



Queensland University of Technology
Brisbane Australia

This is the author's version of a work that was submitted/accepted for publication in the following source:

Jansen, Elena, Daniels, Lynne, & Nicholson, Jan (2011) The dynamics of parenting and early feeding - constructs and controversies : a viewpoint. *Early Child Development and Care*. (In Press)

This file was downloaded from: <http://eprints.qut.edu.au/47812/>

© Copyright 2012 Routledge

This is a preprint of an article submitted for consideration in the [Early Child Development and Care] © [in press] [copyright Taylor & Francis]; [Early Child Development and Care] is available online at: www.tandfonline.com

Notice: *Changes introduced as a result of publishing processes such as copy-editing and formatting may not be reflected in this document. For a definitive version of this work, please refer to the published source:*

Please cite this article as follows:

Jansen, E., Daniels, L.A., & Nicholson, J.M. (in press). The dynamics of parenting and early feeding - constructs and controversies: a viewpoint. *Early Child Development and Care*.

The dynamics of parenting and early feeding - constructs and controversies: a viewpoint.

Elena Jansen¹, Lynne A Daniels¹ and Jan M Nicholson^{2,3}

¹ *Institute of Health and Biomedical Innovation, School of Public Health, Queensland University of Technology, Brisbane, Australia;* ² *Parenting Research Centre, Melbourne, Australia;* ³ *Centre for Learning Innovation, Queensland University of Technology, Brisbane, Australia*

Corresponding author: Professor Lynne A Daniels

E-mail: l2.daniels@qut.edu.au

Address:

Institute of Health and Biomedical Innovation (IHBI), School of Public Health (SPH)
Queensland University of Technology (QUT)
60 Musk Ave Kelvin Grove Qld 4059, Australia

Phone: 07 3138 6139

Fax: 07 3138 6030

Abstract

There is increasing evidence that parenting and feeding interact to influence children's eating behaviour and weight status. Interpretation of existing research is complicated by the lack of consensus in the conceptualisation and measurement of both 'parenting' and 'feeding', particularly the distinction between 'styles', 'dimensions' and 'practices'. In addition, the lack of validated tools to concurrently assess feeding practices in infancy limits the capacity to examine the relationships between parenting and feeding in infancy and their short- and long-term influence on weight status. In this paper we provide an overview of the constructs examined in this emerging area of research, highlight the conceptual, definitional and measurement challenges and propose a unifying model to aid design and the interpretation of intervention studies. Progress on these methodological issues will contribute to the robust evidence required to justify investment in interventions that focus on parenting and feeding in the context of child obesity prevention.

Keywords: parenting, feeding, styles, practices, conceptualisation, measurement

The rising prevalence of childhood overweight amongst populations that are largely genetically stable (Mulder, Kain, Uauy, & Seidell, 2009) has focussed attention on environmental factors that shape the early learning of health-related behaviours (Izuel, Escribano, de la Torre Casares, García, & Maggioni, 2008). Eating and activity patterns are established in infancy, continue into childhood and beyond and are key determinants of healthy weight status (Birch & Davison, 2001; S. Robinson, et al., 2007). From infancy, what, when and how much children eat, is determined by the interaction between the child's behaviour (including their cues of hunger and emotional states), the parent's recognition of and responsiveness to these cues, and the parent's beliefs and attitudes regarding nutrition and child-rearing more generally. These parent-child interactions around food and eating shape the development of food preferences and dietary self-regulation, (Birch, 2006; Hetherington, Cecil, Jackson, & Schwartz, 2011) and offer a plausible focus for early life interventions to prevent childhood overweight. However, understanding the specific ways in which parent-child interactions shape children's eating and influence weight is still in its relative infancy. In this paper we provide an overview of the constructs examined in this emerging area of research, highlight the conceptual, definitional and measurement challenges and propose a unifying model to aid design and the interpretation of feeding practices research. We then provide an overview of what is known about the relationship between parent-child interactions in early childhood and children's eating and/or weight. In particular, we examine the extent to which parents' general approaches to raising their child ('parenting') and providing their child with food and nutrition ('feeding') are inter-related and associated with children's eating and/or weight. We conclude with recommendations for advancing research in this area.

The construct of parenting

‘Parenting’ refers to child-rearing activities which aim to promote and support development across a range of domains (Davies, 2000). Although widely used, there is little consensus about how parenting can be conceptualised and measured (T. G. O’Connor, 2002; Sleddens, Gerards, Thijs, de Vries, & Kremers, 2011). In particular, there is lack of clarity around the constructs of parenting ‘styles’, parenting ‘dimensions’ and parenting ‘practices’. The following description (summarised in Figure 1) presents a model that aims to clarify these constructs and provide a framework for later considering parenting in the context of children’s eating.

[Figure 1 near here]

Parenting styles are regarded as relatively stable traits that are consistent across time and context, and provide the overarching emotional climate for parents’ interactions with their child (Darling & Steinberg, 1993). Traditionally, parenting styles have been characterised using a taxonomical approach based on combining the two **dimensions** of demandingness (control and expectations) and responsiveness (warmth and support) (Darling & Steinberg, 1993) to provide four parenting style typologies: authoritative (high demandingness, high responsiveness), authoritarian (high demandingness, low responsiveness), indulgent/permissive (low demandingness, high responsiveness), and uninvolved/neglectful parenting (low demandingness, low responsiveness) (Maccoby & Martin, 1983). This typology enables parents to be assigned to a single parenting style group. Within white western context, authoritative parenting has been associated with more positive developmental outcomes than the other three parenting styles (Sleddens, et al., 2011), with benefits evident across a range

of areas including children's socio-emotional competence, cognitive ability and health risk behaviours (Baumrind, 1991; Bornstein & Zlotnik, 2009; Jackson, Henriksen, & Foshee, 1998; Lytle, et al., 2003; Smith, 2011).

Parenting dimensions refer to relatively stable parenting practices that are uni-dimensional in nature (in contrast to the styles defined above). In addition to demandingness and responsiveness, other dimensions of parenting practices have been identified: self-efficacy (parental attitudes and beliefs about their competence as parent); irritability or hostility (feelings of anger or frustration towards their child, rejection and emotional reactivity); consistency (the setting and consistent application of age-appropriate rules and expectations); autonomy-encouragement, also referred to as 'inductive reasoning' (behaviours that help the child to learn rules, master tasks in achievable steps, and make own choices); and over-protection (behaviours that involve too much instruction, protection and support relative to the child's capabilities) (Lucas, Maguire, & Nicholson, 2010). Generally, children show better developmental outcomes when exposed to parenting that is high in the dimensions of self-efficacy, consistency and inductive reasoning; and low in the dimensions of irritable/angry affect and over-protectiveness (Bayer, et al., 2011; Wake, Nicholson, Hardy, & Smith, 2007; Zubrick, et al., 2008).

