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Development and Validation of a New Questionnaire Assessing Feeding Styles in Toddlers: Toddler Feeding Style Questionnaire (TFSQ)

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ABSTRACT

Purpose: To develop and validate a new questionnaire assessing feeding styles in toddlers, the Toddler Feeding Style Questionnaire (TFSQ).
Design and methods: An instrumental design was used in this study. A convenience sample of 546 Spanish mothers of a toddler (12–24 months-old) completed the TFSQ and a web-based survey to obtain data on feeding styles, sociodemographic and anthropometric characteristics, weaning and attachment style. Items were developed and classified into two content domains: responsiveness and demandingness. For the construct validity analysis, the sample was randomly divided into two halves used to the exploratory and confirmatory factor analysis, respectively. Validation hypotheses about the differences in the TFSQ scores were suggested.
Results: The factorial analysis revealed a responsiveness scale and a demandingness scale. The McDonald's Omega and Cronbach's alpha values coincided in both scales, being 0.84 and 0.75, respectively. A high responsiveness and demandingness feeding styles degree of agreement showed a statistically significant association with the correspondent scale ($p < .01$). The 33.3% of children who are overweight or obese have mothers who classify themselves as neglectful. Both scales were related to the mothers' attachment styles, toddler's age and the time of weaning at 6 and 12 months.
Conclusions: The TFSQ provides a valid and reliable Responsiveness and Demandingness scale to evaluate feeding styles in toddlers.
Practice implications: Parental feeding styles influence future eating behavior and children's weight. There is a lack of validated instruments used to evaluate feeding styles in toddlerhood based on the two theoretical dimensions of responsiveness and demandingness.

Introduction

Childhood obesity has increased in epidemic proportions globally, and particularly in many developing countries (Kumar & Kelly, 2017). If current trends continue, the number of overweight or obese infants and young children (aged 0 to 5 years) globally will increase to 70 million by 2025 (Unicef, World Health Organization [WHO], & World Bank, 2018). In recent years, research aimed at preventing childhood obesity is increasingly directed to the analysis of different parenting styles, feeding styles and feeding practices, that determine what parents do and how they do it when it comes to raising and feeding their children (Shloim, Edelson, Martin, & Hetherington, 2015).

Initially, the parenting constructs were developed. Baumrind (1967) originally described parenting styles and several years later, Maccoby and Martin (1983) modified them and proposed four distinct parenting styles based on two dimensions of parental behavior: demandingness and responsiveness to the child (Maccoby & Martin, 1983). The dimension of Responsiveness is explained as "the extent to which parents intentionally foster individuality, self-regulation, and self-assertion by being attuned, supportive, and acquiescent to children's special needs and demands" (Baumrind, 1991) and the dimension of Demandingness refers to "the claims parents make on children to become integrated into the whole family, by their maturity demands, supervision, disciplinary efforts and willingness to confront the child who disobeys" (Hughes, Power, Orlet Fisher, Mueller, & Nicklas, 2005). These dimensions are in turn made up of a relatively stable set of parenting practices which refer to the context-specific behaviors or strategies parents use for child-rearing purposes, which vary over time, across situations and according to the children's characteristics and influence the child's attitudes, behaviors, or beliefs (Jansen, Daniels, & Nicholson, 2012; Vaughn

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et al., 2016). Unlike parenting practices, parenting styles are defined as "stable traits that are consistent across time and context, and provide the overarching emotional climate for parents' interactions with their child" (Darling & Steinberg, 1993).

Later, the traditional parenting constructs have been theoretically used to define the specific context of feeding. Similar to Maccoby and Martin's (1983) classification of parenting styles, feeding styles can be determined by a combination of these two dimensions, demandingness and responsiveness, which results in four feeding styles: authoritative (high scores in both dimensions), authoritarian (high demandingness and low responsiveness), indulgent (low demandingness and high responsiveness), and neglectful (low scores in both dimensions) (Hughes et al., 2005). Feeding styles define how parents interact with the child when it comes to feeding, remain consistent within a family context, and assess not only feeding practices but also the emotional relationship between parent and child (Darling & Steinberg, 1993; Ventura & Birch, 2008).

As established in the scientific literature, the concepts of styles, practices and dimensions follow a defined hierarchy, where the dimensions are placed in the center: the parenting/feeding styles are made up of the combination of the responsiveness and demandingness dimensions and each dimension refers to a set of specific parenting/feeding practices. However, the current scientific literature has found a lack of consensus in the conceptualization and measurement of these concepts (Hughes et al., 2013; Jansen et al., 2012; Vaughn et al., 2016). This lack of agreement with the measurement of these constructs in a consistent manner across studies is difficult, especially regarding the validated instruments used to evaluate feeding styles in toddlerhood, which impairs the interpretation of results (Hughes et al., 2013; Jansen et al., 2012).

