

Chapter 5

Feeding Styles and Child Eating Behaviors: A Multi-Method Approach



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Abstract During the early twentieth century, research on child eating targeted the type of food children ingested and the adequacy/deficiency of nutrients in their diets. Simultaneously, psychologists were studying how parents socialize their children into becoming adults. Subsequently, a multidisciplinary field emerged regarding the development of child eating behaviors grounded in the idea that parents play an important role in socializing children's eating. Early studies showed that patterns of general parenting were associated with child eating and obesity risk. However, subsequent studies focusing on feeding children provided a more proximal target for studying eating behaviors in the family context. Consequently, the construct of feeding styles emerged in the literature. Numerous studies over the past two decades have shown that feeding styles are differentially associated with child outcomes, with the most consistent relationships found between the indulgent feeding style, problematic child eating, and higher weight status. Interest in feeding styles led to the question of the stability of feeding styles over situations and time. Whether parents exhibit the same feeding behaviors across meals and situations or whether feeding varies over time is an important question for prevention research. This chapter covers the stability of common self-reported and observed feeding in studies among families with low-income levels. Additionally, the direction of effects—whether child weight predicts parental feeding or if parental feeding predicts later child weight—is also presented. Intervention programs may choose to target parental feeding behaviors at young ages to prevent the development of childhood obesity.

Keywords Feeding styles · Feeding practices · Child eating behaviors · Childhood obesity · Child socialization · Stability of feeding · Authoritative feeding · Authoritarian feeding · Controlling feeding · Indulgent feeding · Uninvolved feeding · Problematic child eating · Socializing children's eating · Parental feeding · Caregiver's Feeding Styles Questionnaire

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The Greek physician Hippocrates (400 B.C.) has been credited with saying, “Let thy food be thy medicine and thy medicine be thy food” (Witkamp & van Norren, 2018). This exact quotation does not appear in any of the recovered writings of Hippocrates. Nonetheless, nutrition has been a core element in traditional western medicine since that time. This early recognition of the importance of food and its impact on health, as well as food’s role in the prevention of illness, has had a major influence on the study of eating behaviors, especially in children.

History of Parent Feeding and Child Eating Literature

Child eating behaviors and parent feeding have received a plethora of interest from a number of disciplines including pediatrics, nutrition, and psychology. Historically, the major focus of child eating among pediatricians and nutritionists was on the importance of adequate physical growth and development during pregnancy, infancy, and childhood (Kleinman, Barness, & Finberg, 2003). In the early twentieth century, research related to growth focused on the significance of nutrients in the child’s diet. Beginning in 1912 with the discovery of vitamins by Casimir Funk (Kucharz, Shampo, & Kyle, 1994) and extended by the work of Eijkman and Hopkins who received the Nobel Prize in 1929 (Raju, 1998), the relationship between various vitamins and child growth was identified. Similarly, the role of iron in human health was discovered by Mackay in 1928, which increased our understanding of the incidence of respiratory and diarrheal diseases in infants (MacKay, 1928). Throughout the next four decades, scientists continued to focus on the role of deficiencies in micronutrients such as iron, zinc, and others in the growth and development of young children (Kleinman et al., 2003). Therefore, prior to the 1970s, research related to child eating and growth targeted the type of foods children ingested, focusing primarily on the nutrients in those foods and nutrient adequacy or deficiencies in the child’s diet.

Simultaneously, during the early part of the twentieth century, psychologists were beginning to theorize about how various approaches used by parents to socialize children influenced child outcomes (Maccoby, 1992). Socialization in this context referred to how parents instill habits, skills, values, and motives that enable children to become functioning adults (Maccoby, 1992). This early general parenting research on child socialization in the family focused mainly on child rearing practices and was dominated by psychoanalytic and behavioral theories (Cairns, 1983). As the field of child socialization evolved and other theories emerged, such as developmental psycholinguistics (Chomsky, 1959), attachment theory (Bowlby, 1969), and social learning theory (Bandura & Walters, 1963), the field turned to more domain specific child outcomes such as cognitive development, emotional competence, and social development. During this era and into the late 1990s, developmental psychologists viewed mother/child interactions during eating episodes as a context for studying child rearing. Little attention was being given to child eating outcomes, the influence of maternal feeding practices on these outcomes, and the