Parenting practices are the context-specific behaviours or strategies parents use (e.g. reprimand or praise), which may vary over time, across situations and with different children (Bornstein & Zlotnik, 2009; Walker & Kirby, 2010). These operationalise the parenting dimensions and styles.

Towards a unified construction of parenting

With recognition in the public health context of parenting as an important determinant

of child physical and emotional well being, numerous self-report measures have been developed for use in large studies (Sleddens, et al., 2011). However, the lack of consistency in how parenting is conceptualised in these measures limits comparisons. To address this issue it may be helpful to borrow concepts and terms from structural equation modelling (SEM), particularly as these are used in the context of measurement and analysis for the purposes of understanding relationships (see Figure 1). Using this analogy, parenting practices are the specific behaviours parents report using by responding to items on a questionnaire. From these practice-based items, dimensions of parenting practices (scales) are constructed to form the equivalent of first order latent variables which are then combined to form categorical, higher order latent variables that describe and allow each parent to be assigned a unique parenting style. In summary, parenting **practices** are *what* parents do, based on directly assessed behaviours, while parenting **styles** refer to *how* parents do it; that is the overall emotional climate characterised by an a priori combination of several dimensions or scales.

Although we have broadly borrowed from SEM concepts, we acknowledge that the relationships between the different levels of variables may be direct or indirect and probably involve complex moderation effects. In addition, although we have described item-level variables as ‘practices’, these often assess a mixture of attitudes, beliefs and behaviours. Many health promotion theories distinguish between attitudes, beliefs and behaviours (Ajzen, 1985; Nnakwe, 2009; Rosenstock, Strecher, & Becker, 1988) and the implications of failing to do so for modelling and understanding relationships between parenting (and feeding) constructs are unclear.

The construct of (parental) feeding

Parenting and feeding are closely related – one of the central tasks of early parenting is

feeding. As interest in the potential relationships between parenting and the development of healthy eating habits and weight status has increased, there has been an attempt to apply the traditional parenting constructs to feeding, with feeding described in terms of ‘styles’ and ‘practices’. Similar to the parenting field, there is lack of clarity regarding definitions and measurement (DiSantis, Hodges, Johnson, & Fisher, 2011). With reference to four commonly used measures of feeding, the following feeding definitions are proposed in an attempt to clarify the variety of terms being used throughout the literature and to align these with our definitions of parenting (summarised in Table 1).

Feeding styles refer to how the parent interacts with the child when it comes to feeding (Enten & Golan, 2008; T. M. O'Connor, et al., 2010). Three tools have been developed to measure ‘feeding styles’ (Hughes, Power, Orlet Fisher, Mueller, & Nicklas, 2005; Thompson, et al., 2009; Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002). However, only one of these (Hughes, et al., 2005) provides a multidimensional construct that parallels the parenting styles taxonomy, while the others measure what we call feeding ‘dimensions’ (see below). Hughes et al. (2005) in the *Caregiver’s Feeding Style Questionnaire (CFSQ)* assess the dimensions of demandingness (defined as ‘how strongly parents encourage eating’) and responsiveness (defined as ‘the ways that parents encourage eating’) which can be combined to describe authoritative, authoritarian, indulgent, and uninvolved feeding styles. However, although the same terminology implies consensus, these definitions of the dimensions of demandingness and responsiveness as used in the feeding context are conceptually quite different to the dimensions used to construct the parenting styles, i.e. control or expectations, and warmth or support as described in the previous section. Besides this discrepancy in the conceptualisation of the two dimensions, they are also

measured in different ways. For instance, while the CFSQ (Hughes, et al., 2005) makes use of the same pool of items to create demandingness as well as responsiveness scores (i.e. overlap in items used to assess each dimension), several parenting questionnaires do not have one scale assessing demandingness and another one assessing responsiveness but rather include items that if summed give an indication of an authoritarian, authoritative or permissive parenting style (e.g. Jackson, Bee-Gates, & Henriksen, 1994; Reitman, Rhode, Hupp, & Altobello, 2002; C. C. Robinson, Mandleco, Olsen, & Hart, 1995). According to the proposed framework, parenting style is only a first order latent variable (i.e. dimension) in these questionnaires. Furthermore, in those questionnaires that measure demandingness and responsiveness separately and construct parenting styles out of these dimensions, a different set of attitudes and behaviours is assessed than in the feeding context. For example, only a single item is used to measure demandingness (Taylor, Wilson, Slater, & Mohr, 2011) while demandingness in feeding is assessed with 19 items (Hughes, et al., 2005); and whereas parenting dimensions are measured based on children's responses (Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg, Elmen, & Mounts, 1989), Hughes et al. (2005) rely on parental reports. Consequently, the question arises whether it is appropriate to transfer this terminology and the constructs from the parenting to the feeding context and provides an explicit example of the inconsistencies in this area.

Dimensions of feeding practices The *Infant Feeding Style Questionnaire* (IFSQ) developed by Thompson et al. (2009) assesses five feeding 'styles' (laissez-faire, responsive, indulgent, restrictive and pressuring). While the names of these appear to correspond to the traditional parenting style taxonomy, each is based on two to four dimensions and there is no combination of scale scores to create a unique multidimensional style for each parent. Thus, the IFSQ 'styles' are more akin to a

unidimensional first-order latent variable. According to the authors, this approach allows the exploration of associations within and across the five ‘styles’, and has revealed some unexpected associations (e.g. strong positive correlations between ‘responsive attention’ and ‘pressuring to finish’) (Thompson, et al., 2009). Indeed the authors conclude that using a typological approach (what we have conceptualised as the second order latent variables of feeding styles) may obscure relevant associations, which further supports conceptualising the IFSQ scales as being dimensional (scaled) measure of feeding practices rather than ‘styles’. In addition, redefining these scales as dimensions provides consistency with the dimensions assessed by other measures (as shown in Table 1), and overcomes for example, the confusion that ‘responsive feeding’ was measured as a ‘style’ in the IFSQ and as a ‘dimension’ in the CFSQ .

The *Parental Feeding Style Questionnaire* (PFSQ) (Wardle, et al., 2002) assesses four aspects of feeding (emotional feeding, instrumental feeding, prompting/encouragement to eat, and control over eating) using items that describe very specific feeding practices (e.g. ‘*I praise my child if she eats what I give her*’). Again, while the name of the questionnaire implies the measurement of ‘styles’, we argue that conceptually, the scales are unidimensional, parents are not assigned a unique feeding style, and therefore are more akin with ‘dimensions’ of feeding practices.

