

## CHAPTER 4.

# DEVELOPMENT AND PRELIMINARY VALIDATION OF THE TODDLER FEEDING QUESTIONNAIRE

### 4.1 Introduction

This chapter draws on the qualitative analysis of parent feeding practices in Chapter 3, and extends these findings by describing the development of a measure of parental influences on toddlers' intake of energy-dense/ nutrient-poor snack foods. The thematic framework that emerged from the interview analysis provided the basis for the development of items to measure aspects of parental control in feeding. Exploratory factor analysis describes the structure in a five factor solution that forms the basis of the Toddler Feeding Questionnaire (TFQ). The TFQ incorporates measures of different aspects of parental control over feeding. They include: (a) how much parents allow access to energy-dense foods (Allow Access), (b) the rules associated with managing intake of these foods (Rules), and (c) flexibility in the way rules are applied (Flexibility). The TFQ also includes a measure of parental self-efficacy beliefs (Self-efficacy), which may influence the use of feeding practices, and a measure of toddler's attraction to energy-dense foods (Child's Attraction), a characteristic of the child that may influence both parent feeding practices and energy intake. The aim of the current study was to develop and conduct a preliminary validation of the TFQ, so that it could be used to explore aspects of parental control in managing toddlers' intake of high energy-dense/ nutrient-poor snack foods and their relationships to toddlers' self-regulation of energy intake and the development of overweight and obesity in children.

The Child Feeding Questionnaire (Birch et al., 2001) has been instrumental in research examining aspects of parental feeding practices and their influence on the development of self-regulation of energy intake in preschool aged children, but this questionnaire, as outlined in Chapter 1, may have some limitations for research into earlier periods of development. An investigation of parental management of sweets and snack foods in the diet of toddlers,

described in the previous chapter, indicated that there was poor variability in parents' responses to items on the restriction scale, thereby limiting the predictive validity of the scale. The Restriction subscale of the CFQ did not adequately capture the range of parental attitudes and behaviours that were subsequently described by parents. This is despite the fact that the study was conducted with a group of well-educated mothers, typical of the socio-demographic background of parents with whom the CFQ has been successfully used.

The interviews conducted in Chapter 3 highlighted that the notion of restriction was conceptually problematic for mothers of toddlers because the mother was largely responsible for determining what the toddler ate and for shaping the toddler's dietary environment. In the parent interviews there was variability in parent feeding practices when mothers discussed their toddler's access to sweets and snack foods, their beliefs and attitudes about the role of snack foods in the diet, and how they managed their toddlers' intake. This variability within a small homogeneous sample highlighted that there were aspects of parental control that could potentially influence children's eating behaviour, but had not been previously explored. Furthermore, the analysis of parents' interview responses in conjunction with their responses to CFQ Restriction illustrated an apparent contradiction. The responses on the Restriction scale suggested that parents were highly restrictive, yet the interview responses indicated otherwise, with some mothers reporting that their toddler was given sweets and snack foods on a regular basis.

One of the criticisms of CFQ Restriction is that it has limited applicability across the socio-demographic spectrum (Baughcum et al., 2001), but this criticism also holds for earlier periods of development like toddlerhood. The CFQ Restriction scale represents a negative conceptualisation of parental control but it is important to consider that some level of control is likely to be appropriate for toddlers; too little control may be undesirable. Although this is likely to be true at any age, it is particularly relevant to consider at earlier periods of development because the relative influence of parents compared to other influences on children's food intake diminishes as children get older. The interview analysis indicated that

parents can influence their children's consumption of unhealthy foods through their role as a 'gatekeeper' (e.g., being selective about the types of foods they allow their child to access), while expressing beliefs that are consistent with restriction (e.g., I have to be sure that my child does not eat too many sweets) and without engaging in other controlling behaviours typically associated with restriction (e.g., using food to reward behaviour, monitoring consumption, limiting portion size). The parent interviews indicated that the degree to which parents make snack foods accessible to the child is a key area in which parents have varied practices. For example, parents vary in terms of how often sweets and snacks are generally given to the child, the extent to which there are limits on what types of sweets and snacks the child is allowed to have, and the accessibility of sweets and snacks in the child's environment. This level of control may be relatively easy to establish in young children because their awareness and exposure to snack foods may be limited.

The development of the TFQ also reflects other theoretical considerations. The factors that are likely to influence parents' use of feeding practices may be different for parents of toddlers and may vary depending on the type of control that is examined. Parent concerns and perception of child weight have been shown to influence parental restriction in preschool children (Fisher & Birch, 1999a; Fisher & Birch, 1999b). Parents of toddlers, however, did not indicate this to be a motivation for their feeding practices. Instead, self-efficacy beliefs were salient when they were discussing how they manage toddlers' intake of snack foods. A lack of confidence in parenting skills was identified as an impediment to parents' ability to manage their toddler's access to energy-dense foods, particularly in challenging contexts. Another factor that parents identified as a potential influence of their toddler's intake of snack foods was the toddler's attraction to these types of foods. A high level of attraction made it more difficult for parents whereas a low level of attraction made it easier to manage their intake. The TFQ incorporates these key influences on parents' feeding practices, and their influence on children's self-regulation can be explored together with aspects of parental control.

The TFQ is not intended to represent a comprehensive model of parental influences or parental control. It reflects parent-derived feeding behaviours and attitudes developed from parent interviews conducted in Chapter 3, for which there was evidence of variability. It offers an alternative conceptualisation of parental control that may be used in conjunction with the CFQ to investigate the influence of aspects of parental control on self-regulation of energy-intake in toddlers.

The aim of the study was to develop and conduct a preliminary validation of the Toddler Feeding Questionnaire. Exploratory factor analysis was conducted on an initial sample of mothers in South Australia. The resultant five factor structure was tested in a second sample of mothers also from South Australia. Subsequent analyses were conducted to examine the internal consistency, test-retest reliability, convergent, discriminant and concurrent validity of the TFQ factors to provide a preliminary validation of the instrument.

## 4.2 Method

### 4.2.1 Participants

Participants in Sample 1 were 175 mothers of toddlers (86 boys, 89 girls) aged between 18 and 24 months ( $M = 21.36$ ,  $SD = 2.52$ ) who responded to the Toddler Feeding Questionnaire sent to their child care centre. Mothers ranged in age from 19 years to 45 years ( $M = 33.95$ ,  $SD = 4.39$ ). Approximately equal numbers of questionnaires were sent to child care centres in statistical local areas (SLA) in the highest (16 centres, 223 questionnaires), second highest (12 centres, 238 questionnaires), and lowest tertiles (19 centres, 250 questionnaires) of social disadvantage in metropolitan and regional Adelaide. SLAs are geographical areas that comprise the Australian Standard Geographical Classification (Australian Bureau of Statistics, 2007), and the index of relative socioeconomic disadvantage score (Australian Bureau of Statistics, 1996) was used to classify areas into tertiles of disadvantage. In total 192 questionnaires were returned giving an overall response rate of 27% with the response rate being the lowest in the most disadvantaged (19.7%) and the highest in the least disadvantaged tertile (40.8%). Of these, 16 cases were excluded including 12 that did not meet the age criteria and 4 that had been completed carelessly and contained a significant amount of missing data.

Sample 2 included 216 mothers of preschool children (117 boys, 97 girls) aged between 4 and 5 years ( $M = 4.78$ ,  $SD = 0.19$ ) who responded retrospectively to the Toddler Feeding Questionnaire (i.e., they were asked to think back to when their child was a toddler and answer the questions for that period). The recruitment procedure and eligibility criteria have been described in Chapter 2, as this sample was also used to examine the factor structure of the Child Feeding Questionnaire (Birch et al., 2001). A decision was made to collect data on the TFQ questionnaire at the same time as the CFQ data so the TFQ factor structure could be assessed in a second sample, and the relationship between the TFQ factors and children's BMI at age 4 could also be examined. The findings of the latter are described in the next chapter.

The study was approved by the Human Ethics Subcommittee of the School of Psychology at the University of Adelaide and the Children, Youth and Women's Health Service Human Research Ethics Committee.

#### *4.2.2 Procedure*

Sample 1 participants were recruited via child care centres. Information sheets, questionnaires, and reply-paid envelopes were placed in parent pigeon boxes. Participants in Sample 2 were recruited via the Child and Youth Health preschool health checks, and the study information was personally handed to participants by the visiting nurse. A modified questionnaire was used for Sample 2, in which the items were phrased in the past tense. Additional instructions were provided to remind participants to respond thinking about their past experiences. Both questionnaires included the TFQ items and the Child Feeding Questionnaire (Birch et al., 2001). Parent and child demographic and background information was obtained. The measures included level of education, occupation, BMI, breastfeeding duration, child's birth weight, child's weight status, child's gender, and number of siblings. The questionnaire given to Sample 1 also included a food frequency questionnaire for snack food consumption (discussed in more detail in the next section). The food frequency questionnaire was not included in the Sample 2 version as it was thought that it would be too difficult for a parent to recall the foods that the child consumed as a toddler. Sample 2 participants were asked to respond to the CFQ based on their current experience and based on their recollections of the toddler period. The questionnaire given to Sample 1 participants is shown in Appendix F. The modified questionnaire given to Sample 2 is provided in Appendix G<sup>6</sup>.

#### *4.2.3 Scale Development Phase*

The Toddler Feeding Questionnaire (TFQ) was developed from interviews with mothers who had toddlers aged between 18 and 24 months, exploring attitudes and feeding

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<sup>6</sup>Please note that not all demographic and background information obtained from participants in the questionnaire is used in the analyses reported in the current chapter.

practices associated with toddlers' consumption of high energy-dense/ nutrient-poor snack foods. The procedures, analysis protocol, and findings are detailed in Chapter 3. The purpose of the interview was to develop an understanding of how mothers manage their toddlers' intake of snack foods and to conceptualise the behaviours, attitudes and beliefs on a continuum from low to high levels of control.

The TFQ items were developed from the framework analysis and a detailed inspection of parent-derived dialogue in the interviews. Items were then constructed to sample parental attitudes and behaviours across seven constructs that were identified using framework analysis: allowing access to sweets and snack foods (16 items); rigidity of parent feeding practices (6 items); rigidity of parent feeding practices at social occasions (6 items); parent responsibility for snack food choices (4 items); parent control of snack food choices at social occasions (8 items); parent self-efficacy in managing snack foods (8 items); and child's attraction to sweets and snack foods (5 items). The items were developed to sample the construct as widely as possible based on the interview notes and are listed in Tables 4.2 to 4.8. All items were scored on 5-point Likert-type scales. Six different response scale anchors were used depending on the item. These were: *not at all true of me* (1) to *always true of me*, *not at all true of my toddler* (1) to *always true of my toddler* (5), *never* (1) to *always* (5), *unaware of all* (1) to *aware of all* (5), *none of these* (1) to *all of these* (5), and *never* (1) to *at least once a day* (5).

The questionnaire was given to four mothers who were not involved in the interview process to check that questions could be understood. The mothers belonged to a Friends of Child and Youth Health parenting group and were chosen as a sample of convenience. Feedback from this group indicated that there was some confusion about the meaning of 'sweets and snack foods', even though a textual description was provided. A description was therefore required that would be easily and quickly understood to ensure consistency of understanding and minimise participant burden. A graphic representation of 'sweet and snack foods' was developed through consultation with six mothers at a child care centre in

Adelaide, who were asked to list as many snack food types (and brands if known) that are given to toddlers, including foods that they have seen *other* parents give toddlers. Foods meeting the criteria for extra foods, based on the Australian Guide to Healthy Eating (AGHE: Smith, Kellett, & Schmerlaib, 1998) for energy, sugar/or salt content, were identified from this list. A broad range of snack food types (e.g., salty biscuits; sweet biscuits; cakes and pastries; chips; and high-fat, high-sugar dairy foods) were included in a collage attached to the questionnaire. Some foods that are defined as 'extra foods' in the AGHE such as margarines and oils, and pies, pasties, sausage rolls and savoury pastry items were not mentioned by parents and therefore were not included.

#### 4.2.4 Data Analysis

##### 4.2.4.1 Factor Analysis

The factor analysis is described in detail for Sample 1, as this was the primary sample of interest consisting of mothers who currently had a toddler. The factor structure that was determined from the analysis of Sample 1 data was then repeated for Sample 2, and except where specified, the same procedures were followed.

Sample 1 data screening revealed that a number of the variables were not normally distributed. Two variables were transformed to improve skewness and kurtosis: *somanage* ('I can manage social occasions well') was square-root transformed, and *canget* ('in my home there are sweets and snacks that my toddler can access by himself/herself') was inverse transformed. One case was identified as being a multivariate outlier using Mahalanobis Distance criteria of  $\alpha = .001$ ,  $df = 51$ ,  $\chi = 87.96$ , and was deleted. The presence of multicollinearity amongst the items was checked by examining the correlation matrix. Two pairs of items were very highly correlated. Items *avoidpl* ('I avoid taking my toddler to places where sweets and snacks are visible') and *avoidask* ('I avoid taking my toddler to places where he/she might ask me for a sweet or snack') were correlated at  $r = .86$  ( $p < .001$ ) and *teach1* ('I tell my toddler why certain foods are only for sometimes') and *teach2* ('I tell my toddler why certain foods are healthy') were correlated at  $r = .76$  ( $p < .001$ ). These items are



similar in their wording and they were located together on the questionnaire. A composite item was therefore created for each pair of items by calculating the mean score and the items were labelled *avoidcomp* and *teachcomp*. In Sample 2 the same variable transformations were performed and no multivariate outliers were found.

