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Psychometric Properties of the Spanish Version of the Parental Feeding Style Questionnaire

Irene Martínez-Hernández¹ , Marina Olmos-Soria¹ , Eduardo Fonseca-Pedrero² , María Dolores Hidalgo¹  and Ana V. Valero-García¹ 

1 University of Murcia (Spain)
2 University of La Rioja (Spain)

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ABSTRACT

Background: There are no validated instruments in Spain for measuring parental feeding styles. The aim was to validate the Parental Feeding Styles Questionnaires (PFSQ) in a Spanish sample. **Method:** A total of 523 mothers of 523 school-children participated. The children had a mean age of 4.4 years ($SD = 1.3$), with 51% being boys ($M = 4.3$ years, $SD = 1.4$) and 49% girls ($M = 4.5$ years, $SD = 1.3$). The PFSQ and the Comprehensive General Parenting Styles Questionnaire (CGPQ) were used. **Results:** A model of four correlated factors was identified: Prompting/encouraging eating, emotional feeding, instrumental feeding, and control over eating. Cronbach's alpha for the subscales ranged from 0.64 to 0.86, and McDonald's Omega coefficient ranged from 0.66 to 0.86. Emotional feeding and prompting/encouraging eating had values above 0.70, control over eating had a value of 0.68 and instrumental feeding had an alpha coefficient of 0.64 and omega coefficient of 0.66. The factor structure was similar to the original and to other adapted versions. The Spanish sample used more control over eating and prompting/encouraging to eat. **Conclusions:** The adapted PFSQ is a suitable instrument for assessing the feeding styles of Spanish parents.

Propiedades Psicométricas de la Versión Española del Cuestionario de Estilos de Alimentación Parental

RESUMEN

Antecedentes: No hay suficientes instrumentos validados en España para medir los estilos de alimentación parental. El objetivo fue validar el cuestionario de estilos de alimentación Parental (PFSQ) en muestra española. **Método:** Participaron 523 madres de 523 escolares con una media de edad de 4.4 años ($DT = 1.3$), siendo el 51% niños ($M = 4.3$ años, $DT = 1.4$) y 49% niñas ($M = 4.5$ años, $DT = 1.3$). Se utilizaron el PFSQ y el cuestionario de estilos de crianza general (CGPQ). **Resultados:** Se identificó un modelo de cuatro factores correlacionados: persuadirle/animarle a comer, alimentación emocional, alimentación instrumental, y control de la ingesta. El alfa de Cronbach de las subescalas osciló entre 0.64 y 0.86, y el coeficiente omega de McDonald entre 0.66 y 0.86. Alimentación emocional y persuadirle/animarle a comer obtuvieron valores superiores a 0.70, control de la ingesta obtuvo 0.68 y la alimentación instrumental, un coeficiente alfa de 0.64 y un coeficiente Omega de 0.66. La estructura factorial coincide con la versión original y otras versiones adaptadas. La muestra española utilizó más el control de la ingesta y persuadirle/animarle a comer. **Conclusiones:** El PFSQ es un instrumento adecuado para evaluar los estilos de alimentación de los padres españoles.

Palabras clave:

Estrategias parentales
Estilos de alimentación
Sobrepeso/obesidad
Infancia

In recent decades, there has been an alarming increase of overweight/obesity in childhood (World Health Organization [WHO], 2022), and Spain is among the European countries with the highest increase in the prevalence of overweight (WHO, 2021). This is quite worrying considering that can trigger risks to the physical and psychological health of children (Amendola, 2022; Bowen et al., 2018; Gozal et al., 2017; Mallan et al., 2017; Muc et al., 2016).

Knowing the risk factors associated with being overweight/obese could help us to develop appropriate prevention measures in childhood. In general terms, the risk factors associated with childhood obesity have been very diverse, ranging from genetic to economic, educational, personal and environmental factors (Herle et al., 2020; Power et al., 2020; Wardle et al., 2002; WHO, 2022; Yeaton et al., 2018; Zhou et al., 2019).

Parental feeding styles have been linked to children's weight gain and eating behaviour (Alahmadi, 2019; Altan & Bektas, 2017; Demir & Bektas, 2017; Lo et al., 2015; Wardle et al., 2002; Yavuz & Selcuk, 2018). This includes not only more or less healthy eating behaviours (Kiefner-Burmeister et al., 2014) such as availability, accessibility, timing, and frequency of meals (Silventoinen et al., 2010), but also reactions to infants' eating behaviours (Haszard et al., 2019).

Control has been one of the most studied feeding styles in the literature. Positive control refers to parental monitoring of children's increased intake of healthy foods (Blissett & Haycraft, 2008; Wardle et al., 2002). It has been positively linked to healthier eating behaviours (Haycraft et al., 2011) and increased intake of healthy foods (Vollmer & Mobley, 2013). Restrictive control or control over eating refers to parental pressure to decrease infants' access to and intake of high-calorie foods (Faith et al., 2004), and has been linked to obesogenic eating behaviours (Bergmeier et al., 2014), preferences for high-calorie foods (Farrow et al., 2015), and increased weight gain (Ventura & Birch, 2008).

