

**CHAPTER 1**  
**PARENTAL RESTRICTION OF YOUNG CHILDREN'S SNACK FOOD**  
**INTAKE: IMPLICATIONS FOR THE DEVELOPMENT OF POOR**  
**SELF-REGULATION OF ENERGY INTAKE AND OVERWEIGHT**  
**IN CHILDHOOD**

**1.1 Chapter Overview**

This chapter will review the literature on parental restriction and its association with self-regulation of energy intake and weight in children. Parental restriction refers to the practice of controlling children's access to palatable foods, usually energy-dense snack foods (Fisher & Birch, 1999a). Restrictive feeding practices have been associated with children eating more of the restricted foods when those foods are freely available (Birch, Fisher, & Davison, 2003; Fisher & Birch, 1999a; Fisher & Birch, 2000; Fisher & Birch, 1999b). This suggests that parents need to be mindful of the way that they manage their children's diet in relation to energy-dense foods. This review will evaluate the evidence for a negative role of restriction on children's eating behaviour, in particular the extent to which the findings can be applied to parents and children across the socio demographic spectrum and at early periods of development. It will also examine the different ways that restriction has been conceptualised and measured, highlighting the confusion that this presents in terms of understanding what aspects of parental restriction might be associated with poor self-regulation of energy intake.

**1.2 Obesity in Australian Children**

In most developed countries around the world, including Australia, increasing numbers of children are becoming overweight and obese (Booth et al., 2003; Booth et al., 2001). There is no simple explanation for this trend because a child's weight is determined by a complex interplay of factors that include biological mechanisms (e.g., genetics), behaviours (e.g., physical activity and eating), and social and environmental influences (e.g., energy-density of the food supply and parental feeding practices) (Katzmarzyk et al., 2007). The

prevalence of childhood obesity has risen rapidly in Australia in recent years. Between 1985 and 1997, a two-fold increase in overweight and obesity combined was documented in children aged 7 to 15 years (Booth et al., 2003). The most recent national prevalence estimates for Australian children come from the 1995 National Nutrition Survey and indicate that 19.5% of boys and 21.1% of girls aged between 2 and 18 years are either overweight or obese (Magarey, Daniels, & Boulton, 2001). There is evidence that more children are becoming overweight (Norton, Dollman, Martin, & Harten, 2006), and that the risk is higher for children in lower socio economic (SES) backgrounds (Dollman & Pilgrim, 2005; O'Dea, 2003; Sanigorski, Bell, Kremer, & Swinburn, 2007).

It is particularly concerning that increasing numbers of preschool children are becoming overweight. 'Child and Youth Health' in South Australia has documented a trend of increasing overweight and obesity in children as young as 4 years of age (Vaska & Volkmer, 2004). The South Australian database captures between 56% and 82% of the birth cohort for 4-year old children, and indicates that between 1995 and 2002 the prevalence of overweight (and obesity) increased from 9.4% (3.5% obese) to 15.6% (5.8% obese) for girls, and from 6.9% (3.2% obese) to 13.1% (4.1% obese) for boys. Comparable prevalence rates have been obtained in smaller studies in other parts of Australia using the same criteria for classifying overweight and obesity (Cole, Bellizzi, Flegal, & Dietz, 2000). A study of preschool children in Victoria, found that the prevalence of overweight (and obesity) was 17.0% (2.3%) in girls and 17.4% (3.0%) in boys in the period 2002 to 2004 (Campbell, Wake, & Williams, 2004). Data collected in the mid 1990s in Sydney and Melbourne (Zuo, Norberg, Wen, & Rissel, 2006) also suggest similarly high levels of overweight and obesity to those reported by Campbell et al. (2004). The rise in prevalence in overweight and obesity is concerning given that children's weight in early childhood tracks into adolescence (Johannsson, Arngrimsson, Thorsdottir, & Sveinsson, 2006), and adulthood (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). It is important that the drivers of obesity in early childhood are identified so that appropriate action can be taken to slow and ultimately reverse this trend.

### **1.3 Aetiology of Obesity**

Although the aetiology of obesity is complex, it is clear that obesity occurs when energy intake exceeds energy expenditure relative to that needed for growth (Rosenbaum & Leibel, 1998). It is also apparent that genetic factors are particularly influential. Recent research by Wardle et al. (2008) has indicated that children's body mass index (BMI) and waist circumference is determined to a large extent by genetic factors. Wardle et al. (2008) explained that this does not mean that behaviour is not important, but rather a particular combination of genes working together will determine how a child will respond in a particular environment. Over the time that obesity has risen, the global food environment has changed immensely. One of the most significant changes, influenced by advancements in food production and supply, has been in the way we eat and also in what we eat (Swinburn, Caterson, Seidell, & James, 2004). Trend data from the United States of America (US) indicates that children and adults alike are eating more food away from home, and are consuming more energy from snack foods and from sweetened drinks (Nielsen, Siega-Riz, & Popkin, 2002; Zizza, Siega-Riz, & Popkin, 2001). In regards to snacking, the foods that children are consuming as snacks are higher in energy density and also contain a higher proportion of energy from fat (Jahns, Siega-Riz, & Popkin, 2001).

### **1.4 Parental Feeding Practices and Obesity**

Given the importance of children's diets in maintaining energy balance, researchers have also been interested in the role of parental feeding practices on the development of obesity in children. The provision of nutritious foods is only part of a parent's responsibility in feeding their child. Apart from providing food, parents must also be sensitive to the child's cues of hunger and satiety so they can support the child to regulate the quantity of food consumed (Satter, 1986). For example, the reason that breastfeeding is protective against the development of obesity is thought to be due to both the nutritional composition of the breast milk and also because the child is able to regulate how much they consume (Lederman et al.,

2004). Poor self-regulation of energy intake is associated with consumption past the point of satiety and may therefore contribute to overeating and overweight (Birch, 1998).

Feeding children is challenging because the most appropriate feeding practices can be counterintuitive. For example, it is common practice for parents to use the promise of a sweet dessert to entice their child to eat their vegetables, effectively sabotaging their efforts to encourage their child to actually like the vegetable, and making the dessert even more prized by the child (Birch, Birch, Marlin, & Kramer, 1982; Birch, Zimmerman, & Hind, 1980). Another commonly used feeding practice is getting children to eat all the food on their plate. By insisting the child eat everything that is served, regardless of whether the portion size is correctly judged for the child, the parent therefore unintentionally teaches the child to ignore their internal cues of hunger and satiety and to overeat (Birch, McPhee, Shoba, Steinberg, & Krehbiel, 1987). More recently, it has been demonstrated that when parents restrict their children's intake of palatable foods, parents run the risk of making these foods even more appealing to their child and encourage over consumption when the foods are freely accessible (Fisher & Birch, 1999a; Fisher & Birch, 2000; Fisher & Birch, 2002). It is this last feeding practice that is most relevant in the current climate of obesity.

The negative consequences of restriction on children's self regulation highlight that parents may need to be mindful about the way they limit children's intake of energy-dense foods. The evidence for a negative impact of parental restriction on children's eating behaviour is based on research conducted mostly in preschool to school-aged girls and their mothers from middle income White American families in the United States (Birch & Fisher, 2000; Birch et al., 2003; Fisher & Birch, 2000; Fisher & Birch, 2002; Francis & Birch, 2005). It is not known whether the findings are broadly applicable in other cultural groups and across diverse socio economic backgrounds. It is not known whether parents are restrictive with their children at earlier developmental periods. Furthermore, restriction has been conceptualised and measured in a number of ways, which adds complexity to the interpretation of study findings. Given the priority that has been given to the reduction of the

intake of energy-dense foods as a strategy to address obesity, and the critical role of parents in effecting this strategy, the broader applicability of the research on restriction is a matter of importance.

### **1.5 Measurement of Restriction**

One of the most widely used measures of restriction is the Restriction subscale from the Child Feeding Questionnaire (CFQ; Birch et al., 2001). The CFQ is a self-report questionnaire that measures three aspects of parental control; Restriction, Monitoring, and Pressure to Eat. The items that define Restriction include parental directives that the child should not eat too many sweets, snacks or high fat foods (3 items), keeping food out of the child's reach (1 item), using food to reward behaviour (2 items), and extent of concern that the child would eat too much in the absence of parental control (2 items). The Monitoring subscale measures how often parents keep track of the sweets, snack foods and high fat foods that their child eats (3 items). The items that define Pressure to Eat include pushing the child to eat all the food on their plate or eat when they are not hungry (2 items), and expressing the belief that the child would under-eat in the absence of parental encouragement (2 items). Restriction, Monitoring and Pressure to Eat are also commonly referred to as parental 'feeding practices' or 'feeding styles'.

The development of the CFQ was influenced by the Model of Obesity Proneness (MOP) proposed by Costanzo and Woody (1985). This model describes how parental control might influence the development of obesity in children. The MOP is a model of domain-specific parenting that suggests that "parents become rapidly locked into domain-specific hypersurveillant and constraining strategies when highly concerned about negative developments in their children" (Costanzo & Woody, 1985, p. 443). Costanzo and Woody (1985) argue that, in the case of obesity, parental concern about the child's current overweight status or concern about the child becoming overweight in the future, may prompt parents to adopt controlling feeding practices. It is argued that highly controlling strategies, such as restricting access to certain foods, interfere with the child's innate ability to self-

regulate their energy intake. The disruption to self-regulation is characterised by a weakened response to internal cues of hunger and satiety and a tendency to over-eat in response to environmental cues, including the presence of palatable foods.

Research investigating the psychometric properties of the Child Feeding Questionnaire (CFQ: Birch et al., 2001) has identified some problematic features of the instrument. Cross-cultural differences in feeding practices measured by the CFQ have been identified in White American, Hispanic, and African-American samples (Anderson, Hughes, Fisher, & Nicklas, 2005; Birch et al., 2001), and problems with the Restriction subscale have also been identified (Anderson et al., 2005). In the original validation study conducted by Birch et al. (2001), two items from the Restriction scale that ask parents about their use of food to reward behaviour cross-loaded on the Pressure to Eat subscale in one sample and did not load significantly on the Restriction subscale in another sample. Confirmatory factor analysis of the CFQ carried out by Anderson et al. (2005) also highlighted problems with Restriction, retaining only 3 of the 8 original items from this subscale. It is therefore important to investigate the factor structure and psychometric properties of the CFQ in Australian children, to determine if the factor structure proposed by Birch et al. (2001) is supported, particularly in regards to the Restriction subscale.

## **1.6 Restriction and Intake of Snack Foods**

### *1.6.1 Studies Leading to the Development of the Child Feeding Questionnaire*

Prior to the development of the CFQ, a number of studies were conducted to investigate whether restricting children's access to palatable foods could be linked with children eating more when those foods were freely accessible. One method that has been used to measure children's intake in an unrestricted setting is the 'Free Access Procedure'. The Free Access Procedure is designed to assess children's snack food intake under conditions of satiety. The procedure takes place after children have consumed their usual lunch and indicate that they are no longer hungry. The children are then allowed unsupervised free access to generous portions of snack foods and toys for a 10-minute period. The children are given permission to

play with the toys and eat any of the foods while the experimenter leaves the room. The amount of food consumed in this time is used to calculate total energy intake, and is referred to as Eating in the Absence of Hunger (EAH). EAH is an indicator of poor-self regulation of energy intake.

Fisher and Birch (1999a) conducted a study with 3 to 5 year old children using the Free Access Procedure. The children were given access to 10 varieties of snack food. Parental restriction was measured with a 9-item questionnaire, which was completed for each of the 10 snacks. The items included limiting the snack to special occasions, getting upset if the child obtained the snack without permission, monitoring consumption, limiting the amount consumed, limiting the portion size, limiting opportunities to eat it, limiting availability, keeping it out of reach, and limiting availability in the home. A score for restriction was obtained by summing the responses for each of the snack foods. The study found that restriction was positively associated with children's snack food intake only for girls, but not boys. The authors concluded that parental restriction is a counterproductive strategy to limit intake of palatable foods, because it may promote overconsumption of the foods, at least in girls.

Two experimental studies have been conducted that simulate restriction within the child's current environment (Fisher & Birch, 1999b)<sup>1</sup>. The two studies were conducted with separate samples of boys and girls aged 3 to 5 years in a day care setting. Restriction was simulated by placing one food (the target food) in a glass jar in the middle of the table during snack time. Another food, which was known to be liked equally to the target food, was made accessible for the duration of the snack food period (i.e., 20 mins). The children were allowed to access the target food (i.e., the food in the jar) for a 2 minute period, 10 minutes into the snack period. This procedure was repeated twice a week for five weeks. Baseline and follow-up testing was conducted, during which time both foods were freely accessible for the children to eat. In Study 1, behavioural observations were recorded to assess children's

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<sup>1</sup> The two experimental studies were reported in a single publication.

response to the restriction. The measures included comments about or behaviours toward the restricted food or the act of restriction, and requests for the food or attempts to get the food. The authors reported that there was an increased behavioural response to the restricted food, compared to baseline when both foods were accessible. The children made more comments about the restricted food and were aware that they were being restricted. Follow-up testing conducted 3 weeks later, found that children's intake of the two snack foods had returned to baseline levels.

The second study used the same basic procedure with a different group of children and experimental foods. In addition to the observational measures of children's behaviour, the researchers recorded how much of the restricted food was taken (selection), and how much was eaten (intake) during the 2-minute period of granted access. Parental restriction was also measured using the Restricted Access Questionnaire (i.e., items about restriction similar to that used in Fisher & Birch, 1999a). In this study, the restriction was associated with more comments and requests for the food (cf. Study 1), a greater selection of the restricted food, and a greater intake of the food. In addition, mothers' restriction of the experimental food in the home environment was associated with greater selection of the restricted food in the restricted context, but not with greater intake. How often mothers purchased the food was associated with the number of comments made by the children about the food but not with selection or intake. It is interesting to note that the different measures of restriction, the glass jar and the self-report measure of parental restriction, were associated with different outcomes. This suggests that the relationship between restriction and children's eating behaviour is not simple and may depend on how parents choose to limit their children's intake of snack foods.

Recently, researchers have attempted to conceptualise overt and covert forms of control over feeding. Ogden, Reynolds and Smith (2006) define Overt Control as controlling feeding strategies that could be detected by the child. In contrast, Covert strategies could not be detected by the child. The measure of Overt Control included asking parents how firm they



are about various aspects of the child's eating including the types of foods allowed, when and where eating takes place, how much food is allowed, and encouraging the child to eat more. Covert Control included items about avoiding places that sell unhealthy food, avoiding the purchase of sweets, crisps, biscuits and cakes, avoiding the purchase of foods that the parent themselves likes, and not eating unhealthy foods in view of the child. The study examined the relationship between the two types of control and children's snack food intake. Snack food intake was assessed by parent-report and was categorised into healthy snacking and unhealthy snacking. Covert Control was associated with a lower consumption of unhealthy snacks, suggesting that covert strategies to limit intake of unhealthy snacks may be effective. Overt Control was associated with a greater consumption of healthy snacks, highlighting the benefits of overt strategies. It should be noted that Overt Control does not measure parents' control of snack foods, but rather the parents' control of the child's eating in general, and therefore the comparison between these two approaches for children's snack food intake may not be a valid one. Measures of parental feeding practices that focus specifically on managing snack foods are therefore required.

#### *1.6.2 CFQ Restriction in a Longitudinal Cohort Study of Girls*

Much of the evidence for an association between parental restriction and children's self-regulation of energy intake and weight comes from a longitudinal cohort study of girls and their mothers (N = 197), who have been followed from age 5 to age 13 (Birch & Fisher, 2000; Birch et al., 2003; Fisher & Birch, 2002; Francis & Birch, 2005). Measures of parent feeding practices and attitudes have been taken over this time, including the CFQ and the Restricted Access Questionnaire (RAQ). The RAQ measures a number of behaviours or strategies that parents may use to limit access to particular foods, for example, limiting how much the child is allowed eat and keeping the food out of reach. Parents are asked to think about their behaviour in regards to specific foods when responding to the RAQ. The specific foods are the snacks foods used in an experimental context with the child (e.g., potato chips and chocolate). Self-regulation of intake has been measured using the Free Access Procedure and

a procedure that measures short-term energy compensation from food (COMPX). In the COMPX procedure children's *ad libitum* energy intake from lunch is measured on two occasions; on the first occasion a low-energy drink is given as a preload, and on the second occasion a high-energy preload is given. The COMPX score is a measure of how precisely children adjust their subsequent lunch intake based on the different energy values of the preload. Children's internal mechanisms of self-regulation should lead them to eat more lunch after the low-energy drink and less lunch after the high energy drink. The difference in the caloric value of the two preloads is used to assess how well children adjust their energy intake at lunch.