Eating healthy foods is a learned behavior that begins during the first 1000 days (Dattilo, 2017). Both children and caregivers' eating behaviors contribute to feeding interactions in a two-way process that will determine the diet quality, food consumption, preferences, and consequently weight status (Kral & Rauh, 2010; Pinard et al., 2012; Sameroff & Chandler, 1975). To evaluate the feeding styles of parents in this critical period (the first 24 months of life) would help in the prevention of childhood obesity (Ciampa et al., 2010; Gillman & Ludwig, 2013; Hesketh & Campbell, 2010). In fact, responsive feeding behaviors have been positively associated with the child's dietary intake, healthy growth, and child development (Black & Aboud, 2011; DiSantis, Hodges, Johnson, & Fisher, 2011; Hurley, Cross, & Hughes, 2011). On the contrary, caregiver feeding approaches that are unresponsive to the child's cues of hunger or fullness have been related to a lower capacity for the infant self-regulation and, therefore, to a child's overnutrition, overweight and obesity (DiSantis et al., 2011; Hodges et al., 2013; Hurley et al., 2011). In this respect, very few tools have been developed to measure feeding styles in parents of children under 2 years-old (Hodges et al., 2013; Hurley et al., 2013; Hurley, Black, Papas, Caulfield, & Caufield, 2008; Rigal, Chabanet, Issanchou, & Monnery-Patris, 2012; Sacco, Bentley, Carby-Shields, Borja, & Goldman, 2007; Savage, Rollins, Kugler, Birch, & Marini, 2017; Thompson et al., 2009; Wood et al., 2016). However, none of them has defined subscales for the theoretical concepts from which they derive (demandingness and responsiveness dimensions), as is recommended by the latest standards for quality criteria of patient-reported outcome measurement instruments (Mokkink et al., 2018; Prinsen et al., 2018; Terwee et al., 2018). Conversely, there are many studies developed with toddlers that have provided valuable information about feeding behaviors but were focused on feeding practices (Baughcum et al., 2001; Chaidez & Kaiser, 2011; Corsini, Wilson, Kettler, & Danthiir, 2010; Heerman, Lounds-Taylor, Mitchell, & Barkin, 2018; Jansen, Mallan, Nicholson, & Daniels, 2014; Moursi et al., 2008).

The objective of the present work is to validate a new questionnaire: The Toddler Feeding Style Questionnaire (TFSQ) consists of two scales, a demandingness scale and a responsiveness scale, which measure the two theoretical dimensions described by the scientific literature to assess the parental feeding styles in children between 12 and 24 months-old.

Materials and methods

An instrumental design was used in this study (Carretero-Dios & Pérez, 2005).

Participants

A convenience sample of 546 Spanish mothers was recruited between October 2013 and June 2014, during postpartum hospital admission in 17 hospitals in eastern Spain. These mothers are a subsample of a larger study investigating factors related to early parenting including a sample of 1980 mothers after birth (Gordo et al., 2018; Riera-Martín et al., 2018). The inclusion criterion was mothers that had answered all items of the TFSQ between 12 and 24 months postpartum. Mothers with a cognitive delay limiting the ability to understand the TFSQ were excluded.

Ethics

All the subjects were informed prior to their inclusion in the study and decided to participate voluntarily, hence they signed an informed consent document. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Clinical Research Ethics Committee of the General Directorate of Public Health and the Higher Public Health Research Center reporting to the Valencian Health Ministry.

Procedure

For the development and validation of the TFSQ, a standardized procedure was used (Chadha, 2009). A multi-disciplinary team, including two nurse-midwives, two nutritionists, and a psychologist, was assembled. Items were developed in Spanish language and generated through a multi-step process: 1) review of relevant measures and related papers; 2) the items' development; 3) evaluation of relevance and comprehension; and 4) an empirical study to validate the questionnaire.

In view of the review's results and according to the theoretical framework developed by Maccoby and Martin (1983) to describe parenting styles, we used feeding practices related to the dimensions of responsiveness and demandingness to develop the items. In addition, the content of different tools created for the measurement of feeding styles was checked (Hughes et al., 2005; Thompson et al., 2009; Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002).

The items constituted a draft list of questions classified into two content domains. The responsiveness domain included items related to three topic areas: time and place selected for eating, the parents' response to the toddler's signals of hunger and satiety, and the interest in food of the children. The demandingness domain included items related to the quantity and quality of the food offered to the child. The development team provided feedback on the appropriateness, understandability, comprehensiveness and relevance of the draft questions. A pool of 42 draft items was produced (responsiveness: 20 items, demandingness: 22 items).

To obtain a preliminary TFSQ, 10 mothers and 10 fathers were interviewed about the comprehensibility, comprehensiveness, relevance, and clarity of expression of the items in the pilot test. A qualitative analysis examined whether each item reflected the construct concept and identified pairs of items with very similar content or with an ambiguous interpretation. In these cases, the worst-rated items or those that involved both dimensions were eliminated, leaving the clearest and most concise items.

The first version of the TFSQ included 19 items (responsiveness: 9 items, demandingness: 10 items). The team decided not to include, on

either of the two dimensions, items written in an inverse manner, to avoid the effects of the method variance (Hu & Bentler, 1999). The items were answered on a seven-point Likert-type scale, ranging from strongly disagree to strongly agree. The sum of the responses of each item of both scales was calculated, obtaining the summation of the responsiveness dimension and the summation of the demandingness dimension for the subsequent statistical analysis.

Measures

Demographic characteristics

Maternal age on the day of delivery, toddler sex, educational level, and the family socioeconomic status were assessed. The mothers' educational levels were classified into two groups: with or without a university degree. The family socioeconomic status was classified according to the total annual income in the family unit: < 11,999 euros or ≥12,000 euros.

Anthropometric characteristics

Birth weight of the child and the latest available data on the toddler's and maternal height and weight were self-reported by the mothers. The weight-for-length z-scores for children under 2 years-old were calculated using the World Health Organization child growth standards (WHO, 2006). Children were categorized as severe underweight (BMI Z-score < −3), underweight (BMI Z-score ≥ −3 and ≤ −2), normal weight (BMI Z-score ≥ −2 and ≤2), overweight (BMI Z-score > 2 and ≤3), or obese (BMI Z-score > 3). For further statistical analysis, this variable was grouped into two categories: 1) No overweight / obesity (the categories of severe underweight, underweight and normal weight were grouped) and 2) overweight / obesity (the categories of overweight and obese were grouped). Maternal nutritional status was defined by the BMI (kg/m^2) according to World Health Organization criteria (WHO, 1995).