Emotional and instrumental feeding practices involve using food to help infants regulate their emotions or as a reward for good behaviour (Rodenburg et al., 2014; Wardle et al., 2002). Emotional feeding has been positively linked to obesogenic eating behaviours, such as emotional regulation through food or eating in the absence of hunger (Farrow et al., 2015). Instrumental feeding practices have been positively linked to a preference for (Alm et al., 2015; Kiefner-Burmeister et al., 2014), and higher consumption of high-calorie reward foods (Rodenburg et al., 2014).

Prompting or encouragement to eat, is used by parents to encourage their children to eat healthier or more elaborately prepared foods (Wardle et al., 2002) by providing appropriate guidance (Grolnick & Pomerantz, 2009). It has been positively linked to healthier eating (Alm et al., 2015), and lower body mass index (BMI) (Musher-Eizenman et al., 2009).

It is necessary to detect and identify possible cases of risk for obesity in childhood. Several systematic reviews of the literature (Beckers et al., 2021; Heller & Mobley, 2019) have examined and identified a large number of measurement instruments to assess parental feeding styles and practices in childhood. However, few have been translated into and validated in Spanish (Anderson et al., 2005; Hughes et al., 2006; Larios et al., 2009).

Vaughn et al. (2013) proposes six key elements to assess the quality of the instruments that are in line with those used in test evaluation (Hernández et al., 2016). In this study, the Parental

Feeding Styles Questionnaire (PFSQ) (Wardle et al., 2002), widely used in research literature and related to child obesity in some studies (Altan & Bektas, 2017; Demir & Bektas, 2017), has demonstrated adequate quality. First, it conceptualises the purpose of the tool and defines the constructs it aims to measure. It assesses four aspects of parental feeding styles: emotional feeding, instrumental feeding, prompting or encouraging eating and control over eating. These aspects have been most frequently assessed in the literature (Heller & Mobley, 2019) and have become established as risk factors in the family environment (Wardle et al., 2002). Secondly, it has taken into account multiple methods in the development of the set of potential items (Vaughn et al., 2013): Involved a clinical and experimental review of the literature, sampling existing measures and conducting semi-structured interviews with 20 mothers (Wardle et al., 2002). Thirdly, it presents a refinement of the item set, as the initial version was pre-tested with two unselected samples of parents in London schools. Finally, the PFSQ has demonstrated adequate psychometric properties, showing evidence of reliability or internal consistency, and validity (Sleddens et al., 2010; Vaughn et al., 2013). It features a one-factor structure for prompting/encouragement to eat, emotional feeding and instrumental feeding, and a two-factor structure for control over eating. The questionnaire has four subscales, reliability as internal consistency was good for the scales "control over eating" (0.81) and emotional feeding (0.83), and adequate for encouraging to eat (0.74), the instrumental feeding subscale had a partially adequate value (0.67) although it must be considered that this subscale is made up of a small number of items (4 items). In its favor it's an instrument whose test-retest reliability is good. The reliability coefficient (Cronbach's alpha) ranged between 0.67 (Instrumental feeding) and 0.88 (Emotional feeding) in its validation in Portuguese (Pimenta et al., 2019), between 0.63 (Control over eating and Instrumental feeding) and 0.83 (Prompting/encourage eating) in its validation in Chinese (Tam et al., 2014), and between 0.54 (Permissive control) and 0.74 (Prompting and encouraging to eat) in its validation in Turkish (Özçetin et al., 2011). Since its original English version, the PFSQ (Wardle et al., 2002) has been used in various study populations (Braden et al., 2014; Özçetin et al., 2011; Pimenta et al., 2019; Rodenburg et al., 2014; Rodgers et al., 2013; Sleddens et al., 2010; Sleddens et al., 2014; Surkov et al., 2012; Tam et al., 2014), and has been validated in different languages and cultures: Turkish (Özçetin et al., 2011), Chinese (Tam et al., 2014), Portuguese (Pimenta et al., 2019), and Russian (Surkov et al., 2012), but the latter was not accessible to use for consultation.

Since the association between variables is the basis for obtaining evidence of validity (Muñiz & Fonseca-Pedrero, 2019), we gathered sources of validity evidence based on external variables. The Comprehensive General Parenting Questionnaire (CGPQ) (Sleddens et al., 2014) was considered useful to explore the meaning of PFSQ scores further. Such validity was supported through significant correlations between the PFSQ and the CGPQ (Sleddens et al., 2014). The CGPQ is a simple and quick-to-apply instrument with adequate psychometric properties (Damen et al., 2020; Sleddens et al., 2014; Van Der Horst & Sleddens, 2017).