[Table 1 near here]

The most widely used tool to assess feeding practices is the *Child Feeding Questionnaire* (CFQ) (Birch, et al., 2001). It contains seven scales assessing weight-related cognitions (e.g. perception of own weight, perceptions and concern about child’s weight) and parental control over feeding (‘pressuring’, ‘monitoring’ and ‘restriction’).

While numerous studies have used these later three CFQ scales to assess ‘controlling feeding practices’ (Hurley, Cross, & Hughes, 2011), within our proposed framework, the dimensions of pressuring, monitoring and restriction could potentially be combined to form an overall measure of controlling feeding style conceptually equivalent to a second-order latent variable. Though, we are not aware of any study that has done so.

Feeding practices are the situation-specific behaviours or strategies that parents use to manage how much, when and what children eat (Ventura & Birch, 2008; Vereecken, Legiest, De Bourdeaudhuij, & Maes, 2009). These specific behaviours (or attitudes or beliefs) are assessed through parents’ responses to questionnaire items and are combined to form dimensions of feeding practices (first-order latent variables) (see Figure 1).

Other aspects of feeding that are important in early life include breast feeding, formula feeding, and the use and timing of complementary (solid) feeding. While referred to in the literature as ‘feeding practices’ (Owen, Martin, Whincup, Smith, & Cook, 2005), to differentiate these from the practices shown in Table 1, we propose the term ‘**feeding mode**’. In addition, an infant may be fed either on demand or to a fixed schedule, which we propose to refer to as a ‘**feeding pattern**’. This may be an indicator of responsive feeding, as feeding on demand requires recognising and responding to the child’s hunger cues (DiSantis, et al., 2011; Saxon, Gollapalli, Mitchell, & Stanko, 2002). These aspects of early feeding are potentially important moderators in any relationship between parenting, feeding and infant/child outcomes but have rarely been included in statistical modelling.

The relationships between parenting and feeding

As evident from the discussion above, parenting and feeding can be seen as two

distinctive, but potentially related constructs. As shown in Table 1, generalising the constructs of parenting styles and dimensions to early feeding is inherently plausible, but to date there is little evidence that these concepts are directly transferable and relevant. Furthermore, there is limited agreement or even explicit discussion regarding exactly which feeding practices would conceptually fit within which feeding dimensions and styles, and the related content and construct validities have not been adequately established. How these dimensions of feeding then relate to the corresponding parenting dimensions has not been explored (e.g. how closely related are responsive parenting and responsive feeding?).

Consistent with our framework, it has been argued that it is important to distinguish parenting and feeding. For example, Rhee (2008) positions specific feeding practices, within the broader context of parenting, which in turn is shaped by the wider family environment. However, many authors have used the parenting and feeding constructs interchangeably (Birch & Ventura, 2009; Ventura & Birch, 2008).

There is growing evidence that parenting is related to child weight (Chen & Kennedy, 2004; Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006; Topham, et al., 2010; Wake, et al., 2007). However, what is not clear is whether parenting influences children's weight by determining how parents feed their children (i.e., feeding as a mediator) (Blissett & Haycraft, 2008; Duke, Bryson, Hammer, & Agras, 2004; Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008; Hughes, et al., 2005) or if parenting alters the influence of feeding on child weight (i.e., parenting as a moderator) (Gubbels, et al., 2009; Kremers, Brug, de Vries, & Engels, 2003). These alternatives are shown in Figure 2 and explained below.

[Figure 2 near here]

Does feeding mediate the relationship between general parenting and child weight?

Feeding is more domain specific than general parenting. It is plausible that ‘how’ and ‘what’ parents feed their child reflects their broader approach to parenting, that is, the way parents feed their child is related to the way they ‘parent’ (Fisher & Birch, 1999). Thus, a more controlling parenting style would translate into a tendency to be more controlling when feeding the child. This assumes that feeding is more proximal to the child’s eating/weight than parenting (Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2010), and the influence of parenting on eating/weight arises as a result of the influence of parenting on feeding (see Figure 2, paths a and b).

Relationships between parenting and feeding have been examined in five studies (Blissett & Haycraft, 2008; Brann & Skinner, 2005; Duke, et al., 2004; Hubbs-Tait, et al., 2008; Hughes, et al., 2005). Three studies showed correlations between general parenting **styles** and dimensions of feeding **practices** assessed using the *Child Feeding Questionnaire* (CFQ) (Birch, et al., 2001) in support of a mediation pathway (Blissett & Haycraft, 2008; Hubbs-Tait, et al., 2008; Hughes, et al., 2005). For example, authoritarian parenting style was associated with feeding that involves higher pressure and restriction, and lower monitoring (Hubbs-Tait, et al., 2008). However, as the CFQ (Birch, et al., 2001) focuses on the ‘control’ aspects of feeding it is not clear yet if and how other feeding dimensions are related to parenting style.

Hughes et al. (2005) measured general parenting dimensions, feeding styles and dimensions of feeding practices to test the convergent validity of the *Caregiver’s Feeding Style Questionnaire*. While there was a correlation between feeding styles (i.e.,

authoritative, authoritarian, indulgent, uninvolved) and parenting dimensions, these parenting dimensions did not directly correspond to the dimensions they used to construct feeding styles; that is demandingness and responsiveness. Instead, the Parenting Dimensions Inventory (Power, 2002) assessed the following nine parenting dimensions: nurturance, inconsistency, following through on discipline, organization, letting situation go, physical punishment, material/social consequences, reasoning and reminding. Furthermore, none of these parenting dimensions were combined into styles. To our knowledge, there are no studies that have directly related parenting **styles** to feeding **styles** and parenting **practices** to feeding **practices**.

The conclusion that feeding is a reflection of parenting requires further consideration. All the studies that found evidence of relationship between these constructs were cross-sectional and only provided correlational evidence (Blissett & Haycraft, 2008; Hubbs-Tait, et al., 2008; Hughes, et al., 2005). In contrast, Brann et al. (2005) and Duke et al. (2004) found little association between parenting and feeding. Notably, Duke et al.'s study was the only longitudinal one while Brann et al.'s study included the oldest children. Moreover, none of the studies considered the potential confounding role of factors such as early feeding mode and feeding pattern.

Does parenting moderate the effects of feeding on child weight?

An alternative perspective is that parenting styles influence the way that specific parenting and feeding practices are executed and set the context for the degree to which they support healthy weight status (Gubbels, et al., 2009; Rhee, 2008). This postulates parenting as a moderator of the relationship between feeding and child weight (Figure 2, path c). For example, controlling feeding practices (like the restriction of desirable

foods) might work well for parents with an authoritative style but may be less successful for those who are typically more indulgent or disengaged (Kremers et al., 2003). In support of this hypothesis, Van der Horst et al. (2007) found that the general parenting style had differential impact on children's consumption of sweetened beverages; controlling feeding only reduced consumption when parents engaged in moderately strict and highly involved parenting.