#### 4.2.4.2 Test-Retest Reliability

To assess the measures' test-retest reliability, sixty participants from Sample 1 were randomly selected to complete the questionnaire on a second occasion. The repeat questionnaire was sent to participants two weeks after receipt of the first questionnaire. Repeat questionnaires were returned by 46 participants giving a response rate of 77%. A comparison of demographic characteristic of the test-retest sub-sample with the remaining sample, found that the sub-sample was slightly older ( $M = 35.26$  years,  $SD = 4.45$ ) than participants who completed the questionnaire only once ( $M = 33.48$  years,  $SD = 4.31$ ;  $p < .05$ ). No significant differences were found on any other demographic variable.

Pearson's correlations were calculated for the TFQ factor scores obtained at the first and second occasion to measure the degree of linear relationship between the scores. A correlation coefficient of .70 is an indicator of modest test-retest reliability (Nunnally & Bernstein, 1994). Interclass correlations were also computed to measure the degree of agreement between the two sets of scores. The intra-class correlation is most commonly used to determine inter-rater reliability and there are six forms of ICCs that vary in terms of the model that is tested and the type of ICC that is computed. Because the ICC was being applied to test-retest reliability a *two-way mixed effects model* was selected and computed for *absolute agreement*, as this treats the rater as a fixed effect and measures the degree of agreement for scores obtained on both occasions. An ICC coefficient ranges from 0 to 1.00, with higher values indicating better agreement between scores.

#### 4.2.4.3 Convergent, Discriminant, and Concurrent Validity

The TFQ, described in detail in the introduction, consists of 53 items that measure attitudes and feeding practices associated with toddlers' consumption of high energy-dense/

nutrient-poor snack foods. The Child Feeding Questionnaire (CFQ: Birch et al., 2001) comprises three subscales that measure aspects of parental control over feeding (Restriction, Monitoring and Pressure to Eat), with the Restriction and Monitoring subscales focussing on parental control over children's access to and consumption of snack foods. Therefore, CFQ Restriction and CFQ Monitoring should share some variance with the TFQ (convergent validity), but CFQ Pressure to Eat should not be associated with the TFQ (discriminant validity). In analyses where CFQ Restriction is used, a 6-item measure of Restriction, and Food as Reward will also be examined in light of the findings in Chapter 2.

The TFQ was designed to be a more sensitive measure of actual parent behaviour compared with the CFQ Restriction scale, therefore a measure of toddlers' intake of sweets and snack foods was included to examine the associations with both scales. Concurrent validity of the TFQ would be evidenced by positive correlations with frequency of snack food intake. Furthermore, the TFQ factors should share more variance with the snack food intake in comparison with the Restriction scale. Snack food intake was measured with a Food Frequency Questionnaire that was adapted from the Anti-Cancer Council Dietary Questionnaire for adults (Giles & Ireland, 1996). It incorporates the following snack categories: (a) salty, flavoured or cheesy crackers, (b) sweet biscuits, (c) cakes and other sweet pastries, (d) chips and crisps, (e) and, high-fat/high-sugar dairy foods. It is recognised that this is an imperfect measure of general consumption, however no measures of dietary intake were found that were appropriate for toddlers and that could be included in a self-report questionnaire. A review of dietary assessment methods as part of the National Children's Study in the United States concluded that there is a scarcity of research on the validity of dietary assessment methods for toddlers (NIH Office of Dietary Supplements, NCI and Johns Hopkins University, & Westat, 2003). They note further that although several study populations included children of this age, there are very few validation studies of dietary assessment methods that specifically sampled toddlers (13 – 24 months of age).

#### 4.2.4.4 *Calculating Factor Scores and Internal Consistency*

Factor scores were estimated and saved using the regression option in SPSS FACTOR, and were used in the analyses reported in this chapter. Means and standard deviations for each factor were also calculated by taking an average of the scores for items with high loadings on each factor. The findings from the factor analysis of Sample 1 and Sample 2 were considered in determining the final item content for each factor. The internal consistency of the factor was then measured with Cronbach's alpha.

## 4.3 Results

### 4.3.1 *Sample Characteristics*

The parent and child characteristics for Samples 1 and 2 are shown in Table 4.1. The educational attainment level was higher for Sample 1 with 54.3% having completed university compared with only 29.5% for Sample 2. Sample 1 also consisted of a high percentage of mothers with professional occupations. Based on the Australian Standard Classification of Occupations (Australian Bureau of Statistics, 1997), 57.1% were managers and administrators, professionals or associate professionals. The sample also included 17 mothers who were not in the labour force. Compared with the South Australian census data for females aged between 25 and 44 years (Australian Bureau of Statistics, 2001), this sample consisted of almost twice as many managers, professionals and associate professionals, with all other classifications being under-represented. Sample 1 is therefore predominantly well educated and of a high SES. Sample 2 consisted of a high percentage of stay-at-home mothers, and the percentage of mothers in professional occupations was similar to the ABS data for females aged between 25 and 54 years. Sample 2 is less educated, consists of a high percentage of mothers who are not in the labour force, and the occupational skill base is more in line with South Australian census data. Breastfeeding duration and child's birth weight was also similar for the two samples. The majority of children in Sample 1 were only children or had one other sibling. The majority of children in Sample 2 had at least one other sibling and very few children had no siblings. The sibling disparity between Sample 1 and Sample 2 is not surprising due to the older age of the target children in Sample 2.

**Table 4.1***Parent and Child Characteristics for Sample 1 and Sample 2*

	Sample 1		Sample 2	
	<i>n</i>	%	<i>n</i>	%
Level of education				
High school or less	32	18.1	91	42.5
Technical, trade, TAFE	48	27.4	60	28.0
University	95	54.3	53	29.5
ASCO				
Managers & administrators	14	8.2	8	3.7
Professionals	65	38.2	43	19.9
Associate professionals	18	10.6	13	6.0
Tradespersons	3	1.8	4	1.9
Advanced clerical	3	1.8	7	3.2
Intermediate clerical	26	15.3	38	17.6
Elementary clerical	7	4.1	17	7.9
Labourers	1	0.6	7	3.2
Not in labour force	17	10.0	65	30.0
Inadequately described	16	9.4	14	6.5
Mother's BMI				
18.5 – 24.9	100	66.3	122	59.8
25 – 29.9	39	22.3	45	22.1
> 30	20	11.4	37	18.1
Child's sex				
Male	86	49.1	117	54.7
Female	89	50.9	97	45.3
Child's current weight status				
Not overweight	-	-	164	76.6
Overweight			39	18.2
Obese			11	5.1

	Sample 1		Sample 2	
	<i>n</i>	%	<i>n</i>	%
Sibling Status				
Only child	89	46.0	28	13.1
One sibling	72	38.0	109	50.9
Two or more siblings	31	16.0	77	36.0
Breastfeeding duration	8.09	5.75	8.18	7.58
Birth weight	3.53	0.48	3.53	0.50

*Note:* ASCO = Australian Standard Classification of Occupations. Height and weight was not obtained for Sample 1. Mother's BMI was calculated from self-reported height and weight. Child's weight status was calculated using the age and sex-specific criteria for BMI described by Cole et al. (2000). Breastfeeding duration was measured in months. Birth weight was measure in kilograms.

#### 4.3.2 Descriptive Statistics

The descriptive statistics for each of the TFQ questionnaire items are presented in Table 4.2 to 4.8, corresponding to the thematic distinctions in the interview analysis: Allowing Access to Sweets and Snack Foods (Table 4.2), Toddler's Attraction to Sweets and Snack Foods (Table 4.3), Rigidity of Parent Feeding Practices (Table 4.4), Parent Responsibility for Snack Food Choices (Table 4.5), Parent Self-efficacy in Managing Snack Foods (Table 4.6), Rigidity of Parent Feeding Practices at Social Occasions (Table 4.7), and Parent Responsibility for Snack Food Choices at Social Occasions (Table 4.8). The means and standard deviations for all items were very similar in both Samples 1 and 2.

**Table 4.2**

*TFQ Items Developed for the Theme 'Allowing Access to Sweets and Snack Foods': Item Means (and Standard Deviations)*

	Item	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
1.	Thinking about the types of foods like those shown in the picture, my toddler is... (participant indicates awareness <sup>1</sup> )	Aware	2.65 (1.10)	2.69 (1.01)
2.	Thinking about sweets and snacks like those in the picture, I would allow my toddler to eat... (participant indicates proportion of allowable foods <sup>2</sup> )	Allow	2.44 (0.89)	2.32 (0.88)
3.	Thinking about sweets and snacks like those in the picture, I would prevent my toddler from eating... (participant indicates proportion of foods they would not allow <sup>2</sup> )	Prevent	2.79 (1.14)	2.80 (1.11)
4.	I would give my toddler a sweet or snack food... (participant indicates how often food is usually given <sup>3</sup> )	Give	3.33 (0.88)	3.01 (0.93)
5.	Think about social occasions that you attend with your toddler (e.g., gatherings with friends, parties etc) and indicate how often sweets and snack foods are available <sup>4</sup>	Soavail	1.76 (0.77)	1.72 (0.81)
6.	How often is your toddler given a sweet and/or snack food at social occasions? <sup>5</sup>	Sogive	2.18 (0.85)	2.17 (0.91)
7.	My home is free of sweets and snack food <sup>4</sup>	Home	2.71 (1.19)	2.78 (1.15)
8.	In my home there are sweets and snacks that my toddler can see but can't reach <sup>4</sup>	Cantreach	2.35 (1.28)	2.55 (1.34)
9.	In my home there are sweets and snacks that are hidden from my toddlers view <sup>4</sup>	Cantsee	3.75 (1.03)	3.40 (1.15)
10.	In my home there are sweets and snacks that my toddler can access by himself/herself <sup>4</sup>	Canget	1.47 (0.64)	1.50 (0.81)
11.	I avoid taking my toddler to places where sweets and snacks are visible <sup>4</sup>	Avoidpl	1.91 (1.06)	1.96 (1.06)

	Item	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
12.	I avoid taking my toddler to places where he/she might ask me for a sweet and snack <sup>4</sup>	Avoidask	1.78 (1.00)	1.85 (0.97)
13.	When I am at a shop counter where sweets and snacks are available I buy something for my toddler <sup>4</sup>	Shopbuy	1.47 (0.64)	2.12 (0.84)
14.	Your toddler 'asks for' (includes gestures if your toddler doesn't not talk) a sweet or snack food <sup>3</sup>	Asks	2.84 (1.09)	2.87 (1.15)
15.	Your toddler 'asks you' to give him/her some more of a sweet or snack food <sup>3</sup>	Askmore	2.64 (0.94)	2.42 (1.03)
16.	If I've told my toddler 'no you can't have it', I'm likely to give in to his/her demands <sup>4</sup>	Givein	2.13 (0.66)	2.08 (0.79)

*Note.* Means and standard deviation of the non-transformed variables are shown. Response scale is: <sup>1</sup> Unaware of all (or most), Unaware of many, Aware of some, Aware of many, Aware of all (or most); <sup>2</sup> None of these, Some of these, About half of these, Most of these, All of these; <sup>3</sup> Never, Less than once a week, 1 to 3 times a week, 4 – 7 times a week, At least once a day; <sup>4</sup> Never, Rarely, Sometimes, Mostly, Always; <sup>5</sup> Always, Mostly, Sometimes, Rarely, Never.



**Table 4.3***Toddler's Attraction to Sweets and Snack foods<sup>1</sup>*

	Item	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
17.	My toddler seeks out or asks for these types of foods	Todask	2.46 (0.87)	2.68 (0.88)
18.	My toddler has a taste for these foods	Todtaste	2.81 (1.00)	2.72 (0.97)
19.	If my toddler were to see these foods he/she would be interested in them	Todint	3.51 (0.85)	3.36 (0.97)
20.	If my toddler were to see these foods he/she would want them	Todwant	3.40 (0.90)	3.30 (0.98)
21.	If my toddler were to see a sweet or snack food he/she would recognise it as being 'different' from other foods	Todrec	3.07 (1.03)	3.39 (1.09)

<sup>1</sup> All items scored on scale: Not at all true of my toddler, Rarely true of my toddler, Sometimes true of my toddler, Mostly true of my toddler, Completely true of my toddler.

**Table 4.4**

*TFQ Items Developed for the Theme 'Rigidity of Parent Feeding Practices': Item Means (and Standard Deviations)*

	Item	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
22.	I have very firm rules about what types of foods I allow my toddler to have (i.e., I stick to this regardless of the situation)	Firmtype	3.41 (1.12)	3.49 (0.98)
23.	I am flexible about what types of foods I allow my toddler to have (i.e., it depends on the situation)	Flextype	3.49 (1.02)	3.26 (1.02)
24.	I have very firm rules about when I allow my toddler to have sweets and snack foods (i.e., I stick to this regardless of the situation)	Firmwhen	3.49 (1.02)	3.54 (1.05)
25.	I am flexible about when I allow my toddler to have sweets and snack foods (i.e., it depends on the situation)	Flexwhen	3.11 (1.07)	3.07 (1.07)
26.	I have very firm rules about the amount I allow my toddler to have (i.e., I stick to this regardless of the situation)	Firmquan	3.68 (0.99)	3.77 (0.98)
27.	I am flexible about the amount I allow my toddler to have (i.e., it depends on the situation)	Flexquan	2.86 (1.06)	2.88 (1.03)

*Note.* Response Scale is Not at all true of me, Rarely true of me, Sometimes true of me, Mostly true of me, Always true of me.