Age, gender and BMI were also considered as possible external variables that could influence. Though consistent relations of age and gender to overweight/obesity are not consistent till adolescence (Wardle et al., 2002; Altan & Bektas, 2017), we included

them as a potential field of differences. As overweight and obesity had previously been related to PFSQ (Altan & Bektas, 2017; Demir & Bektas, 2017) and were the ultimate concern, we also took into account BMI.

Following the guidelines for test adaptation and translation (Muñiz et al., 2013), this paper aims to study the psychometric properties of the Spanish-adapted version of the PFSQ (Wardle et al., 2002).

Specifically, our purposes were: (1) to examine internal structure; (2) to examine the reliability of scores in terms of internal consistency; (3) to investigate gender and age differences in relation to parental feeding styles; (4) to investigate the relationships between the parental feeding styles and General parenting variables. It was hypothesized that the PSFQ scores would: (a) (Hypothesis 1) have a good internal consistency (reliability); (b) (Hypothesis 2) be moderately associated with measures of CGPQ; (c) (Hypothesis 3) be moderately correlated with BMI status of mothers; (d) (Hypothesis 4) be moderately correlated with BMI status of children; (e) (Hypothesis 5) be not correlated with age; and (f) (Hypothesis 6) be not correlated with gender.

Method

Participants

Twelve early childhood and primary schools and five nurseries agreed to participate in the study. The final study population consisted of 523 mothers of 523 school children aged between 2 and 7 years ($M = 4.4$ years, $SD = 1.3$). In the analysis, children's age was divided in two groups (under and over 5 years old) as it's the critical age World Health Organization uses to differentiate risk of obesity from proper obesity and recommends a different way of classifying BMI (WHO, 2022). Fifty-one per cent of the participants were mothers of boys ($M = 4.3$ years, $SD = 1.4$) and 49% were mothers of girls ($M = 4.5$ years, $SD = 1.3$). Seventy-eight per cent of children were classified as normal weight, 11% as overweight, 8% as obese and the remaining 3% as underweight. Regarding the Body Mass Index (BMI) of the mothers, it was found that 72% were classified as normal weight, 20% were classified as overweight and 8% as obese (see Table 1).

Instruments

The PFSQ (Wardle et al., 2002) consists of 27 items to assess four scales: a) Control over eating (10 items) that refers to the control that parents exercise over their children's eating (e.g., "I decide when it is time for my child to have a snack."); b) Emotional feeding (5 items), parents' use of food to regulate their children's emotions (e.g., "I give them something to eat to make them feel better when they are angry"); c) Prompting and encouraging to eat (8 items), referring to parents' encouragement of their children to eat (e.g., "I encourage them to try all the foods I serve at mealtimes"); and d) Instrumental feeding (4 items) that refers to parents' use of food as a reward or punishment to regulate their children's behaviour (e.g., "I reward them with something to eat when they behave well"). It is a questionnaire with five possible response options, scored from 1 (*never*) to 5 (*always*).

Table 1
Characteristics of Participants

	<i>M (SD)</i>	<i>n (%)</i>
Children		
Age	4.4 (1.35)	
Gender		
Male		266 (51%)
Female		257 (49%)
BMI		
Normal weight		406 (78%)
Overweight		57 (11%)
Obese		43 (8%)
Underweight		17 (3%)
Mothers		
Age	35.25 (9.2)	
BMI		
Normal weight		373 (71%)
Overweight		103 (20%)
Obese		40 (8%)
Unknown		7 (1%)
Mother's level of education		
Primary Education		82 (16%)
Secondary Education		242 (46%)
Baccalaureate, Vocational Training II, Certificate of Higher Education		16 (3%)
Degree, Diploma, Bachelor's Degree		155 (30%)
Postgraduate studies (Master's, Doctorate)		22 (4%)
Unknown		6 (1%)
Mother's employment status		
Active		340 (65%)
Inactive		177 (33.6%)
Others		2 (0.4%)
Unknown		4 (1%)

We also adapted and translated the original Comprehensive General Parenting Questionnaire (CGPQ) into Spanish (Martínez-Hernández et al., 2018). It consists of 85 items to assess five constructs: a) Nurturance (20 items), representing the extent to which parents encourage and acknowledge individuality and self-affirmation by being supportive and responsive to their children's needs; b) Structure (20 items) that means the extent to which parents organise their children's environment, helping them when necessary to gradually achieve a certain goal, enforcing rules and limits consistently; c) Behavioural control (20 items), that refers to as parents monitoring and managing their children's activities, providing clear expectations of behaviour and using non-intrusive approaches to discipline; d) Coercive control (20 items) refers to parental control characterised by pressure, intrusion, domination, and discouragement of the child's independence and individuality; and e) Overprotection (10 items) is defined as excessive protection or monitoring given the child's developmental level responses scored from 1 (*never*) to 5 (*always*). Previous studies support the adequate psychometric properties of this instrument (Damen et al., 2020; Sleddens et al., 2014; Van Der Horst & Sleddens, 2017). In

this study, Cronbach's alpha and McDonald's omega coefficients were respectively 0.86 and 0.86 for the Nurture scale scores; 0.78 and 0.75 for Structure; 0.61 and 0.60 for Behavioural Control; 0.83 and 0.82 for Coercive Control; 0.62 (coefficient alpha) for Overprotection, McDonald's Omega coefficient could not be estimated due to some inter-item covariances close to zero.