complex interplay of the two. General parenting research based on child socialization theories of child rearing evolved into an understanding that better parenting consisted of reasonable expectations for the child, autonomy promotion, respect for a child's individual needs, and the need for nurturance (Baumrind, 1989). A plethora of evidence-based research showed that individualized approaches to general parenting produced differential child outcomes across multiple contexts including academic, health, and socio-emotional development (Baumrind, 1989).

Subsequently, a scientific literature began to emerge during the late 1970s and into the 1980s based on groundbreaking studies of child taste preference and short-term energy intake (Birch & Deysher, 1985; Birch & Marlin, 1982). Early studies of taste preference showed that when young children were exposed to novel foods (i.e., offered the food), an exposure effect was found on choice and liking (Birch & Marlin, 1982; Birch, McPhee, Shoba, Pirok, & Steinberg, 1987). Researchers showed that it took 8–15 or more exposures for children to learn to prefer novel foods (Birch & Marlin, 1982). These findings have been replicated across multiple settings (Cooke, 2007). Similarly, early work on short-term energy intake showed that young children possessed the innate ability to regulate energy intake by responding to their internal cues of fullness (Birch & Deysher, 1985, 1986). Short-term energy intake was defined as the ability to regulate intake of energy in response to covert changes in energy density of foods consumed as a first course (Birch & Deysher, 1985, 1986). It was later shown that many children lose this ability as they age (Cecil et al., 2005; Johnson & Taylor-Holloway, 2006). More importantly, differences in children's ability to self-regulate their eating were linked to parenting. In a seminal study conducted in the 1990s, it was found that mothers reporting higher control in feeding had children who exhibited a lessened ability to self-regulate their eating (Johnson & Birch, 1994). Based on these seminal child taste preference and energy intake studies, the integration of parenting theories from developmental psychology, and the continuing focus on child eating behaviors in pediatrics and nutrition, the multidisciplinary study of child eating behaviors emerged. The new field of study focusing on the development of child eating behaviors was grounded in the idea that parents play an important role in socializing children's eating in the context of the family. Since the early 2000s, a burgeoning literature has focused on this subject as evidenced by a rapid increase in the number of published articles—less than 10,000 in the 1990s to over 80,000 from 2000 to the present (Dimensions Research Database, 2019).

Parental Feeding Practices: Influence on Child Eating Behaviors

The rapid increase in the early twenty-first century of published studies on the association between parental feeding and child eating behaviors was heavily influenced by the emergence of the Child Feeding Questionnaire (CFQ) developed by Leanne

Birch and colleagues (Birch et al., 2001). The CFQ is the most widely used measure of parental feeding in the field of child eating behaviors and has been instrumental in its focus on highly controlling feeding practices used by parents of young children (Hurley, Cross, & Hughes, 2011). The CFQ measures the highly controlling parental feeding practices of restriction, monitoring, and pressure to eat along with parental attitudes of perceived responsibility, perceived parent and child weight, and concern about child weight (Birch et al., 2001). The idea behind the development of the CFQ was that highly controlling feeding practices are used by parents because of their concern over their child's weight (Hughes et al., 2006). Early development of this questionnaire was directly related to the seminal work by Johnson and Birch in the 1990s showing that high control in feeding was linked to a lessened ability for children to self-regulate energy intake (Faith, Scranlon, Birch, Francis, & Sherry, 2004; Johnson & Birch, 1994). Thus, these two events—linking parental feeding to child eating self-regulation and the development of the CFQ to assess controlling feeding practices—led to the emergence of a new paradigm in the field of child eating behaviors. Subsequently, a large number of studies were conducted and published supporting the premise that high control in feeding may lead to the development of childhood obesity (see Ventura & Birch, 2008 for a review).