**Table 4.5**

*TFQ Items Developed for the Theme 'Parent Responsibility for Snack Food Choices': Item Means (and Standard Deviations)*

	Item	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
28.	I like to have complete control over what types of sweets and snacks my toddler is given <sup>1</sup>	Contmum	3.93 (1.04)	4.00 (0.93)
29.	I do not allow other people to give sweets and snacks to my toddler <sup>1</sup>	contoth1	3.06 (1.18)	3.05 (1.19)
30.	I allow certain other people to make decisions about the types of sweets and snacks my toddler is given <sup>2</sup>	contoth2	2.61 (0.98)	2.42 (0.99)
31.	I get upset when my toddler is given sweets and snacks by others <sup>2</sup>	contoth3	2.92 (1.05)	2.78 (1.10)

*Note.* Response scale is <sup>1</sup>Not at all true of me, Rarely true of me, Sometimes true of me, Mostly true of me, Always true of me, <sup>2</sup>Never, Rarely, Sometimes, Mostly, Always.

**Table 4.6**

*TFQ Items Developed for the Theme 'Parent Self-Efficacy in Managing Snack Foods': Item Means (and Standard Deviations)*

	Item	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
32.	I feel guilty about giving my toddler S&S foods	guilt	2.55 (1.02)	2.55 (1.01)
33.	I feel pressured to give my toddler these foods when he/she hasn't eaten other foods	pressure1	1.69 (0.94)	1.66 (0.88)
34.	I'm afraid my toddler won't like me if I don't give him/her the foods that he/she likes	pressure2	1.16 (0.40)	1.17 (0.49)
35.	When it comes to sweets and snack foods I spoil my toddler	spoil	1.67 (0.78)	1.86 (0.85)
36.	I'm confident about my parenting abilities when it comes to managing these foods	confpar	4.35 (0.80)	4.19 (0.90)
37.	I worry that my toddler eats too much of these foods	worry	1.96 (0.92)	2.10 (0.99)
38.	I tell my toddler why certain foods are only for sometimes	teach1	3.41 (1.18)	4.12 (0.91)
39.	I explain to my toddler why certain foods are healthy	teach2	3.56 (1.14)	4.22 (0.91)

*Note.* Response scale for all items is Never, Rarely, Sometimes, Mostly, Always.  
S&S = Sweets and Snack Foods.

**Table 4.7***Rigidity of Parent Feeding Practices at Social Occasions: Item Means (and Standard Deviations)*

	Item <sup>1</sup>	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
40.	I have very firm rules about what types of foods I allow my toddler to have (i.e., I stick to this regardless of the situation)	sofirmtype	3.36 (1.18)	3.05 (1.13)
41.	I am flexible about what types of foods I allow my toddler to have (i.e., it depends on the situation)	soflextype	2.99 (1.10)	3.12 (1.03)
42.	I have very firm rules about when I allow my toddler to have sweets and snack foods (i.e., I stick to this regardless of the situation)	sofirmwhen	3.44 (1.11)	3.52 (1.07)
43.	I am flexible about when I allow my toddler to have sweets and snack foods (i.e., it depends on the situation)	soflexwhen	3.07 (1.07)	2.90 (1.01)
44.	I have very firm rules about the amount I allow my toddler to have (i.e., I stick to this regardless of the situation)	sofirmquan	3.26 (1.08)	3.16 (1.15)
45.	I am flexible about the amount I allow my toddler to have (i.e., it depends on the situation)	soflexquan	3.29 (0.98)	3.09 (0.98)

*Note.* With the exception of items where social occasions is mentioned, each questionnaire item was prefaced with 'At social occasions'.

<sup>1</sup> All items scored on scale: Not at all true of me, Rarely true of me, Sometimes true of me, Mostly true of me, Always true of me.

**Table 4.8**

*Parent Responsibility for Snack Food Choices at Social Occasions: Item Means (and Standard Deviations)*

	Item <sup>1</sup>	Variable name	Sample 1 <i>M (SD)</i>	Sample 2 <i>M (SD)</i>
46.	I allow my toddler to have sweets and snack foods of my choosing only	somumch	3.38 (1.11)	3.05 (1.18)
47.	I allow my toddler to have sweets and snack foods of his/her choosing	sochch	2.69 (0.97)	2.98 (1.03)
48.	I deliberately avoid giving my toddler sweets and snack foods	soavoid1	2.26 (0.99)	2.12 (0.98)
49.	I avoid social occasions with my toddler where I know these types of foods will be available for him/her to eat	soavoid2	1.30 (0.56)	1.42 (0.70)
50.	I attend social occasions with my toddler when I am confident that there will be foods I approve of for my him/her	soattend	1.55 (0.92)	1.54 (0.80)
51.	I can manage social occasions well	somanage	4.21 (0.62)	4.03 (0.86)
52.	I find that social occasions present a battle for me and my toddler	sobattle	1.62 (0.78)	1.81 (0.88)
53.	I find that I feel pressured to give my toddler these foods	sopress	2.00 (0.99)	2.10 (1.09)

<sup>1</sup> All items scored on scale: Not at all true of me, Rarely true of me, Sometimes true of me, Mostly true of me, Always true of me.

### 4.3.3 Exploratory Factor Analysis

The complete 51-item questionnaire data was analysed using principal axis factoring (PAF) with oblimin rotation. An oblique rotation, in which factors are allowed to correlate, was selected because intercorrelations between the factors were expected. Maximum Likelihood extraction and promax rotation were also explored and the solutions were comparable. The oblimin rotated solution produced the simplest structure with few item-factor cross-loadings. The procedure described in Chapter 2 regarding best practice in factor

analytic research (Coste, Bouee, Ecosse, Lepage, & Pouchot, 2005; Henson & Roberts, 2006; Steger, 2006) was also employed here. Multiple criteria were used to determine the number of factors to retain: theoretical importance and meaningfulness of the factors, eigenvalues greater than 1, screeplot, parallel analysis, and Velicer's MAP test.

The PAF solution produced eight factors that had eigenvalues greater than 1 post-rotation. Visual inspection of the screeplot revealed a change in slope after the third factor and a flattening of the line after the seventh factor. The parallel analysis indicated that eight components accounted for more variance than the random data eigenvalues. The MAP test indicated that there were five factors with the smallest average squared correlation being 0.01. A series of solutions were examined ranging from a three factor solution to an eight factor solution. A three and four factor solution was difficult to interpret and six, seven and eight factor solutions had items with low factors loadings. A five factor solution resulted in the most meaningful and interpretable solution. Only factor loadings above 0.3 were considered salient as recommended by Kline (Kline, 1994). Post rotation, five factors with eigenvalues of 10.68, 4.76, 2.15, 1.95 and 1.56 accounted for 46.6% of the variance in the correlation matrix. The oblimin rotated pattern matrix is shown in Table 4.9. For each of the factors, the items with salient loadings are shown in bold. Six items failed to load on a factor (items 12, 13, 18, 50 and 51 in Table 4.9).

#### *4.3.4 Interpretation of the Factors*

The interpretation of oblique-rotated factor solutions (i.e., where factors are allowed to correlate) is complex and therefore the method of interpretation will be discussed briefly. A key issue in interpreting an oblique solution concerns the distinction between the pattern matrix and the structure matrix. The structure matrix consists of the actual correlations (or loadings) of the variables with the factor and the pattern matrix consists of factor weights for each item that is used to determine the factor scores (Kline, 1994). One of the complexities inherent in the structure matrix is that the shared variance amongst the factors is not removed. In the pattern matrix the shared variance is partialled out making it easier to see which

variables are uniquely associated with the factors. The pattern matrix is therefore very important along with the loadings shown in the structure matrix. In the current analysis the pattern matrix weights and structure matrix loadings were very similar in magnitude and therefore the pattern matrix will be referred to for simplicity.

#### *4.3.4.1 Rules (Factor 1)*

The items that define factor 1 describe the mother's rules about the types of sweets and snacks that are allowed (items 5, 7), how much of these foods is allowed (items 1, 4) and when these foods are given to the toddler (items 2, 8), with all items having strong negative loadings. Despite the negative factor loadings, for ease of interpretation it would seem more appropriate to define this factor as the presence of rules, rather than the absence of rules. Several other items are consistent with this interpretation. Three items indicate that the child's access to snacks is limited to foods that the mother considers appropriate (items 3, 6, 9: 'I allow my toddler to have sweets and snack foods of my choosing only'; 'I like to have complete control over what types of sweets and snacks my toddler is given'; 'I attend social occasions with my toddler when I am confident that there will be foods I approve of' respectively). The only item with a positive loading was an item asking parents to indicate the degree to which the child is given autonomy over snack food choices (item 10: 'I allow my toddler to have sweets and snack foods of his/her choosing'). This item also fits well with the interpretation of this factor; that the parent has rules for determining the child's access to sweets and snack foods.

#### *4.3.4.2 Child's Attraction (Factor 2).*

The items that define factor 2 reflect the toddler's attraction to sweets and snack foods. The items cover four areas of behaviour: recognition (item 16), interest (item 15) desire for (item 14, 45) and liking (item 17). This factor is unique because it measures the parents' perception of child behaviour and cognitions. The other four factors ask parents to report on their own feeding practices including behaviours, attitudes and beliefs. For this



reason, the factor label has been prefaced with 'Child' to distinguish it from the other factors that measure aspects of parent feeding practices.

#### 4.3.4.3 *Self-efficacy (Factor 3)*

The items that define factor 3 describe the mother's lack of confidence in her ability to manage her toddler's diet in relation to sweets and snack foods. Several items loading positively on this factor describe the difficulties associated with feeding young children. These include feeling guilty or worried about child's consumption of snacks (items 20, 43), coping with the child's demands and difficult environments (items 19, 21, 25, 24), and fear of rejection (item 23). Two items with negative loadings reflect confidence in parenting abilities (item 22) and in managing social occasions where sweets and snacks are available (item 26). Taken together, most items reflect a lack of self-efficacy in controlling the child's access to sweets and snacks. For ease of use, this factor will be labelled in the positive direction (i.e., 'self-efficacy', as opposed to 'lack of self-efficacy').

#### 4.3.4.4 *Flexibility (Factor 4)*

Seven items load uniquely on factor 4. Six of these describe the mother's degree of flexibility in managing what (items 30, 31), how much (items 33, 34) and when (items 29, 32) sweets and snack foods are given to the child. All items had high loadings. Also loading uniquely on this factor was an item describing parents' acceptance of other people giving snacks to the child (item 35). An eighth item (item 27: 'I get upset when my toddler is given sweets and snacks by others') had a weak negative loading. Items 35 and 27 appear to be conceptually different from the remaining items.

#### 4.3.4.5 *Allow Access (Factor 5)*

Several items had high loadings on factor 5. The items that comprise this factor include a number of parent and child behaviours that together may indicate the extent to which the child is allowed access to sweets and snacks. Regarding parent behaviour, several items describe how often sweets and snacks are generally given to the child (items 36, 42, 45, 49), the extent to which there are limits on what types of sweets and snacks the child is

allowed to have (items 41, 44), and the accessibility of sweets and snacks in the child's environment (items 37, 47, 48). Regarding the child's behaviour, several items describe the child's tendency to ask for sweets and snacks (items 39, 40, 46) and the child's familiarity with these types of foods (item 38). Higher scores on each item that loads positively on the factor suggest higher levels of access to sweets and snacks. The two items that load negatively suggest lower levels of access (items 44 and 37: 'I would prevent my toddler from eating...' and 'my home is free of sweets and snack foods'). Item 49 ('how often is your toddler given sweets and snacks at social occasions') also had a negative loading but this is a reflection of the response scale that was used and therefore can be interpreted in the same way as items with positive loadings.