Adaptation and Translation Process

The questionnaire was translated into Spanish once authorization was received from the original authors. The Spanish version of the PFSQ was the result of an iterative refinement process carried out by a committee of experts composed of three psychologists after a careful adaptation of meanings (Muñiz et al., 2013). During the process, the guidelines of the International Test Commission (ITC) for the adaptation and translation of tests to other cultures were taken into account (Muñiz et al., 2013). The committee of experts reviewed and compared the two versions of the PFSQ (English and Spanish), considering the cultural, conceptual, linguistic and metric aspects (such as sort of snacks, family meals, etc.). Finally, the PFSQ was adapted from the original culture to Spanish. The items of the Spanish version were adapted and translated (see Table 2), taking into account the quality control of item translation-adaptation (Muñiz et al., 2013). The same procedure was followed for the CGPQ.

Procedure

The research was approved by the Research Ethics Committee of the University of Murcia (ID: 3181/2020). In order to select the sample, one parent of 988 families had to sign an informed consent form stating the purpose of the study and the commitment to confidentiality of the information collected. Once the informed consents were collected (639), participants were given the questionnaires. Participants were informed of the confidentiality of their responses and the voluntary nature of the study. The study was presented to participants as a research on self-regulation and eating behaviour in infancy and childhood. When processing the data, we knew that in some of the foreign families (mainly in Moroccan families), the questionnaires were completed by older daughters and not mothers as the mothers did not dominate Spanish. So it was finally decided to exclude all the questionnaires of mothers whose native language was not Spanish. Also families that did not complete both questionnaires were excluded. The final sample consisted of 523 families.

Data Analysis

First, descriptive statistics for the PFSQ items were examined. Data screening was performed to assess missing data. A total of 5.8% of the missing data were imputed at the item level using Expectation Maximization. Secondly, to analyze the internal structure of the PFSQ scores, a confirmatory factor analysis using MPLUS (Muthén & Muthén, 2017) was performed, where the Weighted Least Squares Adjusted Mean and Variance (WLSMV) method of estimation was used (Kline, 2016). To assess the model fit, the χ^2 statistic, the root mean squared error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI) were considered. Values of ≥ 0.95 for CFI and TLI,

and values of ≤ 0.05 for RMSEA are considered a good fit (Hu & Bentler, 1999; Kline, 2016). Values of RMSEA between 0.05 and 0.08 and values of CFI and TLI greater than 0.90 are considered an acceptable fit. Items with a factor loading ≥ 0.40 and statistically significant ($p \leq .05$) were considered. Afterwards, the reliability of the scores of each of the subscales of the PFSQ was estimated using Cronbach's alpha coefficient and McDonald's omega coefficient, the descriptive statistics of the items were also analyzed, as well as the discrimination indices (corrected item-subscale correlation). To obtain evidence of external validity, possible differences in parental feeding styles were analyzed as a function of children's gender, age and BMI. Finally, to obtain evidence of external validity in terms of correlations with other variables, bivariate correlations between PFSQ subscale scores and CGPQ subscale scores were calculated. SPSS 28.0 and MPLUS were used for the analysis (Muthén & Muthén, 2017).

Results

Evidence of Validity Based on Internal Structure: Confirmatory Factor Analysis

Two alternative factor models were evaluated: four-factor correlated model and higher-order factor. Results from CFA showed that the probability levels of all chi-square statistics were less than 0.01, indicating a rather poor absolute fit for both models, four-factor correlated (977.3; $df = 318$, $p < .001$) and higher-order (1046.7; $df = 318$, $p < .001$), however, this value should be taken with caution as it is affected by relatively large sample size. When goodness-of-fit statistics were considering the best relative fit of the estimated models was found for the four-factor correlated model (Instrumental Feeding, Emotional Feeding, Prompting and Encouraging Eating and Controlling Overeating), thus the values obtained for CFI, TLI and RMSEA indicated an acceptable fit CFI = .93; TLI = .92, RMSEA = .063 (CI: .058 -.067). On the other hand, the values for higher-order model were CFI = .92; TLI = .92, RMSEA = .064 (CI: .060 -.069).

Overall, almost all parameter estimates were moderate to high and statistically significant (see Table 2). In the Instrumental Feeding scale, all items obtained factor loadings above 0.40 (ranging from 0.42 to 0.87). On the Emotional Feeding scale, all items obtained factor loadings higher than 0.70, ranging from 0.79 to 0.89. For Supporting and Encouraging them with food, the factor loadings of the items ranged from 0.31 (item 7) to 0.84. Finally, for the Control Over Eating scale, the factor loadings were found to be between 0.34 and 0.62. Overall, four of the 27 items showed factor loadings < 0.40 , namely items 7, 4, 23 and item 27, but all of them were statistically significant.