Both hypotheses – feeding as mediator or parenting as moderator – imply a need to distinguish between the broad constructs of parenting and feeding and examine how they independently or together interact to influence child weight. As indicated by Figure 2 all three constructs need be measured and simultaneously integrated to investigate individual relationships (e.g., does parenting remain associated with child weight when feeding is entered in the same model?).

To our knowledge only one cross-sectional study (n= 99; 6- to 11-year-old children) has integrated all three constructs in one model. Hennessy et al. (2010) tested for moderation effects to investigate whether general parenting remains associated with child weight when child feeding is entered in the same model and to explore changed relationships between (parenting and feeding) practices and child weight depending on (parenting and feeding) style. The following tools were used to assess feeding practices, feeding styles and parenting styles respectively: Child Feeding Questionnaire (Birch, et al., 2001), Caregiver's Feeding Style Questionnaire (Hughes, et al., 2005), and Parenting Dimensions Inventory (Power, 2002) . Briefly, their results adjusted for parental weight and confounders, showed (a) moderate agreement (i.e., agreement for only 1/3 of participants) between parenting styles and feeding styles; (b) feeding style

but not parenting style was associated with child weight status¹, and (c) feeding style was a significant moderator of the relationship between restrictive feeding practices and child weight (i.e., higher restriction was associated with lower child weight for the involved but not the uninvolved feeding style group). However, no moderation was found for the relationship between pressuring or monitoring feeding practices and child weight. Results suggest that in this study, only aspects of feeding, not parenting, styles moderated the influence of feeding practices on child weight. Although important, this study is limited by the cross-sectional study design, a small sample of older children (mean age = 9 years) from disadvantaged rural communities in the US, and the analyses were likely to have been underpowered with consequent risk of Type II error.

Limitations of research to date

The plasticity of infancy potentially offers the opportunity to mould desirable behaviours rather than change entrenched adverse habits (Anzman, Rollins, & Birch, 2010). This is particularly pertinent to the prevention of 'obesogenic' lifestyle behaviours. However, most of the studies that have examined the relationships between parenting, feeding and child weight status have involved school-aged children and are cross-sectional and observational (Anzman, et al., 2010; Birch & Ventura, 2009; Hesketh & Campbell, 2010; Skouteris et al., 2011b; Ventura & Birch, 2008). These relationships are plagued by reverse causality whereby parents adjust their feeding practices in response to real or perceived child weight status. The lack of prospective longitudinal and intervention studies starting in infancy limits our understanding of

¹ Due to the fact that parenting styles were not associated with child weight status, its moderating effect on the relationship between feeding practices and child weight status could not be tested as the following step in this study.

early mechanisms and in turn limits identification of modifiable factors that should be targeted in interventions aiming to prevent child obesity.

Parenting research is characterised by a wide range of parenting tools that assess diverse aspects of parenting (Smith, 2011). Few can be classified as comprehensive and most were not specifically designed to assess universal parenting beyond the clinical setting. When applied to a community sample, such measures are likely to be highly skewed to the positive and lack the sensitivity to capture small variations in ‘normal/adequate’ parenting. There is considerable variation in definitions and terms, and little evidence to identify which specific parenting practices, dimensions and styles are most relevant to the feeding and obesity prevention context.

In contrast, the feeding literature has been dominated by a single tool, the *Child Feeding Questionnaire* (CFQ) (Birch et al., 2001). Generally only three of the seven original scales are used, which assess dimensions of control. Although this facilitates comparison across studies, the CFQ represents a relatively narrow interpretation of feeding, overlooking a range of potentially important dimensions of feeding such as emotional feeding (Musher-Eizenman & Holub, 2007; Ogden, Reynolds, & Smith, 2006). While the CFQ has not been validated for use in infants, the *Infant Feeding Questionnaire* (Baughcum et al., 2001) is one of the few feeding measures designed for use in children under two years. However, this tool asks mothers to retrospectively report of their feeding practices over the first year of the child’s life – a period of very significant developmental change – and the validity of this retrospective approach is unclear. The paucity of validated tools to concurrently assess feeding practices in infancy limits the capacity to undertake longitudinal studies starting in infancy that would inform our understanding of early mechanisms, including bi-directionality of relationships between feeding and parenting, and their short-and longer-term effect on

weight status. More broadly there has been little consideration of the applicability of different feeding practices assessment tools across developmental stages and how this might influence outcomes. This may have contributed to contradictory findings across studies.

Assessment of parenting and feeding in the public health context requires the use of self-report questionnaires which raises the potential for acquiescence bias. The alternative approach of observing parent-child feeding interactions generally shows poor agreement with self-reported feeding practices (Klesges et al., 1983; Klesges, Malott, Boschee, & Weber, 1986; Sacco, Bentley, Carby-Shields, Borja, & Goldman, 2007). However, observational methods capture a snapshot of the feeding interaction during a single meal and may not accurately assess *typical* parent-child (feeding) interactions, while self-report questionnaires aim to assess ongoing, steady-state feeding interactions (Faith, Scanlon, Birch, Francis, & Sherry, 2004). Consequently, there are likely to be validity issues with both approaches.

An important limitation of both parenting and feeding measurement tools is that they have largely been developed and implemented in well-educated, Caucasian families living in the US or England (Birch, Dietz, & American Academy of Pediatrics., 2008; Bornstein & Zlotnik, 2009). Both parenting and feeding are strongly influenced by cultural beliefs and tradition and use of tools in culturally diverse samples for which they have not been validated is inappropriate. This cultural bias in tools limits the generalisability of the current evidence to more diverse cultural and ethnic contexts. It should also be noted that the feeding practices research has almost exclusively focussed on mothers. While the terms 'parenting' and 'parent-child' interactions predominate in both the theoretical and research literatures, it is 'mothering' and 'mother-child' interactions that have been examined. In light of emerging evidence that fathers may

influence their child's eating and/or weight in ways that differ from mothers (Wake et al., 2007) the research considered here cannot be assumed to be generalisable to fathers.

In summary, there are a range of methodological challenges in assessing parenting and feeding and exploring the relationships between these constructs and with healthy weight status in the context of obesity prevention. In this public health context, assessment of parenting and feeding is almost entirely by self-report questionnaires and the lack of valid tools to prospectively assess very early feeding practices limits the capacity to undertake longitudinal studies starting in infancy. There are significant definitional issues both within and between parenting and feeding fields that require caution in extrapolating from one to the other and limit comparison between studies.