**Table 4.9**

*Oblimin Rotated Factor Pattern Matrix for Toddler Feeding Questionnaire*

	Factor					h <sup>2</sup>
	Rules	Child's attraction	Self-efficacy	Flexibility	Allow access	
1. I have very firm rules about the amount I allow my toddler to have (SO)	<b>-.718</b>	-.128	-.055	-.127	-.039	.654
2. I have very firm rules about when I allow my toddler to have S&S (SO)	<b>-.695</b>	-.003	.042	-.018	.131	.456
3. I allow my toddler to have S&S of my choosing only	<b>-.665</b>	-.030	-.013	.026	-.093	.479
4. I have very firm rules about the amount I allow my toddler to have	<b>-.660</b>	.133	-.085	-.006	-.096	.504
5. I have very firm rules about what types of foods I allow my toddler to have (SO)	<b>-.629</b>	-.118	.010	-.244	-.099	.670
6. I like to have complete control over what types of S&S my toddler is given	<b>-.628</b>	-.061	.055	.000	-.133	.476
7. I have very firm rules about what types of foods I allow my toddler to have	<b>-.569</b>	.029	-.007	-.111	-.283	.584
8. I have very firm rules about when I allow my toddler to have S&S	<b>-.543</b>	.122	-.051	-.099	-.123	.419
9. I attend social occasions with my toddler when I am confident that there will be foods I approve of for my him/her	<b>-.455</b>	.049	.260	-.166	.099	.363
10. I allow my toddler to have S&S of <i>his/her choosing</i> only	<b>-.441</b>	.117	-.058	.224	.071	.388
11. Teachcomp (composite item combining teach1 and teach2) <sup>a</sup>	<b>-.390</b>	.056	-.084	-.053	.102	.161
12. I deliberately avoid giving my toddler S&S <sup>a</sup>	-.281	-.161	.266	-.097	-.278	.356

	Factor					h <sup>2</sup>
	Rules	Child's attraction	Self-efficacy	Flexibility	Allow access	
13. I do not allow other people to give S&S to my toddler <sup>a</sup>	-.269	-.159	.246	-.265	-.230	.430
14. If my toddler were to see these foods he/she would want them	.081	<b>.823</b>	.137	.011	.016	.734
15. If my toddler were to see these foods he/she would be interested in them	-.014	<b>.814</b>	.058	.040	.060	.710
16. If my toddler were to see a S&S he/she would recognise it as being 'different' from other foods	-.037	<b>.668</b>	.104	-.041	-.019	.464
17. My toddler has a taste for these foods	.086	<b>.435</b>	.102	-.055	<b>.375</b>	.453
18. In my home there are S&S that are hidden from my toddlers view <sup>a</sup>	-.136	.176	-.085	-.022	.000	.052
19. I find that I feel pressured to give my toddler these foods (SO)	.103	.065	<b>.595</b>	.036	.134	.356
20. I feel guilty about giving my toddler sweets and snack foods	-.108	.071	<b>.540</b>	-.045	.112	.349
21. I find that social occasions present a battle for me and my toddler	-.078	.167	<b>.497</b>	.051	-.016	.292
22. I can manage social occasions well	-.219	.045	<b>-.489</b>	.020	.058	.268
23. I'm afraid my toddler won't like me if I don't give him/her the foods that he/she likes	.085	.018	<b>.489</b>	-.086	.075	.271
24. I avoid social occasions with my toddler where I know these types of foods will be available for him/her to eat	-.251	-.054	<b>.471</b>	-.159	.008	.362
25. I feel pressured to give my toddler these foods when he/she hasn't eaten other foods <sup>2</sup>	-.024	.001	<b>.453</b>	.127	.206	.285

	Factor					h <sup>2</sup>
	Rules	Child's attraction	Self-efficacy	Flexibility	Allow access	
26. I'm confident about my parenting abilities when it comes to managing these foods	-.014	.110	<b>-.353</b>	-.201	-.266	.397
27. I get upset when my toddler is given sweets and snacks by others <sup>a</sup>	-.161	.023	<b>.340</b>	<b>-.320</b>	-.255	.417
28. Avoidcomp (composite item combining avoidpl and avoidask) <sup>a</sup>	-.244	-.195	.286	-.070	-.158	.242
29. I am flexible about when I allow my toddler to have S&S (i.e., it depends on the situation)	-.061	-.042	.062	<b>.788</b>	-.077	.555
30. I am flexible about what types of foods I allow my toddler to have	-.064	-.077	-.113	<b>.729</b>	.123	.569
31. I am flexible about what types of foods I allow my toddler to have (SO)	.175	.111	-.027	<b>.697</b>	-.023	.638
32. I am flexible about when I allow my toddler to have S&S (SO)	.185	.055	.031	<b>.684</b>	-.167	.560
33. I am flexible about the amount I allow my toddler to have	-.007	-.203	.075	<b>.674</b>	.023	.468
34. I am flexible about the amount I allow my toddler to have (SO)	<b>.318</b>	.136	.070	<b>.528</b>	-.057	.522
35. I allow certain other people to make decisions about the types of S&S my toddler is given <sup>a</sup>	-.021	.215	-.031	<b>.424</b>	.058	.257
36. I would give my toddler a sweet or snack food	-.084	.042	-.060	.075	<b>.740</b>	.552
37. My home is free of sweets and snack food	.013	.012	.054	-.039	<b>-.713</b>	.506
38. Thinking about the types of foods like those shown in the picture, my toddler is aware of	.196	.104	.004	-.065	<b>.647</b>	.556
39. Your toddler 'asks for' (includes gestures if your toddler doesn't not talk) a sweet or snack food	-.061	.211	.127	.024	<b>.637</b>	.545

	Factor					h <sup>2</sup>
	Rules	Child's attraction	Self-efficacy	Flexibility	Allow access	
40. Your toddler 'asks you' to give him/her some more of a sweet or snack food	-.036	.183	.078	.004	<b>.551</b>	.397
41. Thinking about S&S like those in the picture, I would allow my toddler to eat	.056	.114	-.100	.141	<b>.543</b>	.426
42. When it comes to sweets and snack foods I spoil my toddler	.008	.035	.224	.081	<b>.527</b>	.397
43. I worry that my toddler eats too much of these foods	-.016	.093	<b>.428</b>	.053	<b>.519</b>	.555
44. Thinking about S&S like those in the picture, I would prevent my toddler from eating	-.211	-.165	.100	-.139	<b>-.468</b>	.472
45. When I am at a shop counter where S&S are available I buy something for my toddler	-.021	.005	.020	-.021	<b>.437</b>	.186
46. My toddler seeks out or asks for these types of foods	.104	<b>.409</b>	.140	.037	<b>.427</b>	.535
47. In my home there are S&S that my toddler can see but can't reach	.091	-.041	-.024	-.077	<b>.415</b>	.151
48. In my home there are S&S that my toddler can access by himself/herself	-.043	-.167	-.006	.036	<b>.400</b>	.220
49. How often is your toddler given S&S at social occasions?	-.221	-.233	.033	-.011	<b>-.342</b>	.311
50. If I've told my toddler 'no you can't have it', I'm likely to give in to his/her demands <sup>a</sup>	.175	-.012	.233	.057	.269	.458
51. Think about social occasions that you attend with your toddler and indicate how often S&S are available <sup>a</sup>	-.150	-.045	-.007	.077	-.209	.082
<b>% of Variance</b>	<b>20.94</b>	<b>9.34</b>	<b>4.21</b>	<b>3.83</b>	<b>3.05</b>	

*Note.* S&S = Sweets and snacks, SO = Social occasions. <sup>a</sup> Items that were eventually dropped from the final scales.

#### 4.3.5 *Factor analysis of Sample 2 Questionnaire Data*

The questionnaire data for Sample 2 was also analysed using principal axis factoring (PAF) with oblimin rotation. The scree plot produced a distinct elbow at the 6<sup>th</sup> factor, suggesting the presence of five factors. Following the findings of Sample 1, a five factor solution was extracted and examined. An initial inspection indicated that the five factor solution was comparable with the Sample 1 solution. A six and seven factor solution was also examined. In a six factor solution the 6<sup>th</sup> factor was defined by two items with low factors loadings. A seven factor solution was also problematic for this reason. Comparison of the five, six and seven factor solutions, obtained in Sample 1 and Sample 2, indicated that the five factor solution produced the most comparable structure, comprising items with strong loading on all factors and few cross-loadings. The results of the five factor solution are reported. Post rotation, five factors with eigenvalues of 10.38, 3.96, 2.42, 2.34 and 1.69 accounted for 40.7% of the variance in the correlation matrix. The oblimin rotated pattern matrix is shown in Table 4.10.

**Table 4.10**

*Oblimin Rotated Factor Pattern Matrix for Sample 2*

Items	Factor					h <sup>2</sup>
	Allow Access	Self-efficacy	Attraction	Rules	Flexibility	
36. I would give my toddler a sweet or snack food	<b>.763</b>	-.034	.003	-.001	-.048	.553
39. Your toddler asks for a sweet or snack food	<b>.656</b>	.064	.196	.076	-.100	.490
37. My home is free of sweets and snack food	<b>-.621</b>	.057	.027	-.029	-.075	.429
38. Thinking about S&S like those in the picture, my toddler is aware of	<b>.588</b>	-.030	.029	.034	-.012	.352
41. Thinking about S&S like those in the picture, I would allow my toddler to eat	<b>.546</b>	-.092	.067	.002	.181	.390
45. When I am at a shop counter where sweets and snacks are available I buy something for my toddler	<b>.545</b>	.111	-.019	.046	.054	.372
17. My toddler has a taste for these foods	<b>.517</b>	.195	<b>.437</b>	-.006	.047	.568
40. Your toddler asks for more of sweet or snack food	<b>.513</b>	.034	.285	.053	.039	.393
44. Thinking about S&S like those in the picture, I would prevent my toddler from eating	<b>-.465</b>	.093	.064	-.105	-.100	.401
47. In my home there are S&S that my toddler can see but cant reach	<b>.445</b>	-.126	-.132	-.127	.157	.247
42. When it comes to snack foods I spoil my toddler	<b>.442</b>	.287	-.069	.103	.105	.412



Items	Factor						h <sup>2</sup>
	Allow Access	Self-efficacy	Attraction	Rules	Flexibility	Child's	
50. If I've told my toddler 'no you can't have it', I'm likely to give in to his/her demands	<b>.439</b>	.385	-.110	.123	.095		.496
7. I have very firm rules about what types of foods I allow toddler to have	<b>-.418</b>	-.097	.191	-.287	-.148		.486
48. In my home there are S&S that toddler can access by himself/herself	<b>-.409</b>	-.055	-.005	-.025	.016		.180
22. I can manage social occasions well	-.074	<b>-.703</b>	.002	-.093	.115		.508
19. At social occasions I find that I feel pressured to give my toddler these foods	-.151	<b>.589</b>	.291	-.070	.025		.480
26. I'm confident about my parenting abilities when it comes to these foods	-.206	<b>-.560</b>	.154	-.058	.135		.381
21. I find that social occasions present a battle for me	-.101	<b>.553</b>	<b>.318</b>	-.029	-.014		.444
23. I'm afraid my toddler won't like me if I don't give him/her the foods that he/she likes	-.010	<b>.538</b>	.004	.027	-.052		.284
20. I feel guilty about giving my toddler sweets and snack foods	-.109	<b>.509</b>	-.026	-.193	.020		.306
25. I feel pressured to give my toddler these foods when he/she hasn't eaten other foods	.128	<b>.479</b>	-.019	.037	.056		.282
43. I worry that my toddler eats too much of these foods	<b>.408</b>	<b>.430</b>	.084	-.029	.003		.413
28. Avoidcomp (composite item combining avoidpl and avoidask)	-.192	<b>.373</b>	.194	-.065	.043		.220
14. If my toddler were to see these foods he/she would want them	.283	.066	<b>.768</b>	.106	.161		.794

Items	Factor					h <sup>2</sup>
	Allow Access	Self-efficacy	Child's Attraction	Rules	Flexibility	
15. If my toddler were to see these foods he/she would be interested in them	.273	.016	<b>.751</b>	.100	.114	.715
46. My toddler seeks out these types of foods	<b>.539</b>	.034	<b>.556</b>	-.025	-.024	.600
51. Think about the social occasions you attend with your toddler and indicate how often S&S are available	.037	.029	<b>-.381</b>	-.151	-.057	.170
16. If my toddler were to see these foods he/she would recognise it as being 'different' from other foods	-.039	.066	<b>.380</b>	-.154	-.036	.190
4. I have very firm rules about the amount I allow my toddler to have	-.252	-.170	.261	-.247	-.202	.381
18. In my home there are S&S that are hidden from my toddler's view	-.026	.041	.239	-.052	-.015	.066
3. I allow my toddler to have S&S of my choosing only (SO)	.003	-.034	.009	<b>-.759</b>	-.030	.591
5. I have very firm rules about the types of food I allow my toddler to have (SO)	.074	-.136	.030	<b>-.712</b>	-.225	.641
10. I allow my toddler to have sweets and snack foods of his/ her choosing (SO)	-.080	-.019	.158	<b>.593</b>	.191	.449
1. I have very firm rules about the amount I allow my toddler to have (SO)	-.079	-.085	.012	<b>-.541</b>	-.283	.537
27. I get upset when my toddler is given sweets and snack foods by others	-.213	.179	.133	<b>-.516</b>	-.028	.448

Items	Factor					h <sup>2</sup>
	Allow Access	Self-efficacy	Attraction Child's	Rules	Flexibility	
13. I do not allow other people to give sweets and snack foods to my toddler	-.272	.023	-.012	<b>-.490</b>	-.076	.448
6. I like to have complete control over what types of S&S my toddler is given	-.183	-.076	.191	<b>-.473</b>	-.071	.397
2. I have very firm rules about when I allow my toddler to have to have sweets and snacks (SO)	.057	-.109	.150	<b>-.459</b>	-.142	.286
12. I deliberately avoid giving my toddler S&S at social occasions	-.192	.064	-.038	<b>-.438</b>	-.065	.318
24. I avoid social occasions with my toddler where I know these foods will be available	-.038	<b>.307</b>	-.087	<b>-.436</b>	.150	.285
9. I attend social occasions with my toddler only when I am confident that there will be foods that I approve of for my toddler	.079	.227	-.056	<b>-.402</b>	.138	.203
49. How often is your toddler given a S&S at social occasions	-.206	.015	<b>-.317</b>	<b>-.356</b>	-.069	.347
35. I allow certain other people to make decisions about the types of S&S my toddler is given	.132	.101	.146	<b>.300</b>	.066	.196
11. Teachcomp (composite item combining teach1 and teach2)	-.134	-.233	.213	-.297	-.053	.250
8. I have very firm rules about when I allow toddler to have to have S&S	-.183	-.211	.265	-.273	-.180	.350
29. I am flexible about when I allow my toddler to have to have S&S	.023	-.070	.042	-.091	<b>.818</b>	.632

Items	Factor					h <sup>2</sup>
	Allow Access	Self-efficacy	Child's Attraction	Rules	Flexibility	
33. I am flexible about the amount I allow my toddler to have	.088	-.132	-.093	-.161	<b>.682</b>	.461
31. I am flexible about the types of foods I allow my toddler to have (SO)	-.154	.068	.125	.293	<b>.658</b>	.598
34. I am flexible about the amount I allow my toddler to have (SO)	-.047	.037	.127	.226	<b>.627</b>	.534
32. I am flexible about the when I allow my toddler to have S&S (SO)	-.099	.017	.038	.226	<b>.615</b>	.477
30. I am flexible about the types of foods I allow my toddler to have	.243	-.077	.062	-.036	<b>.565</b>	.444
% of variance	<b>20.36</b>	<b>7.77</b>	<b>4.45</b>	<b>4.60</b>	<b>3.31</b>	

Note. S&S = Sweets and snacks, SO = Social occasions. The item number correspond to Table 4.9 and have been included for ease of interpretation between the two tables.