A high positive correlation (0.84) was found between the Emotional Feeding factor and the Instrumental Feeding factor, and a moderate positive correlation between the Overeating Control factor and Prompting and Encouraging Eating (0.35). On the other hand, the Overeating Control factor correlated -0.31 with Instrumental Feeding and -0.48 with Emotional Feeding. The correlation between the Prompting and Encourage factor with the Emotional Feeding and Instrumental Feeding factors was low and inverse, -0.13 and -0.08 respectively. All correlations were statistically significant ($p < .01$) except for the Prompting and Encourage factor with Instrumental Feeding (see Table 3).

Table 2
 Confirmatory Factor Analysis of the Parental Feeding Styles Questionnaire (PFSQ): Four-Factor Model

	Factor Loadings	Standard Error
Instrumental feeding		
6. Para que se comporte, le prometo algo de comer <i>[In order to get my child to behave themselves, I promise them something to eat]</i>	.87	.02
8. Si se porta mal, no le doy su comida favorita <i>[If my child misbehaves I withhold their favourite food]</i>	.53	.04
17. Utilizo los postres como un “soborno” para que se coma el plato principal <i>[I use dessert as a bribe to get my child to eat their main course]</i>	.42	.05
21. Lo premio con algo de comer cuando se porta bien <i>[I reward my child with something to eat when they are well behaved]</i>	.75	.03
Emotional feeding		
2. Le doy algo de comer para que se sienta mejor cuando se siente molesto, disgustado <i>[I give my child something to eat to make them feel better when they are feeling upset]</i>	.79	.02
12. Le doy algo de comer para que se sienta mejor cuando se siente herido, ofendido <i>[I give my child something to eat to make them feel better when they have been hurt]</i>	.89	.02
14. Le doy algo de comer si está aburrido <i>[I give my child something to eat if they are bored]</i>	.79	.03
20. Le doy algo de comer para que se sienta mejor cuando está preocupado <i>[I give my child something to eat to make them feel better when they are worried]</i>	.89	.02
24. Le doy algo de comer para que se sienta mejor cuando está enfadado <i>[I give my child something to eat to make them feel better when they are feeling angry]</i>	.89	.02
Prompting and encouragement to eat		
3. Le animo a que espere con deseo la comida (p. e., “hoy te he preparado una comida riquísima”) <i>[I encourage my child to look forward to the meal]</i>	.41	.04
4. Le felicito si se come lo que le doy <i>[I praise my child if they eat what I give them]</i>	.39	.04
5. Le animo a que coma variedad de alimentos <i>[I encourage my child to eat a wide variety of foods]</i>	.74	.03
7. Le presento la comida de forma atractiva <i>[I present food in an attractive way to my child]</i>	.31	.04
9. Le animo a probar todos los alimentos que sirvo en las comidas <i>[I encourage my child to taste each of the foods I serve at mealtimes]</i>	.80	.03
11. Le animo a probar alimentos que no ha probado antes <i>[I encourage my child to try foods that they haven't tasted before]</i>	.84	.02
18. Le animo a que disfrute su comida <i>[I encourage my child to enjoy their food]</i>	.61	.04
26. Le felicito cuando come alimentos nuevos <i>[I praise my child if they eat a new food]</i>	.64	.05
Control over eating		
1. Le dejo que elija lo que come en las comidas <i>[I allow my child to choose which foods to have for meals*]</i>	.58	.04
10. Le dejo que corree durante las comidas <i>[I allow my child to wander around during a meal*]</i>	.54	.05
13. Le dejo que decida cuándo tomar su comida <i>[I let my child decide when they would like to have their meal*]</i>	.62	.04
15. Le dejo que decida cuándo ha comido suficientes tentempiés, aperitivos <i>[I allow my child to decide when they have had enough snacks to eat*]</i>	.59	.05
16. Decido cuándo es el momento de que mi hijo tome un tentempié, aperitivo <i>[I decide when it is time for my child to have a snack]</i>	.52	.04
19. Decido su horario de comidas <i>[I decide the times when my child eats their meals]</i>	.60	.05
22. Le dejo que coma entre comidas siempre que quiera <i>[I let my child eat between meals whenever they want*]</i>	.57	.04
23. Le insisto a que coma sentado a la mesa <i>[I insist my child eats meals at the table]</i>	.39	.06
25. Decido lo que come entre comidas <i>[I decide what my child eats between meals]</i>	.55	.04
27. Decido cuántos aperitivos, tentempiés debe tomar mi hijo <i>[I decide how many snacks my child should have]</i>	.34	.05

Notes. * Reverse key. All factor loadings were statistically significant $p < .001$.