In the first published study from this cohort (i.e., age 5), girls' self-regulation was measured with the COMPX and Free Access Procedures (Birch & Fisher, 2000). In this study 'Restriction' was measured with three measures; the CFQ Restriction subscale, the CFQ Monitoring subscale and the RAQ. In structural equation modelling, restriction was treated as a latent construct comprising the three measures just described, even though Monitoring is not normally considered a measure of restrictive feeding practices. Z scores from the Free Access Procedure and the COMPX procedure were added together to create a measure of control of energy intake. In this model, 'Restriction' was a significant predictor of control of energy intake. Control of energy intake was positively associated with the girls' daily energy intake, which was in turn positively associated with the girls' body mass index (BMI). The independent contribution of CFQ Restriction, CFQ Monitoring and the Restricted Access Questionnaire on girls' control of energy intake was not reported.

In subsequent studies, reported when the girls were 7 years of age (Fisher & Birch, 2002) and 9 years of age (Birch, Fisher & Davison, 2003), the relationship between CFQ Restriction and eating in the absence of hunger (EAH) was further elucidated. The authors reported that CFQ Restriction was not associated with EAH at age 5 (Birch, Fisher & Davison, 2003). However, by age 7, girls who received higher levels of restriction at age 5 were 2.1 times more likely to have high EAH scores, controlling for EAH and BMI at age 5

(Fisher & Birch, 2002). Restriction at age 5 also predicted EAH at age 9 (Birch, Fisher & Davison, 2003). At age 9, the highest EAH was seen in girls who were overweight at age 5 and had received the highest level of restriction at that time, suggesting that overweight girls were more adversely affected by parental restriction. Other findings from this cohort also suggest that the influence of restriction on EAH varies depending on the weight status of the mother. Francis & Birch (2005) reported that Restriction at age 5 was positively associated with EAH from 5 to 9 years of age only in daughters of overweight mothers. Put another way, restrictive feeding practices in normal weight mothers did not appear to be correlated with poor self-regulation of intake in their daughters. The authors suggested that this was an example of a gene-environment interaction, with overweight girls having a greater genetic susceptibility to environmental triggers for overeating.

### **1.7 Restriction and Overweight**

A number of studies conducted in socio economically and culturally diverse samples do not support an association between CFQ Restriction and child weight (Wardle & Carnell, 2007). There is one exception; a study of 7-14 year old children showed that restriction was associated with greater fat mass assessed by Dual Energy X-ray Absorptiometry (Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002). Therefore, with the exception of the research conducted by Birch and colleagues and the study conducted by Spruijt-Metz et al. (2002), there is only limited evidence to suggest that restriction is associated with overweight in children. The most compelling evidence for the negative influence of restriction is based on the findings of experimental studies, the results of which have been described in the previous section.

Other research investigating the relationship between parental feeding practices and child weight offers an alternative perspective on the issue of parental control; one that implicates lower levels of parental control in the development of childhood overweight (Wardle & Carnell, 2007). An example of this perspective is illustrated in a study by Wardle et al. (2002) that investigated whether feeding practices differed between normal weight and

obese mothers of preschool children (i.e., 3 to 5 years of age). The researchers developed a Parental Feeding Style Questionnaire (PFSQ) that comprised four scales; Instrumental Feeding, Emotional Feeding, Encouragement/Prompting, and Parental Control. Instrumental feeding refers to parents' use of food to reward and to encourage good behaviour. Emotional Feeding, as the title implies, involves using food to make a child feel better when the child is angry, worried, upset or bored. The Encouragement/ Prompting scale measures parental feeding practices that encourage children's enjoyment of eating, and facilitate the consumption of a variety of foods. Parental Control measures the degree to which parents are prescriptive about what foods are made available throughout the day, and also the extent to which the parent is responsible for the timing of eating, food choice, portion size, and behaviour during meals. The Parental Control scale also includes parental directives about the child's consumption of snack foods; determining when snack foods will be available, deciding when the child has had enough snacks, and deciding how many snacks the child should have. The findings of the study indicated that obese parents reported significantly less parental control over feeding than did normal weight parents but there were no significant differences on instrumental feeding, emotional feeding or encouragement/prompting. The study suggested that higher levels of parental control in terms of mealtime structure and food availability might be beneficial.

Other studies have examined parental feeding practices and attitudes that are comparable to the measure of Parental Control from the PFSQ developed by Wardle et al. (2002). Faith et al. (2003) measured 'mother-allotted food choice', which referred to whether the child was allowed to choose the foods they ate at breakfast and lunch (e.g., none, little, some, a great deal). The study sampled over 1000 African-American, Hispanic and White American parents of preschool children, and found that children given 'no choice' had slightly lower BMI z scores. In another study, Lissau et al. (1993) measured attitudes to children's sweet eating habits in a sample of more than 500 mothers. The measures included knowledge of consumption patterns, acceptance of consumption patterns, and the provision of

money for sweets. The authors investigated whether parental attitudes, measured when children were 9 to 10 years of age, would be associated with an increased risk of overweight in young adulthood. They found that the child's risk of overweight increased if mothers lacked knowledge about the child's consumption patterns, were accepting of consumption, and gave more than an average amount of money to their children for sweets.

These studies sampled parents from a diverse range of backgrounds and socio economic circumstances and therefore highlight the potential value of parental feeding strategies that limit children's access to energy-dense food. The notion of restrictive parent feeding practices as a behavioral mediator in the familial transmission of overweight and obesity seems an unlikely scenario in lower SES families. A study by Hupkens, Knibbe, Van Otterloo and Drop (1998) found that parents in low SES groups were less restrictive about their children's sweet eating and snacking habits, were less likely to take health into account in their food choices, and were more likely to take family preferences into account. Therefore, in low SES families, over-consumption of snack foods may be more of a problem than restricted access. It has been suggested that the relationship between restriction and the development of overweight in children is possibly more relevant for high SES groups (Baughcum et al., 2001). Furthermore, parental concern about child overweight, one factor that may prompt parental restriction, has been shown to be higher in high SES groups (Baughcum, Chamberlin, Deeks, Powers, & Whitaker, 2000).

The diverse nature of the associations between parental control and children's weight paints a confusing picture of the influence of parental control on children's weight, and makes it difficult to provide practical advice for parents. It remains unclear exactly how parents should manage their children's consumption of energy-dense foods. There is evidence that too much control, in the form of restriction, may be counterproductive. The study by Wardle et al. (2002) suggests that some aspects of control may be beneficial. There is also evidence that too little control, in the form of allowing children unlimited access, is associated with overweight in children (Lissau et al., 1993). The principle of division of responsibility in

feeding (Satter, 1996) suggests that parents are responsible for the provision of healthy foods and the child is then responsible for deciding what and how much they will eat. The setting of appropriate boundaries for children is therefore considered a key feature of responsible feeding practices and the decision to provide healthy foods implies a decision to restrict other types of foods. Further measurement development is required to identify different aspects of control that pertain to the management of energy-dense foods in the diet, and whether they are associated with child outcomes including self-regulation of energy intake and weight.

### **1.8 Restriction and Early Development**

At present, it is unclear if restriction is causally implicated in the development of poor self-regulation of energy intake and overweight in children. A bi-directional relationship has been suggested, such that parental restriction both influences and is influenced by children's eating behaviour and weight (Birch & Fisher, 2000). Two of the questions on the CFQ Restriction subscale ask parents about their perceptions of their control over their child's eating (e.g., If I did not guide or regulate my child's eating, s/he would eat much more than s/he should). Most research has been conducted in the preschool years (ages 3 to 5) or later, by which time parents will be familiar with how their children independently respond to energy-dense foods, increasing the likelihood that parents' responses will be influenced by the child's eating behaviour. This problem may be minimised by examining restriction at earlier periods of development, when the child has less autonomy over their eating.

Few studies have examined restrictive feeding in children younger than 2 years of age. Most studies that have investigated the influence of parental control of feeding on energy intake and weight in infants and toddlers have focused predominantly on prompting the child to eat (Baughcum et al., 2001; Klesges et al., 1983; Koivisto, Fellenius, & Sjöden, 1994) or have used a measure of general control (Fisher, Birch, Smiciklas-Wright, & Picciano, 2000). Taveras et al. (2004) investigated restrictive feeding in 12-month old infants. Restrictive feeding was measured by one item, "I have to be careful not to feed my child too much". Parents who disagreed with this statement (87%) were presumed to have a less restrictive

feeding style. The single item measure of restriction is quite different to the way that restriction is operationalised in the Child Feeding Questionnaire, which specifically focuses on the mothers' control over her child's access to sweets, snack foods and other high fat foods. A recent development is a measure of parent feeding style modelled on the parenting style classifications: Authoritarian, Authoritative, and Permissive parenting styles (Baumrind, 1971; Maccoby & Martin, 1983). Using this framework, Sacco et al. (2007) conceptualised feeding control more broadly, measuring five feeding styles (i.e., responsive, pressuring, restrictive, laissez-faire, and indulgent) in infants aged 3 to 20 months. Restrictive feeding was defined as the absence of parent responsiveness to the child's hunger cues and limiting infant participation in feeding, again conceptually different from CFQ Restriction.

Farrow and Blisset (2008) used the CFQ in an infant sample. Parents completed the Restriction subscale when their child was 1 year of age and again at 2 years of age. They found that Restriction at 1 year of age predicted a lower child weight at 2 years of age. This finding is difficult to explain because it is unclear how mothers of children this age would interpret the items on the Restriction subscale. The authors suggested that parents' responses to the Restriction subscale might have reflected covert feeding practices because the parent is largely responsible for the provision of foods at this age. Although this may be the case, it is also possible that restriction is overt in young children, particularly if the child is familiar with sweets, snacks and high fat foods.

The CFQ was designed to be used to assess feeding practices in children as young as 2 years of age (Birch et al., 2001). This is not surprising because children begin to consume snacks from an early age. The Feeding Infants and Toddlers Study (FITS) (Skinner, Ziegler, Pac, & Devaney, 2004), conducted in the United States of America, indicates that the consumption of snacks between meals is well established by 2 years of age. Ziegler, Hanson, Ponza, Novak and Hendricks (2006) reported that snacks were consumed by 62% (morning snack), 87% (afternoon snack), and 59% (evening snack) of toddlers aged 12 to 24 months in the FITS study, and contributed about 25% to daily energy intake. The study found that

cookies, crackers and desserts were typically consumed as snacks. In Australia, recent research by Webb et al. (2006) investigated the contribution of energy-dense/ nutrient-poor foods in the diet of children aged 16 to 24 months. The study, which included over 400 toddlers, considered the relative contribution of 'extra' foods and core foods according to the definitions in the Australian Guide to Healthy Eating (AGHE: Smith, Kellett, & Schmerlaib, 1998). Three-day weighed food records were used to measure dietary intake. Consistent with the FITS data, extra foods contributed 26.5% of total energy intake. Several popular snack foods were consumed at least once by children in the three-day recording period including, sweet biscuits (67%), chocolate (38%), savoury biscuits (31%), ice-cream (24%), potato crisps (22%), and cakes (20%). The authors suggest that the results may be a conservative estimate of average consumption, given that the sample was well educated. Overall, the data indicate a high level of snack food consumption at this age.

The toddler period may be a particularly important period in which to examine how parents manage their child's intake of energy-dense foods. Although various definitions exist, the AGHE (Smith et al., 1998) defines a toddler as a child aged 1 to 2 years, and a preschool child as 3 to 5 years. The high level of snack food intake that is evident in children by 2 years of age might reflect the transition to the family table and diet. It is also possible that the high level of snack food consumption at this time reflects the specific difficulties in feeding that arise during the toddler period. The development of food neophobia (the fear of new foods), which reaches its peak at this time (Cashdan, 1994), may make it difficult to feed children nutritious low energy-dense foods (Cooke, 2007). Getting children to consume energy dense snacks is relatively easy because children have a preference for the sweet and salty flavours typical of many snack foods (Birch, 1999) and develop preferences for high-fat foods relatively easily (Kern, McPhee, Fisher, Johnson, & Birch, 1993). Data from the FITS study is consistent with this picture, revealing that toddlers are consuming fewer fruit and vegetables than is recommended while the reverse is true for non-core foods such as sweets and snack foods (Fox, Pac, Devaney, & Jankowski, 2004).



## **1.9 Snack Food Consumption and Obesity**

Interestingly, the majority of studies have not found that snack food consumption alone is associated with overweight (Bell, Kremer, Magarey, & Swinburn, 2005; Field et al., 2004; Phillips et al., 2004; Sanigorski, Bell, & Swinburn, 2007). Only one study that found consumption of low quality food including salty snacks, fats and oil, and desserts, was associated with overweight status (Nicklas, Yang, Baranowski, Zakeri, & Berenson, 2003). Nevertheless, it is widely accepted that discouraging intake of high energy-dense foods in early childhood is an important strategy in the prevention of childhood obesity (Savage, Fisher, & Birch, 2007; Swinburn et al., 2004; Tabacchi, Giammanco, La Guardia, & Giammanco, 2007). Snack foods are typically high in energy, saturated fats, and simple sugars, and low in micronutrients (Walker, Woods, Rickard, & Wong, 2007) and the Australian Guide to Healthy Eating (Smith et al., 1998) makes no allowances for these types of foods in the diets of very young children. Furthermore, the responsibility for change rests largely with parents, who exert a powerful influence on dietary patterns in the early years relative to wider environmental and social factors that become increasingly influential with age (Bluford, Sherry, & Scanlon, 2007). Therefore it is critical to understand how parents manage energy-dense foods in early periods of development.

## **1.10 Chapter Summary**

In summary, the review of literature in this chapter suggested that there are a number of different aspects of restriction. The most widely researched aspect of restriction is conceptualised by the Restriction subscale of the Child Feeding Questionnaire. There is some evidence to support a positive relationship between CFQ Restriction, and poor self-regulation of energy intake, however, the majority of the evidence is based on studies of girls from middle-income White American families. It is not known whether this finding is broadly applicable to parents from different cultural backgrounds and socio economic circumstances. Research that has explored the factor structure of the Child Feeding Questionnaire has identified some problems with the Restriction subscale. Further exploration of the Child

Feeding Questionnaire and the Restriction subscale is needed to determine its construct validity in diverse samples. Although CFQ Restriction was developed to measure aspects of parental control that may be detrimental to children's development of self-regulation of energy intake, some aspects of parental control have been linked to positive outcomes for children, but the conceptual boundaries between positive and negative aspects of control are not well defined.

Although the literature on 'Restriction' has been used to frame the discussion in this chapter, the concept of 'Control' has been used more broadly, incorporating research on Restriction as well as research by others who have investigated different aspects of parental feeding practices. The construct of 'Restriction' was introduced initially as an example of a parental feeding style that has been associated with poor self-regulation of energy intake in children. This work was pioneered by Johnson and Birch (1994) who used the term 'control' to refer to the extent to which feeding practices were responsive to a child's hunger and satiety cues. In this context *less* control was desirable because it was associated with a parent being more responsive to the child. The measure of Restriction represented one aspect of parental control in managing a child's intake to energy-dense foods. Restrictive parents limit the opportunities for children to self-regulate their own energy intake from energy-dense foods. Other researchers have approached 'Control' more broadly, incorporating parental responsibility for snack food availability, snack time structure, and limit setting (Faith et al., 2003; Ogden, Reynolds & Smith, 2006; Lissau et al., 1993; Wardle et al., 2002), however, these strategies could also be considered a form of restriction. In this context, both *too much* and *too little* control could potentially be problematic. Because 'Control' has been approached and defined from two different perspectives, the literature becomes muddled when the question is raised as to whether control is negative or positive. The term 'managing energy-dense foods' has been used in this chapter in an attempt to incorporate the various different constructs that have been developed to investigate how parental feeding practices influence children's consumption of energy-dense foods.

Although researchers have pointed out that there are different ways to control children's access to energy-dense foods, no attempt has been made to describe the range of different strategies and attitudes that parents might apply to the management of their child's diet. Overall, a broader framework for conceptualising the restrictive strategies and attitudes that are used by parents to manage their children's intake of snack foods is required. In addition, given the focus on girls in the research on restriction, it is important that research into parental management of snack foods also include boys. The toddler period may be a critical window in which to examine these issues because snack food consumption is well established by 2 years of age.