### 4.3.6 Comparison of Factors in Sample 1 and Sample 2

#### 4.3.6.1 Allow Access

Thirteen items loaded onto this factor in both samples and a discrepancy was found for 3 items. In Sample 2, but not in Sample 1, the following two items loaded on Allow Access: 'If I've told my toddler 'no you can't have it', I'm likely to give in to his/her demands' (*givein*) and 'I have very firm rules about what types of foods I allow my toddler to have' (*firmtype*). These items had loadings of -.42 and -.41 which are the second and third lowest loading items on this factor in Sample 2. Only the item with the lowest loading on Allow Access in Sample 1 failed to load in Sample 2, 'Think about social occasions that you attend with your toddler and indicate how often sweets and snack foods are available' (*soavail*).

#### 4.3.6.2 Child's Attraction

The five items that loaded on this factor in Sample 1 also loaded on the same factor in Sample 2. Consistent with Sample 1, two items, 'toddler has a taste for these foods' and 'toddler seeks out these foods', cross-loaded on Allow Access. Three additional items also loaded on this factor in Sample 2: availability of foods at social occasions (*soavail*), social occasions present a battle (*sobattle*), and how often food is given at social occasions (*sogive*), but the item loadings were low.

#### 4.3.6.3 Rules

A number of discrepancies were found on this factor. Of the 10 items that loaded on this factor in Sample 1, 7 item loadings were apparent also in Sample 2. The 3 items that were not replicated related to general firm rules (i.e., *firmtype*, *firmquan*, *firmwhen*). These items had considerable sized loadings on this factor in Sample 1. Several additional items with moderate loadings in Sample 2 were: 'I get upset when my toddler is given a sweet or snack by others' (*contoth3*); 'I don't allow other people to give sweets and snacks to my toddler' (*contoth1*); 'I deliberately avoid giving my toddler sweets and snacks at social

occasions' (*soavoid1*); and, 'I avoid social occasions where I know these foods will be available' (*soavoid2*). In Sample 1, three of these items had loadings just below 0.3. In Sample 2 the factor seems to reflect rules at social occasions whereas in Sample 1 it would be interpreted as a more general attitude factor reflecting parental rules.

#### 4.3.6.4 *Self-efficacy*

Nine of the ten items that loaded on this factor in Sample 1 also loaded on this factor in Sample 2. The only discrepancies occurred for items that had low loadings on the factor. For example, 'getting upset when food is given to others' (*contoth3*) did not load on this factor in Sample 2, and 'give in to demands' (*givein*) did not load on this factor in Sample 1.

#### 4.3.6.5 *Flexibility*

There was only one discrepancy for this factor. The item 'allow certain other people to make decisions' (*contoth2*) did not load on this factor in Sample 2. This item was found to correlate poorly with the remaining items (discussed in section 4.3.10).

#### 4.3.6.6 *Summary of Results*

In summary, the factor structure obtained from retrospective reports (Sample 2) was very similar to that obtained for reports from parents who were recalling immediate experiences with their toddler (Sample 1). With the exception of the Rules factor, most of the discrepancies occurred for items that had lower loadings on each of the factors. Overall, the factor structure was replicated in a second sample of parents.

### 4.3.7 *Inter-relationship amongst Factors*

The factor correlation matrix is shown in Table 4.11. The items that loaded on the Rules factor had negative loadings (i.e., high scores would reflect the absence of rules) making interpretation of the factor correlation matrix confusing. The loadings on this factor were reflected so that high scores would indicate greater endorsement of rules. The loadings on Factor 3 (Self-efficacy) were also reversed so that high scores would reflect higher self-efficacy. The signs in the Table 4.11 have therefore been changed for ease of interpretation.

There is a moderate negative correlation between Rules and Flexibility, such that greater endorsement of rules is associated with less flexibility. The presence of rules is also weakly negatively correlated with Allow Access, meaning that mothers who have rules are less likely to allow access to sweets and snacks. In contrast, Allow Access is positively associated with Flexibility and Child's Attraction (Sample 1 only), and negatively correlated with Self-efficacy. Therefore mothers who allow access to sweets and snacks are more flexible, less confident about their parenting, and their children are more likely to be attracted to sweets. Self-efficacy was also weakly negatively associated with Child's Attraction in Sample 2.

**Table 4.11**

*Intercorrelations between Factor Scores on Toddler Feeding Questionnaire for Sample 1 (mothers of toddlers) and Sample 2 (mothers of preschoolers)*

TFQ Factor	1	2	3	4	5
Sample 1					
1. Rules	-				
2. Child's attraction	-.01	-			
3. Self-efficacy	.03	-.09	-		
4. Flexibility	-.42**	.09	.09	-	
5. Allow access	-.32**	.25**	-.13*	.24**	-
Sample 2					
1. Rules	-				
2. Child's attraction	.01	-			
3. Self-efficacy	.02	-.12*	-		
4. Flexibility	-.33**	-.002	-.12*	-	
5. Allow access	-.34**	.01	-.15*	.33*	-

\*  $p < .05$ , \*\*  $p < .01$ .

#### *4.3.8 Relationship between Factor Scores and Feeding Practices Measured with the Child Feeding Questionnaire (Sample 1 and Sample 2)*

The correlations between the TFQ factors and the three scales from the CFQ that measure control over feeding are shown in Table 4.12. As expected, the TFQ factors showed more significant associations with CFQ Monitoring and CFQ Restriction, the two scales that measure parents' control over children's snack food intake. Rules, Child's Attraction, Self-efficacy, and Allow Access were consistently associated with either Monitoring or Restriction



in Sample 1 and Sample 2. Only one TFQ factor, Self-efficacy, was significantly negatively associated with Pressure to Eat.

**Table 4.12**

*Correlations between TFQ Factors and CFQ Subscales*

TFQ Factor	CFQ subscales				
	Pressure to eat	Monitoring	Restriction	Rest-6 item	Reward
Sample 1 (mother's of toddlers, N = 175)					
Rules	.14	.40**	.13	.13	.03
Child's attraction	.14	-.02	.33**	.30**	.19*
Self-efficacy	-.24**	.10	-.33**	-.30**	-.16*
Flexibility	-.002	-.13	.10	.10	.08
Allow access	.09	-.21**	.28**	.16*	.39**
Sample 2 (mother's of preschoolers, N = 216)					
Rules	-.02	.45**	.08	.15*	.11
Child's attraction	.10	.28**	.43**	.43**	.21**
Self-efficacy	-.21**	-.02	-.39**	-.32**	-.31**
Flexibility	.12	-.32**	.08	-.03	.25**
Allow access	.12	-.39**	.14	-.002	.33**

\* $p < .05$ , \*\* $p < .01$ .

#### 4.3.9 Relationship between Factor Scores and Frequency of Snack

##### *Food Consumption (Sample 1)*

Allow Access, Flexibility, and Rules comprise items that ask the parent to indicate how often sweets and snacks are given to the child, and therefore these factors should be associated with frequency of consumption of specific snack foods: higher scores on Allow Access and Flexibility with greater frequency of consumption; and higher scores on Rules with lower frequency of consumption. Child's Attraction also contains items that indicate

that the child is exposed to sweets and snacks on a regular basis, and may therefore consume these foods more regularly. Self-efficacy does not contain items about frequency of consumption or how often snack foods are given to the child. The correlations between the TFQ factors and frequency of snack food consumption are shown in Table 4.13. As would be expected, Allow Access and Flexibility were positively correlated with frequency of consumption in five and four categories of snack food, respectively. Child's Attraction was positively correlated with frequency of consumption in all five categories of snack food. Flexibility was also positively correlated with four of the five categories of snack food. No significant associations were found for Self-efficacy and frequency of snack food consumption.

The correlation of Restriction with frequency of snack food consumption is also shown in Table 4.13. Restriction was positively correlated with frequency of consumption for three of the five snack food types. This indicates that higher frequency of consumption is associated with *more* parental restriction.

**Table 4.13**

*Correlations between TFQ Factors, CFQ Restriction, and Frequency of Snack Food Consumption in Sample 1*

Factor	Snack Food Types				
	Savoury biscuits	Sweet biscuits	Cakes & pastries	Chips	High fat/sugar dairy
Sample 1 (mother's of toddlers, N = 175)					
Rules	-.09	-.01	-.05	-.25**	-.11
Child's attraction	.26**	.25**	.28**	.17*	.22**
Self-efficacy	-.13	-.06	.05	-.06	-.04
Flexibility	.20**	.18*	.03	.19*	.17*
Allow access	.38**	.42**	.28**	.52**	.38**
CFQ Restriction	.25**	.28**	.11	.21**	.15

\* $p < .05$ , \*\* $p < .01$ .

#### 4.3.10 Selecting the Items for the TFQ Scales

The factor structure obtained in Sample 1 provided the basis for item selection, given that Sample 1 was the primary sample of interest and because the results in Sample 2 suggested that this structure was adequately robust. A number of items with poor loadings or poor conceptual fit were removed from the scale. The item *Teachcomp* (a composite of 'I tell my toddler why certain foods are healthy' and 'I tell my toddler why certain foods are only for sometimes') was removed from Rules because there was very little similarity with the other items, and it shared only a small amount of variance with the other items ( $h^2 = .161$ ). The item 'allowing certain other people to make decisions about child's sweet and snack food intake' (*control2*) was removed from Flexibility because of conceptual differences with the other items (i.e., all other items were directly measuring the extent to which parents adapt their behaviour depending on the circumstances or context). This item also explained

considerably less variance in the total scale score compared with the other items (13.6% compared with 37%). Similarly, the item ‘upset when other people give child snacks’ (*contoth3*) was removed from Self-efficacy because it also had an unacceptable correlation with the total scale score ( $r = .16$ ).

Items with cross-loadings of similar magnitude across more than one factor were allocated to the factor where the conceptual fit was best. The item ‘worry that child eats too much’ (*worry*) had a much better conceptual fit with the items that comprised the Self-efficacy factor than Allow Access. The item ‘toddler seeks out foods’ (*todask*) loaded on both Allow Access and Child’s Attraction, but conceptual fit was considered better for the latter.

#### *4.3.11 Final TFQ model descriptive statistics and factor internal consistencies*

The descriptive statistics and Cronbach’s alphas for the final TFQ model are presented in Table 4.14. Subscale scores were created for each factor by calculating the mean score for each item that loaded on the factor. A list of the items that were included in each scale are provided in Appendix H.

#### *4.3.12 Test-Retest Reliability*

Mean test-retest scores, intra-class correlation coefficients, and Pearson’s correlation coefficients for the sub-sample of participants from Sample 1 ( $n = 46$ ) who completed the measure for the second time are shown in Table 4.15. The Pearson’s correlation coefficient indicated excellent test-retest reliability for Rules, Self-efficacy, Flexibility, and Allow Access, and marginally acceptable reliability for Child’s Attraction. The intraclass correlations were all significant and indicated excellent agreement between the scores obtained on the two testing occasions, with the possible exception of Child’s Attraction, which indicated a slightly lower level of agreement.

**Table 4.14***Descriptive Statistics and Cronbach's Alphas for the Final TFQ Model*

TFQ factors	No. of items	<i>M</i>	<i>SD</i>	<i>α</i>
Sample 1 (mothers of toddlers)				
Rules	10	3.28	0.75	.89
Child's attraction	5	3.05	0.73	.85
Self-efficacy	9	4.25	0.46	.75
Flexibility	6	3.14	0.81	.87
Allow access	12	2.59	0.60	.88
Sample 2 (mothers of preschoolers)				
Rules	10	3.21	0.66	.85
Child's attraction	5	3.09	0.73	.81
Self-efficacy	9	4.15	0.51	.76
Flexibility	6	3.05	0.75	.85
Allow access	12	2.63	0.61	.84

**Table 4.15**

*TFQ Factor Mean Test-retest Scores (and Standard Deviation), Intra-class Correlation Coefficient (ICC), Pearson's Correlation Coefficient and p-value*

TFQ factor	ICC <sup>a</sup>	<i>M (SD)</i> <sup>b</sup>			<i>r</i>	<i>p</i>
		Test	Retest	Difference		
Rules	.83	3.35 (0.81)	3.27 (0.87)	0.08 (0.06)	.84	.001
Child's attraction	.67	3.05 (0.73)	2.93 (0.68)	0.12 (0.05)	.68	.001
Self-efficacy	.80	4.29 (0.51)	4.33 (0.43)	0.04 (0.08)	.81	.001
Flexibility	.79	3.04 (0.84)	3.14 (0.97)	0.10 (0.13)	.79	.001
Allow access	.90	2.52 (0.67)	2.53 (0.61)	0.01 (.05)	.91	.001

<sup>a</sup>  $p < .001$  for all ICC, <sup>b</sup> repeated measures t-tests were not significant.