Summary and recommendations

This paper has highlighted a range of definitional issues. The untested assumption that the traditional parenting typology can be readily extended into the feeding construct has contributed to these inconsistencies. Some authors such as Ventura et al. (2008) in their review have gone as far as combining parenting and feeding into a single construct of 'parenting' and have then examined evidence for associations with child weight and eating. However, we have argued that parenting and feeding differ conceptually, and this is likely to be reflected in the stability, variability and modifiability of these constructs. We agree with authors such as Rhee (2008) and Skouteris et al. (2011a) that until evidence indicates otherwise, parenting and feeding should be retained as distinct constructs. In order to reduce inconsistencies, we suggest that use of the term 'style' is reserved for higher order constructs (i.e., the overarching atmosphere/emotional climate) that group parents based on combinations of 'dimensions', and that 'practices', particularly in the feeding context, describe both the dimensions (first order constructs,

e.g., scales such as restriction or pressure) and the behaviours, attitudes and beliefs described by the individual items.

In recent years parenting research has shifted from a focus on parent behaviours (parent-level factors) towards one that acknowledges child-level factors and emphasises interactions and bidirectionality in the parent-child relationships (Smith, 2011). Similarly, the bidirectional and dynamic nature of the feeding relationship between parent and child that encompasses parenting style, feeding practices, child eating behaviour and weight status, real or perceived, needs consideration. More sophisticated modelling that integrates mediation and moderation analyses that incorporate these factors and a comprehensive range of parental and child covariates (e.g., parent weight status and child temperament) is required to understand the complex reciprocal relationships and interactions between these constructs and weight status outcomes. Longitudinal and intervention studies are required to establish the temporal and causal relationships and to confirm the theoretical potential of early life interventions in establishing healthy eating behaviour and weight. Such study designs and modelling need to be supported by sample sizes large enough to provide adequate power. In addition, they bring a range of measurement challenges. There is a need to standardise terms and definitions and develop tools that provide valid assessment of parenting and feeding (styles and practices) in community samples at different ages and developmental stages. Given the substantial changes, particularly in parenting and feeding practices and child eating behaviour, that are to be expected as the child ages, it may be necessary to develop a series of tools that are designed to assess age-specific behaviours that can be used to create dimensions that can be meaningfully applied across developmental stages. Validation of such tools will require purpose-designed

cohort studies with frequent and detailed assessments of both parent and child behaviours from infancy onwards.

Finally there is a need to extend the research in this area to examine the role of fathers and other significant caregivers in the relationships between parenting, feeding and weight status and the generalisability of these constructs and relationships to different cultural and ethnic contexts. This will require further measurement tool validation and potentially development.

In conclusion there is emerging evidence that there are complex links and bidirectional relationships between parenting, feeding, and children's eating behaviour and weight status. The theoretical rationale for targeting parent behaviours in early life interventions to prevent childhood obesity is strong. However, robust evidence is required to justify investment in universal child health programs that address both parenting and feeding in order to promote health and well being through reduction of obesity risk. Such evidence will require resolution of definitional issues and rigorously developed and validated measurement tools that can be applied across developmental stages.

Acknowledgements

EJ is a PhD student funded by the Queensland University of Technology Postgraduate Award (QUTPRA) and the International Postgraduate Research Scholarship (IPRS)

JN was supported by funding from the Victorian Government Department of Education and Early Childhood Development and an Australian National Health & Medical Research Council Population Health Career Development Award (390136).

References

- Ajzen, I. (1985). From intentions to actions: A Theory of Planned Behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11- 39). Heidelberg, Germany: Springer.
- Anzman, S. L., Rollins, B. Y., & Birch, L. L. (2010). Parental influence on children's early eating environments and obesity risk: Implications for prevention. *International Journal of Obesity*, *34*, 1116-1124. DOI: 10.1038/ijo.2010.43
- Baughcum, A., Powers, S., Johnson, S., Chamberlin, L., Deeks, C., Jain, A., et al. (2001). Maternal feeding practices and beliefs and their relationships to overweight in early childhood. *Journal of Developmental & Behavioral Pediatrics*, *22*, 391.
- Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *The Journal of Early Adolescence*, *11*, 56-95. DOI: 10.1177/02724316911111004
- Bayer, J. K., Ukoumunne, O. C., Lucas, N., Wake, M., Scalzo, K., & Nicholson, J. M. (2011). Risk factors for childhood mental health symptoms: National Longitudinal Study of Australian Children. *Pediatrics*, *128*, e865-e879. DOI: 10.1542/peds.2011-0491
- Birch, L. L. (2006). Child feeding practices and the etiology of obesity. *Obesity*, *14*, 343-344. DOI: 10.1038/oby.2006.45
- Birch, L. L., & Davison, K. K. (2001). Family environmental factors influencing the developing behavioral controls of food intake and childhood overweight. *Pediatric Clinics of North America*, *48*, 893-907.
- Birch, L. L., Dietz, W. H., & American Academy of Pediatrics. (2008). *Eating behaviors of the young child: Prenatal and postnatal influences on healthy eating*. Elk Grove Village, IL: American Academy of Pediatrics.
- Birch, L. L., Fisher, J. O., Grimm-Thomas, K., Markey, C. N., Sawyer, R., & Johnson, S. L. (2001). Confirmatory factor analysis of the Child Feeding Questionnaire: A measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite*, *36*, 201-210. DOI: 10.1006/appe.2001.0398
- Birch, L. L., & Ventura, A. K. (2009). Preventing childhood obesity: What works? *International Journal of Obesity*, *33 Suppl 1*, S74-81. DOI: 10.1038/ijo.2009.22