## CHAPTER 2

# FACTOR STRUCTURE AND PSYCHOMETRIC PROPERTIES OF THE CHILD FEEDING QUESTIONNAIRE IN AUSTRALIAN PRESCHOOL CHILDREN

### 2.1 Introduction

Chapter 1 introduced the Child Feeding Questionnaire (CFQ; Birch et al., 2001) and indicated that it is one of the most widely used measures of parental feeding practices and attitudes. Limited research has examined the factor structure and psychometric qualities of the CFQ, yet this research has identified some problematic features of the instrument. For example, confirmatory factor analyses (CFA) have highlighted cross-cultural differences in the factor structure of the CFQ in white American, Hispanic, and African-American samples (Anderson, Hughes, Fisher, & Nicklas, 2005; Birch et al., 2001). One of the main problems is the stability of the Restriction subscale, for which several items appear problematic. As described in Chapter 1, Restriction has been the focus of a number of studies that suggest it is associated with poor self-regulation of energy intake in children, thereby implicating it in the development of overweight in children. The availability of psychometrically sound instruments is critical for research investigating the effects of parental restriction on children's eating behavior and weight. This chapter presents a study that examines the factor structure and psychometric properties of the CFQ in Australian preschool children<sup>2</sup>.

The CFQ comprises three subscales that measure aspects of parental control over feeding (Restriction, Monitoring and Pressure to Eat) and four subscales that measure specific feeding attitudes (Perceived Responsibility for Feeding, Concern about Child Weight, Perceived Child Weight and Perceived Parent Weight). The CFQ subscale items and their abbreviated labels are presented in Appendix B for ease of reading throughout this chapter. The CFQ was influenced by the Model of Obesity Proneness (Costanzo & Woody, 1985)

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<sup>2</sup> The results of this study have been published as Corsini, N., et al. Factor structure and psychometric properties of the Child Feeding Questionnaire in Australian preschool children, *Appetite* (2008), doi:10.1016/j.appet.2008.02.013 (see Appendix A)

which describes how parental control in the area of children's eating may disrupt a child's natural ability to self-regulate their energy intake. In the Model of Obesity Proneness, poor self-regulation of energy intake is implicated in the development of overweight and obesity. The CFQ control subscales (Restriction, Pressure to Eat, and Monitoring) have been incorporated in a number of studies exploring the relationship between parental feeding style, child eating behaviour, and child weight. Of these, Restriction has received the most empirical attention and evidence for its validity is its association with poor self-regulation of eating in children (e.g., Birch & Fisher, 2000; Birch, Fisher, & Davison, 2003; Fisher & Birch, 2000, 2002; Francis & Birch, 2005). One limitation of this body of research is that it has focused mainly on girls from middle to high income White American families. A large number of studies that have sampled children from a wide range of ethnicities and socio-demographic backgrounds do not support a relationship between restriction and weight status or energy intake (e.g., Campbell, Crawford, & Ball, 2006; Carnell & Wardle, 2007; Spruijt-Metz, Chaoyang, Cohen, Birch, & Goran, 2006). Therefore, the evidence that supports the validity of Restriction, as measured by the CFQ, is limited to a fairly specific subsample of the population.

Other subscales from the CFQ have demonstrated reliable associations with child weight. For example, a negative correlation between Pressure to Eat and child weight is a consistent finding in the literature (see Carnell & Wardle, 2007; Faith et al., 2004; Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002). The Concern about Child Weight, Perceived Child Weight, and Perceived Parent Weight subscales have also demonstrated positive associations with child weight (Birch et al., 2001). In addition, the associations between parental feeding practices and child weight are likely to be different for boys and girls given that there are implicit gender differences in the social norms about acceptable body weight (Paeratakul, White, Williamson, Ryan, & Bray, 2002).

The factor structure of the CFQ has been examined in a small number of studies (Anderson et al., 2005; Birch et al., 2001; Kaur et al., 2006). In the original CFA conducted by Birch et al. (2001), which tested the seven factor structure in three samples (two White American and one Hispanic), *rst3a* (“*I offer sweets to my child as a reward for good behaviour*”) and *rst3b* (“*I offer my child his/her favourite foods in exchange for good behaviour*”), although designed to measure Restriction, cross-loaded on the Pressure to Eat subscale in one sample and did not load significantly on the Restriction subscale in another sample. The problems with the Restriction subscale were further highlighted in another CFA (Anderson et al., 2005) conducted with both African-American and Hispanic samples. The authors pointed out several problems with the Birch model, including the use of composite items for several items in the Restriction subscale, for which no justification was given. Specifically, composite items were created by combining *rst1a*, *rst1b* and *rst1c* together, *rst3a* and *rst3b* together, and *rst4a* and *rst4b* together. When the model was fit to the data using the individual items in place of the composite items, problems with the subscale became evident. Several of the items specified to load on the Restriction subscale had small loadings of less than .35 and a better fit was provided when they were dropped from the model. A modified model proposed by Anderson et al. (2005) retained only 3 of the 8 original items from the Restriction subscale. In a more recent study by Kaur et al. (2006), in which the original Birch model was fit to an adolescent sample, problems with the reward items were also identified and the items were omitted from the final model. These findings raise questions about the conceptualisation and measurement of restriction as posited initially by Birch et al. (2001).

On a theoretical level, there is considerable confusion in the literature on parental control, especially concerning the distinction between aspects of control that have a negative influence on children’s eating and those aspects that are relatively benign or possibly even beneficial. For example, there is some evidence to suggest that control is associated with lower body mass index in children (Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002)

and therefore may be beneficial. Recently, Ogden, Reynolds and Smith (2006) expanded the concept of control by distinguishing between overt and covert control. They found that overt and covert control measured concepts distinct from Restriction, Pressure to Eat and Monitoring, sharing between 7% and 21% of the variance with these subscales. Covert control, in which the parent surreptitiously limits their child's availability to junk foods by avoiding certain environments or by moderating how much of these foods they themselves eat, may be a beneficial form of control. Perhaps the disparate findings in the CFA research with regards to the Restriction subscale are reflective of the multidimensional and complex nature of the concept of parental control. It is clear that further investigation of the factor structure of the CFQ is warranted, particularly in culturally and ethnically diverse samples of parents and children. The aim of the current study is to examine the factor structure and psychometric properties of the CFQ in an Australian preschool sample.

## 2.2 Method

### 2.2.1 Participants

The sample consisted of 216 mothers of preschool children (117 boys, 99 girls) aged between 4 and 5 years ( $M = 4.78$ ,  $SD = .19$ ), who responded to a questionnaire<sup>3</sup> about their feeding practices (which included the Child Feeding Questionnaire), provided at their child's preschool health visits in May and June, 2006. A total of 900 surveys were offered to parents across metropolitan and regional South Australia, thus a response rate of 24% was obtained. Mothers were ineligible to participate if their child had congenital or metabolic abnormalities that would have affected their growth, serious food allergies, gestational age less than 37 weeks, and birth weight less than 2500g. Mothers ranged in age from 22 to 50 years ( $M = 35.02$ ,  $SD = 4.80$ ), with a mean BMI of 25.87 ( $SD = 5.93$ ). The educational attainment level of the sample was varied with 42.6% having attained a high school certificate or less, 28% a trade certification or Technical and Further Education (TAFE) qualification, and 29.4% having completed a university qualification.

Participants were asked to indicate the culture(s) that influenced their feeding practices. The Australian Standard Classification of Cultural and Ethnic Groups (Australian Bureau of Statistics, 2005) was used to classify their responses. Australian culture alone was indicated by 67.8% of respondents. A further 15% indicated Australian and European influences; of these, 10.4% were North-West European (i.e., mainly English and British), and 4.7% were Southern and Western European (i.e., mainly Italian and Greek). North-West European cultures alone influenced 6.2%, and Southern and Western European cultures alone influenced 1.9% of respondents. Other cultural influences were indicated by the remaining 9% of cases, with 5 participants choosing not to respond. The relative influence of these cultures is approximately consistent with South Australian census data on country of birth for females, with 74% of

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<sup>3</sup> The questionnaires used in the study are shown in Appendix G. Only data that are relevant to this study are presented in this chapter.



females born in Australia, 9.2% in North-West European countries and 6.3% in Southern and Eastern European countries (Australian Bureau of Statistics, 2006). Only two participants identified themselves as Aboriginal or Torres Strait Islanders, therefore the Australian Aboriginal population was not well represented in the sample.

In South Australia, preschool visits are conducted routinely with nurses visiting kindergartens and preschool centers across the state. Children's height and weight are measured along with a variety of other developmental and health assessments. Nurses recorded the height (in cm) and weight (in kg) on the parent questionnaire, enabling children's body mass index (BMI) to be calculated. Due to missing data for height or weight, BMI was unable to be calculated for 7 children. According to the Cole BMI cut-offs (Cole, Bellizzi, Flegal, & Dietz, 2000), 5.1% of children were obese, 18.2% were overweight, and 76.6% were not overweight. These figures are comparable to the South Australian prevalence statistics for overweight and obesity for this age group (Vaska & Volkmer, 2004).

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.

### *2.2.2 Procedures*

Data screening revealed that a number of the variables were not normally distributed however no transformations were conducted because the instrument is already widely used. Ten cases were identified as being multivariate outliers using Mahalanobis Distance, criteria of  $\alpha = .001$ ,  $df = 28$ , critical  $\chi = 56.89$ , and removed. An additional multivariate outlier was removed after further screening of the new data set, also using Mahalanobis Distance. Two questionnaires that had a large amount of missing data were also excluded. The final sample consisted of 203 mothers.

Exploratory factor analysis (EFA) was used to explore the factor structure of the CFQ (SPSS, version 14). Although confirmatory factor analysis is recommended for examining the factor structure of validated instruments (Henson & Roberts, 2006), the inconsistencies that have been reported concerning the Restriction factor justified more exploratory examination of the data as a first step. The data were analysed using principle axis factoring (PAF) with oblimin rotation. An oblique rotation, in which factors are allowed to correlate, was selected because inter-correlations among the factors of the Child Feeding Questionnaire have been reported and are consistent with the theoretical underpinnings of the instrument. Confirmatory factor analysis (CFA) was then used to examine alternative models for the CFQ (AMOS, version 6).

Pearson's correlations were calculated to examine the correlations between the CFQ factors and BMI z scores for boys ( $n = 110$ ) and girls ( $n = 86$ ).

## 2.3 Results

### 2.3.1 Exploratory Factor Analysis

In an initial run, eight factors were extracted, accounting for 61.7% of the variance in the correlation matrix. Seven factors had eigenvalues greater than 1, post rotation. Visual inspection of the scree plot revealed a steep decrease after the 7<sup>th</sup> factor, a less steep decrease after the 8<sup>th</sup> factor, and then the line began to level off. The 8<sup>th</sup> factor comprised two items from the Restriction subscale, rst3a and rst3b. Following recommendations regarding best practice in factor analytic research (Coste, Bouee, Ecosse, Lepage, & Pouchot, 2005; Henson & Roberts, 2006; Steiger, 1990), multiple criteria were used to determine the number of factors to retain.

A parallel analysis (PA) using the syntax developed by O'Connor (2000) was run. The PA generates random permutations of the data set and the factors that are retained are those with eigenvalues greater than the 95<sup>th</sup> percentile of the values produced by the random data set. The PA supported an eight factor solution.

The residual correlation matrix for both an eight and seven factor solution was also inspected and provided support for an eight factor solution. The seven factor solution revealed a higher number of moderate residuals than the eight factor solution. The existence of a large number of high residuals suggests the presence of another factor.

Next, the seven factor solution was examined to explore whether the variables would conform to the expected factor structure specified by the original CFQ model. Examination of the pattern matrix showed that rst3a and rst3b had salient loadings (defined as above 0.3) on Pressure to Eat, and not Restriction as would be expected based on Birch's (2001) model. However, it makes little sense theoretically to include these items with Pressure to Eat. Although parents may use rewards in order to get their children to eat, these items do not specifically describe this behaviour.

The resulting eight factor solution included Birch's original factors except rst3a and rst3b alone defined the eighth factor. Although it is generally recommended that a factor should have more than two indicators (Kline, 1994), Tabachnick and Fidell (2000) suggest that a factor defined by two items can be considered stable if the correlation between the two items is high and if the variables are poorly correlated with other items. These criteria were met ( $r = .72$ ); the complete correlation matrix is shown in Appendix C.

The results of the eight factor solution are reported in Table 2.1; only factor loadings above 0.3 will be considered salient. Simple structure was attained and Birch's factors of Pressure to Eat, Monitoring, Responsibility for Feeding, Concern about Child Weight, and Perceived Child Weight were replicated. Apart from items rst3a and rst3b, which loaded on a separate factor (factor eight), the Restriction factor was also replicated. Rst3a and rst3b alone define the 8<sup>th</sup> factor, with no cross-loadings. Both items are about offering food to reward behaviour and therefore factor eight will be defined as 'Food as Reward'. Table 2.1 also displays the factor correlation matrix. The inter-correlations amongst the factors were comparable to those reported by Birch et al. (2001). Food as Reward had small positive correlations with Restriction and Pressure to Eat, sharing 10.8% and 11.2% of the variance with these factors respectively.

**Table 2.1**

*Pattern Matrix and Factor Correlation Matrix<sup>a</sup> for the Principal Axis Factor Solution with Oblimin Rotation for the Child Feeding Questionnaire*

CFQ items	Factors								$h^2$
	Rst	Pe	Pr	Ppw	Mon	Pcw	Ccw	Fr	
Rst1a	<b>.803</b>	.121	-.014	-.063	.067	.040	.094	.016	.627
Rst1b	<b>.788</b>	.146	.015	-.043	.178	-.004	-.024	.003	.697
Rst1c	<b>.712</b>	-.165	-.066	.004	-.026	.032	-.016	.105	.544
Rst2	<b>.362</b>	.043	.013	-.009	.058	-.023	-.055	-.089	.181
Rst3a	-.053	-.024	.021	-.051	.037	-.007	.046	<b>-.929</b>	.854
Rst3b	.040	-.003	.027	.034	-.048	.020	-.048	<b>-.777</b>	.638
Rst4a	<b>.635</b>	-.108	.052	.050	-.111	-.073	-.062	-.141	.551
Rst4b	<b>.590</b>	-.261	-.003	.077	-.155	-.063	-.098	-.040	.537
Pe1	.111	<b>-.345</b>	-.079	-.054	.075	.092	-.060	-.183	.297
Pe2	.010	<b>-.846</b>	.051	-.035	-.004	.072	.023	.045	.727
Pe3	.008	<b>-.682</b>	-.059	-.004	.050	-.056	.099	-.035	.479
Pe4	-.018	<b>-.794</b>	.055	-.024	.004	.031	-.024	-.051	.666
Mon1	-.001	-.043	-.048	.040	<b>.921</b>	-.011	-.001	.001	.869
Mon2	-.018	-.049	-.034	.014	<b>.986</b>	.005	.003	-.003	.976
Mon3	.051	-.018	.032	.001	<b>.787</b>	-.056	-.043	.011	.647
Pr1	-.053	-.032	<b>-.931</b>	-.020	.012	-.017	-.055	.036	.881
Pr2	-.037	.018	<b>-.979</b>	.007	-.013	-.020	-.073	-.016	.946
Pr3	.088	.047	<b>-.818</b>	-.013	.037	.055	.063	.026	.707
Pcw1	.007	-.031	-.066	.054	.003	<b>-.766</b>	.043	-.040	.588

CFQ items	Factors								<i>h</i> <sup>2</sup>
	Rst	Pe	Pr	Ppw	Mon	Pcw	Ccw	Fr	
Pcw2	.057	.059	.021	-.090	.024	<b>-.959</b>	.026	.020	.928
Pcw3	-.043	.004	.086	.002	.045	<b>-.672</b>	-.162	.050	.543
Ccw1	-.015	.063	.027	.047	-.044	-.130	<b>-.740</b>	.043	.614
Ccw2	.100	.062	.021	-.040	.041	.031	<b>-.770</b>	-.002	.623
Ccw3	-.012	-.020	-.082	.038	.046	-.011	<b>-.576</b>	-.048	.361
Ppw1	.028	.112	-.090	<b>.629</b>	-.016	-.129	.210	-.067	.474
Ppw2	.058	.084	.109	<b>.653</b>	.058	.054	.004	.022	.445
Ppw3	-.103	-.039	.001	<b>.642</b>	.036	.030	-.059	.055	.435
Ppw4	.003	-.072	-.013	<b>.538</b>	-.052	.004	-.146	-.006	.334
% of Variance	15.02	11.78	10.61	6.50	5.06	4.68	4.49	3.19	
1. Rst	-								
2. Pe	.20	-							
3. Pr	.05	.12	-						
4. Ppw	.07	-.13	-.03	-					
5. Mon	.20	-.07	.25	-.06	-				
6. Pcw	.07	-.21	-.04	.20	.10	-			
7. Ccw	.22	.09	-.02	.14	.09	.22	-		
8. Fr	.33	.33	-.04	-.03	.01	.02	.08	-	

*Note.* Coefficients greater than 0.3 are shown in bold and post rotation percentage of variance is reported. Rst = Restriction; Pe = Pressure to Eat; Pr = Perceived Responsibility; Ppw = Perceived Parent Weight; Mon = Monitoring; Pcw = Perceived Child Weight; Ccw = Concern about Child Weight; Fr = Food as Reward.

