/jhn.12322

Boquin MM, Moslowitz HR, Donovan SM, Lee SY. 2014. Defining perceptions of picky eating obtained through focus groups and conjoint analysis. Journal of Sensory Studies 126–138. https://doi.org/10.1111/joss.12088

Caton SJ, Blundell P, Ahern SM, Nekitsing C, Olsen A, Møller P, Hausner H, Remy, Es, Nicklaus S, Chabanet C, Issanchou S *et al.* 2014. Learning to eat vegetables in early life: The role of timing, age and individual eating traits. Plos One 9(5):e97609. https://doi.org/10.1371/journal.pone.0097609

Chao HC. 2018. Association of picky eating with growth, nutritional status, development, physical activity, and health in preschool children. Front Pediatr 6(22):1–9. https://doi.org/10.3389/fped.2018.00022

Chilman L, Kennedy-Behr A, Frakking T, Swanepoel L, Verdonck M. 2021. Picky eating in children: A scoping review to examine its intrinsic and extrinsic features and how they relate to identification. Int J Environ Res Public Health 18(17):9067. https://doi.org/10.3390/ijerph18179067

Collins C, Duncanson K, Burrows T. 2014. A systematic review investigating associations between parenting style and child feeding behaviours. J Hum Nutr Diet 27(6):557–568. https://doi.org/10.1111/jhn.12192

de Barse LM, Tiemeier H, Leermakers ETM, Voortman T, Jaddoe VWV, Edelson LR, Franco OH, Jansen PW. 2015. Longitudinal association between preschool fussy eating and body composition at 6 years of age: The generation R study. Int J Behav Nutr Phys Act 12(153):1–8. https://doi.org/10.1186/s12966-015-0313-2

Dunn W. 2014. Sensory Profile 2 User's Manual. Texas (USA): Pearson.

Farrow CV, Coulthard H. 2012. Relationships between sensory sensitivity, anxiety and selective eating in children. Appetite 58(3):842–846. https://doi.org/10.1016/j.appet.2012.01.017

Finnane JM, Jansesn E, Mallan KM, Daniels LA. 2017. Mealtime structure and responsive feeding practices are associated with less food fussiness and more food enjoyment in children. J Nutr Educ Behav 49(1):11–18. https://doi.org/10.1016/j.jneb.2016.08.007

Garcia AL, Brown E, Goodale T, McLachlan M, Parrett A. 2020. A nursery-based cooking skills programme with parents and children reduced food fussiness and increased willingness to try vegetables: A quasi-experimental study. Nutr 12(9):2623. https://doi.org/10.3390/nu12092623

Goh DY, Jacob A. 2012. Perception of picky eating among children in Singapore and its impact on caregivers: A questionnaire survey. Asia Pac Fam Med 11(5):1–8. https://doi.org/10.1186/1447-056X-11-5

Grulichova M, Kuruczova D, Svancara J, Pikhart H, Bienertova-Vasku J. 2022. Association of picky eating with weight and height-the European Longitudinal Study of Pregnancy and Childhood (ELSPAC-CZ). Nutr 14(3):444. https://doi.org/10.3390/nu14030444

Hanapi HM, Teng NIMF. 2022. Picky eating behaviour an nutritional status of preschool children in Kuala Selangor, Malaysia. Malays J Med Sci 18(1):145–150.

Johnson SL, Davies PL, Boles RE, Gavin WJ, Bellows LL. 2015. Young children's food neophobia characteristics and sensory behaviours are related to their food intake. J Nutr 145(11):2610–2616. https://doi.org/10.3945/jn.115.217299

Joseph-Louise SP, Tan ST. 2020. Association between eating behaviours and weight status of picky eaters and non-picky eaters among Malaysian children aged 5–10 years old. Proceedings of the Nutrition Society of Malaysia Conference (page 120–121). Selangor (KL): Nutrition Society of Malaysia

Kamarudin MS, Shahril MR, Haron H, Kadar M, Safii NS, Hamzaid NH. 2023. Interventions for picky eaters among typically developed children-a scoping review. Nutr 15(1):242. https://doi.org/10.3390/nu15010242