Restriction and pressure to eat are the highly controlling feeding practices most commonly measured in the literature. Restriction has to do with the extent to which parents restrict children's access to certain energy dense foods (e.g., junk food and sweets). Pressure to eat assesses parents' tendency to pressure children to eat more (Birch et al., 2001). Across multiple studies, restrictive feeding has been associated with problematic child eating behaviors and obesity (see Shloim, Edelson, Martin, & Hetherington, 2015 and Ventura & Birch, 2008 for reviews). For example, restrictive feeding has been linked to children consuming more junk food, sweets, and unhealthy snacks (Boots, Tiggemann, Corsini, & Mattiske, 2015), being over-responsive to food (Webber, Cooke, Hill, & Wardle, 2010), and eating in the absence of hunger (Birch, Fisher, & Davison, 2003). Furthermore, restricting access to desired food has been shown to make the food more desirable to the child (Fisher & Birch, 1999). Longitudinal studies show links to child weight gain (Faith et al., 2004; Hughes, Power, O'Connor, Fisher, & Chen, 2016); however, some studies show no association (Gubbels et al., 2011; Webber, Hill, Cooke, Carnell, & Wardle, 2010). In contrast, pressure to eat has been linked to lower child weight across many studies (see Shloim et al., 2015 for a review). Some researchers have suggested that parents may adapt their feeding practices in response to their child's weight. Longitudinal data indicate a complex bi-directional association between highly controlling feeding practices and child weight with a stronger effect of child weight on practices than vice versa (Jansen et al., 2014).

Initial studies on child eating behaviors from the 1980s and 1990s and subsequent studies examining feeding practices that influence child eating, provided an important focus that expanded the literature beginning early in the twentieth century. Together, these studies produced an extensive literature highlighting the importance of parental feeding, in general, in the development of child eating behaviors and weight trajectories. Subsequent studies resulted in our current understanding of

how highly controlling feeding practices impact the development of childhood obesity (see Ventura & Birch, 2008 for a review). There were limitations to the earlier studies, such as a reliance on parent-report to measure practices, a primary emphasis on highly controlling as opposed to more positive parental directives, parenting behaviors embedded in laboratory studies calling into question the context in which these constructs were assessed, and an emphasis on white, middle-class samples (Birch et al., 2003; see Faith, Scranlon, et al., 2004 for a review; Fisher & Birch, 1999). Nonetheless, this research laid the groundwork for an important evolution in the field of child eating behaviors—specifically, a focus on family processes (including positive parental behaviors) that foster healthier eating in children. This focus gave rise to interest in individualized approaches to socializing children in the context of eating that influence the risk for later childhood obesity.

General Parenting Styles and Child Eating Behaviors

Some of the first studies to examine the influence of more positive parental behaviors on child eating and weight status examined the role of general parenting styles. These styles were introduced into the literature by Diana Baumrind in the late 1960s (Baumrind, 1967, 1973) and later expanded by Eleanor Maccoby and John Martin in the 1980s (Maccoby & Martin, 1983). Levels of demandingness (clear boundaries and expectations) and responsiveness (warmth and approval) translated into four individualized approaches to child rearing (Maccoby & Martin, 1983). Authoritative parents (high demand, high response) were distinguished by involvement, nurturance, and structure; authoritarian parents (high demand, low response) were identified by restrictive, punitive, and power-assertive behaviors; permissive/indulgent parents (low demand, high response) were denoted by warmth, acceptance, and a lack of monitoring; and uninvolved parents (low demand, low response) were characterized by little control and involvement with the child. In general, research on parenting styles shows that authoritative parenting tends to be associated with positive developmental outcomes (e.g., emotional stability, adaptive patterns of coping, life satisfaction); authoritarian parenting has been associated with poor academic achievement and depressive symptoms; and permissive parenting has been associated with poor self-control, low self-esteem, and aggression (see Mandara, 2003; Maccoby & Martin, 1983; Power, 2013 for reviews).