- Blissett, J., & Haycraft, E. (2008). Are parenting style and controlling feeding practices related? *Appetite*, *50*, 477-485. DOI: 10.1016/j.appet.2007.10.003
- Bornstein, M. H., & Zlotnik, D. (2009). Parenting styles and their effects. In J. Benson & M. Haith (Eds.), *Social and emotional development in infancy and early childhood* (pp. 496-509). Oxford: Academic Press.
- Brann, L. S., & Skinner, J. D. (2005). More controlling child-feeding practices are found among parents of boys with an average body mass index compared with parents of boys with a high body mass index. *Journal of the American Dietetic Association*, *105*, 1411-1416. DOI: 10.1016/j.jada.2005.06.005
- Chen, J.-L., & Kennedy, C. (2004). Family functioning, parenting style, and Chinese children's weight status. *Journal of Family Nursing*, *10*, 262-279. DOI: 10.1177/1074840704264021
- Darling, N., & Steinberg, L. (1993). Parenting style as context - An integrative model. *Psychological Bulletin*, *113*, 487-496. DOI: 10.1037//0033-2909.113.3.487
- Davies, M. (2000). *The Blackwell encyclopedia of social work*. Oxford Wiley-Blackwell.
- DiSantis, K. I., Hodges, E. A., Johnson, S. L., & Fisher, J. O. (2011). The role of responsive feeding in overweight during infancy and toddlerhood: A systematic review. *International Journal of Obesity*, *35*, 480-492. DOI: 10.1038/ijo.2011.3
- Duke, R., Bryson, S., Hammer, L., & Agras, W. (2004). The relationship between parental factors at infancy and parent-reported control over children's eating at age 7. *Appetite*, *43*, 247-252. DOI: 10.1016/j.appet.2004.05.006
- Enten, R. S., & Golan, M. (2008). Parenting styles and weight-related symptoms and behaviors with recommendations for practice. *Nutrition Reviews*, *66*, 65-75. DOI: 10.1111/j.1753-4887.2007.00009.x
- Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research*, *12*, 1711-1722. DOI: 10.1038/oby.2004.212
- Fisher, J. O., & Birch, L. L. (1999). Restricting access to foods and children's eating. *Appetite*, *32*, 405-419. DOI: 10.1006/appe.1999.0231
- Gubbels, J. S., Kremers, S. P. J., Stafleu, A., Dagnelie, P. C., Goldbohm, R. A., de Vries, N. K., et al. (2009). Diet-related restrictive parenting practices. Impact on

- dietary intake of 2-year-old children and interactions with child characteristics. *Appetite*, 52, 423-429. DOI: 10.1016/j.appet.2008.12.002
- Hennessy, E., Hughes, S. O., Goldberg, J. P., Hyatt, R. R., & Economos, C. D. (2010). Parent behavior and child weight status among a diverse group of underserved rural families. *Appetite*, 54, 369-377. DOI: 10.1016/j.appet.2010.01.004
- Hesketh, K. D., & Campbell, K. J. (2010). Interventions to prevent obesity in 0-5 year olds: An updated systematic review of the literature. *Obesity*, 18 Suppl 1, S27-S35. DOI: 10.1038/oby.2009.429
- Hetherington, M. M., Cecil, J. E., Jackson, D. M., & Schwartz, C. (2011). Feeding infants and young children. From guidelines to practice. *Appetite*, 57, 791-795. DOI: 10.1016/j.appet.2011.07.005
- Hubbs-Tait, L., Kennedy, T., Page, M., Topham, G., & Harrist, A. (2008). Parental feeding practices predict authoritative, authoritarian, and permissive parenting styles. *Journal of the American Dietetic Association*, 108, 1154-1161. DOI: 10.1016/j.jada.2008.04.008
- Hughes, S. O., Power, T. G., Orlet Fisher, J., Mueller, S., & Nicklas, T. A. (2005). Revisiting a neglected construct: Parenting styles in a child-feeding context. *Appetite*, 44, 83-92. DOI: 10.1016/j.appet.2004.08.007
- Hurley, K. M., Cross, M. B., & Hughes, S. O. (2011). A systematic review of responsive feeding and child obesity in high-income countries. *Journal of Nutrition*, 141, 495-501. DOI: 10.3945/jn.110.130047
- Izuel, J. M. P., Escribano, J. R. D., de la Torre Casares, M. L., García, S. D., & Maggioni, A. P. (2008). Obesity: A review of current issues, novel therapies, and preliminary findings from the SCOUT trial. *Revista Española de Obesidad*, 6, 121-128. Retrieved from <http://www.seedo.es/Default.aspx?tabid=85>
- Jackson, C., Bee-Gates, D. J., & Henriksen, L. (1994). Authoritative parenting, child competencies, and initiation of cigarette smoking. *Health Education & Behavior*, 21, 103-116. DOI: 10.1177/109019819402100110
- Jackson, C., Henriksen, L., & Foshee, V. A. (1998). The Authoritative Parenting Index: Predicting health risk behaviors among children and adolescents. *Health Education & Behavior*, 25, 319-337. DOI: 10.1177/109019819802500307
- Klesges, R. C., Coates, T. J., Brown, G., Sturgeon-Tillisch, J., Moldenhauer-Klesges, L. M., Holzer, B., et al. (1983). Parental influences on children's eating behavior

- and relative weight. *Journal of Applied Behavior Analysis*, 16, 371-378. DOI: 10.1901/jaba.1983.16-371
- Klesges, R. C., Malott, J. M., Boschee, P. F., & Weber, J. M. (1986). The effects of parental influences on children's food intake, physical activity, and relative weight. *International Journal of Eating Disorders*, 5, 335-345. DOI: 10.1002/1098-108x(198602)5:2<335::aid-eat2260050212>3.0.co;2-t
- Kremers, S. P., Brug, J., de Vries, H., & Engels, R. C. (2003). Parenting style and adolescent fruit consumption. *Appetite*, 41, 43-50. DOI: 10.1016/s0195-6663(03)00038-2
- Lamborn, S. D., Mounts, N. S., Steinberg, L., & Dornbusch, S. M. (1991). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, 62, 1049-1065.
- Lucas, N., Maguire, B., & Nicholson, J. M. (2010). Parenting practices and behaviours. *Australian Institute of Family Studies LSAC Annual Statistical Report 2010* (pp. 43-56). Melbourne: Australian Institute of Family Studies.
- Lytle, L. A., Varnell, S., Murray, D. M., Story, M., Perry, C., Birnbaum, A. S., et al. (2003). Predicting adolescents' intake of fruits and vegetables. *Journal of Nutrition Education and Behavior*, 35, 170-178. DOI: 10.1016/S1499-4046(06)60331-X
- Maccoby, E., & Martin, J. (1983). Socialization in the context of the family: Parent-child interaction. In P. H. Mussen & E. M. Hetherington (Eds.), *Handbook of child psychology: Socialization, personality, and social development* (Vol. 4, pp. 1-101). New York: Wiley.
- Mulder, C., Kain, J., Uauy, R., & Seidell, J. C. (2009). Maternal attitudes and child-feeding practices: Relationship with the BMI of Chilean children. *Nutrition Journal*, 8, 37. DOI: 10.1186/1475-2891-8-37
- Musher-Eizenman, D., & Holub, S. (2007). Comprehensive feeding practices questionnaire: Validation of a new measure of parental feeding practices. *Journal of Pediatric Psychology*, 32, 960-972. DOI: 10.1093/jpepsy/jsm037
- Nnakwe, N. E. (2009). *Community nutrition: Planning health promotion and disease prevention*. Sudbury, MA: Jones & Bartlett Learning.