#### 4.4 Discussion

The study presented in this chapter provides preliminary evidence for the validity of the Toddler Feeding Questionnaire. Exploratory factor analysis produced five meaningful and interpretable constructs from the TFQ that complemented the qualitative data obtained in the parent interviews outlined in Chapter 3. The close replication of the factor structure in the second factor analysis supported the robustness of the constructs. There was strong support for a number of the constructs that were developed from the interviews, in particular for allowing access to snack foods (Allow Access), confidence in managing snack foods (Self-efficacy), and toddlers' liking of snack foods (Child's Attraction).

There were also some differences between the concepts that were derived from the interview analysis and the resultant factor structure. Rigidity of parent feeding practices was a theme identified from the interviews that was not supported in the EFA. Items were developed to measure: (a) (global) rigidity of feeding practices, and (b) rigidity of feeding practices at social occasions. There was no evidence to support a differentiation of parent feeding practices at social occasions from general feeding practices as was suggested by the interview analysis. Furthermore, the factor analysis suggested the presence of two factors; one that reflected parental Rules, and the other that reflected parental Flexibility. It is possible that the wording of the items caused some confusion in the way the items were interpreted. In the first instance, the word 'firm' was used instead of rigid. Secondly, a slightly different wording was used for the items that described firm rules and flexible rules (e.g., 'I have firm rules about...', and 'I am flexible about...'). Therefore respondents may have been thinking about their rules when answering the first question, and then thinking about the way they apply their rules in the second instance. It is also possible that these behaviours are not mutually exclusive, whereby a parent can have firm rules but also be flexible by taking into consideration the situation and context when making decisions about feeding their child.

Two themes that were investigated were Parental Control over Snack Food Choices and Parent Rigidity in Feeding Practices, neither of which formed a coherent factor in the factor analysis. The items that determined Parental Responsibility for Snack Food Choices at Social Occasions and Rigidity of Parent Feeding Practices at Social Occasions were more closely related to similar items that reflected general parent feeding practices, suggesting that the parent behaviours were more similar than different across contexts. Items that measured *general* Parental Responsibility for Snack Food Choices also loaded together with these items. It is possible that pressure to respond in a socially desirable way influenced parents' responses in the interview, with parents wanting to emphasise that their feeding practices at social occasions were the exception rather than the rule.

It should be noted that there was some support for Rigidity of Feeding Practices at Social Occasions being a separate factor in the second factor analysis. The factor solution for Sample 2 indicated that items about parental rules at social occasions were closely interrelated and loaded together on a factor; items that measured more general parental rules loaded on another factor. This difference may be due to the different perspectives offered by parents in Sample 2 who were asked to recall their experiences from two years prior. It is possible that parents' recollections of the toddler years were affected by more recent experiences and the greater role that social occasions are likely to play in this time.

Two additional themes were not supported in the EFA: (a) Parent Responsibility for Snack Food Choices, and (b) Parent Responsibility for Snack Food Choices at Social Occasions. A problem with the items developed to measure these constructs was the high degree of conceptual overlap with other constructs. Three items from the former scale loaded on the Rules factor. These items were: 'I allow my toddler to have snacks of my choosing only', 'I allow my toddler to have snacks of his/her choosing', and 'I like to have complete control over what types of snacks my toddler is given'. It is plausible that parental control of foods choices is one aspect of a rigid feeding regime. One item comprising Parental



Responsibility for Snack Food Choices at Social Occasions, also loaded with items that measured parental Rules (i.e., 'I attend social occasions with my toddler when I am confident that there will be foods I approve of for him/her'). Other items on this scale loaded on Self-efficacy. Some of these items were possibly tapping into parents' self-efficacy beliefs because they asked about the difficulties of managing snack food consumption at social occasions (e.g., 'I find that I feel pressured to give my toddler these foods', and 'I can manage social occasions well').

Further analysis of the TFQ factors provided preliminary evidence for the reliability and validity of the TFQ. The inter-correlations between the factors were small in magnitude which indicates that the constructs are conceptually independent with little overlapping variance. The largest correlation was between Rules and Flexibility ( $r = -.42$ ), which is not surprising considering that a number of items amongst them were originally developed to represent the extremes of the same behaviour (e.g. 'I am flexible about when I allow my toddler to have sweets and snacks' and 'I have firm rules about when I allow my toddler to have sweets and snacks'). Other correlations amongst the factors were consistent with the interpretations of the factors. For example, parents who allow access to sweets and snack foods have children who are more attracted to these foods, and they have significantly fewer rules, lower self-efficacy and more flexible feeding practices.

There was no significant change in scores over the re-test period for any of the factors, suggesting that the TFQ scores are relatively stable at least over the short term. The TFQ factors also demonstrated good test-retest reliability with intra-class correlations ranging from .67 to .90. The lowest intra-class correlation was obtained for Child Attraction which was marginally acceptable. The poorer reliability may reflect typical variability in behaviours during the toddler period, unlike parent attitudes and behaviour for which there is likely to be more stability.

The TFQ also demonstrated good convergent and discriminant validity with the factors correlating more closely with the Monitoring and Restriction scales from the CFQ, than with the Pressure to Eat scale. Unlike Pressure to Eat, the Monitoring and Restriction scales are both measures of control that focus on access to sweet and snack foods. TFQ Rules was positively correlated with Monitoring, which is about keeping track of what the child eats. Not surprisingly, Flexibility was negatively correlated with Monitoring. Child Attraction was positively correlated with both Monitoring and Restriction, suggesting that children who like sweets and snack foods may elicit higher levels of control and monitoring from their parents. An alternative explanation is that higher control and monitoring may encourage greater attraction to sweets and snack food. Allow Access was negatively correlated with Monitoring and positively correlated with Restriction. This is consistent with parent reports in the interview which indicated that the availability of snack foods actually prompted more restrictive practices. Parents did not need to worry about restricting access when the foods were unavailable for the child to eat. Self-efficacy was the only TFQ factor that was associated with Pressure to Eat and Restriction, a likely association given that low parenting self-efficacy is expected to be associated with maladaptive feeding practices.

The TFQ also demonstrated good concurrent validity with a number of significant associations found between the TFQ factors and parent reports of child snack food consumption. This indicates that the TFQ factors correspond closely with parent reports of consumption frequency. The factors Allow Access and Child's Attraction were positively correlated with consumption frequency for all types of snack foods. Flexibility was positively correlated with all but one snack food type. There were very few associations between rules and snack food consumption suggesting parent rules may not necessarily match actual behaviour in terms of children's consumption of snack food. Of particular interest was the positive association between the Restriction scale and frequency of snack food consumption. The most likely explanation is that consumption of snack foods elicits increased parental

restriction. It is also possible that restriction is the driver of increase frequency of consumption. Importantly, it suggests that children whose parents are restrictive are not necessarily eating fewer snack foods.

The TFQ defines and measures some important aspects of parent control of sweets and snack foods in toddlers and provides new insights into the parent-toddler feeding relationship. Allow Access may be particularly important because it provides a different conceptualisation of control than restriction. Allow Access measures the degree to which the toddler is allowed access to sweets and snacks. It offers a measure of what the parent believes to be an acceptable level of access to snack foods, and is important in understanding the influence and consequences of parental restriction. It is also advantageous from a theoretical perspective, as it represents parental control at the 'gate-keeper' level, an aspect of control that has received little attention in the literature.

Another TFQ factor, Rules, may reflect an overt form of control. The Rules factor is conceptually very similar to a measure of overt control developed by Ogden et al. (2006). Overt control is measured with five items that asks parents to indicate how often they are firm about what, when, how much and where their child should eat. Also included is an item that asks parents how often they encourage the child to eat when they feel the child has not eaten enough that day. The rules factor comprises items that are very similar in content, with the exception of items about pressuring the child to eat and determining where the child should eat. The Ogden et al. measure was not available at the time the TFQ was developed and it is encouraging that two similar measures were developed independently. Ogden et al. reported that overt control was associated with healthy snack food intake (parent-reported) but not with unhealthy snack food intake. The lack of an association of Rules with snack food intake in the current study is consistent with the Ogden et al. findings.

Flexibility measures parents' degree of flexibility in managing what types, how much and when toddlers are given sweets and snack food and may also reflect a more overt form of

control. Some level of flexibility may be appropriate and necessary to respond to toddlers' unpredictable eating patterns. Being responsive to the needs of the child is an important feature of good parenting. In Authoritative parenting responsiveness is coupled with clear boundaries and expectations of the child (Hughes, Power, Fisher, Mueller, & Nicklas, 2005). Too much flexibility with few boundaries may be undesirable. Parental responsiveness without setting limits is characteristic of an indulgent feeding style (Sacco, Bentley, Carby-Shields, Borja, & Goldman, 2007). The effect of flexibility on children's self-regulation and weight is unknown.

Self-efficacy in managing snack foods is likely to be an important influence on parents' feeding practices. There is strong evidence that self-efficacy is associated with parental competence (Jones & Prinz, 2005). Only one study was found that has constructed a domain-specific measure of parenting self-efficacy specifically for a toddler sample (Coleman & Karraker, 2003), but no measures of parent self-efficacy for managing snack food intake could be located. The specificity of this measure may be important given that task-specific self-efficacy is thought to be a better predictor of behaviour than general measures of self-efficacy (Bandura, 2001). The negative correlation of self-efficacy with both restriction and pressure to eat from the Child Feeding Questionnaire, two measures of maladaptive feeding practices, provides some evidence for its validity. The inclusion of other measures of self-efficacy would have provided more definitive evidence, and is a limitation of this research.

Parent feeding practices may be influenced by the characteristics of the child. Research by Birch and Fisher (2000) suggests that there is a bi-directional relationship between parent feeding practices and children's eating behaviour or weight. Child's Attraction to snack foods is an example of a toddler characteristic that could plausibly influence their eating behaviour and self-regulation as well as influence parent feeding practices. The positive correlation between restriction and child's attraction suggests that this

characteristic may elicit parental restriction or even that parental restriction promotes greater child attraction to foods.

There are some limitations to the study. The primary sample of mothers (Sample 1) was well-educated, and currently employed in professional occupations, and the toddlers were cared for in day care facilities at least some of the time. The applicability of the findings to mothers with less education or mothers who stay at home with their children is unknown. The replication of the findings in a second sample was promising. Mothers in Sample 2 were more representative of the population in terms of occupation classification. However, the recall accuracy of mothers in Sample 2 is unknown and there is also the possibility that current feeding practices or child characteristics contaminated the responses. A second limitation is that the TFQ was based on self-report and was validated against other self-report measures of behaviour, therefore the degree of correspondence with actual behaviour is not known. A study by Sacco et al. (2007) suggested that reported measures of feeding practices correspond poorly with observed feeding styles, although this is likely to be a limitation of any self-report measure of behaviour.

The factor analysis in this chapter provided a useful and interpretable structure for the concepts identified in the interview analysis conducted in Chapter 3. The TFQ provides a picture of some key influences on toddlers snack food intake and an opportunity to investigate several different types of influences on toddlers' self-regulation of energy intake. The TFQ supports a multi-dimensional conceptualisation of control in the management of energy-dense foods, and thereby addresses a limitation in the current literature that has been identified by several researchers (Ogden et al., 2006; Sacco et al., 2007; Wardle & Carnell, 2007). It further provides an opportunity to differentiate between aspects of control that have a negative influence on children's energy intake regulation from those that are relatively benign or even beneficial. The TFQ will enable further investigation into early parental influences on self-regulation of energy intake and child overweight.

## CHAPTER 5

### ARE FEEDING PRACTICES ASSOCIATED WITH PARENTS' WEIGHT STATUS AND PRESCHOOLERS' BODY MASS INDEX?

#### 5.1 Introduction

One aim of the thesis was to explore the possible influence of parents' feeding practices on the development of overweight in young children. This study examines whether toddler feeding practices are associated with parents' weight status and body mass index in preschoolers. The previous chapter provided some preliminary evidence for the validity of the TFQ, by defining its structure and conceptual independence from the CFQ. Using the two samples that were described in the previous chapter, this chapter explores further the validity of the TFQ, and its ability to measure aspects of parental control that are relevant to the development of overweight and obesity.

A difficulty that exists in examining the influence of parent feeding practices on the development of overweight concerns the issue of being able to determine the direction of causality. A limitation of much of the research to date that has examined parental influences of children's weight is the cross-sectional nature of studies. In cross-sectional studies that examine the relationship between feeding practices and BMI, it is not possible to rule out the influence of the child's weight on the parent's use of a particular feeding strategy. This is further complicated by the fact that the relationship between parent feeding practices and child weight is likely to be bi-directional (Birch & Fisher, 2000; Wardle & Carnell, 2007).