Table 3
Factor Correlations Matrix

	Instrumental feeding	Emotional feeding	Prompting / encouragement to eat
Emotional feeding	.83	---	
Prompting / encouragement to eat	-.09	-.14	---
Control over eating	-.31	-.51	.35

Item Descriptive Statistics

Table 4 shows the results of the item descriptive statistics and the corrected item-total correlation. As for the Instrumental Feeding subscale, the mean of the items is below or close to the scale value 2 “Hardly ever”, with item 21 obtaining the highest mean and item 8 the lowest. The corrected item-total correlation ranged between 0.31 and 0.56. The items of the Emotional Feeding subscale presented low mean values close to the scale 1 value “Never”, with item 2 obtaining the highest mean and items 14 and 20 the lowest. The corrected item-total correlation ranged between 0.58 and 0.74. As for the subscale Prompting or Encourage them to eat, the mean of the items is close to the scale value 4 “Often”, with item 26 obtaining the highest mean and item 7 the lowest. The corrected item-total correlation ranged between 0.33 and 0.52. Finally, in relation to the items on the Overeating Control scale, the mean of the items is close to the scale value 4 “Often”, with item 23 obtaining the highest mean and item 1 the lowest. The corrected item-total correlation ranged between 0.18 and 0.42.

Estimating the Reliability of PFSQ Scores

The reliability coefficients of the subscale scores, estimated with the coefficient alpha, ranged between 0.64 and 0.86 (see Table 4). The estimated values for the McDonald omega coefficient were between 0.66 and 0.86.

Evidence of Validity Through Expected Differences in Means.

Mean differences were calculated for the subscales of Prompting or encouraging them with food, Control Over Eating, Emotional Feeding and Instrumental Feeding for age and gender. In relation to age, ANOVA results were not significant for any of the subscales; Prompting or Encouraging them with food [$F(1, 519) = 1.02; p = .313; \tau^2 = .002$], Control Over Eating [$F(1, 519) = 2.55; p = .111; \tau^2 = .005$], Emotional Feeding [$F(1, 519) = 1.39; p = .239; \tau^2 = .003$] and Instrumental Feeding [$F(1, 519) = 1.54; p = .214; \tau^2 = .003$]. In relation to gender, the ANOVA results were also non-significant for none of the subscales; Prompting or encouraging them with food [$F(1, 519) = .32; p = .570; \tau^2 = .001$], Control Over Eating [$F(1, 519) = 0.16; p = .689; \tau^2 < .001$], Emotional Feeding [$F(1, 519) = 1.21; p = .272; \tau^2 = .002$] and Instrumental Feeding [$F(1, 519) = 1.10; p = .745; \tau^2 < .001$]. All means and standard deviations of the subgroups can be found in Table 4.

Evidence of Validity Based on the Relationship With External Variables. When considering the BMI, it should be noted that most of the mothers and children had a normal weight (71 and 78% respectively), and this implies little variability. Mother’s BMI

correlated in a statistically significant way with children’s BMI ($r = .168, p < .001$), although it is a low correlation.

Table 4
Means (M), Standard Deviations, (SD) and Corrected Item-Total Item Correlations of the PFSQ Items

PFSQ	M	SD	Alpha Cronbach/ Omega McDonald	Correlation item-scale
Instrumental feeding (4 items)	1.86	0.65	0.64/0.66	0.43 (Average)
6	1.82	0.87		0.56
8	1.57	0.90		0.33
17	1.99	0.97		0.31
21	2.04	0.98		0.52
Emotional feeding (5 items)	1.43	0.56	0.86/0.86	0.68 (Average)
2	1.61	0.79		0.63
12	1.51	0.78		0.74
14	1.33	0.64		0.58
20	1.33	0.64		0.71
24	1.35	0.67		0.72
Prompting/ Encouragement to eat (8 items)	4.07	0.48	0.72/0.71	0.43 (Average)
3	3.21	1.01		0.43
4	4.17	0.87		0.38
5	4.55	0.62		0.46
7	2.90	1.00		0.33
9	4.50	0.71		0.46
11	4.44	0.70		0.44
18	4.03	0.90		0.52
26	4.73	0.58		0.38
Control over eating (10 items)	4.32	0.43	0.68/0.68	0.35 (Average)
1	3.78	0.84		0.38
10	4.59	0.79		0.37
13	4.52	0.75		0.40
15	4.36	0.89		0.33
16	4.00	1.04		0.37
19	4.67	0.63		0.35
22	4.20	0.82		0.40
23	4.78	0.64		0.18
25	4.06	1.04		0.42
27	4.21	0.89		0.25

On the other hand, for the total sample, we can see that the correlations between the subscales of the PFSQ and the child’s BMI were very low and was only statistically significant for the variable Support ($r = -.105, p = .016$). Regarding mothers’ BMI, we found that all were low, and that they only were statistically significant for Control ($r = -.132, p < .003$) and Instrumental feeding ($r = .116, p < .008$) (see Table 5).