<sup>a</sup>Signs for factors defined with negative loadings have been reflected to assist with interpretability.

### 2.3.2 *Confirmatory Factor Analysis*

#### 2.3.2.1 *Examining the Fit of the Seven Factor Model in an Australian Sample*

To determine whether Birch's (2001) original seven factor model (Model 1) could be replicated in the current sample, the model specified by Birch et al. (2001) was tested using CFA. All factors in the model were allowed to freely correlate. This model comprised the composite items described previously (i.e., rst1abc, rst3ab, and rst4ab). The two correlated residuals between ppw1 and ppw2 and between pcw1 and pcw2, that were included in the original model, were not included here because the covariances between them were small. The following criteria were used to assess the fit of the model: A good fit is indicated by a root mean squared error of approximation (RMSEA) value of less than 0.05 according to Browne & Cudeck (1993) while Hu and Bentler (1999) also consider 0.6 to be reasonable fit; comparative fit index (CFI) and non-normed fit index (NNFI) values above 0.9 are recommended for an acceptable fit (Kline, 1994). Based on these guidelines, the fit of the model was acceptable (see Table 2.2). It should also be noted that in the seven factor model (Model 1: the original Birch model) the factor loadings for all the subscale items were significant, in the expected direction, and all greater than 0.4 in magnitude (see Table 2.3). Following a further modification explored by Birch, a second model was tested, allowing rst3ab (the composite item combining rst3a and rst3b) to crossload on pressure to eat (Model 2). Model 2 produced a significant reduction in chi-square but, based on the other fit indices, did not substantially improve the overall fit of the model. Rst3ab had a significant but small loading of .24 on Pressure to Eat and all factor loadings were comparable with Model 1.

**Table 2.2**

*Fit Indices for Model 1 to Model 6 of the Child Feeding Questionnaire*

CFQ models	AIC	BIC	CAIC	$\chi^2(df)$	$\Delta\chi^2(\Delta df)$	RMSEA	CFI	NNFI
Model 1: 7 factors (cf. Birch et al., 2001)	537	766	835	399 (231)*	-	.06	.93	.92
Model 2: 7 factors, rst3ab crossloading	529	761	832	390 (230)*	9 (1)*	.06	.93	.92
Model 3: 7 factors	1007	1262	1339	853 (329)*	-	.09	.83	.80
Model 4: 7 factors, 1 error covariance	973	1232	1310	817 (328)*	36 (1)*	.09	.84	.82
Model 5: 7 factors, rst3a & rst3b load on Pe <sup>a</sup>	971	1230	1308	815 (328)*	n/a	.09	.84	.82
Model 6: 8 factors, rst3a & rst3b load on Fr <sup>a</sup>	842	1124	1209	672 (321)*	n/a	.07	.89	.86

*Note.* AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; CAIC = Consistent AIC; RMSEA = root mean squared error of approximation; CFI = comparative fit index; NNFI = non-normed fit index; Pe = Pressure to Eat; Fr = Food as

Reward.

\* $p < .05$



**Table 2.3**

*Factor Structure, Standardised Loadings and Factor Correlations from the Original CFQ  
(Model 1, cf. Birch et al., 2001)*

CFQ factor	Rst	Pe	Mon	Pr	Ppw	Pcw	Ccw
Rst1abc	.69						
Rst2	.42						
Rst3ab	.42						
Rst4ab	.78						
Pe1		.44					
Pe2		.88					
Pe3		.64					
Pe4		.85					
Mon1			.96				
Mon2			.99				
Mon3			.78				
Pr1				.94			
Pr2				.96			
Pr3				.83			
Ppw1					.68		
Ppw2					.72		
Ppw3					.55		
Ppw4					.47		
Pcw1						.74	
Pcw2						.97	
Pcw3						.72	
Ccw1							.77
Ccw2							.76
Ccw3							.60

CFQ factor	Rst	Pe	Mon	Pr	Ppw	Pcw	Ccw
Restriction	-						
Pressure to eat	.35**	-					
Monitoring	.15*	-.04	-				
Perceived responsibility	.01	.07	.29**	-			
Perceived parent weight	-.07	-.23**	-.03	-.04	-		
Perceived child weight	.11	-.29**	.12	-.04	.16*	-	
Concern about child weight	.31**	-.01	.11	.02	.14	.29**	-

*Note.* All loadings were significant at  $p < .001$

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

### 2.3.2.2 Testing a Modified Seven Factor Model and a New Eight Factor Model

The first modification of the seven factor model incorporated the individual restriction items and allowed them to load freely on Restriction (Model 3). Given that both the findings by Anderson (2005) and the current EFA highlight some potential problems associated with the Restriction factor, the inclusion of individual items was considered justified. Furthermore, the original paper by Birch et al. (2001) did not specify the rationale for grouping these items; presumably the composite items were formed because there was a high correlation amongst them. The correlations in the current sample do show a stronger correlation amongst the items within the three composite groupings compared with other items in the restriction subscale (see Appendix C): rst1abc (average  $r = .61$ ); rst3ab ( $r = .72$ ); and rst4ab ( $r = .74$ ). Consistent with the findings by Anderson, this model provided a worse fit to the data compared with the Birch model that contained the composite items (Table 2.2). Rst3a and rst3b had low loadings on Restriction, with standardised regression weights of .37 and .39 respectively. A second modification (Model 4) that allowed the residuals of ppw3 and ppw4 to correlate provided a better fit with a significant reduction in the Chi-square (Table 2.2). The correlated residuals are not surprising because

participants are reporting their weight in their 20s (ppw3) and their current weight (ppw4), which is the same question for participants who *are* in their 20s (14.5% of the sample). It was therefore considered reasonable to include this correlation in subsequent models.

Following the findings of the exploratory factor analysis, a further two models were fitted to the data to investigate the merit of the eight factor model: Model 5, in which rst3a and rst3b cross-load on Pressure to Eat, and Model 6, in which rst3a and rst3b load on a new factor, Food as Reward. Models that are not hierarchically related, as is the case with the seven and eight factor models specified here, are compared using the Akaike Information Criterion (AIC: Akaike, 1987), Bayesian Information Criterion (BIC: Schwarz, 1978) and Consistent AIC (CAIC: Bozdogan, 1987) indices. Model 6 resulted in a better fit to the data as indicated by a reduction in all three indices (Table 2.2). Unlike the RMSEA, CFI and NNFI, no specific 'rules of thumb' exist to evaluate the degree of improvement in fit (Kline, 1994). The final model, showing the standardised item-factor loadings, is presented in Figure 1. The item loadings on each of the factors were significant, and most were above 0.4. The only exception was ppw4 (perceived parent weight currently). The restriction items that were dropped from the model by Anderson et al. (2005) (rst1c, rst2, rst3a, rst3b and rst4b) had significant loadings of generally reasonable magnitude in this sample; the loading for rst2 was marginally acceptable. The two Restriction items, rst3a and rst3b, had high loadings on the new factor Food as Reward.

In Model 6, the inter-factor correlations for the CFQ subscales are mostly consistent with those reported by Birch et al. (2001). Small positive correlations were observed amongst the feeding control subscales (i.e., amongst Restriction, Pressure to Eat, Monitoring and Food as Reward), with the exception of Pressure to Eat and Monitoring, for which there was no significant correlation. Restriction was also positively correlated with Concern about Child Weight. Pressure to Eat was negatively correlated with Perceived Child Weight and Perceived Parent Weight, indicating that parents who perceived their children as thinner and who perceived

themselves as thinner were more likely to pressure their children to eat. The latter finding is discrepant from the Birch et al. (2001) sample, for which no significant relationship was found between Perceived Parent Weight and Pressure to Eat. Not surprisingly, Perceived Child Weight and Concern about Child Weight were positively correlated.

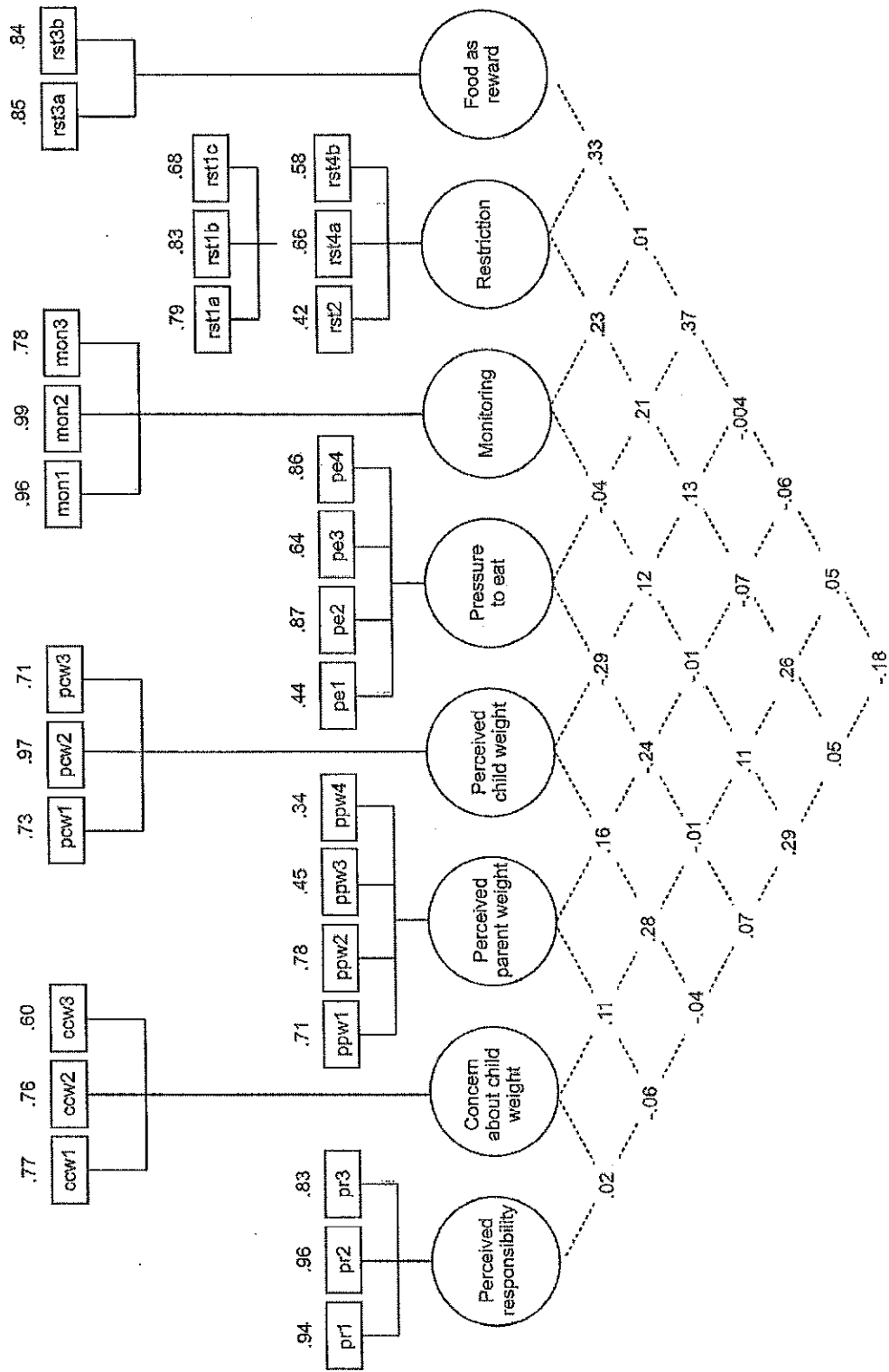


Figure 1. Final eight factor model of the Child Feeding Questionnaire showing the standardised estimates for each item, and inter-factor correlations. All factors were allowed to correlate freely but the arrows are not depicted.

### *2.3.3 Relationships between the CFQ factors and BMI z Scores*

The relationship between the CFQ factors and children's BMI was also investigated and the Pearson's correlation coefficients are presented in Table 2.4. Subscale scores were created by calculating the mean score for each item loading on the subscale. For boys and girls, small to moderate sized significant positive correlations with BMI z scores were found for Perceived Parent Weight, Perceived Child Weight, and Concern about Child Weight and significant negative correlations were found for Pressure to Eat. For boys only, Restriction but not Food as Reward had a significant yet small positive correlation with BMI z scores. Significant small positive correlations with BMI z scores were also found for Monitoring in boys and for Perceived Responsibility in girls.

### *2.3.4 Final CFQ Model Factor Internal Consistencies*

The descriptive statistics and Cronbach's alphas for the CFQ factors represented in the final model were calculated and all had adequate internal consistency (see Table 2.4)

**Table 2.4**

*Descriptive Statistics and Cronbach's Alphas for CFQ Subscales in the Final Model, and Correlations with Children's BMI z scores*

CFQ Factors	<i>M</i>	<i>SD</i>	<i>α</i>	Children's BMI z score	
				<i>r</i>	
				Boys	Girls
Restriction	3.95	0.86	.83	.19*	-.09
Food as reward	2.69	1.26	.83	.01	-.01
Pressure to eat	2.71	1.08	.80	-.22*	-.24*
Monitoring	4.24	0.79	.92	.24*	-.14
Perceived responsibility	4.46	0.53	.93	-.02	-.22*
Perceived parent weight	3.14	0.40	.69	.31*	.30*
Perceived child weight	2.95	0.38	.83	.45**	.35**
Concern about child weight	1.60	0.77	.74	.37**	.53**

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

## 2.4 Discussion

This study investigated the factor structure of the Child Feeding Questionnaire (CFQ) in a sample of Australian preschool children. On the basis of various analyses including EFA, it was suggested that an 8<sup>th</sup> factor could be extracted from the data. This factor comprised two items from the Restriction subscale, (a) rst3a, which asks parents whether they give their child sweets to reward good behaviour, and (b) rst3b, which asks parents whether they give their child their favourite foods in exchange for good behaviour. These two items have behaved inconsistently in confirmatory factor analyses across several samples of parents and children (Anderson et al., 2005; Birch et al., 2001; Kaur et al., 2006).

The original CFQ by Birch and colleagues (2001) failed to expose the problems that existed in the Restriction factor because composite items were used in the analyses in place of the individual items. Inappropriate conclusions may have been drawn about the factor structure, and particularly the stability of Restriction. Given that Restriction has received considerable empirical attention in the literature, and that there is potential for the research findings to influence parental advice on feeding practices, close scrutiny of this measure is warranted. Birch suggested that problems with rst3a and rst3b (these items were combined as rst3ab) reflected cross-cultural differences in feeding practices between non-Hispanic white parents and Hispanic parents. Although it is likely that feeding practices vary across cultures, it would appear that these restriction items are problematic in their own right; the current sample of Australian parents provides further evidence that the empirical fit of these items with the Restriction subscale is poor.

The current EFA of the CFQ data indicated that rst3a and rst3b did not load on a Restriction factor, instead loading on Pressure to Eat in a seven factor solution and Food as Reward in an eight factor solution. The decision to retain the 8<sup>th</sup> factor was supported by findings of the CFA, which indicated a better fit of the eight factor solution (Model 6) compared with the seven factor solution (Model 5). The fit of the solution was also superior



to the Birch model (Model 3) that incorporated the individual restriction items instead of the composite items.

Researchers using the CFQ should consider calculating Restriction as a six item subscale, dropping rst3a and rst3b. The advantages would be twofold: (a) greater stability of the factor and therefore an increase in the strength of associations with other variables, and (b) increased conceptual clarity of the construct. It is premature to suggest that Food as Reward is a replicable factor; it should be recognised that it is generally recommended that a factor have more than two indicators (Kline, 1994) and therefore caution is required in its interpretation. Although Food as Reward in this case meets the criteria for reliability as specified by Tabachnick and Fidell (2000), it explained only a small amount of additional variance (3.9%) in the correlation matrix. Whether it is a valuable factor would depend on how well it explains other variables of interest, in particular children's eating behaviour. It is likely to be important given that previous research has shown that children's liking of foods increases when those foods are used to reward behaviour (Birch, Zimmerman, & Hind, 1980). Clearly, further item development and validation is required.

It may also be prudent to give further consideration to the Perceived Parent Weight subscale of the CFQ. In the final model, the two items that ask parents about their weight in the early years (ppw1, ppw2) had the strongest loadings. It is not surprising that there would be a disparity between child weight status and adult weight status and that it may be inappropriate to average parent weight perception over the lifespan.