Mother's self-reported adult attachment style

The attachment style of the mothers was assessed using a Spanish version of the Relationship Questionnaire (RQ) (Yárnoz-Yaben & Comino, 2011). The RQ consists of four paragraphs, each describing an attitude towards relationships in general, which represents the prototypes of these four attachment styles: secure, dismissing, preoccupied, and fearful. The mothers have to mark the option that best describes their way of relating effectively with others (Yes/No). Also, the RQ evaluates, on a seven-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree', the extent to which the respondents are reflected in each of the four prototypes of attachment styles.

Criterion items of feeding styles and their grade of agreement

Four paragraphs, defining each of the feeding styles, were generated ad hoc, in the image and likeness of the RQ (Yárnoz-Yaben & Comino, 2011), for the validation of the feeding styles along with the TFSQ (Appendix A). The mothers had to choose which definition best described what they do when it comes to feeding the child (Yes/No). In another question, the mothers had to mark the number that best reflected their degree of agreement with sentences defining their feeding style. It was a seven-point Likert scale, which ranged from 'Strongly Disagree' to 'Strongly Agree'.

Time of weaning

The self-reported information about the time of weaning was measured at six and twelve months after the birth of the child (Yes/No).

Data collection

A survey was conducted for the psychometric validation of the TFSQ. The mothers received written information about the study from which they could voluntarily join and the confidentiality of the data collected during the in-hospital stay after birth. Written consent was obtained from all the participants in the study. The sociodemographic characteristics and contact information for follow-up were obtained through a self-administered questionnaire. Once the contact data were collected, the participants received an email thanking them for their participation in the study and they were informed that a new questionnaire would be sent to them soon. Retrospective data were collected on factors related to early parenting and infants' feeding at four and eight months postpartum. Between 12 and 24 months postpartum the participants completed a web-based survey to obtain data on feeding styles, anthropometric characteristics, duration of breastfeeding, and attachment style. All the study notifications were personalized and allowed the participants to opt-out of the study. The online questionnaire was hosted on the web platform E-encuesta and accessed through a link sent via email. The link allowed the participants to interrupt the completion of the survey at any time, save the draft for later completion and prevent the survey from being filling out more than once. The responses of each participant were associated with an identification code. That same code guaranteed confidentiality. Each email was accompanied by an SMS message advising the participants that the questionnaire had been made available to them. Reminders for completing the online form were sent by email and SMS during the following three weeks, to mothers who had not answered the survey. To increase the response rate, a €300 prize was raffled among the study's participants.

Data analysis

Descriptive characteristics of the sample were determined. Also, we calculated the mean and standard deviation of the item scores and the floor and ceiling effects. For factorial analysis, although the TFSQ was developed assuming two domains, we analyzed the factor structure including jointly both groups of items, as a strategy to confirm empirically the content of the items. Following theoretical recommendations, for the construct validity analysis, we conducted cross-validation studies to replicate de factor structure and divided the sample randomly into two halves. We applied exploratory factor analysis (EFA) to one half of the sample and confirming the structure by means of confirmatory factor analysis (CFA) on the other half. The use of not a single procedure to determine the number factors to be retained favors the degree of stability of the results obtained (Izquierdo, Olea, & Abad, 2014).

Exploratory factor analysis

This analysis was performed with one of the sample halves (n = 273). It included a parallel analysis based on minimum rank factor analysis, to identify the number of factors, and an EFA with the estimation method of Unweighted Least Squares (ULS), an array of polychoric correlations, and an oblimin rotation, to examine subdomain structure. Substantive and statistical criteria were used to determine which items should remain in the questionnaire. After the EFA, to preserve the content validity, the items that were grouped in a dimension different from that in which they had been developed were eliminated (e.g. items developed for responsiveness that were grouped with items of demandingness). Also, the items with high saturations (> 0.3) in more than one dimension or those with a saturation of <0.3 in their factor were deleted.

Confirmatory factor analysis

This analysis involved the other half of the sample (n = 273), to check the factor structure identified in the exploratory phase. Five models were explored to support decisions taken in the EFA. Model 1 examined the structure extracted from the EFA, excluding the items with saturations < 0.3 in their factor and those that saturated in more than one factor. Model 2 explored the fit of model 1, excluding also the items that saturated in a factor different from that for which they

had been developed, and considering two related dimensions. Model 3 explored the fit of model 2 but considered two unrelated dimensions. Finally, Models 4 and 5 tested, respectively, the fit of the data of the responsiveness and demandingness items as two independent scales. We used the maximum likelihood estimation to fit models. The models were assessed using the goodness-of-fit index (GFI) and the comparative fit index (CFI), with values close to 0.95 or higher indicating an acceptable fit; the root mean square error of approximation (RMSEA), which favors more parsimonious models, with a value close to 0.06 or lower indicating a good fit; and the standardized root mean square residual (SRMR), with values close to 0.08 or lower indicating a good fit (Hu & Bentler, 1999).

Reliability

The reliability data were calculated with the complete sample, for the structure of the scale with the best fit indexes in the CFA. To determine the internal consistency of the questionnaire, McDonald's Omega and Standardized Cronbach's alpha coefficients of 0.7 or higher were accepted.