Several early studies examined the relationship between measures of general parenting style and child food consumption and/or weight status. Researchers found that the authoritative parenting style was associated with greater adolescent fruit and vegetable consumption (Kremers, Brug, de Vries, & Engels, 2003; Lytle et al., 2003), whereas authoritarian parenting was associated with greater availability of sweets in the home (Gable & Lutz, 2000). The most influential and frequently cited paper in this area was an analysis of the data from National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006). They found that authoritative

parenting assessed at 4 years was associated with the lowest levels of childhood obesity in the first grade. Since then, numerous studies have confirmed that general authoritative parenting is associated with lower childhood obesity risk, as well as health-promoting food consumption patterns (see Shloim et al., 2015; Sleddens, Gerards, Thijs, de Vries, & Kremers, 2011 for reviews), including a longitudinal study of Mexican-American preschoolers (Olvera & Power, 2010). Mexican-American preschoolers with indulgent or uninvolved mothers were shown to be at greatest risk for subsequent childhood obesity.

Construct of Feeding Styles Based on Parenting Style Framework

Around the same time that researchers began to examine the relationship between general parenting and childhood obesity, our research group began to explore how parenting styles could be examined specifically in the feeding context (Hughes, Power, Fisher, Mueller, & Nicklas, 2005). The construct of feeding styles is based on the general parenting style framework and emphasizes family processes specifically around feeding children in the home. Since that time, a clear distinction has been made in the literature between feeding styles and practices (Vaughn et al., 2016). In the context of feeding, *practices* such as restriction and pressure to eat refer to goal-oriented strategies or directives that parents use to get the child to do something specific, such as refraining from eating high fat foods or eating more vegetables (Vaughn et al., 2016). In contrast, *styles* of feeding, much like general parenting styles, refer to a broader, more general approach used by parents in the eating socialization process. Feeding styles include the emotional climate created between parents and children during eating episodes (Hughes et al., 2005; Vaughn et al., 2016).

A Questionnaire to Measure Feeding Styles

Feeding styles, similar to general parenting styles, are measured on two continuous, parent-reported scales: demandingness and responsiveness. Demandingness refers to the amount of control and supervision a parent expresses when feeding his/her child. Responsiveness refers to the amount of warmth with which a parent expresses that demandingness. Cut points on the demandingness and responsiveness scales are used to categorize parents into one of the four feeding style categories: authoritative (high demand, high response); authoritarian (high demand, low response); indulgent (low demand, high response); and uninvolved (low demand, low response; Hughes et al., 2005).

Initial work on the development of the Caregiver's Feeding Styles Questionnaire (CFSQ) was conducted through a study with low-income African-American and Hispanic Head Start families with preschoolers. Parents completed the CFSQ along with a general parenting questionnaire (Parenting Dimensions Inventory; Power, 2002) and a measure of highly controlling feeding practices (Child Feeding Questionnaire; Birch et al., 2001). Multiple differences across the feeding styles were seen on the general parenting constructs (Hughes et al., 2005). Results showed that authoritative parents reported more nurturance compared to parents with low responsive styles (i.e., authoritarian and uninvolved). Authoritarian parents reported more inconsistency in their child rearing compared to uninvolved parents, and reported lower reasoning and reminding compared to high responsive styles (i.e., authoritative and indulgent). Uninvolved parents reported that they followed through on discipline less often compared to high responsive parents and reported less organization compared to the other three feeding styles. Finally, indulgent parents reported less use of physical punishment compared to the low responsive styles. Regarding associations with feeding practices, authoritarian parents reported putting more pressure on their children to eat compared to parents low on demandingness (indulgent and uninvolved feeding styles); indulgent parents reported using less restriction compared to parents high on demandingness (authoritative and authoritarian feeding styles), and authoritative parents reported more monitoring compared to parents low on responsiveness (authoritarian and uninvolved feeding styles; Hughes et al., 2005).