The findings of this study together with the CFA published by Birch et al. (2001) and Anderson et al. (Anderson et al., 2005) point to a need for conceptual consideration of rst3a and rst3b in relation to Restriction and suggest that the behaviours that these items tap are distinct from Restriction. Aside from rst2 (*"I intentionally keep some foods out of my child's reach"*), rst3a and rst3b are the only items in the restriction subscale that measure specific parental behaviours. The remaining items in the subscale reflect general beliefs that

children's access to many types of energy dense foods should be limited (rst1a – rst1c), and parental concern that a child would eat too much if they were allowed to regulate their intake for themselves (rst4a, rst4b). The items rst3a and rst3b describe specific parent behaviours (using food as a reward) to control children's food intake. These items likely reflect a broader aspect of parent feeding behaviour, such as instrumental feeding. A distinction between various types of parental feeding behaviours is instantiated in the Parent Feeding Style Questionnaire developed by Wardle et al. (2002), which distinguishes between control over eating and other feeding behaviours including instrumental feeding, emotional feeding, and prompting/encouragement. Instrumental feeding is one example of parent control; it is likely that parents use many different strategies to restrict children's access to certain types of foods, possibly tapping unique domains of parental restriction.

Another problem may also be parents' reluctance to admit to using food to reward behaviour and their desire to respond in a socially acceptable way. An overwhelming majority of participants indicated that they did not use food to reward behaviour. The response options 'disagree,' 'slightly disagree,' and 'neutral' reflected 77% of the responses to rst3a and 87% of the responses to rst3b. It seems unlikely that this would be a true reflection of actual parenting behaviour. The wording of rst3b is especially contentious, 'I offer my child his/her favourite food in exchange for good behaviour', because it effectively says, 'I bribe my child with food to behave well'. Parents are unlikely to acknowledge this behaviour particularly if they have already indicated by their responses to the preceding items that they are careful to limit the sweets, snacks, and junk foods that their child eats. In developing further items and/or investigating this potential factor further, careful phrasing of items will be crucial when attempting to tap into the concept of using food as a reward.

It is clear that parental control is complex and multidimensional. Costanzo and Woody (1985) suggest parental control over feeding has a negative influence on a child's self-regulation of energy intake because the child learns to focus more on external cues for eating

than internal cues such as appetite and satiety. However, not all strategies that parents use to limit what their children eat will necessarily have negative consequences. Ogden et al. (2006) distinguished between covert control (feeding strategies about which the child is unaware) and overt control (feeding strategies about which the child is aware) to limit children's intake of highly desirable foods, and found that they were differentially associated with parents' reports of children's snack food intake. Covert feeding predicted a decreased intake of unhealthy snacks, whereas overt feeding strategies predicted an increased intake of healthy snacks. In the current study, Restriction but not Food as Reward, was positively associated with BMI z scores in boys. Although these findings cannot be directly compared with the research on restriction and self-regulation, they do suggest that it is useful to expand the conceptualisation of restriction as well as supporting the distinction between the two constructs. Conceptually differentiating between negative, benign, and even positive aspects of parental control, and investigating whether such distinctions can be supported empirically, is a challenge for future research.

Costanzo and Woody (1985) also suggest that gender differences may be relevant in the relationship between parent feeding practices and weight given that there are greater socio-cultural pressures and body image ideals in girls. This might explain why a lot of research has focused on young girls. The current study identified some potential gender differences: a small positive association of BMI with restriction and monitoring in boys only; and a small negative association of BMI with perceived responsibility in girls only. The lack of association between restriction and BMI in girls suggests that mothers are just as likely to restrict energy dense foods from thinner daughters as they are from heavier daughters. For boys, restriction is more likely when they are heavier, or alternatively, restriction leads to heavier weight. One other large study of preschoolers in London found, in contrast to this study, that the correlation between CFQ restriction and BMI was higher for girls than for boys

but that the difference was not statistically significant (Carnell & Wardle, 2007). No other study was found that reported the association of restriction with adiposity in boys.

In summary, the confirmatory factor analysis suggested that the Birch et al. (2001) model, with minor modifications, provided an adequate fit to the data. All items, apart from rst3a and rst3b, had significant and moderate to high factor loadings on their respective factors. Unlike the results of Anderson (2005) that suggested dropping several items from the Restriction subscale, the current study supported the proposed factor structure with regard to the remaining items on the subscale. It is possible that some of the inconsistencies in the study by Anderson reflect cross-cultural differences in feeding styles and attitudes. This study supports the findings by Anderson with respect to the problems with rst3a and rst3b, and suggests that the model requires further work particularly in the conceptualisation of restriction.

## CHAPTER 3

# INVESTIGATING MOTHERS' FEEDING PRACTICES TO MANAGE INTAKE OF SNACK FOODS IN TODDLERS' DIETS

### 3.1 Introduction

Following Study 1, the present study aimed to further examine the construct of Restriction and how it is understood by parents. The findings of Study 1 indicated that using food to reward behaviour, one strategy that parents may employ to limit their children's intake of energy-dense foods, was conceptually distinct from Restriction. This finding raised questions about the conceptualisation of Restriction, particularly in terms of understanding how it might relate to the development of poor self-regulation of energy intake in children. The present study explored how parents understand and interpret items that comprise Restriction and how they manage energy-dense foods in their children's diet. The study focused on feeding practices in the toddler years, a period of development that is considered critical for laying the foundation for healthy eating habits into childhood (Allen & Myers, 2006).

Understanding the origins of restrictive feeding practices is important given that it has been associated with the development of poor self-regulation of energy intake (Fisher & Birch, 2002) and overweight in children of preschool age (Francis, Ventura, Marini, & Birch, 2007; Johnson & Birch, 1994; Shunk & Birch, 2004). The toddler period is likely to be particularly important as children make the transition to the family table and snack foods become more accessible. Research in the United States of America has documented that the transition from infancy to toddlerhood is associated with a deterioration of dietary quality (Fox, Reidy, Novak, & Ziegler, 2006), and an increase in the consumption of snack foods (Skinner, Ziegler, Pac, & Devaney, 2004). Also characterising the toddler period is an increase in language skills, mobility, and ability to request and obtain food (Butte et al., 2004), affecting the dynamics of the feeding relationship as the toddler seeks independence

(Chatoor et al., 1997). Managing the intake of snack foods is therefore likely to be particularly difficult for parents of toddlers and it is possible that restrictive feeding practices might originate during this time.

Birch et al. (2001) indicate that the Restriction subscale from the Child Feeding Questionnaire can be used to assess parental behaviours with children from the age of 2 years. Evidence for the validity of the Restriction subscale is based, in the most part, on studies of children aged 3 years or older; it is not known, for example, whether restriction is associated with poor self-regulation of energy intake or weight in 2 year old children. One study that investigated Restriction in children under 2 years of age used an adapted measure of Restriction (Taveras et al., 2004). In this study, Taveras et al. (2004) measured restriction with a single item, "I have to be careful not to feed my child too much". Mothers who disagreed with this statement were characterised as having a less restrictive feeding style. In another study, Sacco et al. (2007) conceptualised restriction as a lack of parental responsiveness to infant hunger cues and restricting infant participation in feeding. These measures are very different from the way Restriction is conceptualised in the CFQ, which specifically addresses feeding practices and attitudes as they relate to the provision of palatable snacks.

There is some evidence for the validity of the Restriction subscale to assess feeding practices at 2 years of age or younger. In a study conducted by Blisset and Farrow (2007), parents completed the CFQ, including the Restriction subscale in its complete form, when their children were 1 year of age, and again at 2 years of age. A key finding was that Restriction at 2 years of age was predicted by a higher child weight at 1 year of age. The positive relationship between weight and the use of restriction is consistent with the theoretical framework underpinning Restriction (i.e., the Model of Obesity Proneness) and also with findings from studies of preschool children (Fisher & Birch, 1999a; Fisher & Birch, 1999b). It is important to note that the variability in the Restriction scores was similar to the variability in scores found in mothers of preschool children, suggesting that the restriction

scale may be sensitive to the different approaches to feeding used by parents at an early age. There was also evidence to suggest that parental restriction was stable over this time.

An additional consideration is that broader conceptualisations of control are receiving more attention in the literature (Wardle & Carnell, 2007) and it has been suggested that there may be aspects of parental control that are beneficial to children's eating and weight (Ogden, Reynolds, & Smith, 2006). In regard to parental management of snack foods in toddlers, it is likely that some level of parental control may be appropriate, and there may be implications of too little control as well as too much control for children's energy intake regulation. The ideal feeding relationship described by Satter (1986) suggests that some level of parental control is appropriate, given that parents are responsible for ensuring that children are offered nutritious foods. Although it has been suggested that there are beneficial aspects of parental control the conceptual boundaries between negative and positive control are unclear. Researchers have pointed out that there are different ways to control children's intake of snack foods (Wardle & Carnell, 2007) yet there is very little research on toddler feeding practices and no research has explored how parents of toddlers manage their intake of energy-dense foods. It is also possible that the positive or negative influence of parental control is a question of degree, with the most extreme behaviours and attitudes having a harmful influence while some level of restriction may be appropriate. Research is required that explores how parents manage toddler's intake of energy-dense foods and to identify feeding behaviours and attitudes taking into consideration the different feeding strategies and varying degrees of control that parents might use. A broader conceptualisation of parental control is also likely to be more applicable to both high and low SES groups (Baughcum et al., 2001). More importantly, parent feeding advice will benefit most from research that suggests how parents should best manage sweets and snack foods, therefore it is important to consider what might be an appropriate level of control.

This study aimed to address this gap in the literature, by exploring the different feeding practices and attitudes that parents adopt to manage their toddlers' intake of snack foods. At

the time that this study was conceived there were no measures of parental feeding practices available that attempted to identify different strategies that parents might use in this context, or that attempted to distinguish between positive and negative aspects of parental control. Since this time, there have been some developments in this area. Sacco et al. (2007) have developed a measure of parental feeding style that incorporates less controlling practices (e.g., laissez-faire and indulgent), highly controlling practices (e.g., restrictive and pressuring) and an appropriate feeding practices (e.g., responsive). Ogden et al. (2006) have also conceptualised two different types of control: Covert Control, that may remain undetected by the child, and Overt Control, that may not be detected by the child. The measures used by Sacco et al. (2007) reflect global domains of parental feeding style and do not specifically address parental management of snack foods. The measures of Covert and Overt Control, developed by Ogden et al. (2006), address parental management of snack foods, however, it should be noted that the items that comprise the Overt Control measure do not specifically mention snack foods. The age range of the children in the study conducted by Sacco et al. (2007) was 3 months to 20 months, and in the study by Ogden et al. (2006) the age range was 4 to 11 years. The focus on parental control in toddler feeding practices, in the current study, addresses an important gap in the literature.

In summary, research on parental restriction suggests that parents may need to be mindful of the strategies they use to manage their children's intake of snack foods in the preschool years, but little is known about the emergence of parental feeding practices as children transition to the family diet. Understanding the origin of parental restriction at early periods of development has implications for the type and timing of advice that may be given to parents. The aims of the study were: (a) to determine whether the CFQ Restriction subscale (Birch et al., 2001) would be appropriate for assessing parent behaviours with toddlers, and (b) to explore the strategies mothers use to control their toddlers' intake of snack foods. The Restricted Access Questionnaire (Fisher & Birch, 1999a) was also examined along with the Restriction subscale. The Restricted Access Questionnaire incorporates a



range of parent behaviours, not explicit in the Restriction scale, that have been associated with negative consequences for children's self-regulation of energy intake (Fisher & Birch, 1999a).

## 3.2 Method

### 3.2.1 Participants

Participants were 22 mothers (mean age =  $34.70 \pm 4.82$ ) who were interviewed about their approaches to managing their toddlers' diet. The toddlers were between 18.73 and 24.77 months of age ( $M = 20.71$ ,  $SD = 1.67$ ). Most mothers were well educated and of a high socioeconomic status. Over half the sample (55%) had university qualifications, 5 mothers had trade or vocational qualifications, and 4 mothers had completed high school or less. Most mothers (77%) were currently in the workforce and all mothers who were not currently working had previously been in the workforce. The majority (72%) were working in occupations within the two highest skills levels defined by the Australian Standard Classification of Occupations (Australian Bureau of Statistics, 1997). On the basis of self-reported BMI, 11 mothers were classified as normal weight, 4 were overweight, 3 were obese and 1 was underweight. Three parents did not provide their weight. Most mothers were married; 2 were single parents and 1 was an adoptive parent. Anthropometric measures were only available for 15 children. Child weight-for-length ranged from the 10th percentile to the 99th percentile ( $M = 58.47$ ,  $SD = 23.58$ ) and the median weight-for-age percentile was 63. The majority of children were above the 50th percentile on weight-for-length. Only one child was classified overweight, being above the 95th percentile. Nearly half (46%) the sample were only children, 41% had one other sibling and 13% had two or more siblings.

### 3.2.2 Procedure

Participants were recruited through Child and Youth Health (CYH) clinics and child care centres in metropolitan Adelaide. All CYH Clinics in metropolitan Adelaide participated: five sites in the central region (Norwood, Enfield, Port Adelaide, Woodville and Cowandilla), three in the northern region (Elizabeth, Modbury and Munno Para) and three in the southern region (Marion, Edwardstown and Woodcroft). Three child care centres participated, one each from the eastern suburbs, northern suburbs and western suburbs of Adelaide. This recruitment method was intended to provide a broad sample of mothers from

areas of high and low socio economic background, although the sample was weighted heavily toward the higher SES population. Information sheets were distributed by the CYH nurses to any person presenting for the 18-month health check throughout October 2005, and by the staff at the child care centres to mothers with children in the required age range (18 to 24 months<sup>4</sup>). It is not known how many invitations to participate were distributed, however, the response rate was exceptionally low. The implications of this low response rate are addressed later in this chapter. Mothers who were interested in participating were asked to complete a form with their contact details and hand this to staff. Participants were then contacted by the researcher to make a time for the interview. The study was approved by the Children, Youth and Women's Health Service Research Ethics Committee, Department of Psychology Human Research Ethics Subcommittee of the University of Adelaide, and the Human Research Ethics Committee of the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Eligible participants included any mother or female primary caregiver of a toddler aged between 18 and 24 months of age. The study focused on mother because they are most likely to be the primary caregivers and responsible for feeding their children at this age. An Australian study that investigated dietary intake of children age 16 to 24 months, reported that mothers were responsible for providing the food records for their children (Webb et al., 2006). Furthermore, there is some evidence that maternal and paternal feeding practices are differentially associated with children's eating behaviour and food consumption (Blissett, Meyer, & Haycraft, 2006; Johannsen, Johannsen, & Specker, 2006). The exclusion criteria included: the presence of congenital or metabolic abnormalities that would affect growth, serious food allergies or food sensitivities, gestational age at birth less than 37 weeks, and low birth weight (less than 2500g).

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<sup>4</sup> The lower limit for this age range was chosen on this basis of evidence from the Feeding Infants and Toddlers Study (Fox, Pac, Devaney, & Jankowski, 2004) which indicates that snack food consumption is well ingrained in the diet by this age. Another consideration was that Australian children typically receive a health check at 18 months of age. Understanding parent feeding practices at this time may inform the type of advice that parents receive at this point of contact with child health professionals.

Participants were contacted on two occasions. On the first, they were invited to take part in the study after confirmation of inclusion criteria. On the second, the interview was conducted. Formal consent was established verbally on the second occasion. The interview was conducted over the telephone. Regarding the purpose of the study, participants were told that the research was being conducted to investigate the variety of strategies that mothers use to feed their toddlers, why they are used, and how mothers determine what types of food to feed their toddler. Participants were further told that this information will inform future studies investigating whether particular strategies are more effective than others in encouraging young children to self-regulate their energy intake from food. The following information, contained in the information sheet, was reiterated (a) that the information may be published but that their privacy would be protected and personal information would not be divulged, (b) that they would be free to withdraw at any time and without prejudice to future services provided by the child care centre, and (c) that their participation would assist in the advancement of research but they may not receive any personal benefit from the research.

### *3.2.3 Interview Development and Pilot Testing*

The interview was divided into four main sections: section 1 (people responsible for feeding the toddler), section 2 (mothers' control over the toddlers' access to palatable snack foods), section 3 (concerns about the toddlers' weight), and section 4 (background information). Participants completed a number of scales from existing child feeding questionnaires and these were then used to prompt discussion about the parent's use of control. When completing the existing measures, participants were encouraged to speak freely and to make comments in addition to responding on a forced choice format. Three subscales from the Child Feeding Questionnaire (CFQ: Birch et al., 2001) were included: Monitoring, Restriction, and Concern about Child Weight. Two subscales from the Infant Feeding Questionnaire (IFQ: Baughcum et al., 2001) were included: Concern about Over-eating and Concern about Under-eating. The Restricted Access Questionnaire (Fisher &

Birch, 1999a) was also included. The complete interview schedule is included in Appendix D.