Other validity tests. Concurrent validity

Hypotheses about the differences in the scores of the TFSQ were conceived according to previous studies on different characteristics of mothers and toddlers. First, the scores obtained on both scales (responsiveness and demandingness) should have coincided with the criterion items and the degree of agreement of each feeding style. For instance, respondents who obtained a high score on both scales should have satisfied the definition corresponding to the authoritative style. In relation to the mothers' attachment, insecure mothers are less sensitive about food interactions and can exercise greater control (Bost et al., 2014), so they would be characterized mainly by a high demandingness or low responsiveness score. We also hypothesized that the scores on the responsiveness dimension would be higher for a longer duration of breastfeeding (Ventura, 2017). Finally, we expected that mothers with low demandingness and high responsiveness (indulgent feeding style) would have children with the highest weight-for-length z-scores (Bergmeier, Skouteris, & Hetherington, 2015; Hughes et al., 2005; Olvera & Power, 2010).

According to the non-normal distribution of the data verified by the Kolmogorov-Smirnov test, the Spearman's correlation coefficient was used to measure the association between continuous variables, and a U Mann-Whitney or Kruskal-Wallis tests were used to analyze the differences between groups. In normal variables, the independent *t*-test was performed. Fisher's exact test was used to analyze the association between dichotomous variables. The statistical significance was established at a value of $p \leq .05$.

The statistical analysis was run using SPSS, v23.0, and FACTOR, v10.3.01 (Lorenzo-Seva & Ferrando, 2016), and the Structural Equation Modeling Software (EQS),v6.2 (Multivariate Software, Inc., 2019) were used for the construct and reliability analysis.

Results

Description of the sample

A total of 684 participants of 1465 with adequate contact data (46.7%) answered the follow-up questionnaire and 546 of them (37.3%) completed all items of de TFSQ (see Flowchart in Fig. 1). Statistically significant differences for the following variables were found between the participants who completed the questionnaire between 12 and 24 months and those who did not. The participants who responded were more frequently Spanish ($chi^2 = 52.8$; $p < .001$), older ($t = 7.8$; $p < .001$) and had not a previous child ($chi^2 = 19.8$; $p < .001$). Also, they had higher educational level ($chi^2 = 127.5$; $p < .001$) and family income ($t = 10.3$; $p < .001$).

Table 1 describes the sociodemographic and anthropometric characteristics of the included sample. Most of the sample had a high educational level and a total family income above 12,000 euros per annum. Most of the mothers and children had a normal weight. According to the criterion items of feeding styles, the 56.8% of the mothers classified themselves as authoritative, 12.9% as authoritarian, 24.5% as indulgent and 5.7% as neglectful.

TFSQ development. Description of the scale

Exploratory factor analysis. Sub-sample 1 ($n = 273$)

The Kaiser-Meyer-Olkin (0.80) and Bartlett's test ($p < .01$) values for the sample showed that the use of factor analysis was appropriate. The parallel analysis indicated the existence of two dimensions. According to the EFA (Table 2), Factor I explained 25% of the total variance and included 10 items, mostly from the responsiveness dimension (R2, R4, R5, R6, R7, R8, R9, D5, D7, D8,). Factor II explained 15% of the total variance, included seven items, and mainly grouped items from the demandingness domain (D1, D2, D3, D6, D9, D10, R8). Items R1, R3, and D4 had a saturation lower than 0.3, item R8 saturated in both dimensions and D5, D7, and D8 grouped in a factor different from the one assigned by content, so they were eliminated. The final version of the TFSQ included six items in each dimension, responsiveness (R2, R4, R5, R6, R7, R9) and demandingness (D1, D2, D3, D6, D9, D10), and its explained variance was 50% (28% for the first factor and 22% for the second factor). The correlation between the two factors was 0.14. Due to the low correlation between the two scales of the model, we decided to analyze the items

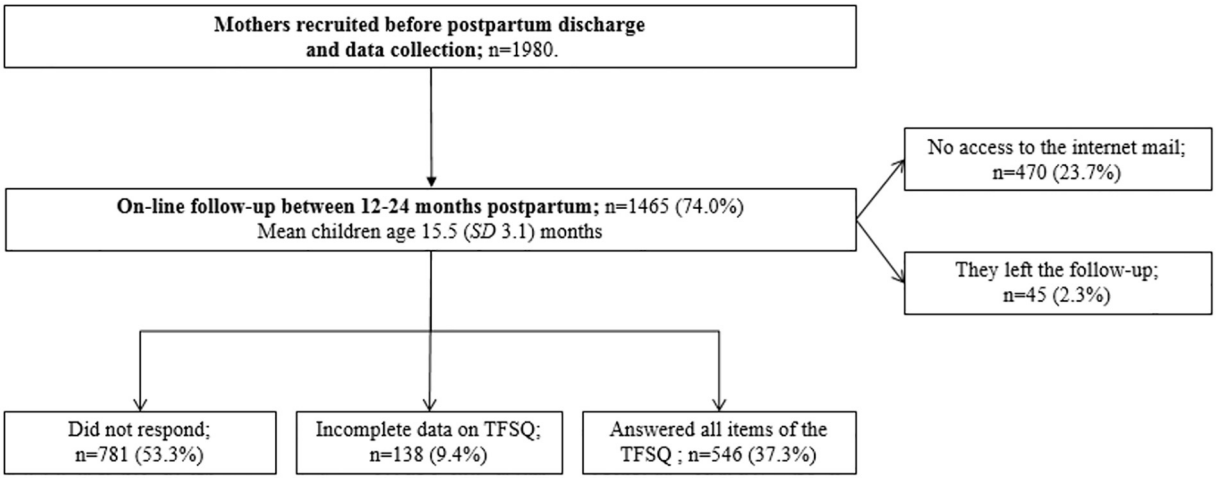

Fig. 1. Flowchart of the sample in the study.