- O'Connor, T. G. (2002). Annotation: The 'effects' of parenting reconsidered: Findings, challenges, and applications. *Journal of Child Psychology and Psychiatry*, *43*, 555-572. DOI: 10.1111/1469-7610.00046
- O'Connor, T. M., Hughes, S. O., Watson, K. B., Baranowski, T., Nicklas, T. A., Fisher, J. O., et al. (2010). Parenting practices are associated with fruit and vegetable consumption in pre-school children. *Public Health Nutrition*, *13*, 91-101. DOI: 10.1017/S1368980009005916
- Ogden, J., Reynolds, R., & Smith, A. (2006). Expanding the concept of parental control: A role for overt and covert control in children's snacking behaviour? *Appetite*, *47*, 100-106. DOI: 10.1016/j.appet.2006.03.330
- Owen, C. G., Martin, R. M., Whincup, P. H., Smith, G. D., & Cook, D. G. (2005). Effect of infant feeding on the risk of obesity across the life course: A quantitative review of published evidence. *Pediatrics*, *115*, 1367-1377. DOI: 10.1542/peds.2004-1176
- Power, T. G. (2002). Parenting Dimensions Inventory (PDI-S): A research manual. Unpublished manuscript, Washington State University.
- Reitman, D., Rhode, P. C., Hupp, S. D. A., & Altobello, C. (2002). Development and validation of the Parental Authority Questionnaire – Revised. *Journal of Psychopathology and Behavioral Assessment*, *24*, 119-127. DOI: 10.1023/a:1015344909518
- Rhee, K. E. (2008). Childhood overweight and the relationship between parent behaviors, parenting style and family functioning. *Annals of the American Academy of Political and Social Science*, *615*, 12-37. DOI: 10.1177/0002716207308400
- Rhee, K. E., Lumeng, J. C., Appugliese, D. P., Kaciroti, N., & Bradley, R. H. (2006). Parenting styles and overweight status in first grade. *Pediatrics*, *117*, 2047-2054. DOI: 10.1542/peds.2005-2259
- Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (1995). Authoritative, authoritarian, and permissive parenting practices: Development of a new measure. *Psychological Reports*, *77*, 819-830.
- Robinson, S., Marriott, L., Poole, J., Crozier, S., Borland, S., Lawrence, W., et al. (2007). Dietary patterns in infancy: The importance of maternal and family

- influences on feeding practice. *British Journal of Nutrition*, 98, 1029-1037. DOI: 10.1017/s0007114507750936
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education & Behavior*, 15, 175-183. DOI: 10.1177/109019818801500203
- Sacco, L. M., Bentley, M. E., Carby-Shields, K., Borja, J. B., & Goldman, B. D. (2007). Assessment of infant feeding styles among low-income African-American mothers: Comparing reported and observed behaviors. *Appetite*, 49, 131-140. DOI: 10.1016/j.appet.2007.01.004
- Saxon, T. F., Gollapalli, A., Mitchell, M. W., & Stanko, S. (2002). Demand feeding or schedule feeding: Infant growth from birth to 6 months. *Journal of Reproductive and Infant Psychology*, 20, 89-99. DOI: 10.1080/02646830220134586
- Skouteris, H., McCabe, M., Ricciardelli, L. A., Milgrom, J., Baur, L. A., Aksan, N., et al. (2011a). Parent-child interactions and obesity prevention: A systematic review of the literature. *Early Child Development and Care*. Advance online publication. DOI: 10.1080/03004430.03002010.03548606
- Skouteris, H., McCabe, M., Swinburn, B., Newgreen, V., Sacher, P., & Chadwick, P. (2011b). Parental influence and obesity prevention in pre-schoolers: A systematic review of interventions. *Obesity Reviews*, 12, 315-328. DOI: 10.1111/j.1467-789X.2010.00751.x
- Sleddens, E. F. C., Gerards, S. M. P. L., Thijs, C., de Vries, N. K., & Kremers, S. P. J. (2011). General parenting, childhood overweight and obesity-inducing behaviors: A review. *International Journal of Pediatric Obesity*, 6(2-2), e12-e27. DOI: 10.3109/17477166.2011.566339
- Smith, M. (2011). Measures for assessing parenting in research and practice. *Child and Adolescent Mental Health*, 16, 158-166. DOI: 10.1111/j.1475-3588.2010.00585.x
- Steinberg, L., Elmen, J. D., & Mounts, N. S. (1989). Authoritative parenting, psychosocial maturity, and academic success among adolescents. *Child Development*, 60, 1424-1436.
- Taylor, A., Wilson, C., Slater, A., & Mohr, P. (2011). Parenting and child body mass index: Longitudinal investigation of maternal and paternal influence. *Australian*

- Journal of Psychology*. Advance online publication. DOI: 10.1111/j.1742-9536.2011.00024.x
- Thompson, A. L., Mendez, M. A., Borja, J. B., Adair, L. S., Zimmer, C. R., & Bentley, M. E. (2009). Development and validation of the Infant Feeding Style Questionnaire. *Appetite, 53*, 210-221. DOI: 10.1016/j.appet.2009.06.010
- Topham, G. L., Page, M. C., Hubbs-Tait, L., Rutledge, J. M., Kennedy, T. S., Shriver, L., et al. (2010). Maternal depression and socio-economic status moderate the parenting style/child obesity association. *Public Health Nutrition, 13*, 1237-1244. DOI: 10.1017/S1368980009992163
- van der Horst, K., Kremers, S., Ferreira, I., Singh, A., Oenema, A., & Brug, J. (2007). Perceived parenting style and practices and the consumption of sugar-sweetened beverages by adolescents. *Health Education Research, 22*, 295-304. DOI: 10.1093/her/cyl080
- Ventura, A. K., & Birch, L. L. (2008). Does parenting affect children's eating and weight status? *International Journal of Behavioral Nutrition and Physical Activity, 5*, 15. DOI: 10.1186/1479-5868-5-15
- Vereecken, C., Legiest, E., De Bourdeaudhuij, I., & Maes, L. (2009). Associations between general parenting styles and specific food-related parenting practices and children's food consumption. *American Journal of Health Promotion, 23*, 233-240. DOI: 10.4278/ajhp.07061355
- Wake, M., Nicholson, J. M., Hardy, P., & Smith, K. (2007). Preschooler obesity and parenting styles of mothers and fathers: Australian National Population Study. *Pediatrics, 120*, E1520-E1527. DOI: 10.1542/peds.2006-3707
- Walker, L., & Kirby, R. (2010). Conceptual and measurement issues in early parenting practices research: An epidemiologic perspective. *Maternal and Child Health Journal, 14*, 958-970. DOI: 10.1007/s10995-009-0532-8
- Wardle, J., Sanderson, S., Guthrie, C. A., Rapoport, L., & Plomin, R. (2002). Parental feeding style and the inter-generational transmission of obesity risk. *Obesity Research, 10*, 453-462. DOI: 10.1038/oby.2002.63
- Zubrick, S., Smith, G., Nicholson, J., Sanson, A., Jackiwicz, T., & the LSAC Research Consortium. (2008). *Parenting and families in Australia. Social Policy Research Paper No. 34*. Australian Government Department of Families, Housing, Community Services and Indigenous Affairs.