Considerable pilot testing was conducted. As the majority of the research in the area of feeding control had been conducted in an American context, it was important to confirm that the constructs were relevant in Australian context and applied to a younger sample. Initially, informal discussions were held at Friends of Child and Youth Health<sup>5</sup> parenting groups to familiarise the researcher with the types of issues that mothers face with their toddlers in trying to manage their intake of snack foods, and to determine parents' willingness to discuss their parenting practices. Snack food was defined using the examples in the CFQ Restriction subscale (e.g., ice-cream, cakes, pastries, lollies, biscuits and chips). These discussions suggested that parents required very little prompting to talk about their use of parental control. The interview schedule was then pilot tested more formally with four mothers, not involved in Friends of Child and Youth Health, to confirm the suitability of the interview protocol and the recording format. The CFQ Concern about Child Weight item "how concerned are you about your child having to diet to maintain a desirable weight" was removed, as parents found this very difficult to answer. Another CFQ Concern about Weight item, "how concerned are you about your child becoming overweight" was re-worded to "how concerned are you that your child *might become* overweight". Parents interpreted the original question as referring to the immediate future and invariably replied that they were unconcerned. The second wording prompted more thought about the issue and produced more variability in parents' responses.

#### 3.2.4 Demographic Variables

A number of demographic and background variables were measured. These included parents' age, BMI, highest level of education, occupation, toddlers' weight-for-length, and family structure (single or two parent family, number of children in the family). Mother's BMI was calculated from self-reported height and weight using the formula  $\text{weight (kg)}/$

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<sup>5</sup> Friends of Child and Youth Health are community based social networks of parents who work in partnership with Children, Youth and Women's Health Service to provide peer support and access to parenting information.

height<sup>2</sup> (m). Height and weight was not available for three participants. Parents' occupation was measured with the Australian Standard Classification of Occupations (ASCO: Australian Bureau of Statistics, 1997). The ASCO can be used to classify an occupation into one of five major skill levels based on the level of formal education, training, and experience required to perform the job's duties.

For each child, the most recent record of length and weight measured by a qualified health professional was obtained. The child's age at which these measures were obtained ranged from 18 months to 21 months. The National Centre for Health Statistics Centre for Disease Control and Prevention reference growth charts (2000) were used to calculate the child's weight-for-length z score and corresponding percentile. Overweight was defined as the sex-specific weight-for-length at the 95th percentile or greater, the criteria used in other studies (Burke et al., 2005; Whitaker, 2004). Anthropometric data were not available for five children.

### 3.2.5 *Interview Analysis*

Two methods of analysis of parents' responses were used. Response frequencies were calculated for the existing child feeding measures. Open-ended responses were analysed using the five stage framework analysis approach (described below). The interviews were not tape recorded but extensive notes were taken throughout. The quotes that are included in this chapter are taken from these hand-written notes and as such include verbatim comments from parents but are written in an abbreviated style. The interviews were conducted by the primary researcher. A second research student (Psychology) attended seven interviews to assist with note-taking. The level of detail obtained with the additional note-taker was not substantially different from the information that was recorded by the primary researcher. The interviews were conducted over a 5 week period.

*Framework* is an analytic method for qualitative data that was developed in Britain specifically for applied policy research (Ritchie & Spencer, 1995). The method encompasses five stages: familiarisation, identifying a thematic framework, indexing, charting, and

mapping and interpretation. Familiarisation involves reading the transcripts and notes, facilitating the emergence of themes and providing a context for the analysis. It was possible to conduct a thorough analysis of the complete data set as the number of interview cases was relatively small. In the second stage, a number of key themes and concepts are identified and a series of index categories are developed. These are used to label the data. In the indexing stage, the index categories are applied to the data systematically by using a numerical code in the margin of the interview notes. In the fourth stage, charts are created to present the information in its entirety. For this study, information was recorded for each respondent across all the themes in the index. The information is synthesised at this stage so that the range of beliefs and practices for each theme are clearly identified. The mapping and interpretation stage involves returning to the original aims and research questions and looking for patterns, connections and structure in the data. The purpose is to draw together the information in a cohesive way to satisfy the research objectives.

The framework method was considered the most suitable analytical method for the data that were obtained. Firstly, one of the features of framework analysis is that the data are approached in the context of a specific set of objectives. Because the method was developed for policy research, the research aims are designed to meet specific requirements and this influences the way the information is approached. Another key feature of framework analysis is that the process of analysing textual information is also based in grounded theory. This is the idea that the categories of analysis are generated from the information itself. Thus, although the aims of the research are explicit, the analytical process incorporates a bottom-up approach to the analysis, enabling new information or hypotheses to be extracted. The current study had specific objectives in terms of the way parental control was to be conceptualised, however the specific aspects of control (i.e., parent behaviours and attitudes) were generated from the participants' responses. Framework has been used in a health research context (e.g., Murtagh, Dixey & Rudolf; Walker, Strong, Achinson et al., 2007; Wood, Swinburn & Burns, 2003) and in questionnaire development (Steed, Cook, Hurel & Newman, 2008).

The framework approach uses a comprehensive and systematic approach to data analysis. All material gathered is analysed in a methodical way and this makes it less likely that the analysis will be selective or confirmatory. The analytical process involves indexing of the original textual information so it can easily be retrieved and evaluated by a third party. It is also possible to make comparisons between cases and within cases as would be possible using quantitative methods. This enabled a comparison between overweight and non-overweight mothers to be conducted. An example of how the indexing was applied to the interview notes is shown in Appendix E.



### 3.3 Results

#### 3.3.1 Responsibility for Feeding

A justification given for research that focuses exclusively on mothers rests on the assumption that mothers are the predominant carers in the feeding domain, and indeed this was the case in this particular sample. Mothers were asked to indicate whether other people fed their toddler on a regular basis (defined as any portion of one day per week on most weeks) and to indicate which meals across the day each person provided. The proportion of time that mothers were responsible for feeding was estimated by subtracting the number of meals prepared by others from the total number of meals a toddler would be likely to have in a given week (i.e., 35 meals: breakfast, morning snack, lunch, afternoon snack and dinner each day). The average number of meals prepared by others was calculated by multiplying the number of meals provided by each caregiver by the number of days for which they cared for the child. It was found that mothers provided on average 25.77 of a possible 35 meals each week, which is 73.63% of meals.

Other caregivers responsible for feeding toddlers included day care centre staff, fathers and grandparents. Only 3 mothers indicated that they were solely responsible for feeding the toddler. Over half the toddlers regularly attended day care, 10 toddlers (45%) were regularly cared for by their father, 6 toddlers (27%) by a grandparent, and 2 toddlers (9%) by another person. A person other than the mother was responsible for feeding the toddler on average 2.9 ( $SD = 1.98$ ) days per week for at least a portion of the day. The average number of meals prepared by others was 9.23 ( $SD = 6.63$ ).

#### 3.3.2 Concern about Toddler's Weight

Parental concern about their child's weight is an important aspect of the Model of Obesity Proneness (Costanzo & Woody, 1985) because this concern may lead parents to take action to control their child's weight. The level and nature of mothers' concern was investigated using several measures of child weight concern and some additional researcher-

constructed questions. The findings are presented in Table 3.1. The response frequencies are shown in preference to the overall means and standard deviations due to the lack of variability in the responses and the small sample size. The distribution of responses for each item is positively skewed indicating that the majority of mothers were not concerned that their child might become overweight. This was also true for IFQ concern about undereating/underweight, although there was slightly more concern about undereating/underweight than concern about overeating/overweight.

Based on the responses to Additional Question 1 (Table 3.1), 18 mothers indicated that they were currently “unconcerned” about their toddler’s weight, 3 mothers were “a little concerned” (1 of these was concerned about underweight), and 1 mother was “concerned”. Responses to CFQ 1 indicated that 8 mothers (36%) expressed some level of concern, albeit a low level, “that [their] toddler might become overweight”. In contrast, only 4 mothers expressed agreement with the statement in IFQ 1, “I am worried my toddler will become overweight”. Despite the apparent similarity of these questions, the responses options in CFQ 1 produced a greater spread of responses than the response options in IFQ 1, suggesting that the CFQ might be a more sensitive measure of parental concern about weight at this age. It is possible that mothers do not like to believe that their toddler will become overweight, as suggested in IFQ 1, but they acknowledge the possibility that this may occur, as suggested in CFQ 1. This is consistent with parents’ responses to Additional Question 2, in which 9 mothers indicated that their child was vulnerable to becoming overweight. The most common reasons given by mothers were perceived genetic susceptibility and environmental or societal factors outside the control of the family.

In summary, few mothers were concerned about their child’s current weight. Mothers’ concern about their child becoming overweight in the future was also low, although the number of mothers who indicated some level of concern varied depending on the phrasing of the question/statement and the response scale. CFQ Item 1 and Additional Question 2, which asked about vulnerability, produced the greatest variability in the responses.

**Table 3.1**

*Response Frequencies to Questions about Toddler Weight Concerns*

Measures of Concern	Response Categories				
	Unconcerned	A little concerned	Concerned	Fairly concerned	Very concerned
<b>Increasing levels of concern</b> <span style="float: right;">↗</span>					
<b>Child Feeding Questionnaire</b>					
1 How concerned are you that your toddler might become overweight? (CFQ)	14	4	2	1	1
2 How concerned are you about your toddler eating too much when you are not around him/her? (CFQ)	20	0	0	2	0
3 How concerned are you about your toddler having to diet to maintain a desirable weight? (CFQ)	18	0	1	2	1
<b>Additional Questions</b>					
1 Are you currently concerned about your toddler's weight?	18	3	1	0	0
2 Do you think your toddler is vulnerable to becoming overweight?	13	9	n/a	n/a	n/a
	no/ don't know	yes			
<b>Infant Feeding Questionnaire</b>					
1 I am worried that he/she will become overweight	5	12	1	3	1
2 I am worried that he/she will become underweight	4	15	0	2	0
	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Often</b>	<b>Always</b>
3 I worry that he/she is eating too much	14	5	1	0	1
4 I get upset if he/she eats too much	19	0	1	0	1
5 If I do not encourage him/her to eat then he/she will not eat enough	8	11	1	1	0
6 I worry that he/she is not eating enough	5	10	3	3	0
7 It is a struggle to get him/her to eat	8	8	2	3	0

### 3.3.3 *Control over Access to Palatable Snacks*

The variability in the responses to each item comprising the CFQ Restriction, CFQ Monitoring and Restricted Access Questionnaire was inspected to determine whether these measures would be appropriate for parents with toddlers. Consequently, evidence of reasonable utilisation of the full range of responses was sought. The response frequencies for the individual items are shown in Table 3.2. Generally there was very little variability in responses, with parents tending to respond at the extremes of the scale. There were also a number of items that were not applicable to some parents.

Of the eight items comprising the CFQ Restriction scale, the responses to items 1 and 4 showed the poorest variability with one response option utilised in all but one case. In this sample, the overwhelming majority of mothers said that they had to be sure that their toddler did not eat too many sweets and that they kept foods out of their toddlers' reach (item 1). In contrast, 14 mothers indicated that item 3 was not applicable because their toddlers' favourite foods were foods that they would be happy for the child to eat. Most mothers also agreed that they had to be sure that their toddler did not eat too many high fat foods (item 2), although there was slightly more variability with 2 mothers disagreeing with this sentiment. These mothers indicated that high fat milk was acceptable for children less than 2 years of age. A different pattern was observed for items 5 and 6 that ask about using favoured foods as rewards. Firstly, the responses to these items were skewed in the opposite direction, a response indicative of a lower level of control. Secondly, there was at least some indication of variability in the use of food as rewards. A different pattern again was observed for item 7, which asks about the child's propensity to overeat junk foods if their intake was not regulated by the mother. There was a tendency for mothers to respond at the extremes of the scale either disagreeing or agreeing with the statement.

The CFQ Monitoring subscale was particularly problematic. The variability in responses was very low, with only two responses utilised. Six mothers in this sample could

not respond and felt that the statements were not applicable to their situation. In each case the reason given was that the child was rarely given these types of foods, and that because so few of these foods were consumed, the idea of *keeping track* of the child's consumption was not appropriate.

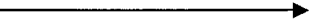
Of the seven items comprising the Restricted Access Questionnaire, the full range of responses was utilised for items 5, 6 and 7. A restricted range of response were utilised for the remaining items 1, 2, 3 and 4 where the response options *often* and *always* were used most commonly. A number of mothers found item 1 and item 4 difficult to respond to using the scale. Item 1 was not applicable to mothers whose toddlers had very little exposure to these foods. Item 3 was not applicable to mothers who indicated that they did not have these types of foods in the home. One additional item from the Restricted Access Questionnaire (these foods are reserved only for special occasions) was also included, however a categorical response format (yes or no) was used. Eight mothers (36%) indicated that they only allowed these foods on special occasions and 14 mothers (64%) indicated that these foods were not restricted to special occasions only.

Overall, mothers tended to respond to these items using the extreme end of the response scale. There were four exceptions to this trend: items 4 and 5 from the CFQ Restriction, which ask about the use of food as a reward, and items 5 and 6 from the Restricted Access Questionnaire, which ask about limiting foods in the home, and becoming upset with others for giving the toddler sweets and snack foods.

**Table 3.2**

*Response Frequencies for Mothers' Responses to CFQ Restriction, CFQ Monitoring and the Restricted Access Questionnaire*

<b>Measures of Control over Feeding</b>	<b>Response Scale</b>				
	Increasing levels of control				
<b>CFQ Restriction</b>	disagree	slightly disagree	neutral	slightly agree	agree
1. I have to be sure that my child does not eat too many sweets	0	0	0	0	22
2. I have to be sure that my child does not eat too many high fat foods	1	1	0	5	15
3. I have to be sure that my child does not eat too many of his/her favourite foods <sup>b</sup>	1	1	0	3	4
4. I intentionally keep some foods out of my child's reach	1	0	0	0	21
5. I offer sweets to my child as a reward for good behaviour	14	3	1	2	2
6. I offer my child his/her favourite foods in exchange for good behaviour	16	2	2	2	0
7. If I did not guide or regulate my child's eating, he/she would eat too many junk foods	10	1	0	3	8
8. If I did not guide or regulate my child's eating, he/she would eat too much of his/her favourite foods <sup>b</sup>	5	1	0	1	4
<b>CFQ Monitoring<sup>a</sup></b>	never	seldom	half the time	most of the time	always
1. How much do you keep track of the sweets that your child eats	0	0	0	7	9
2. How much do you keep track of the snack foods that your child eats	0	0	0	9	7

Measures of Control over Feeding	Response Scale				
	Increasing levels of control 				
3. How much do you keep track of the high fat foods that your child eats	0	0	0	9	7
<b>Restricted Access Questionnaire<sup>a</sup></b>	never	rarely	s/times	often	always
1. How often do you monitor your child's eating of sweets/snacks	1	0	0	7	7
2. How often do you limit the amount of sweet/snack you let your child eat	0	0	0	4	18
3. How often do you limit when the food is available to eat	0	1	1	6	14
4. How often do you keep the food out of reach	0	0	0	3	10
5. How often do limit when the food is in the home	2	3	1	3	13
6. How often would you get upset if someone else gave the child a sweet/snack food	6	4	6	5	1
7. How often would you limit the opportunities for your child to eat sweets/snack foods	1	1	1	9	10

<sup>a</sup> Where responses do not equal 22 the responses are missing because participants indicated that the question was not applicable

<sup>b</sup> The missing cases are mothers who indicated that the question was not applicable because favourite foods were 'healthy' foods.

### 3.3.4 Qualitative Analysis

The following section presents an analysis of mothers' open-ended responses to questions about the types of sweets and snacks foods she allows or restricts, and what she does to manage her toddler's consumption of these foods. The analysis was conducted according to the framework method of analysis for qualitative data described previously. Given the high level of interest in the topic, mothers provided extensive information about

their feeding practices in many parts of the interview and therefore all the notes and comments taken from the entire interview were used in the analyses.

The tables that follow present the results of the charting stage of the framework approach. The organisation of the material was influenced by the initial analysis at the familiarisation stage, which found that the information could be divided into three broad thematic areas. These were: (a) toddler's level of exposure to sweets and snack foods, (b) management of toddler's consumption, and (c) toddler's reaction to sweets and snack foods. Within each area, the key ideas and concepts were identified and a thematic framework was developed. At the familiarisation stage, it was evident that there were examples of feeding practices that ranged from low to high levels of control, and therefore this was used as context for the thematic analysis and charting. Each table presents a summary of the findings for all mothers across all themes. An index is provided with each table that gives a description of the type of material presented in the chart, and how to interpret the information. Examples of the actual comments or notes are also provided to illustrate these themes.