Table 1
Sociodemographic and anthropometric characteristics of the sample.

	n	Mean (*SD*)	%
Sample size	546		
Mother's characteristics			
Age	486	33.9 (4)	
Educational level			
No university degree	199		40.8
More qualifications	289		59.2
Family income per year			
<11,999 €	86		17.4
≥12,000 €	408		82.6
BMI (kg/m^2)			
Underweight	17		3.7
Normal weight	320		70.5
Overweight	92		20.3
Obese	25		5.5
Child's characteristics			
Age (months)	468	17.5 (2.9)	
Sex (% female)	246		48.6
Birth weight (g)	545	3300 (403)	
Normal weight	354		84.7
Overweight	22		5.3
Obese	21		5
Underweight	13		3.1
Severe underweight	8		1.9
Any breastfeeding			
6 months (% yes)	357		65.4
12 months (% yes)	223		40.8

of both factors independently; that is, a responsiveness scale (6 items) and a demandingness scale (6 items), respectively. The EFA showed, for the responsiveness scale, a total explained variance of 67.8%, with saturations of the items between 0.50 and 0.70. For the demandingness scale the total explained variance was 59.6%, with saturations of the items between 0.45 and 0.76 (Table 2).

Confirmatory factor analysis. Sub-sample 2 (n = 273)

The results for sub-sample 2 corroborated those of the parallel analysis. Models 4 and 5, identified in the EFA as two independent scales (a responsiveness scale and a demandingness scale), showed the best fit (Table 3).

Table 3
Confirmatory factor analyses of the TFSQ: overall model fit (Subsample 2, n = 273).

Model	X^2	df	X^2/df	CFI	GFI	SRMR	RMSEA
Model 1	219.00	89	2.46	0.87	0.90	0.083	0.074
Model 2	103.76	53	1.96	0.94	0.94	0.056	0.060
Model 3	115.59	54	2.14	0.93	0.94	0.082	0.065
Model 4	15.96	9	1.77	0.95	0.98	0.042	0.053
Model 5	21.45	9	2.38	0.98	0.98	0.072	0.032

Notes: X^2, Chi-square; df, degrees of freedom; CFI, Comparative Fit Index; GFI, Goodness of Fit Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual; Model 1, 15 items in two related factors F1 (R2, R4, R5, R6, R7, R9, D5, D7, D8) and F2 (D1, D2, D3, D6, D9, D10); Model 2, 12 items in two related factors F1 (R2, R4, R5, R6, R7, R9) and F2 (D1, D2, D3, D6, D9, D10); Model 3, 12 items in two independent factors F1 (R2, R4, R5, R6, R7, R9) and F2 (D1, D2, D3, D6, D9, D10); Model 4, 6 items of the Responsiveness Scale; Model 5, 6 items of the Demandingness Scale.

Reliability and scale performance

The McDonald's Omega and Standardized Cronbach's alpha values of the demandingness and responsiveness scales coincided in both cases, being 0.84 and 0.75, respectively. The description about TFSQ items appears in Table 4.

Concurrent validity

Regarding the association analysis between the dimensions and the hypothesis, the responsiveness dimension showed a statistically significant association with the criterion items of the authoritarian and indulgent feeding styles (Table 5). When studying the degree of agreement, a statistically significant association with the authoritative and indulgent styles was found. Moreover, a negative association with the authoritarian style was also found (Table 6). The demandingness dimension was related to all criterion items of feeding styles, except the neglectful one (Table 5). Besides, this dimension was related to the degree of agreement of all the feeding styles in the correct sense, that is, a higher score on the demandingness dimension corresponds to a greater degree of agreement with the authoritative and authoritarian styles, and a lower score on the same dimension corresponds to a greater degree of agreement with indulgent and neglectful styles (Table 6).

Regarding the feeding styles dimensions and the mother's attachment, the responsiveness dimension showed a positive association

Table 2
Exploratory factor analysis of the TFSQ.

		Initial EFA[a]		Final EFA[b]	
		F I (R)	F II (D)	R Scale	D Scale
R1	1. At lunch time I consider the place my daughter/son prefers.	0.28		E	
R2	2. I don't care how much time my daughter/son takes to eat.	0.52		0.53	
D1	3. If my daughter/son does not want something but I think he/she should take it, I insist until I get my way.		0.70		0.68
R3	4. I take care of the presentation of the dishes so that the food is appealing.	0.24		E	
D2	5. It is important that my child finishes the food I prepare.		0.75		0.76
R4	6. When my child is full, I don't give him/her more.	0.61		0.59	
R5	7. I offer my daughter/son the foods she/he likes.	0.45		0.49	
R6	8. I let my child experiment with the food, even if he/she gets dirty.	0.58		0.59	
D3	9. My daughter/son has to eat what I offer.		0.74		0.71
D4	10. I prevent my child from eating other foods outside of meal times.		0.27		E
D5	11. I choose carefully what foods my child eats.	0.59		E	
R7	12. When my child is hungry, I feed her/him.	0.68		0.67	
R8	13. If my child, when eating, is distracted, I encourage her/him to eat.	0.42	0.43	E	E
D6	14. My child is too young to decide what she/he has to eat.		0.44		0.45
D7	15. I decide when I introduce new foods.	0.41		E	
D8	16. I do not allow my child to take candy or snacks.	0.42		E	
R9	17. I keep in mind the rhythm at which my son/daughter eat.	0.74		0.70	
D9	18. If my child leaves part of the food I have prepared, I try to make her/him finish it.		0.71		0.71
D10	19. I decide the amount of food my child should take in.		0.59		0.61

This is not an English version or adaptation but a mere translation for educational purposes from the original Spanish version. Abbreviations: R, responsiveness dimension; D, Demandingness dimension. Items grouped in a factor different from the one assigned by content, those that saturated in two different dimensions, and those with a saturation <0.3 in the initial EFA were eliminated here and appear marked with (E).