Kaur S, Ming NC, Chin KH, Kuan RYW, Seng H, Mukhtar F. 2020. A research protocol of hands-on healthy meal preparation intervention (Kidchen Study) to improve children's nutritional outcomes. J Gizi Pangan 15(3):139–148. https://doi.org/10.25182/jgp.2020.15.3.139-148

Kutbi HA, Alhatmi AA, Alsulami MH, Alghamdi SS, Albagara SM, Mumenab WA, Moslia RH. 2019. Food neophobia and pickiness among children and associations with socioenvironmental and cognitive factors. Appetite 14:104373. 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 behaviour. Appetite 96(1):347–357. https://doi.org/10.1016/j.appet.2015.09.008

Leuba AL, Meyer AH, Kakebeeke TH, Stulb K, Arhab A, Zysset AE, Leeger-Aschmann CS, Schmutz EA, Kriemler S *et al.* 2022. The relationship of parenting style and eating behaviour in preschool children. BMC Psychol 10(1):275. https://doi.org/10.1186/s40359-022-00981-8

Li Z, van der Horst K, Eldelson-Fries L, Yu K, You L, Zhang Y, Vinyes-Pares G, Wang P, Yang X, Qin L *et al.* 2017. Perceptions of food intake and weight status among parents of picky eating infants and toddlers in China: A cross-sectional study. Appetite 108(1):456–463. https://doi.org/10.1016/j.appet.2016.11.009

Machado BC, Dias P, Lima VS, Campos J, Gonçalves S. 2016. Prevalence and correlates of picky eating in preschool-aged children: A population-based study. Eat Behav 22(1):16–21. https://doi.org/10.1016/j.eatbeh.2016.03.035

Macinnes A. 2012. Influence of parenting style and environment on perception of picky eating behaviour in toddlers [Dissertation]. Champaign (USA): University of Illinois Urbana-Champaign.

Maranhão HDS, Aguiar RCD, Lira DTJD, Sales MUF, Nóbrega NÁDN. 2017. Feeding difficulties in preschool children, previous feeding practices, and nutritional status. Rev Paul Pediatr 36:45–51.

Mascola AJ, Bryson SW, Agras WS. 2010. Picky eating during childhood: A longitudinal study to age 11 years. Eat Behav 11(4):253–257. https://doi.org/10.1016/j.eatbeh.2010.05.006

Nederkoorn C, Jansen A, Havermans RC. 2015. Feel your food. The influence of tactile sensitivity on picky eating in children. Appetite 84(7–10). https://doi.org/10.1016/j.appet.2014.09.014

Oliveira TD, Costa DDS, Albuquerque MR, Malloy-Diniz LF, Miranda DM, de Paula JJ. 2018. Cross-cultural adaptation, validity, and reliability of the Parenting Styles and Dimensions Questionnaire - short version (PSDQ) for use in Brazil. Braz J Psychiatry 40(4):410–419. https://doi.org/10.1590/1516-4446-2017-2314

Ong SC. 2015. Validiti konstruk borang soal selidik tingkah laku makan (CEBQ) serta hubungannya dengan status berat badan dalam kalangan kanak-kanak di Malaysia. Universiti Kebangsaan Malaysia.

Pellegrino R, Luckett CR. 2020. Aversive textures and their role in food rejection. J Texture Stud 51(5):733–741. https://doi.org/10.1111/jtxs.12543

Podlesak AK, Mozer ME, Smith-Simpson S, Lee SY, Donovan SM. 2017. Associations between parenting style and parent and toddler mealtime behaviours. Curr Dev Nutr 1(6):e000570. https://doi.org/10.3945/cdn.117.000570

Rahmawati A, Fajrianthi F, Purwono U. 2022. The psychometric properties of parenting styles and dimensions questionnaire-short form in Indonesia. Int J Eval Res Educ 11(1):42–50. https://doi.org/10.11591/ijere.v11i1.21650

Robinson CC, Mandleco B, Olsen SF, Har CH. 2001. The Parenting Styles and Dimensions Questionnaire (PSDQ). Thousand Oaks (CA): Sage.