### *3.3.5 Toddler's Level of Exposure to Sweets and Snack Foods*

One of the key concepts that emerged from the analysis of the material was individual differences in attitudes to toddlers' level of exposure to sweets and snack foods. An index was created based on six key issues: (a) Forbidden Foods, (b) Allowed Foods, (c) Consumption Frequency, (d) Availability (d) Exposure in the Home, and (e) Exposure Outside the Home. A description of each is provided in Table 3.3. Three categories of responses were identified for (a) foods not allowed, (b) foods allowed, and (c) frequency of consumption, that reflected increasing levels of exposure, and these are also described in Table 3.3. 'Availability' refers to whether snack foods are available in the home. 'Exposure in the Home' included the toddlers' opportunity to see and access these foods in the home environment. The final index category 'Exposure Outside the Home' is simply a list of locations outside the home in which the toddler sees and recognises sweets and snack foods.



Table 3.4 presents a picture of the mothers' attitudes and feeding practices according to the thematic framework described above. Exposure to snack foods can be conceptualised in terms of parental control, with high exposure relating to the parent taking less control over the child's access to snack foods, and low exposure relating to the parent taking greater control in this area. The data are presented separately for overweight mothers and normal weight mothers as maternal overweight status represents a risk factor for child overweight (Wardle et al., 2000). It was not possible to present the data in this way for overweight toddlers and normal weight toddlers because only 1 toddler was classified as overweight and weight-for-height data were missing for 5 toddlers.

#### *3.3.5.1 Forbidden Foods, Allowed Foods, and Consumption Frequency*

The interview analysis provided evidence that there was variability in the degree to which mothers allowed their toddler to have access to snack foods. Mothers were asked to indicate whether there were snack foods that they were not happy for their toddler to eat. Responses were grouped to distinguish high, medium and low levels of forbidden foods. A comparison of the different approaches is indicated respectively by the following quotes:

*Participant 18: A freddo frog at the shops as a treat, really the only thing child knows, doesn't have other sweets.*

*Participant 9: Not really, depends more on how much and how often...definitely not lollies [note: later said this was safety issue], I wouldn't be keen on chips, fake cheese/ fake flavour shapes, things with additives or msg*

*Participant 22: ...[child] is a good eater. Food is a big part of culture, sweets are part of diet in some way almost every day*

Mothers were also asked about the types of snack foods they did allow their toddler to eat and their responses usually correlated well with their responses to the question just described. For example, mothers who suggested that many foods were forbidden also indicated that their toddler ate only a limited variety of snack foods. Consumption frequency was also variable.

Participant 18 in the example above indicated that the freddo frog was only a once-a-week treat. Other mothers indicated a high frequency of consumption with the highest being once-a-day.

A key feature of the data was that overweight mothers reported that they allowed their children more access to snack foods compared with normal weight mothers. Put another way, overweight mothers were less restrictive about energy-dense foods consumed by their toddlers. Normal weight mothers were more likely to report banning particular foods or not having introduced these types of foods to their toddler. Most parents indicated how often their child consumed these foods with many parents indicating that their toddler did not eat sweets or snack food every day.

### *3.3.5.2 Foods Available at Home and Exposure to Foods in the Home*

A high level of exposure tended to be associated with the presence of sweets and snack foods in the home and the toddler being aware of these foods within the home setting. Most parents reported social occasions as being a setting in which exposure to these foods was high, regardless of the level of exposure in other settings.

The information that mothers gave on this topic also qualified some of their responses to CFQ Restriction and the Restricted Access Questionnaire. When availability was low, many of the items on these scales were actually redundant. For example, keeping foods out of reach was not necessary in households where these foods were not available. In these circumstances the idea of monitoring or keeping track of the child's consumption was also not relevant. Mothers who indicated low availability to sweets and snack foods indicated that the child did not know what s/he was missing out on. Where these foods were very limited in the child's life, mothers reported that the child did not seek out these foods. Some examples of typical comments are:

*Participant 02: "if she doesn't see it, she doesn't want it"*

*Participant 18: "out of sight out of mind"*

It follows that the likelihood of a battle emerging over these foods is less likely. Therefore, while all mothers indicated that they limit their children's access to these foods, a child with low exposure may be less likely to be aware of the restriction.

**Table 3.3**

*Index Labels reflecting the Thematic Framework for Toddlers' Exposure to Sweets and Snack Foods*

<b>Chart 1 Index Label</b>	<b>Description</b>
1.1 Forbidden Foods	<p><i>Low</i> Mother indicates that all foods are allowed or that no specific foods are banned</p> <p><i>Medium</i> Mother reports some forbidden or banned foods (1 to 2 foods)</p> <p><i>High</i> Mother indicates that toddler is not given sweet or snack foods, or lists more than 2 types of foods that are banned</p>
1.2 Allowed Foods	<p><i>High</i> Mother lists several sweets or snack foods that toddler consumes in his/ her diet</p> <p><i>Medium</i> Mother allows toddler to consume 1 or 2 sweet/ snack foods</p> <p><i>Low</i> No foods in this category are consumed</p>
1.3 Consumption Frequency	<p>How often the toddler was given a sweet or snack food</p> <p>i) Daily</p> <p>ii) Less than once a day but more than once a week</p> <p>iii) Once a week</p> <p>iv) Less than once a week</p>
1.4 Availability	<p>i) Yes (at least some foods are kept in the home)</p> <p>ii) No</p>
1.5 Exposure in the Home	<p><i>High</i> Foods are in view, toddler knows where to find a food or indicates knowledge or where these foods are kept</p> <p><i>Low</i> Foods are hidden from view, foods not kept in the home, toddler does not show awareness of where foods are stored</p>
1.6 Exposure Outside of the Home	<p>A list of locations where toddler sees and recognises these food</p>

**Table 3.4**

*Summary of Toddlers' Exposure to Sweets and Snack Foods*

Participant ID	1.1 Forbidden Foods	1.2 Allowed Foods	1.3 Consumption Frequency	1.4 Availability	1.5 Exposure in the home	1.6 Exposure outside the home
02	High	Medium	Once a week	No	Low	-
04	Low	High	Daily	Yes	High	Relatives
05	High	Medium	-	Yes	Low	Social occasions
06	High	Low	Once a week	No	Low	Social occasions
07	Medium	Medium	<daily>once a wk	No	Low	Swimming
08	Low	Medium	<daily>once a wk	No	Low	-
11	Medium	Medium	-	Yes	Low	Relatives
12	Medium	Medium	<daily>once a wk	Yes	Low	Outings
15	High	Medium	-	Yes	Low	Social occasions
18	High	Low	Once a week	No	Low	Social occasions
19	High	Low	Once a week	No	Low	Social occasions
20	Medium	Medium	Once a week	No	Low	Social occasions
21	Low	High	<daily>once a wk	Yes	Low	Shops
						Shops
						Grandparent

Participant ID	1.1 Forbidden Foods	1.2 Allowed Foods	1.3 Consumption Frequency	1.4 Availability	1.5 Exposure in the home	1.6 Exposure outside the home
			<b>Overweight</b>			
03	High	Low	<once a week	No	Low	Social occasions
14	Low	High	<daily >once a wk	Yes	High	Social occasions Shops
16	Low	Medium	-	No	Low	Social occasions Shops
17	Low	High	Daily	Yes	High	Social occasions
22	Low	High	<daily >once a wk	Yes	High	Social occasions Shops
			<b>BMI not known</b>			
01	Low	High	-	Yes	High	-
09	Medium	High	<daily > once a wk	Yes	Low	Aunts
13	Low	High	<daily >once a wk	Yes	High	Relative

*Note.* Where no data is provided, the information pertaining to that theme was not provided by the participant.

### 3.3.6 Managing Toddler's Consumption

A second key issue that emerged from the analysis of the material was the various ways in which the mother managed her toddler's consumption of energy dense sweets and snack foods. Analysis of data indicated that there was considerable variation both in the beliefs held by mothers on the role of sweets and snack food in the diet of their toddlers and in the way that they managed to achieve what they believed to be an acceptable level of consumption. This was interesting because this variation was not captured by any of the child feeding questionnaires. An index was created based on eight key areas (a) beliefs, (b) flexibility and rigidity, (c) parent-control versus others-control, (d) self-efficacy, (e) social occasions and availability of foods, (f) food restricted to social occasions, and (g) restricted access at social occasions, (h) foods restricted to social occasions. A description of each is provided in Table 3.5 and a chart summarising the data is presented in Table 3.6.

#### 3.3.6.1 Beliefs

In regards to general beliefs about the role of these foods in the diet, it was clear that these could be placed on a continuum from high control to low control. Three different belief types were identified. Two features defined the least controlling group. Firstly, a belief that no food should be banned or that it is acceptable for the child to try most things. Sweets and snack foods were considered to be okay in small amounts as part of the diet, so mothers indicated that they would be mindful of how much of these foods they gave their toddler but did not specifically avoid any types of foods. The following comments were typical of this group:

*Participant 4: "I don't believe in hiding these foods from him, I think I can teach my kids to have some self control"*

*Participant 10: "I've seen what happens when mothers ban their kids from things; as soon as they turn their back the kid goes crazy"*

These mothers were by no means laissez-faire in their feeding style and indicated, as did all mothers, that they were very careful that their child did not consume too many of these types of foods. Some mothers believed that these foods were not necessary and wanted to avoid introducing them for as long as possible, and other mothers believed that it was okay to have these foods but not on a daily basis. Mothers who expressed these sentiments were categorised as moderate or high control. High control was distinguished from moderate control if the mother indicated that particular sweets and snack foods would be unacceptable. Thus, while sweets and snack foods might be allowed on a particular occasion, the more controlling mothers would be more discerning about the particular type of food that would be given as a treat. An example of high and moderate control is indicated respectively by the following comments:

*Participant 3: "low sugar yoghurt okay even if it's high in fat, would avoid pretty much all other fatty or sugary snacks"*

*Participant 7: "right now I'm particular about what he gets, very rich foods make him sick so would avoid, most plainer versions okay occasionally"*

The findings in Table 3.6 show that overweight mothers were more likely to have a pattern of beliefs consistent with a lower level of control. Not surprisingly, less control was also associated with less rigidity in feeding practices.

### *3.3.6.2 Rigidity and Flexibility*

Rigidity was the term given to refer to how strictly mothers *stuck to their rules* on what types of sweets and snacks their toddler could eat, how much they could eat, and when they were allowed to eat it. Some mothers indicated that they stuck to their beliefs quite firmly and would be unlikely to be persuaded by the situation. For example, one mother indicated that she would take a packed snack for her toddler to a party so that she could be confident the child would be eating foods she approved. Other mothers were more flexible; they would take into account the situation when applying their rules. For example, one mother indicated



that ‘chips’ were a banned food, yet she would allow her toddler to have some chips at a party and that the toddler was occasionally given chips when dad was eating them. Further evidence that lends support to the higher levels of restriction in normal weight mothers is the finding that they were more likely to report restricting sweets and snack foods to social occasions, and report a higher level of control over access to these foods at social occasions.

It is interesting to note that when mothers spoke about managing their toddler’s consumption of sweets and snack foods, they tended to focus more on the types of foods that they would choose for their toddler than on the portion size. A number of mothers did not mention portion size at all. It is perhaps not surprising then that those mothers who managed their toddlers’ consumption by limiting the child’s access to these foods did not have to worry about appropriate portion sizes. When the issue of portion size was discussed, most mothers talked in terms that were difficult to quantify such as ‘a bit’ or ‘we never go overboard’. For some mothers, an acceptable quantity was determined by instinct. Some mothers indicated that they would give their toddler a smaller quantity of foods that they knew to be high in fat, salt or sugar. Some mothers also mentioned allowing their toddler to have more on special occasions or if they knew the child was actually hungry.

### *3.3.6.3 Parent-control versus Other-control*

There were also individual differences in how comfortable mothers felt about other people giving their toddler a sweet or snack. Some mothers indicated that they liked to have a lot of control over the types of foods that their toddler was given. One mother indicated that she found it difficult to leave her child with her husband’s side of the family because she did not approve of the types of foods they might offer her child. She indicated that it actually made her feel very anxious and agitated because she did not feel comfortable saying anything. For other people, supportive social networks made it easier for them to manage what their toddler ate. One mother said that her friends shared her views on children’s eating and that she has found other people to be respectful of this provided she is upfront with them about what is and isn’t allowed. Approximately two-thirds of mothers were confident about

allowing other caregivers to make decisions about what sweets and snacks to give the child. This issue of parent control over snack food choices was raised by half of the sample when discussing social occasions. Some mothers did not allow their toddler to have any autonomy over food choices at social occasions. Other mothers felt that they could manage social occasions well, allowing their toddler to make some choices from a limited number of options determined by the parent.

#### 3.3.6.4 *Self-efficacy*

Parents also had varied self-efficacy beliefs about their ability to manage energy-dense foods in their child's diet. Examples of low self-efficacy included finding it difficult to say no to their child or fear of criticism from other people about their parenting abilities. The first quote below is an example of low self-efficacy; the second an example of high self-efficacy beliefs.

*Participant 1: "When they're fussing about everything else, and I can't cope, I might give [child] something I know they'll eat. I know it's wrong."*

*Participant 18: "Sometimes [child] looks at me and I feel bad for saying no but it's a part of teaching healthy habits"*

#### 3.3.6.5 *Social Occasions and Availability*

Another key feature of the data was mother's feeding practices and attitudes at social occasions. Not surprisingly, all mothers indicated that sweets and snacks were available at social occasions. They further indicated that it was much more difficult to control what their toddlers ate at parties and outings. Some comments that were typical of the sentiments expressed were 'if everyone else is having it you can't very well say no' and 'if she sees it she wants it'. The social environment is likely to elicit a high level of mother-child interactions around sweets and snacks, and therefore is very pertinent to this area of research.

#### 3.3.6.6 *Restricted Access at Social Occasions*

Analysis of the data explored the issue of mother-child control over access to sweets and snacks at social occasions. The extent to which the child was allowed some control over

the intake of these foods in this context varied between mothers. These behaviours could also be conceptualised from high to low levels of control. For example, there were mothers who indicated that these foods were out of bounds even in a party situation. For some mothers, the rules could be bent to some extent at a party so that foods that the child wouldn't normally be given were allowed. The following comments illustrate these two points of view; the most controlling listed first

*Participant 3: "I bring my own food for (child) or I make up a plate with the things I'm happy for him to eat"*

*Participant 4: "it's too overwhelming for [child] at a party so I narrow the options, give her a choice from this or that"*

The level of autonomy that children were given in choosing foods themselves in this situation also varied with some mothers mostly choosing for the child and other mothers allowing the child to pick something. Normal weight mothers were more likely to have a higher level of control over the child's access to sweets and snacks, that is, they were less inclined to allow their toddler to choose a sweet or snack for themselves.

#### *3.3.6.7 Foods Restricted to Social Occasions*

Approximately half of the participants indicated that they restricted their toddlers' sweets and snack food consumption to social occasions. There was no difference between normal weight and overweight mothers on this issue, with 50% of overweight parents and 54% of normal weight parents restricting snack food consumption to social occasions.