[a] Initial Exploratory Factor Analysis including 19 initial items.

[b] Final Exploratory Factor Analysis.

Table 4
TFSQ items floor and ceiling effects, means (M) and standard deviation (SD).

	Items	n	Floor[a,b]	Ceiling[a,b]	*M*	*SD*
R2	I don't care how much time my daughter/son takes to eat.	546	2.2[a]	26.4[a]	5.01	1.72
D1	If my daughter/son does not want something but I think she should take it, I insist until I get it.	546	9.7[a]	23.8[a]	4.20	1.84
D2	It is important that my child finish the food I prepare.	546	9.5[a]	20.7[a]	4.27	1.85
R4	When my child is full, I don't give him more.	546	1.5[a]	54.8[a]	6.06	1.52
R5	I offer my daughter/son the foods she/he likes.	546	2.4[a]	24.7[a]	4.96	1.51
R6	I let my child experiment with the food, even if it gets dirty.	546	1.1[a]	48[a]	6.02	1.27
D3	My daughter/son has to eat what I put.	546	3.8[a]	23.3[a]	3.59	1.73
R7	When my child is hungry, I feed her/him.	546	1.1[a]	36.4[a]	5.75	1.31
D6	My child is too young to decide what she/he has to eat.	546	7.7[a]	23.8[a]	4.81	1.88
R9	I keep in mind the rhythm that my daughter marks when eating	546	0.9[a]	34.1[a]	5.77	1.24
D9	If my child leaves part of the food I have prepared, I try to make her/him finish it.	546	8.2[a]	24[a]	4.20	1.85
D10	I decide the amount of food my child should take.	546	6.4[a]	24.2[a]	4.71	1.76
Responsiveness dimension (total)		546	0[b]	4.6[b]	33.55	4.96
Demandingness dimension (total)		546	1.6[b]	0.5[b]	25.74	8.25

This is not an English version or adaptation but a mere translation for educational purposes from the original Spanish version. Abbreviations: M, mean; SD, standard deviation.
[a] Floor (proportion of the value one "strongly disagree" that represents the lowest score) and ceiling (proportion of value seven "strongly agree" that represents the maximum score) effects in the TFSQ scoring of the items.
[b] Floor (proportion of the value 6 that represents the value one as minimum score multiplied by the six items that make up the dimension: R2, R4, R5, R6, R7, R9) and ceiling (proportion of the value 42 that represents the value seven as maximum score multiplied by the six items that make up the dimension: D1, D2, D3, D6, D9, D10) effects of the summation of the items' scores that make up both the Responsiveness Dimension and Demandingness Dimension.

with the degree of agreement of the secure attachment style ($r_= 0.134$, $p = .003$) and a negative association with the degree of agreement of the fearful attachment style ($r_s = -0.134$, $p = .003$). The demandingness dimension was related to the definition of the dismissing attachment style ($p = .039$) and showed a positive association with the degree of agreement of the preoccupied attachment style ($r_s = 0.099$, $p = .028$).

In relation to the sociodemographic characteristics, there were no differences in the scores of either dimension regarding the mothers' educational level and the annual family income.

Regarding anthropometric characteristics, there were no differences in mothers' BMI with the two dimensions studied. Conversely, the 33.3% of children who were overweight or obese had mothers who classify themselves as neglectful, according to the criterion item of feeding styles ($p = .001$). In addition, both dimensions were related to the toddler's age: the older the child, the lower the score of responsiveness, and, the older the child, the higher the score of demandingness ($r_s = -0.215$ and $p \leq 0.001$; $r_s = 0.193$ and $p \leq 0.001$, for the responsiveness and demandingness dimensions respectively). Finally, a relationship between the two scales and the time of weaning at 6 and 12 months was also found ($p \leq 0.001$ in all cases for both dimensions).

Discussion

In the current study a novel tool to assess feeding styles in mothers of toddlers has been developed and validated. To our knowledge, no previous studies have examined feeding styles in children younger than two years-old defining subscales according to the theoretical concepts from which they derive (demandingness and responsiveness dimensions).

In line with the criteria of psychometric validity, the adjustment of the structured models, the reliability data and the validity tests of the final version of the responsiveness and demandingness dimensions suggest that the selection of the pull of the initial items was adequate (Chadha, 2009).

In view of the scientific literature, all the questionnaires that state assessing the parental feeding styles of children between 12 and 24 months-old are more conceptualized with feeding practices than with feeding styles (Hodges et al., 2013; Hurley et al., 2008, 2013; Rigal et al., 2012; Sacco et al., 2007; Savage et al., 2017;Thompson et al., 2009; Wood et al., 2016). In fact, only Savage et al. (2017) provide evidence of being based on the two theoretical dimensions of structure and control, which can be considered synonymous with our dimensions of responsiveness and demandingness (Savage et al., 2017). Besides, each parent can be assigned to two or more "styles" in these tools (Rigal et al., 2012; Thompson et al., 2009; Wood et al., 2016), which does not conform to the theoretical definition of the feeding styles of parents (Darling & Steinberg, 1993; Ventura & Birch, 2008).