Rohde JF, Handel MN, Stougaard M, Olsen NJ, Traerup M, Mortensen EL, Heitmann BL. 2017. Relationship between pickiness and subsequent development in body mass index and diet intake in obesity prone normal weight preschool children. Plos One 12(3):e0172772. https://doi.org/10.1371/journal.pone.0172772

Sandvik P, Ek A, Eli K, Somaraki M, Bottai M, Nowicka P. 2019. Picky eating in an obesity intervention for preschool-aged children - what role does it play, and does the measurement instrument matter? Int J Behav Nutr Phys Act 16(1):1–10. https://doi.org/10.1186/s12966-019-0845-y

Sharma SK, Mudgal SK, Thakur K, Gaur R. 2020. How to calculate sample size for observational and

experimental nursing research studies? Natl J Physiol Pharm Pharmacol 10(1): 1–8. https://doi.org/10.5455/njppp.2020.10.0930717102019

Steinsbekk S, Bonneville-Roussy A, Fildes A, Llewellyn CH, Wichstrøm L. 2017a. Child and parent predictors of picky eating from preschool to school age. Int J Behav Nutr Phys Act 14(87):1–8. https://doi.org/10.1186/s12966-017-0542-7

Steinsbekk S, Sveen TH, Fildes A, Llewellyn C, Wichstrom L. 2017b. Screening for pickiness - a validation study. Int J Behav Nutr Phys Act 14(2):1–4. https://doi.org/10.1186/s12966-016-0458-7

Taylor CM, Wernimont SM, Northstrone K, Emmett PM. 2015. Picky/fussy eating in children: Review of defination, assessment, prevalens and dietary intakes. Appetite 95:349–359. https://doi.org/10.1016/j.appet.2015.07.026

Taylor CM, Steer CD, Hays NP, Emmett P, M. 2019. Growth and body composition in children who are picky eaters: A longitudinal view. Eur J Clin Nutr 1–10. https://doi.org/10.1038/s41430-018-0250-7

Tharner A, Jansen PW, Kiefte-de Jong JC, Moll HA, van der Ende J, Jaddoe VW, Hoffman A, Tiemeier H, Franco OH. 2014. Toward an operative diagnosis of fussy/picky eating: A latent profile approach in a population-based cohort. Int J Behav Nutr Phys Act 11(1):1–11. https://doi.org/10.1186/1479-5868-11-14

van der Horst K. 2012. Overcoming picky eating. Eating enjoyment as a central aspect of children's eating behaviours. Appetite 58(2):567–574. https://doi.org/10.1016/j.appet.2011.12.019

van der Horst K, Sleddens EF. 2017. Parenting styles, feeding styles and food- related parenting practices in relation to toddlers' eating styles: A cluster-analytic approach. Plos One 12(5):e0178149. https://doi.org/10.1371/journal.pone.0178149

[WHO] World Health Organization. 2006. WHO child growth standards: length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: methods and development. France (FR): WHO.

[WHO] World Health Organization 2011. WHO anthro software for assessing growth and development of the world's children. Geneva (CH): WHO.

Wardle J, Guthrie CA, Sanderson S, Rapoport L. 2001. Development of the children's eating behaviour questionnaire. J Child Psychol Psychiatry 42 (7):963–970. https://doi.org/10.1111/1469-7610.00792

Xue Y, Lee E, Ning K, Zheng Y, Ma D, Gao H, Yang B, Bai Y, Wang P, Zhang Y. 2015. Prevalence of picky eating behaviour in Chinese school-age children and associations with anthropometric parameters and intelligence quotient. A cross-sectional study. Appetite 91(1):248–255. https://doi.org/10.1016/j.appet.2015.04.065

Yaffe Y. 2018. Convergent validity and reliability of the Hebrew version of the Parenting Styles and Dimensions Questionnaire (PSDQ) in Hebrew-speaking Israeli-Arab families. International Journal on Personal Relationships 12(2):133–144. https://doi.org/10.5964/ijpr.v12i2.303

Zulkifli MN. 2023. The relationship between assessment of oral sensory modulation, eating behaviour and body weight status among children with autism in selected states in Peninsular Malaysia. Master in Health Science Dietetics, National University of Malaysia.