**Table 3.5***Index Labels reflecting the Thematic Framework for Managing Toddlers' Consumption*

<b>Chart 2 Index Labels</b>	<b>Description</b>
2.1 Beliefs	<p><i>Low Restriction</i></p> <p>Mother indicates either of the following</p> <ul style="list-style-type: none"> <li>i) a limited portion of any food is acceptable</li> <li>ii) these foods are a regular part of the diet</li> </ul> <p><i>Medium Restriction</i></p> <p>Mother indicates that</p> <ul style="list-style-type: none"> <li>i) these foods are not consumed on a regular basis</li> <li>ii) these foods are seen as a true treat</li> </ul> <p><i>High Restriction</i></p> <p>Mother indicates that</p> <ul style="list-style-type: none"> <li>i) as per medium restriction but must include (ii)</li> <li>ii) parent has specific rules regarding what types of sweets and snack are acceptable as treat foods (i.e., not all energy dense foods accepted)</li> </ul>
2.2 Flexibility and rigidity	<p>Refers to the extent to which the mother is compromising (<i>flexible</i>) or unyielding (<i>rigid</i>) in her practices in regards to</p> <ul style="list-style-type: none"> <li>i) T - food type allowed</li> <li>ii) W - when the food is given</li> <li>iii) P - portion size</li> </ul>
2.3 Parent-control versus others-control	<p>The degree to which the mother likes to control the child's food choices</p> <ul style="list-style-type: none"> <li>i) High - mother controls snack food choices</li> <li>ii) Low - others' allowed to control snack food choices</li> </ul>
2.4 Self-efficacy	<p>Confidence in managing snack foods</p> <ul style="list-style-type: none"> <li>i) Low - feeling pressured to give child foods they like</li> <li>ii) High - teaching child about moderation or healthy eating</li> </ul>
2.5 Social occasions and availability of food	<p>Are sweets and snack foods typically available at social occasions?</p> <ul style="list-style-type: none"> <li>i) Yes</li> <li>ii) No</li> </ul>

- 2.6 Foods restricted access at social occasions Refers to the level of restriction imposed at social occasions – the extent to which mother is controls the food choices.
- i) High - mother brings own food or mother controls access to the food
  - ii) Low - mother allows child to have some control over food choices
- 2.7 Foods restricted to social occasions Are sweets and snack foods restricted to social occasions?
- i) Yes
  - ii) No

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*Note.* Where no data is provided, the information pertaining to that theme was not provided by the participant

**Table 3.6**

*A Summary of the Key Features of Managing Toddlers' Consumption*

Participant	2.1 Restrictive beliefs	2.2 Flexibility and rigidity	2.3 Parent-control vs other-control	2.4 Self-efficacy	2.5 SO Availability	2.6 Restricted access at SO	2.7 Restrict food to SO
<b>Not overweight</b>							
02	Medium	Rigid – W	High	High	Yes	Yes	Yes
04	Low	Flexible – W	Low	Low	Yes	High	No
05	High	Rigid – T	High	High	Yes	High	No
06	High	Rigid – T	-	Low	Yes	Low & High <sup>a</sup>	Yes
07	Medium	Flexible – T	High	High	Yes	High	Yes
08	Medium	Flexible – T	High	High	Yes	Low	No
<b>Rigid – W</b>							
<b>Flexible – P</b>							
11	Medium	Flexible – P	High	High	Yes	High	No
<b>Rigid - T</b>							
<b>Flexible – T</b>							
12	Medium	Flexible – T	Low	High	Yes	High	Yes

Participant	2.1 Restrictive beliefs	2.2 Flexibility and rigidity	2.3 Parent-control vs other-control	2.4 Self-efficacy	2.5 SO Availability	2.6 Restricted access at SO	2.7 Restrict food to SO
15	Medium	Flexible – T	High	High	Yes	Low	No
		Rigid – W					
18	Medium	Flexible – T	High	High	Yes	Low	Yes
		Rigid – W					
19	High	Rigid – T & W	-	-	Yes	High	Yes
20	High restriction	Rigid – T, P	High	High	Yes	High – most of the time	Yes
21	Low	Flexible – T&P	Low	High	Yes	Low	No
<b>Overweight</b>							
3	High	Rigid – T	High	High	Yes	High	Yes
10	Low	Flexible - T	Low	High	Yes	Low & High	Yes
14	Low	Flexible - T	Low	High	Yes	Low	No
16	Medium	Not mentioned	Low	High	Yes	Low	-
17	Low	Flexible – W	High	Low	Yes	Low	No

Participant ID	2.1 Restrictive beliefs	2.2 Flexibility and rigidity	2.3 Parent-control vs other-control	2.4 Self-efficacy	2.5 SO Availability	2.6 Restricted access at SO	2.7 Restrict food to SO
22	Low	Flexible - T	-	High	Yes	Low	No
<b>BMI not known</b>							
01	Low	Flexible - T	-	Low	Yes	Low	No
09	Medium	Flexible - T	High	High	Yes	Low	Yes
13	Low	Flexible - T	Low	Low	Yes	High	No

*Note.* SO = Social occasions. Where no data is provided, the information pertaining to this topic was not mentioned by the parent.

<sup>a</sup> An example of both was given in different parts of the interview



### 3.3.7 *Toddlers' Behaviour*

A third key concept that emerged from the analysis of the data was mothers' reports of their toddlers' behaviour in relation to sweets and snack foods. An index was created based on two domains of behaviour: (a) liking of and preference for sweets and snack foods, and (b) asking for or seeking out sweets and snack food. A description of each is presented in Table 1.7 and a summary of the data is presented in Table 1.8.

#### 3.3.7.1 *Liking of and Preference for Sweets and Snacks*

Analysis of the data indicated that toddlers' behaviour around these foods varied. Although some children really liked these foods, others were quite uninterested. Some comments indicative of this are 'he doesn't know what they are', 'doesn't know she's missing out', or 'doesn't have a taste for these foods'. Overweight mothers were more likely to report that their toddler liked sweets and snacks foods, although the majority of mothers indicated that their toddlers' favourite foods were indeed other types of foods. The majority of mothers indicated that their toddler rarely requested or sought out these types of foods. Some mothers did mention that their child had an idea that these foods were different to other foods and would occasionally seek them out specifically.

#### 3.3.7.2 *Asking For or Seeking Out Sweets and Snacks*

Most mothers suggested that it is visibility of these foods that encourages children to consume them. For example, most toddlers would want a sweet or snack food if it were visible to them.

*Participant 14: "won't quit asking at the supermarket"*

Notwithstanding this, not all toddlers were equally interested in these foods, even when they were visible. Normal weight mothers were more likely to indicate that their child would choose another type of food even if sweets and snack type foods were available.

*Participant 15: “[snack food] is not a big deal, a grape is as interesting as a biscuit, she’s more likely to play with the biscuit”*

Therefore, the presence of these foods presented a greater battle for some mothers compared with others. It is important to remember that all mothers were concerned about their toddler eating too many sweets and snacks so if the child is seeking out these foods it follows that many of the child’s attempts to obtain the foods would be denied, or restricted. In fact, a number of comments reflected this issue:

*Participant 4: ‘if she chooses a sweet biscuit I might redirect her to a rice cracker’*

*Participant 21: “I have to pretend I don’t have things sometimes”*

It is this interaction that is relevant to restriction because mothers who frequently engage with their children in an effort to curb their consumption of these foods may reflect a more restrictive approach that mothers who limit consumption by other means.

**Table 1.7***Index labels reflecting the Thematic Framework for Toddlers' Attraction to Snack Foods*

<b>Chart 3 Index Labels</b>	<b>Description</b>
3.1 Liking of and preference for sweets and snacks	<p>Mother perception of toddler's attraction to sweets and snack foods</p> <p><i>High Preference</i></p> <p>Sweets/ snacks are liked (e.g., 'has a sweet tooth')</p> <p><i>Moderate Preference</i></p> <p>Sweets/ snacks are liked but also has other preferred foods</p> <p><i>Low Preference</i></p> <p>Sweets/ snacks are not preferred foods (e.g., 'wouldn't go for them' or 'doesn't have a taste for', 'favourite thing is fruit')</p>
3.2 Asking for or seeking out sweets and snacks	<p>Refers to the extent to which the child specifically asks for sweets/snack foods</p> <p>i) Unprompted – shows interest in having a sweet/snack with no visual cue (e.g., goes to cupboard or fridge for a sweet/snack, asks for a sweet/snack)</p> <p>ii) Prompted – shows interest in having a sweet/snack with visual cue (e.g., wants a sweet or snack when the food is visible)</p>

**Table 1.8***A Summary of Mothers' Perceptions of Toddlers' Attraction to Snack Food*

Participant ID	3.1 Liking of and preference	3.2 Asking for or seeking out
	for sweets and snacks	sweets/snacks
<b>Not overweight</b>		
02	Moderate	Prompted
04	High	Unprompted Prompted
05	Low	Prompted
06	Moderate	Prompted
07	Low	-
08	Moderate	Prompted
11	Low	Prompted
12	Low	-
15	Low	-
18	Low	Prompted
19	Low	-
20	Low	Unprompted Prompted
21	Moderate	Prompted
<b>Overweight</b>		
03	Low	-
10	Moderate	Prompted
14	High	Unprompted Prompted
16	Moderate	Unprompted (rarely) Prompted
17	High	Unprompted

<b>Participant ID</b>	<b>3.1 Liking of and preference for sweets and snacks</b>	<b>3.2 Asking for or seeking out sweets/snacks</b>
		Prompted
22	-	Unprompted
		Prompted
<b>BMI not known</b>		
01	High	Unprompted
		Prompted
09	Low	Prompted
13	Low	Unprompted
		Prompted

*Note.* In 3.1, no data indicates that the information was not provided.

### 3.4 Discussion

The findings of this exploratory study suggest that existing measures of restrictive feeding are not adequate measures for toddlers. The high level of interest, and extensive additional information provided by mothers, indicates that the issue of managing sweets and snack foods is very important even at this young age. Despite being a fairly homogeneous group in terms of their background characteristics, the mothers varied in their beliefs about and practices used, to manage these foods in their child's diet. The CFQ Restriction and the Restricted Access Questionnaire did not capture this variability with toddlers aged 18 to 24 months.

The CFQ Restriction items were problematic for a number of reasons; uniformity in responses on some items, lack of item relevance, problems with terminology, and lack of cohesion of some items with other scale items. The belief that toddlers should not eat too many sweets was strongly held by all mothers and may be a ubiquitous belief about dietary patterns at this age. The vast majority of parents also indicated that their children's favourite foods were foods that they were happy for them to eat, so these items from the Restriction scale may not be appropriate. Similarly, the use of the term 'high fat foods' was problematic with some responses influenced by the mothers' awareness of the importance of full fat milk in the diet of young children. The majority of mothers did not use sweets or high-fat foods to reward good behaviour or in exchange for good behaviour, so the responses to these items were not consistent with their responses to other items on the Restriction scale. It is unlikely that this was due to social desirability, with mothers qualifying their responses with an explanation that the strategy would be ineffective at this age even though it can be effective with older children. However, a number of mothers used the term 'bribe' when answering this question so that it's possible that they equated rewards and bribes. Mothers may use these foods as positive reinforcers for certain behaviours (e.g., being good at the shop) or in certain situations (e.g., in special outings or to comfort the child) and these may not be

considered rewards. This was not explored in the interview but may reflect more culturally acceptable practices.

Responses to the items on the Restricted Access Questionnaire also lacked variability. Most mothers limited the amount, availability and opportunities for the child to consume these foods. There was more variability in mothers' feelings about other people giving their toddler sweets, and their attitudes about confining the consumption of these foods to special occasions. The applicability of two items (keeping track of consumption and keeping food out of reach) was questionable to children who had very low access to these foods. It should be noted that this study asked parents to respond to the Restricted Access Questionnaire in the context of sweets and snack foods in general. This approach differs from its measured use with specific foods and this may have influenced parents' responses.

There are a number of possible reasons for the low variability in responses to CFQ Restriction, CFQ Monitoring and the Restricted Access Questionnaire. In the first instance, it may be due to the small and homogenous sample of parents who took part in the study. It is possible that a larger more diverse sample would have produced a greater spread of responses. Limits to the spread of responses may also reflect the high level of maternal responsibility for feeding at this age. Toddlers had very little autonomy over their food choices and children's main source of snack foods was the mother and a limited number of other caregivers. Many of the items that were developed to reflect high levels of parent control in older children appeared to reflect a more typical mother-child feeding relationship in younger children. Nonetheless, it was certainly not the case that this group of mothers had similar feeding practices. Although all mothers agreed that sweets and snack foods should be limited in the diet, they had diverging views on whether these foods should be available in the home, and whether they should be limited to special occasions. There were also different opinions on the best way to manage children's consumption of foods at a party, including whether the children should be allowed to have these foods and make choices for themselves. The high level of control in this sample may be typical of mothers of young children in the context of

managing sweets and snack food intake. New measures are required that tap into these divergent dietary and feeding beliefs.

Mothers spontaneously reported a range of beliefs about the role of sweets and snack foods in the diet. These have been discussed extensively in the preceding section and will only be touched upon briefly here. There was variation in the frequency of consumption of snack food that was allowed and variation in beliefs about the appropriate level of exposure to these foods. The toddlers varied considerably in how much their parents allowed them to have access to sweets and snack foods. The implication of mothers 'restrictive' practices varied depending on the child's level of access to sweets and snack foods. It is therefore important to consider how much mothers allow their child access to sweets and snack foods when asking mothers about their feeding practices in this context.

Analysis of the interviews highlights the complexity of mother's beliefs about sweet and snack food intake. It is noteworthy that the mothers' level of confidence that their children were consuming the 'right amount' of foods was very high. No mother thought that their child was having too many energy-dense foods. It is possible that this may be an accurate reflection of the child's diet in many cases. Alternatively, this level of optimism about the child's diet may also be a characteristic of older, high SES mothers. In essence, all mothers thought they were doing the right thing and their agreement with many of the statements in the interview reflects this optimism. It is very difficult to avoid value-laden statements on this topic (for example, 'I have to be sure my child doesn't eat too many sweets', 'I limit the amount of this food my child is allowed to eat') and this may explain why so many mothers responded in exactly the same way to many of the items on the existing measures. The qualitative analysis provided some insight into the different feeding practices, attitudes and beliefs that defined parents' perceptions of acceptable limits for their toddler.

It is also important that the language used in a questionnaire encourages honest responses. It wasn't until the mothers spoke freely about their feeding practices that the differences in parent feeding practices became apparent. There were many examples where



these differences could be positioned on a continuum from restrictive, through to more balanced, through to less restrictive. One example is the mothers' beliefs about the role of sweets and snack foods in the child's diet: that they are unnecessary and should be avoided for as long as possible (high restriction); they are an acceptable part of the diet but are not a daily food (balanced); and they are an acceptable part of the daily diet (less restrictive). It is therefore meaningful to conceptualise restrictive practices on a continuum.

Concern about toddlers' overweight was also explored and was found to differ depending on the nature of the question. Concern about overweight is an important aspect of the model of obesity proneness. Costanzo and Woody (1985) propose that controlling feeding practices in combination with concern about the child's weight may lead to maladaptive and obesity promoting eating behaviours in children. Only 2 out of 21 mothers in the sample indicated that they were currently concerned about their child being overweight. This is consistent with other studies that find that most caregivers of young children do not readily express concerns about overweight (Adams, Quinn, & Prince, 2005; Baughcum, Burklow, Deeks, Powers, & Whitaker, 1998). Only 1 child in the sample was classified as overweight, with a weight-for-length above the 97th percentile. The child's mother in this particular case was concerned about the child being overweight. It is possible that there may be recognition of overweight for children at the extreme end of the distribution. It is interesting that 41% of mothers thought that their child was vulnerable to becoming overweight and this was attributed to genetic and environmental factors. Perception of child vulnerability to overweight was associated with a higher maternal BMI, suggesting that heavier mothers do recognise their child's genetic susceptibility to overweight. It is not surprising therefore that 36% of mothers expressed some level of concern 'that child might become overweight (CFQ Concern item 1)'. The wording of this item was altered from the original CFQ Concern where it was worded in the present tense. In future research it will be important to include questions that reflect mothers' future concerns about their child's weight to elicit a greater spread of responses.

A limitation of this study is that the analysis of parent management of snack foods was based on a small sample of well educated parents. It is not known whether these findings are applicable outside this context and it is possible that other important themes may have been revealed in a different sample. On the other hand, the predictive validity of the CFQ is based on research in well-educated samples. If the measures of restriction are applicable in toddlers, it is likely that they would be most applicable in a well-educated sample. Another limitation is that the interviews were not taped-recorded and therefore the completeness of parents' responses was not captured.

In conclusion, the construct of Restriction is relevant to mothers with children under the age of 2 years but existing measures do not appear to capture the variability in parental control behaviours and attitudes evident in the interviews. Parents control their toddlers intake of snack foods in a variety of ways including availability to foods (whether they allow access or restrict access), rigidity in feeding practices (whether they have firm rules or flexible rules), and taking responsibility for feeding (whether the parent is responsible for the toddler's snack food choices or allows other people to be responsible for making these choices). Rigidity in feeding practices is also relevant to social occasions, although the parent's approach at social occasions may vary from their usual approach. Parent-child responsibility for feeding (whether the parent decides or allows the child to make food choices) appears to be a particularly important influence at social occasions. All of these factors are influenced by confidence in parenting (whether the parent is confident in their skills or finds it difficult to manage challenging situations or the demands of the child), and the toddler's attraction to snack foods (whether the toddler is aware or unaware of snack food). The development of a new measure that quantifies these key concepts will be required to progress understanding in this area. The main advantage of these conceptualisations, provided they can be reliably measured, is that they correspond closely with parents' reports of toddlers' snack food consumption, whereas the CFQ restriction scale and the Restricted Access Questionnaire did not appear to correspond with parent behaviour.

The benefits of a more comprehensive measure of parental control behaviours and attitudes will allow the exploration of parental control, a psychological risk for overeating and overweight, whether this impacts early in life, and whether this style of feeding aggregates in families that have a genetic susceptibility to overweight and obesity.