One way to curtail this problem, to some degree, is to examine the differences in feeding practices between normal-weight, overweight and obese *parents*, when their children are young (Wardle & Carnell, 2007). In this way, parents' overweight status is used as an indicator of the children's risk of becoming overweight. The focus of the current investigation on 2 year olds allows exploration of a critical stage in the development of eating behaviour; the initiation of table foods. Research examining parental perceptions of weight

status in children has found that parents are less able to identify overweight status in younger children (Eckstein et al., 2006; Huang et al., 2007). As a consequence, except in very rare circumstances, it is unlikely that parents' feeding practices would reflect a response to their child's weight status. If weight is implicated, underweight is more likely to be the driver as parents can recognise underweight in their children more easily than they can recognise overweight (Baughcum et al., 2000). Therefore, any evidence that the TFQ factors discriminate between normal weight and overweight or obese parents or that the factors correlate with children's BMI, would provide preliminary evidence of the validity of the TFQ in capturing behaviours and attitudes that may be associated with the development of overweight and obesity in children.

The study presented in this chapter also incorporates two large samples with which cross-validation of results can be achieved. One of the samples (i.e., Sample 1 in the previous chapter) represents mothers who currently have a toddler. The other sample (i.e., Sample 2 in the previous chapter) represents parents of preschool children from diverse socio-economic backgrounds and includes measured height and weight for the children. Preschool is an age group for which there has been a documented increase in the prevalence of overweight and obesity in South Australia (Vaska & Volkmer, 2004). Therefore, exploring feeding practices that precede this development provides an insight into the possible role that parent feeding practices may play in this trend to increasing weight.

The review of the literature in Chapter 1 indicated that evidence to suggest that parental control over feeding influences the development of overweight in children is equivocal depending on the measure of control used. The finding that Restriction was positively associated with child BMI was mostly limited to middle class, high SES mothers and daughters (Francis & Birch, 2005). However, there was some evidence that implied that higher levels of control were associated with lower child weight, particularly when diverse measures of control were investigated (Wardle & Carnell, 2007). In one study, children whose parents had less knowledge about their children's sweet eating habits were more likely

to be heavier as adolescents (Lissau, Breum, & Sørensen, 1993). In another study, Wardle et al. (2002) found that obese parents had significantly lower scores on parental control, as measured with the Parent Feeding Questionnaire. The items on the Control scale reflected parental rules about mealtimes and snacks, including the extent to which the parent or child is responsible for the timing of eating, food choice and quantity, and behaviour during meals. These studies highlight that some aspects of control may be beneficial to children's weight outcomes. The TFQ is more similar to the conceptualisations of control just described, than it is to restriction as measured by the CFQ. For example, the Allow Access subscale of the TFQ reflects the parent's role as a *gatekeeper*, who manages the availability of foods to which the child has access. Similarly, the Rules subscale taps into the way feeding situations are structured and parental boundaries around provision of energy-dense foods. The Flexibility subscale reflects the parent's tendency to take into account situational factors in their decisions about snack food consumption. Theoretically, higher scores on Flexibility and Allow Access, and lower scores on Rules, might be associated with children eating more energy-dense foods, and therefore possibly having a higher BMI.

It is important to remember that there is an emerging body of evidence for a gene-environment interaction in the relationship between feeding practices and children's weight. Faith, et al. (2004) investigated the influence of the CFQ factors on children's BMI, measured at ages 5 and 7 in a small sample of White American families in the US. They found that the relationship between feeding practices and child BMI varied according to the child's predisposition to becoming overweight, with parent weight status the indicator of risk. In low risk families (i.e., normal weight parents), monitoring was associated with a lower BMI change score. In high risk families (i.e., overweight parents), restriction was associated with higher BMI change score. A recent study by Powers, Chamberlin, van Schaick, Sherman and Whitaker (2006) involving African-American preschoolers also found that restriction was positively correlated with children's BMI only in obese mothers. Lastly, a longitudinal study of mothers and daughters (Francis & Birch, 2005) reported that restriction was associated



with an increase in BMI z scores only in daughters who had overweight mothers. These findings suggest that the influence of feeding practices on children's weight may vary depending on the weight status of the parent.

Apart from the influence of feeding practices on children's weight, it is also important to investigate how parents' concerns about their child's future weight or their perceptions of overweight vulnerability, influence how they feed their children. Because parents fail to recognise overweight in their children (Campbell, Williams, Hampton, & Wake, 2006) this may explain, in part, why it is difficult to get parents to adopt appropriate feeding practices. In a recent study of Australian preschoolers, 2 to 6 years of age, concern about the child's weight was associated with restriction but perceived child weight and child BMI were not significant predictors of restriction (Crouch, O'Dea, & Battisti, 2007). A study conducted in the US with low-income parents found that restriction was associated with parental concern about their preschoolers becoming overweight, but was not associated with actual weight status (May et al., 2007). Costanzo and Woody's (1985) Model of Obesity Proneness includes weight concerns as a factor that may motivate parents to control their child's eating, highlighting how concerns may motivate maladaptive feeding practices. On the other hand, it has also been suggested that a parent's concern about child weight can be a motivator for parents to adopt positive feeding practices that promote lower weight in children (Farrow & Blissett, 2008). In a toddler sample, an exploration of these influences is needed to provide an insight into whether parents' concerns might motivate their use of a particular feeding strategy, even if they are not currently concerned about weight issues in their child.

Several research questions were specifically addressed in the study presented in this chapter. Firstly, do parental feeding practices differ between normal-weight, overweight and obese parents? (Research Question 1). Secondly, are parental feeding practices in the toddler period associated with children's BMI as preschoolers? (Research Question 2). If so, do these associations vary depending on the child's predisposition to becoming overweight? Thirdly, is parental concern about a toddler's weight associated with the use of specific parental

feeding practices? (Research Question 3). Due to the exploratory nature of the investigation no specific hypotheses were made about the TFQ factors that might be associated with parent weight status or children's BMI.

## 5.2 Method

### 5.2.1 Participants

Participants were mothers of toddlers (Sample 1, 18 – 24 months), and mothers of preschool children (Sample 2, 4 – 5 years of age). The characteristics of the two samples have been described in the previous chapter (pgs 100 - 101). BMI data were available for 159 (90.8%) mothers in Sample 1 and 204 (94.4%) mothers in Sample 2. BMI data were also available for 214 (99.0%) children in Sample 2. As described in the previous chapter, mothers in Sample 2 were recruited at their child's preschool health visit, at which time the child's height and weight was measured by trained nursing staff. All mothers completed the Toddler Feeding Questionnaire, basing their responses on their recollections of the toddler period (i.e, retrospective data are reported in Sample 2).

### 5.2.2 Measures

#### 5.2.2.1 Parent Feeding Questionnaires

Mothers completed the Toddler Feeding Questionnaire (TFQ), and the Restriction scale from the Child Feeding Questionnaire (CFQ; Birch et al., 2001).

#### 5.2.2.2 Concern about Toddlers' Weight.

Parental concern about toddlers' weight was assessed with four measures. The measures included two items from the Concern about Child Weight Scale from the Child Feeding Questionnaire (Birch et al., 2001) - 'How concerned are you that your child might become overweight?' and 'How concerned are you about your child eating too much when you are not around him/her?' The phrasing of the first question was slightly different from the original CFQ as a result of pilot testing reported in Chapter 3. Response options were: *unconcerned, a little concerned, concerned, fairly concerned, and very concerned*. A third item that referred to dieting ('How concerned are you about your child having to diet to maintain a desirable weight?') was removed because pilot testing suggested that this question was inappropriate for parents with very young children. The two items were therefore

considered separate measures in the analyses. An additional two measures of parental concern, pilot-tested in Chapter 3, were used. The first measured parental perception of toddlers' vulnerability to becoming overweight. Parents were asked 'Do you believe your child is vulnerable to becoming overweight?' and the response options were: *no, a little vulnerable, quite vulnerable, and very vulnerable*. The second measured parents' current feelings about the child's weight: 'How would you describe your current feelings about your child's weight?' The response options were: *totally unconcerned, only a little concerned, moderately concerned, and very concerned*. Parents were also asked to indicate whether their concern was due to underweight or overweight, so parent concern about overweight could be isolated.

#### 5.2.2.3 Mothers' Body Mass Index (BMI)

Self-reported height and weight was used to calculate BMI ( $\text{kg}/\text{m}^2$ ), and to categorise individuals into normal weight (BMI 20 - 24.99), overweight (BMI 25 - 29.99) and obese (BMI > 30) mothers. To improve measurement accuracy, participants were encouraged to measure their weight using a scale, and to indicate whether they did this or made a guess at their weight. To evaluate the accuracy of height measurements, participants also indicated whether they knew their height to be correct or whether they had guessed.

#### 5.2.2.4 Child's BMI (Sample 2 only)

The method for determining children's BMI has been described in Chapter 2. Children's height and weight was measured at their preschool health visit, a service conducted routinely by Child and Youth Health in South Australia. Trained nurses recorded children's height (in cm) and weight (in kg) using a standard protocol, enabling children's body mass index (BMI) to be calculated. The age- and sex-specific BMI cut-offs developed by Cole were used to classify children as normal weight, overweight and obese (Cole, Bellizzi, Flegal, & Dietz, 2000).

### 5.2.2.5 *Demographic Variables*

Sample characteristics for mothers' age, level of education, occupation, weight status and child's age, sex, sibling status and weight status were obtained as described in the previous chapter. Information on duration of breastfeeding and child's birth weight was also collected. Breastfeeding duration and birth weight have been associated with BMI in preschool children (Dubois & Girard, 2006; Owen, Martin, Whincup, Smith, & Cook, 2005) and they have also been associated with measures of parental control over feeding (Blissett & Farrow, 2007; Farrow & Blissett, 2006).

### 5.2.3 *Statistical Analyses*

#### 5.2.3.1 *Preliminary Analyses.*

Socio Economic Status has been associated with both parent weight status and feeding practices in previous research (Baughcum et al., 2001; Hupkens, Knibbe, Van Otterloo, & Drop, 1998; Sobal & Stunkard, 1989). Consequently, initial univariate analyses were conducted to determine if there were any differences between normal weight, overweight and obese parents on occupational category or educational attainment. Australian Standard Classification of Occupation (ASCO) major group occupation categories were divided into three groups: high prestige (major groups 1 and 2), medium prestige (major groups 3 to 7) and low prestige (major groups 8 and 9, including stay-at-home mothers), to represent distinct levels of occupational prestige. A chi-square test of independence indicated that there were no significant differences in the proportion of high prestige, medium prestige, and low prestige occupations in normal weight, overweight and obese parents in Sample 2,  $\chi^2(8, N = 204) = .89, p > .05$ . In Sample 1, the number of cases in each cell was too small to perform the chi-square analyses however, inspection of the descriptive data indicated that there were considerably fewer obese parents with professional occupations. A MANOVA was therefore performed in Sample 1 using ASCO classification as the independent variable, and TFQ factors and CFQ Restriction as the dependent variables<sup>7</sup>. No significant differences

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<sup>7</sup> A MANOVA, which creates a combined dependent variable, reduces the risk of an inflated Type 1 error.

were found on the combined dependent variable,  $F(12, 284) = 1.35, p > .05$ ; Wilks Lambda = .90. There was no difference in the proportion of parents with and without university education in Sample 1,  $\chi^2(2, N = 159) = 4.90, p > .05$ , or in Sample 2,  $\chi^2(2, N = 201) = 1.17, p > .05$ . No covariates were included in the multivariate analyses.

#### 5.2.3.2 *Research Question 1.*

A one-way between-groups multivariate analysis of variance (MANOVA) was performed to investigate differences in feeding practices by mothers' weight status. This analysis was conducted for Sample 1 and Sample 2. In Sample 1, BMI data were not available for 16 mothers. No multivariate outliers were found and the results of the assumption testing were also satisfactory. All cases for which BMI was available were used in the analysis. In Sample 2, BMI data was not available for 12 mothers, and there were four cases with missing data on at least one feeding measure. One multivariate outlier was found and deleted, and one case that was an extreme outlier was also excluded. After removal of these cases, parent weight status was defined by three groups: normal weight (BMI 20 to 25,  $n = 119$ ), overweight (BMI 25 – 30,  $n = 43$ ), and obese (BMI > 30,  $n = 36$ ). There were sufficient numbers in the cells to ensure multivariate normality of the sampling distribution of means. Data screening revealed that the assumptions for normality, linearity, homogeneity of variance-covariance matrices (Box M;  $F(42, 344476) = 1.13, p > .05$ ) were satisfactory and no multicollinearity was found. A Bonferroni adjusted alpha level of .01 was used to evaluate the significance of the between subject comparisons.

#### 5.2.3.3 *Research Question 2.*

Pearson's correlations were calculated to investigate whether parental feeding attitudes and practices (based on retrospective reports from the toddler period) were associated with BMI  $z$  scores in preschoolers. Separate analyses were also conducted for boys and girls, and for normal weight parents and overweight-or-obese parents.

#### 5.2.3.4 *Research Question 3.*

Pearsons correlations were used to examine the associations between parental feeding practices and attitudes and parental concern about the child's weight (four measures).

Although a number of correlations were conducted, a Bonferroni adjusted alpha level of .006 was considered too stringent to be applied in this case. As two samples were examined, the similarities or discrepancies could also be used to evaluate the robustness of any associations.