On the other hand, given the lack of current consensus for the measurement of feeding styles, it has been difficult to compare our results with other studies. The Feeding Style Questionnaire (Rigal et al., 2012) classifies mothers into three possible feeding styles: authoritarian, authoritative and permissive. The Infant Feeding Style Questionnaire (Thompson et al., 2009; Wood et al., 2016) and the Infant Feeding Questionnaire (Sacco et al., 2007) assess five different feeding styles domains: laissez-faire, pressuring / controlling, restrictive / controlling, responsive and indulgent. The Toddler Feeding Behavior Questionnaire (Hurley et al., 2013) measures five dimensions of parenting with respect to feeding: responsive, forceful / pressuring, restrictive, indulgent, and uninvolved. Only those studies that have used the Caregiver's feeding styles questionnaire (CFSQ) (Hughes et al., 2005) could be compared with our data, although this questionnaire is validated for older children. Savage and her colleagues (2017) used the CFSQ to evaluate the criterion validity of its tool and obtained that the most prevalent feeding style was indulgent (34.1%), followed by authoritarian (30.6%),

Table 5
Association between the feeding style criterion items and the responsiveness and demandingness dimensions of the TFSQ.

Feeding styles	Authoritative criterion item			Authoritarian criterion item			Indulgent criterion item			Neglectful criterion item		
	Yes	No	*p*	Yes	No	*p*	Yes	No	*p*	Yes	No	*p*
	Mean (*SD*)	Mean (*SD*)		Mean (*SD*)	Mean (*SD*)		Mean (*SD*)	Mean (*SD*)		Mean (*SD*)	Mean (*SD*)	
Responsiveness dimension	33.7 (4.6)	33.4 (5.5)	0.959	32.4 (52)	33.7 (4.9)	0.023	34.2 (5.6)	33.3 (4.7)	0.006	31.9 (5.0)	33.6 (4.9)	0.055
Demandingness dimension	27.1 (7.3)	24.1 (9.0)	<0.001	31.8 (4.9)	24.9 (8.3)	<0.001	19.5 (7.9)	27.8 (7.2)	<0.001	26.5 (7.2)	25.7 (8.2)	0.766

Notes: SD, standard deviation; U Mann-Whitney test was used to analyze the differences between groups; p, the statistical significance was established at a value of $p \leq .05$.

Table 6
Association between the degree to which mothers identify with each feeding style and the responsiveness and demandingness dimensions of the TFSQ.

Degree of agreement with Feeding Styles								
	Authoritative		Authoritarian		Indulgent		Neglectful	
	r_s	p	r_s	p	r_s	p	r_s	p
Responsiveness dimension	0.151	<0.001	−0.115	0.007	0.245	<0.001	−0.032	0.457
Demandingness dimension	0.232	<0.001	0.532	0.000	−0.449	<0.001	−0.090	0.036

Notes: p, the statistical significance was established at a value of $p \leq .05$; r_s, Spearman's correlation coefficient was used to measure the association between continuous variables.

uninvolved (19.2%), and authoritative (15.8%) (Savage et al., 2017). In our sample, the 56.8% of the mothers classified themselves as authoritative, 12.9% as authoritarian, 24.5% as indulgent and 5.7% as neglectful. These differences may be due to the great heterogeneity of the samples used in each study. We worked with a very homogenous sample characteristic of the middle-upper class and their sample was composed of low-income mothers at relatively high risk for obesity. Considering the sociodemographic characteristics, there are studies that have related mothers with a higher educational level and family income to more responsive parenting compared to their counterparts (Tan, Min, Xue, Wang, & Wang, 2018; Vollmer, Adamsons, Foster, & Mobley, 2015), although these studies did not focus expressly on feeding styles.

Based on the scientific literature, one of our hypotheses was that mothers with low demandingness and high responsiveness (indulgent feeding style) would have children with the highest weight-for-length z-scores. Mothers in our sample who had identified themselves as neglectful (low scores in both dimensions) had the children with a greater weight ($p = .002$). These results do not coincide with those obtained in other studies that measured feeding styles and concluded that children with indulgent parents had the highest body mass index z-scores (Bergmeier et al., 2015; Hughes et al., 2005; Olvera & Power, 2010). However, our results coincide with a meta-analysis on parenting styles that showed that neglectful parenting was related to higher body weight (effect size 0.12) and lower levels of healthy eating of the child (effect size 0.09) (Pinquart, 2014). Obviously, the parenting styles and the feeding styles are connected, so the results are in line with expectations. Caregiver parenting and feeding approaches that are unresponsive to the needs of the child have been related to worse health outcomes and quality of life (DiSantis et al., 2011; Hodges et al., 2013; Hurley et al., 2011; Pinquart, 2014). So, in keeping with our results, neglectful parents are usually more likely to tolerate unhealthy eating and activity patterns that are risk factors for higher body weight (Pinquart, 2014). Moreover, the studies that found a relationship between the indulgent feeding style with a greater weight of the children are made in children older than two years-old (Bergmeier et al., 2015; Hughes et al., 2005; Olvera & Power, 2010). In this sense, our results showed a positive and a negative relationship between the mother's demandingness and responsiveness scores, respectively, with the child's age. In accordance with this, Gahagan (2012) indicated that parents report changing strategies as the child's needs evolve (Gahagan, 2012). Besides, it is known that the control of feeding practices plays an important role in the development of feeding behavior (Anzman, Rollins, & Birch, 2010; Frankel et al., 2012; Russell & Russell, 2018). The development of feeding in humans relies on complex relationships among physiological mechanisms and child motor, sensory, and socio-emotional capability (Fisher & Birch, 1999; Issanchou and & Habeat consortium, 2017; Russell & Russell, 2018). To confirm this hypothesis with the TFSQ, longitudinal studies will be needed.

In addition, feeding styles have been linked to numerous parental behaviors or attitudes, such as attachment styles, although scientific evidence in this field is scarce (Anderson & Whitaker, 2011; Bost et al., 2014; Frankel et al., 2012; Pederson, Gleason, Moran, & Bento, 1998). Investigations have shown a relationship between secure attachment and parental sensitivity (Pederson et al., 1998). Insecure or preoccupied parents reported pressure caregiver feeding practices (high demandingness) more often than less insecure caregivers (Bost et al., 2014). These factors can influence the determination of feeding styles. The results in our study coincide, in part, with those of the literature and with our initial hypothesis, although more studies are needed in this field.