The ANOVAS performed based on the child’s BMI classification and the PSFQ subscales did not show statistically significant

differences. On the other hand, if we focus on the mothers and their classified BMI, we found significant differences in mothers with obesity being their scores lower on average in control [$F(2, 515) = 6.22; p = .002; \tau^2 = .024$] and higher in instrumental feeding [$F(2, 515) = 3,25; p = .04; \tau^2 = .012$].

The analysis comparing the groups (gender and age) in the levels of the PFSQ scale scores indicates that there were no statistically significant differences between boys and girls, older or younger than 5 years.

Bivariate correlations were calculated between PFSQ subscale scores and CGPQ scale scores (see Table 6). The PFSQ subscale scores, prompting/encouraging eating and control over eating were positive, and correlated statistically significantly with parenting constructs such as nurturance and structure. The subscales of emotional feeding and instrumental feeding correlated statistically significantly with coercive control and overprotection. Nevertheless, this relation to overprotection should be taken with care as the reliability of this measure was low in this sample. Statistically

significant negative correlations were found between the emotional and instrumental feeding subscales with Structure.

Table 5
Descriptive Statistics of the Subscale Scores of the Parental Feeding Styles Questionnaire

	PFSQ				n
	Prompting/ Encouraging Eating	Control over eating	Emotional feeding	Instrumental feeding	
	M (SD)	M (SD)	M (SD)	M (SD)	
Gender					
Male	4.06 (0.50)	4.32 (0.44)	1.46 (0.59)	1.87 (0.62)	266
Female	4.08 (0.45)	4.35 (0.42)	1.40 (0.54)	1.85 (0.67)	257
Age					
<= 5 years	4.09 (0.46)	4.29 (0.44)	1.46 (0.57)	1.89 (0.66)	273
>5 years	4.04 (0.49)	4.35 (0.42)	1.39 (0.56)	1.82 (0.62)	250

Table 6
Correlations Between Parental Feeding Styles Questionnaire and Comprehensive General Parenting Questionnaire

	PFSQ			
	Control over eating	Emotional feeding	Prompting /Encouragement to eat	Instrumental feeding
CGPQ				
Nurturance	.08	.03	.38**	-.02
Social rewarding	.08	.00	.31**	-.01
Responsiveness	.08	.07	.22**	.00
Autonomy support	.02	.00	.36**	-.04
Involvement	.07	.01	.31**	-.03
Structure	.33**	-.20**	.33**	-.19**
Consistency	.21**	-.13**	.32**	-.08
Inconsistent discipline	.28**	-.26**	.07	-.22**
Organization	.27**	-.04	.35**	-.07
Scaffolding	.07	.00	.30**	-.05
Behavioural control	.04	.05	.32**	.01
Monitoring	.06	.09*	.25**	.04
Expectations for behaviour	.12**	.02	.28**	-.00
Non-intrusive discipline	.03	-.02	.25**	.03
Considering child input	-.11**	.00	-.03	-.05
Coercive control	-.12**	.19**	-.02	.17**
Psychological control	-.17**	.16**	-.04	.18**
Physical punishment	-.13**	.18**	-.05	.11*
Authoritarian control	.03	.10*	.05	.13**
Overprotection	-.06	.18**	.17**	.10*
Excessive monitoring	.01	.11*	.15**	.03
Excessive involvement	-.11*	.19**	.13**	.13**

** $p < .001$ * $p = .005$

Discussion

The main aim of this study was to adapt the PFSQ into Spanish and to analyse its psychometric properties in the Spanish population. A total of 523 mothers of school children aged 2–7 years participated in this study and responded to the Spanish version of the PFSQ. In this Spanish sample, mothers of school children most frequently used parental feeding practices, such as controlling overeating and prompting or encouraging them to eat, and less frequently used instrumental and emotional feeding. Results were very similar to those obtained in the original version (Wardle et al., 2002), and later in a Dutch sample (Sleddens et al., 2010). They were very similar in the validation and translation of the PFSQ into other languages and cultures: Turkish (Özçetin et al., 2011), Portuguese (Pimenta et al., 2019) and Chinese (Tam et al., 2014).

The Spanish version of the PFSQ showed adequate psychometric properties. In relation to the reliability analysis (considered as internal consistency), the scales ranged between 0.86 (Emotional Feeding) and 0.64 (Instrumental Feeding), but it should be taken into account that the latter scale has a small test length (4 items) that may be underestimating the coefficient (see Table 3). The values of the Omega coefficient were similar to those estimated with the alpha coefficient. These results are very similar to those obtained in the original version (Wardle et al., 2002), whose scales obtained Cronbach's alpha coefficient values ranging from 0.83 (Emotional Feeding) to 0.67 (Instrumental Feeding) and in adaptations to other languages (values offered above in the Introduction section). Nevertheless, Instrumental feeding is a scale that should be taken with care due to its lower score in the original and adapted versions.