Tables and figures

Table 1. Overview of the terminology commonly used to describe parenting and feeding categorised according to the proposed framework of styles, dimensions and practices.

Note that terms in italics although common to both have different meanings.

| Construct | Parenting | Feeding (measure)¹ |
|--|--|---|
| Styles | <i>Authoritative</i> <i>Authoritarian</i> <i>Indulgent/ permissive</i> <i>Uninvolved/ neglectful</i> | <i>Authoritative</i> (CFSQ) <i>Authoritarian</i> (CFSQ) <i>Indulgent</i> (CFSQ) <i>Uninvolved</i> (CFSQ) Over-control (pressuring, restriction, monitoring) ² |
| Practices: Dimensional measures | <i>Warmth/ responsiveness</i> <i>Control/demandingness</i> Self-efficacy Irritability/hostility Consistency Autonomy-encouraging Over-protectiveness | <i>Responsiveness</i> (CFSQ; IFSQ) <i>Control</i> over eating (CFSQ; PFSQ; IFSQ 'indulgent' i.e. lack of control) Emotional feeding (PFSQ) Instrumental feeding (PFSQ) Pressuring (IFSQ; CFQ)/ encouragement (PFSQ) Restriction (IFSQ; CFQ) Monitoring (CFQ; IFSQ 'laissez-faire' i.e. lack of monitoring) |
| Practices: Behaviour, attitudes & | Context-specific parent behaviours with child | Context-specific behaviours, related to how much, when and what child eats |

| | | |
|---------------|--|--|
| beliefs items | | |
| Other | | <u>Feeding Mode</u> : breast feeding, formula feeding and/or complementary (solid) feeding <u>Feeding Pattern</u> : on demand versus schedule |

¹ CFSQ = Caregiver's Feeding Style Questionnaire (Hughes, et al., 2005); ISFQ = Infant Feeding Style Questionnaire (Thompson, et al., 2009); PFSQ = Parental Feeding Style Questionnaire (Wardle, et al., 2002); CFQ = Child Feeding Questionnaire (Birch, et al., 2001).

² Over-control is suggested as a higher order construct (i.e. a style) given several underpinning control dimensions, but has not yet been modelled as such in the literature.

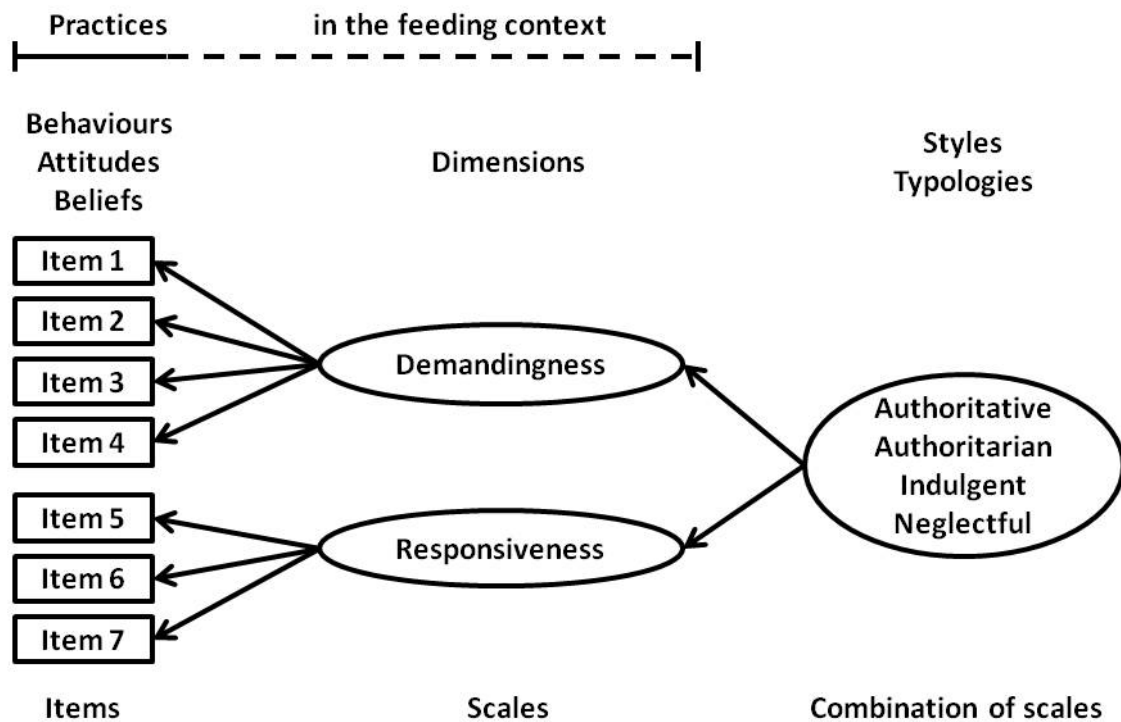


Figure 1. Suggested framework for the distinction between parenting and feeding ‘practices’, ‘dimensions’, and ‘styles’

Note: As indicated by the dotted line, ‘practices’ within the feeding context can be used to describe both the dimensions (first order constructs, e.g. scales such as restriction or pressure) and the behaviours, attitudes and beliefs describe by individual items. For instance, ‘pressure to eat’ refers to a specific behaviour but also describes a dimension within the CFQ (Birch, et al., 2001)

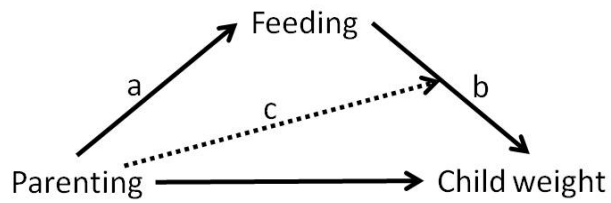


Figure 2. Potential interrelationships between general parenting, parental feeding, and child weight.

Note: Physiologically any relationship between either parenting and/or feeding and child weight status has to be mediated by variety and amount of food eaten by the child, i.e., child eating behaviour.

The three pathways refer to the following relationships:

a) *Parenting and feeding*

b) *Feeding and child weight*

a & b) *Feeding as the mediator of the relationship between parenting and child weight*

c) *Parenting as the moderator of the relationship between feeding and child weight*