To minimise the influence of current concerns on the relationship between toddler weight concerns and toddler feeding practices, partial correlations were conducted controlling for parents' current concerns about the child's weight. For Sample 2, concerns about the child's preschool weight were significantly correlated with retrospective reports of concern about the child's weight as a toddler. The Child Feeding Questionnaire Concern about Child Weight subscale was used for this purpose.

## 5.3 Results

### 5.3.1 Sample Characteristics

The parent and child characteristics for Sample 1 ( $N = 175$ ) and Sample 2 ( $N = 216$ ) were reported in the previous chapter. Only additional information that was collected for the purpose of the current analyses is reported here. In Sample 1 and 2 respectively, the mean duration of breastfeeding was 8.23 ( $SD = 5.70$ ) and 8.17 ( $SD = 7.58$ ) months, and mean birth weight was 3.54 ( $SD = 0.46$ ) and 3.54 ( $SD = 0.48$ ) kg. In Sample 1 and 2 respectively, mean BMI for mothers was 24.89 ( $SD = 4.57$ ) and 25.77 ( $SD = 5.61$ ). The mean BMI z score for the preschool children (Sample 2) was 0.77 ( $SD = 1.20$ ). Although parents' height and weight were self-reported, 80.3% of participants in Sample 1 indicated that they measured their weight using a scale and 72.6% were confident about their height. In Sample 2, these figures were 82.5% and 66.5% for weight and height respectively.

Preschoolers' BMI z score was significantly positively correlated with mothers' BMI ( $r = .27, p < .05$ ) and birth weight ( $r = .26, p < .05$ ), but not with breastfeeding duration ( $r = -.005, p > .05$ ). Birth weight was not associated with any of the feeding scales. Breastfeeding duration was significantly but weakly positively correlated with Rules ( $r = .14, p < .05$ ), and negatively correlated with Allow Access ( $r = -.16, p < .05$ ).

### 5.3.2 Differences in Feeding Practices between Normal Weight, Overweight and Obese Parents

The mean scores (and standard deviations) for normal weight, overweight and obese parents on each of the feeding scales are shown in Table 5.1. In Sample 1 there were no statistically significant differences on the combined dependent variables between normal-weight, overweight and obese parents. In Sample 2, a statistically significant difference on the combined dependent variables was found:  $F(12, 382) = 2.66, p = .002$ ; Wilks Lambda = .85. When the dependent variables were considered separately, the only feeding scale to reach significance using the Bonferroni-adjusted alpha level of .01 was Allow Access. Normal



weight parents had significantly lower scores than obese parents, and overweight parents had lower scores than obese parents. When a less stringent alpha level was considered ( $p < .04$ ), Rules and Flexibility also reached significance. Normal weight parents had higher scores on Rules compared with obese parents as well as lower scores on Flexibility compared with overweight parents.

**Table 5.1**

*TFQ Factor Mean Scores (and Standard Deviations) for Normal Weight, Overweight, and Obese parents for Samples 1 and 2*

Feeding scales	Sample 1			<i>p</i>
	Normal weight	Overweight	Obese	
Rules	3.28 (0.77)	3.27 (0.64)	3.31 (0.81)	-
Child's attraction	3.09 (0.76)	2.97 (0.60)	3.30 (0.78)	-
Self-efficacy	4.26 (0.46)	4.24 (0.40)	4.13 (0.42)	-
Flexibility	3.11 (0.80)	2.98 (0.73)	3.35 (0.90)	-
Allow Access	2.53 (0.61)	2.64 (0.60)	2.75 (0.48)	-
Restriction	3.32 (0.69)	3.36 (0.60)	3.54 (0.65)	-
	Sample 2			
Rules	3.29 (0.66)*	3.32 (0.65)	3.00 (0.53)*	.04
Child's attraction	3.06 (0.76)	3.10 (0.65)	3.34 (0.64)	.12
Self-efficacy	4.21 (0.51)	4.12 (0.51)	3.98 (0.49)	.06
Flexibility	2.93 (0.79)*	3.28 (0.73)*	3.13 (0.75)	.02
Allow Access	2.55 (0.58) *	2.56 (0.65)†	2.95 (0.53)*†	.002
Restriction	3.51 (0.73)	3.61 (0.62)	3.71 (0.67)	.27

*Note.* *p*-values are not reported for Sample 1 because the multivariate test was not significant

\*† Matching symbols represent significant between group differences

### 5.3.3 *Associations between Feeding Practices and Child BMI z score*

No significant correlations were found between feeding attitudes and practices (based on retrospective reports from the toddler years) and BMI z scores in preschool children. This analysis was conducted separately for boys and girls, and for children with normal weight parents and overweight or obese parents. No significant associations with BMI z scores were found and therefore there was no need to perform a regression analysis to examine the independent influence of each feeding practice on BMI z score.

A MANOVA was also performed to examine if there were any differences on the feeding scales between children who were normal weight ( $n = 161$ ) and children who were overweight or obese ( $n = 49$ ), and no differences were found:  $F(6, 203) = 1.33, p = .247$ ; Wilks Lambda = .96.

### 5.3.4 *Associations between Feeding Practices and Parental Concern about Child's Weight*

In both samples there was a consistent association between measures of concern about weight and Self-efficacy and Restriction. The correlations for Sample 1 and Sample 2 are presented in Table 5.2 and Table 5.3 respectively. In both samples, Self-efficacy was significantly negatively correlated with at least one measure of concern about weight amongst parents of girls and boys. For parents of girls, Restriction was significantly positively correlated with three measures of concern in Sample 1 and one measure of concern in sample 2. Specifically, parental concern about the child overeating, the child being currently overweight, and being vulnerable to becoming overweight were associated with higher Restriction in Sample 1. In Sample 2, only vulnerability to overweight was associated with more Restriction. For parents of boys, only concern about the child becoming overweight in Sample 2 was positively correlated with Restriction. Amongst parents of girls in Sample 1, concern about the child overeating was associated with more parental Rules. This was not found in Sample 2. Amongst parents of boys in Sample 1, parental perception of the child's attraction to snack food was associated with less concern about the child's current weight status. In general, caution is required in interpreting these associations given the number of

correlations that have been calculated. However, cross-validation of results across samples does support the robust nature of several of the associations.

The correlations just described for Sample 2 were calculated while controlling for parents' concerns about the child's preschool weight. When the analysis was re-run without controlling for parents' concerns about the child's preschool weight, Restriction was significantly correlated with all four measures of concern in girls, replicating the findings obtained for Sample 1. Correlations were  $r = .22$ ,  $r = .29$ ,  $r = .24$ ,  $r = .29$ , for concern about child becoming overweight, concern about child overeating, current weight concerns, and overweight vulnerability.

**Table 5.2**

*Correlations between Feeding Scales and Parental Concern about Weight in Boys and Girls for Sample 1*

Feeding scale	Girls				Boys			
	Become overweight	Over-eating	Current weight <sup>a</sup>	Vulnerable to overweight	Become overweight	Over-eating	Current weight	Vulnerable to overweight
Rules	.11	.23*	-.13	.04	-.01	.20	.17	.03
Child's attraction	-.07	-.12	.10	-.08	.16	.03	-.30**	.13
Self-efficacy	-.18	.09	-.35**	-.14	-.12	-.11	-.07	-.27*
Flexibility	.10	-.05	.02	-.05	.19	-.11	-.14	.09
Allow access	.09	.20	.25*	.18	.15	-.15	-.21	.06
Restriction	.20	.27**	.22*	.21*	.16	.12	.08	.16

<sup>a</sup> Participants who were concerned about underweight were excluded. This was based on parents' response to Qu.12 in Part 5 of the Parent Feeding Questionnaire, Appendix F and G)

\* $p < .05$ , \*\* $p < .01$ .

**Table 5.3**

*Correlations between Feeding Scales and Parental Concern about Weight in Boys and Girls for Sample 2*

Feeding scale	Girls			Boys			
	Become overweight	Over-eating	Current weight <sup>a</sup>	Vulnerable to overweight	Become overweight	Over-eating	Current weight
Rules	-.02	-.12	-.21	-.02	-.03	.10	.05
Child's attraction	.07	-.17	-.03	.09	.02	.02	-.09
Self-efficacy	-.16	-.24*	-.20	-.13	-.25*	.03	-.09
Flexibility	.09	.03	-.08	-.07	.11	.01	.06
Allow access	.16	.01	-.08	.06	-.002	-.11	-.14
Restriction	.18	.17	.06	.25*	.28*	.03	.14

*Note.* Partial correlations are presented for sample 2, controlling for concerns about the child's weight as a preschooler.

<sup>a</sup> Participants who were concerned about underweight were excluded

\* $p < .05$ , \*\* $p < .01$ .

## 5.4 Discussion

The findings of this study provide some evidence that feeding practices, measured by the TFQ, vary between normal weight, overweight and obese parents. Retrospective reports by parents of preschool children (Sample 2) indicated that Allow Access, Rules, and Flexibility subscales of the TFQ varied with parent weight status. Obese parents had higher scores on Allow Access and lower scores on Rules compared with normal weight parents. Overweight parents had lower scores on Flexibility compared with normal weight parents. There were no statistically significant differences on any of the TFQ factors for parents of toddlers in Sample 1. Inspection of the mean scores indicated that obese parents in Sample 1 had the highest scores on Allow Access and Flexibility, but these were not significantly different from normal weight or overweight parents.

The finding that feeding practices differed by parent weight status does suggest that feeding practices might play a role in the development of overweight. Obese parents reported allowing their toddlers to have greater access to sweets and snack foods and had fewer rules about the types of snack foods that were acceptable, how much was acceptable and when the toddler was allowed to eat these foods. Overweight parents were also more flexible in their approach to managing what, how much, and when snack foods were eaten. These feeding practices could contribute to higher intakes of energy-dense foods and positive energy balance.

A reason for the non-significant findings in Sample 1 could be the characteristics of the sample. Parents in Sample 1 were from more similar backgrounds, with a high percentage being university educated and working in professional occupations. This is partly a consequence of the method of recruitment that focused on child care centres. The response rate from the Child Care Centre recruitment was quite low (27%). It is possible that those parents who were most interested in parenting and nutrition were the ones who completed the survey. By contrast, parents in Sample 2 were more representative of the South Australian

population and the survey was personally handed to them at their child's health appointment, which may have encouraged a more diverse range of parents to participate.

There was no evidence of a gene-environment interaction between the TFQ factors and child BMI. The relationship between feeding practices and child's BMI did not differ between normal weight, overweight and obese parents. In fact, the study found no evidence that toddler-feeding practices were associated with BMI in preschool children. It is possible that the aspects of feeding measured by the TFQ do not have any impact on children's preschool weight. Although feeding practices by the parent are likely to have an immediate influence on children's eating, it may take some years to impact on the BMI of the child. Whether feeding practices exert an influence at a later stage remains unknown.

The study also explored the association between feeding practices and parents' concern about their toddler becoming overweight. Four aspects of parental concern were considered, including concerns about future weight, overeating, vulnerability to overweight, and current weight status. The findings indicated that Restriction was positively correlated with all four measures of concern for girls in Sample 1 and one measure of concern for girls in Sample 2. In contrast, there were no significant associations between concern and Restriction for boys in Sample 1 and only concern about future overweight was associated with Restriction in Sample 2. This finding is consistent with research conducted by May et al. (2007) in low income Hispanic and African American preschool children. In contrast to the current study, no gender differences in the relationships were observed in the sample studied by May et al. (2007).

The findings also indicated that feeding self-efficacy was negatively correlated with at least one measure of concern in both samples and in boys as well as in girls. Parents who were concerned about their child's weight felt less confident in their ability to manage sweets and snack foods. In the previous chapter, self-efficacy was significantly correlated with the Pressure to Eat, Monitoring and Restriction subscales of the CFQ, three aspects of parental control that represent maladaptive feeding practices. Parents with lower self-efficacy also

allowed access to snack foods more often, were more flexible and reported that their children were more attracted to foods. The causal direction of these relationships cannot be determined. One might speculate that parents with low self-efficacy use less effective feeding strategies. The use of these feeding practices may encourage poor eating habits in the child, which in turn feed into the parent's lack of self-confidence about their feeding practices. It is possible that the relationship between self-efficacy and concern about weight reflects parents' lack of confidence or concern about dealing with their children's poor eating habits. It should be noted that most parents reported high levels of self-efficacy, with high mean scores recorded for both samples in the previous chapter. Self-efficacy was not associated with parent education, parent BMI or child BMI in either sample, suggesting that low self-efficacy could be a problem for parents across the demographic spectrum.

A limitation of this research is that it does not take into account the mechanism through which feeding practices are likely to influence children's weight. The Model of Obesity Proneness implicates poor self-regulation of energy intake in the development of overweight (Costanzo & Woody, 1985). A number of studies have suggested a link between overweight and poorer precision in self-regulating energy intake (Jansen et al., 2003; Faith et al., 2006; Fisher et al., 2007). It is therefore important to investigate how the TFQ factors are associated with eating behaviour in toddlers. Investigating the influence of the TFQ factors on children's ad libitum intake under conditions of satiety, following the research conducted by Birch and colleagues (e.g., Fisher & Birch, 1999a; Birch & Fisher, 2000), would provide an insight into links between parental feeding practices and the development of self-regulation of intake in early childhood.