Confirmatory factor analysis provided evidence of a four-factor structure Instrumental Feeding, Emotional Feeding, Prompting and/or Encouraging Eating and Controlling Overeating. The items of the latter scale showed, in general, lower factor loadings than the rest of the scales; the analysis of the item wording may indicate a method effect, as half of the items were worded positively and the other half negatively. These results replicate those obtained in previous studies in a Dutch sample (Sleddens et al., 2010), as well as in the validation and translation of the instrument to other languages and cultures (Özçetin et al., 2011; Pimenta et al., 2019; Tam et al., 2014). These results could not be compared with the original English version (Wardle et al., 2002), as psychometric analyses were not carried out. From a Factor Analysis perspective (Ferrando et al., 2022), for the Spanish adaptation of the PFSQ, evidence was obtained of the validity of its internal structure in terms of the parental feeding styles identified in the literature.

As to the lack of differences in age and gender, from a theoretical point of view, considering the young ages of the children in this study, there was no reason to expect gender and/or age differences, as parents employ very similar eating styles regardless of their children's differences (Wardle et al., 2002). These results were also consistent with those of Özçetin et al., (2011), in the validation and translation of the PFSQ into Turkish.

The correlation between mothers and children's BMI is consistent with literature on the topic, though usually it's related to both parents. The inverse correlation between child's BMI and PFSQ's support variable means that children with higher support

from their parents (as defined in the questionnaire) were the ones with lower BMI. On the other hand, when mothers had a higher BMI, they were lower in control and higher in instrumental feeding. That is, they had less control of what their children eat and they used more food as a way of controlling their children's behaviour. This same pattern is found when the mothers' classified MBI is analyzed in the ANOVA: mothers with obesity were the ones who showed less control and more instrumental feeding. This difference in control in mothers with obesity was also found in Wardle et al. (2002).

Considering the relations between PFSQ and CGPQ, parental feeding styles such as prompting or encouragement to eat and control over eating were positively correlated with parenting constructs such as nurturance and structure. Whereas emotional and instrumental feeding correlated negatively with structure and positively with coercive control and overprotection. These results are in line with previous studies, where parents of school children with healthier eating behaviours were more likely to use encouragement towards food and control over eating in a more positive parenting context, providing support to their children (nurturance) and setting consistent rules and limits (structure) (Sleddens et al., 2014). Whereas, parents of school children who harshly enforce rules on their children (coercive control) and interfere with their children's autonomy development (overprotection) make greater use of emotional and instrumental feeding by using food to soothe or reward their children's good behaviour (Sleddens et al., 2014).

More recent studies support this theory, as more positive parenting constructs such as setting consistent rules and limits (structure) have been shown to be more beneficial in the development of healthy eating behaviours at an early age (Balantekin et al., 2020; Gubbels et al., 2020). Whereas, not setting these consistent rules and limits (structure) and using food to reward good behaviour (instrumental feeding) have been linked to an increased risk of childhood overweight/obesity (Mihirshahi et al., 2018). Coercive control or harsh rule enforcement has also been linked to increased intake of high-calorie foods (Damen et al., 2020).

This study addresses the insufficiency of validated instruments in Spanish. Analysing parental feeding styles could help us in the development of family-centred interventions to promote healthy eating habits in childhood (Sleddens et al., 2010), and prevent the development of eating behaviours that may lead to the development of childhood overweight/obesity.

To interpret the results of this research, some limitations must be taken into account. Firstly, relations between feeding parental styles and overweight/obesity are not yet. Secondly, it's a non-random sampling of families in Murcia, which could limit the generalisability of the results. However, it respects the recommendations for the number of participants per item administered (Ferrando & Anguiano-Carrasco, 2010).

In conclusion, the initial evidence of reliability and validity supports the use of the adapted version of the PFSQ for the Spanish population to assess parental feeding styles. The availability of this instrument in its Spanish version allows for a better understanding of how parental feeding styles may affect nutrition patterns and contribute to the development of early obesogenic behaviours, which may ultimately affect the development of

overweight or obesity in childhood. Nevertheless, the study results should be interpreted with caution and that further research with longitudinal designs, representative samples, and objective measures is needed to better understand the factors that contribute to childhood obesity.

Author Contributions

Irene Martínez-Hernández: Conceptualization, Methodology, Investigation, Writing – Original Draft, Writing – Reviewing and Editing. **Marina Olmos-Soria:** Conceptualization, Methodology, Investigation, Writing – Reviewing and Editing, Supervision. **Eduardo Fonseca-Pedrero:** Formal Analysis, Writing – Reviewing and Editing, Supervision. **María Dolores Hidalgo:** Formal Analysis, Writing – Reviewing and Editing. **Ana V. Valero-García:** Conceptualization, Methodology, Investigation, Writing – Reviewing and Editing, Supervision.

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Declaration of Interests

The authors declares that there is no conflict of interest.

Data Availability Statement

The research data of the article will be available upon request to the authors.

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