Related to feeding styles and the time of weaning, our results show higher levels of responsiveness in the majority of mothers who did breastfeed their children and higher levels of demandingness in the mothers who did not breastfeed their babies at 6 and 12 months. Our initial hypothesis coincides with the results of a recent review study, which indicates that cross-sectional observational studies consistently reported greater responsiveness among breastfeeding mothers compared to mothers who offer formula or bottle-feeding (Ventura, 2017). In addition, longitudinal studies showed that longer breastfeeding durations predicted lower use of nonresponsive feeding practices during later childhood (Ventura, 2017). Other previous studies have related a short breastfeeding duration with few nurturance behaviors, and with high levels of reported anxiety and an increased maternal use of parent-led routines (Brown & Arnott, 2014; Sachs, Dykes, & Carter, 2006).

The current study has several limitations. Firstly, the anthropometric data were self-reported, which may have limited the accuracy of the BMI data (Pursey, Burrows, Stanwell, & Collins, 2014). Despite this, it has been found that self-reported height and weight correlate strongly with measurements obtained by a researcher and, therefore, are believed to provide valid estimates of anthropometric data (Pursey et al., 2014). Secondly, due to its cross-sectional nature, this validation study does not confirm the causality of the relationships between the variables in the study. No longitudinal studies have been found that relate parents' feeding styles and children's weight from an early age. As feeding styles are studied in more populations and over time, reliable information should emerge to help clarify whether the parent's feeding styles cause differences in children's weight or vice versa. In addition, the global form of the project to which this study belongs was very extensive and the questionnaire with the information necessary to develop the TFSQ was at the end. The cognitive interviews suggest that there was no difficulty in answering the items of the TFSQ, therefore, the high burden to the respondent of the global form of the study could explain the proportion of the TSFQ items that were not answered and therefore were not included in this study. Besides, we proposed a single criterion item for each feeding style, which can be an unreliable measure of a concept, by definition (Hu & Bentler, 1999), although the results between the scales developed and several of the criterion items showed a good association. Finally, the TFSQ has been validated in a very homogenous sample, so it does not allow one to examine differences among other population groups. According to the theoretical framework, we suspect that the dimensions of the feeding styles are basic measures so they could be extrapolated to any population, although it would be important to study the differences between the feeding styles of the parents, according to the socioeconomic level, the ethnicity or the culture, analyze if they vary over time or according to the age of the children and the bidirectional effects of parent–child interactions (Bergmeier et al., 2015; Hughes et al., 2013; Power, 2013). In addition, studies are needed to analyze the influence of other caregivers (e.g., fathers, grandmothers, and older siblings) on the children's eating behaviors (Bergmeier et al., 2015; Hughes et al., 2013).

Some of the strengths of this study are explained below. The exploration of parental feeding styles according to the theoretical concepts depicts a contribution to the literature and extends previous studies on this topic. Besides, this work focuses on knowing the combination

of parental control over the quality and quantity of food they offer to the child, the parents' response to the toddler's signals of hunger and satiety, and the child's choice of what foods they consume and the quantity. This can help to promote a healthy diet.

Conclusions

The results of our study indicate that the two scales included in the TFSQ can be considered valid and reliable measures to evaluate the feeding styles of parents of children under two years-old in the Spanish population.

CRediT authorship contribution statement

María Angeles Avecilla-Benítez: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing. **Isabel Sospedra:** Conceptualization, Methodology, Validation, Investigation, Writing - original draft, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Antonio Cano-Climent:** Validation, Investigation, Resources, Writing - review & editing. **Miguel Richart-Martínez:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Antonio Oliver-Roig:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Supervision, Project administration, Funding acquisition.

CRediT authorship contribution statement

María Angeles Avecilla-Benítez: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing. **Isabel Sospedra:** Conceptualization, Methodology, Validation, Investigation, Writing - original draft, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Antonio Cano-Climent:** Validation, Investigation, Resources, Writing - review & editing. **Miguel Richart-Martínez:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Antonio Oliver-Roig:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

The authors have no competing interests to declare.

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Appendix A. Self-report feeding styles prototypes

Authoritative. I carefully control what my child eats since I know what is good for her/him. I take care that she/he eats the things that I prepare for him, although I take into account her/his behavior when I can see that she/he is hungry, that she/he does not want any more, or that there are things that she/he does not like. I make sure she/he eats what she/he needs while respecting her/his likes and dislikes

Authoritarian. I carefully control what my child eats since I know what is good for her/him. I take care that he/she eat the things that I prepare for her/him and - although I realize that sometimes she/he is hungry, that there are things that she/he does not like, or that she/he does not want to eat anymore - I am the one who decides what she/he eats, when, and how much. I get her/him to eat what she/he needs, even if she/he does not like it or does not want it at a certain moment

Indulgent. My child knows very well what she/he needs to eat despite her/his tender age. During meals, I do not pressure or blackmail her/him when she/he does not eat something and I adapt to her/his rhythm in terms of the amount and type of food I give her/him. I make sure my child is happy during meals, respecting her/his tastes and what she/he wants at any moment, and I give less importance to eating a certain amount or type of food.

Neglectful. I think the guidelines on eating - on whether children have to eat this or that amount or whether or not they can eat sweets, snacks, or other food - go too far. It does not seem very important to me that my child eats a certain amount or type of food. I give her/him what I prepare, sometimes she/he likes it and sometimes not.

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