Subsequently, a number of studies using the CFSQ supported the predictive validity of the measure in families from low-income backgrounds with children. Indulgent feeding has been linked to larger self-selected portion sizes (Fisher, Birch, Zhang, Grusak, & Hughes, 2013), lower intake of vegetables, dairy, and fruit (Hoerr et al., 2009), and higher intake of snack foods in children (Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2012). The authoritative feeding style has been linked to lower child intake of snack foods (Hennessy et al., 2012) as well as better diet quality of the meal both served to and consumed by children at dinner (Arlinghaus et al., 2018). Uninvolved feeding has been linked to lower child intake of fruit and vegetables (Hoerr et al., 2009). Evidence supports the premise that indulgent feeding puts children at risk for the development of childhood obesity (see Table 5.1).

Validation of the CFSQ Through Direct Observation

Research conducted in our laboratory (Hughes et al., 2007, 2011; Power et al., 2018) and by others (Edelson, Mokdad, & Martin, 2016; Ontai, Sutter, Sitnick, Shilts, & Townsend, 2019) has shown convergence between feeding constructs derived from the CFSQ and independent observations of feeding behavior. A study of 50 Head Start child care providers found that endorsement of indulgent feeding on the CFSQ was positively correlated with observed indulgent feeding across three

Table 5.1 Studies linking feeding styles to child intake and weight

Author	Sample	Results
Hughes et al. (2005)	231 (African-American, Hispanic) ages 3–5	Higher child BMI z-score (indulgent)
Hughes, Shewchuk, Baskin, Nicklas, and Qu (2008)	718 (African-American, Hispanic, white) ages 3–5	Higher child BMI z-score (indulgent)
Hoerr et al. (2009)	715 (African-American, Hispanic, white) ages 3–5	Lower child intake of fruit, vegetables, and dairy; higher child intake of energy dense foods (indulgent; uninvolved)
Hennessy, Hughes, Goldberg, Hyatt, and Economos (2010)	99 (African-American, Hispanic, white) ages 6–11	Higher child BMI z-score (indulgent)
Hughes et al. (2011)	177 (African-American, Hispanic) ages 3–5	Higher child BMI z-score in Hispanic boys (indulgent)
Hennessy et al. (2012)	99 (African-American, Hispanic, white) ages 6–11	Higher child intake of energy dense snacks (indulgent) Lower child intake of energy dense snacks (authoritative)
Tovar et al. (2012)	383 (Brazilian, Haitian, Latino) ages 3–11	Higher child BMI z-score (indulgent)
Fisher et al. (2013)	60 (African-American, Hispanic, white) ages 4–6	Greater child self-served portions and higher child energy intake (indulgent; authoritarian)
Tovar et al. (2015)	313 (Brazilian, Haitian, Latino) ages 3–11	Lower child intake of whole grains (mothers in US <5 years) (indulgent)
Hughes et al. (2016)	129 (Hispanic; longitudinal) ages 4–5 at first time point	Increased child BMI z-score 18 months later (indulgent)
Horodynski et al. (2018)	626 (African-American, Hispanic, white) ages 3–5	Higher child BMI z-score (indulgent)
Arlinghaus et al. (2018)	131 (African-American, Hispanic) ages 3–5	Higher diet quality served to and consumed by child (authoritative)

mealtime observations in a preschool classroom, $r(48) = 0.27$, $p < 0.05$ (Hughes et al., 2007). Authoritative feeding showed a marginally significant correlation, $r(48) = 0.24$, $p < 0.10$, and authoritarian feeding showed no significant correlation, $r(48) = 0.08$, n.s.

Subsequently, 177 African-American and Hispanic Head Start families with low incomes were observed during three dinners in their homes (Hughes et al., 2011). Two observers independently recorded the frequency of 25 specific feeding behaviors and conducted global ratings of the emotional climate of the meal using an observational system adapted from Belsky, Crnic, and Woodworth (1995). Parents also completed the CFSQ. Numerous differences in observed behavior were identified between parents reporting the four feeding styles. Specifically, authoritative and authoritarian parents (high demandingness styles) were most likely to use spoon

feeding/physical intervention, verbally prompt eating, use reasoning, and make positive comments about the food. Authoritarian parents were more likely to encourage the child to eat a small amount, hurry eating, and disapprove of or scold the child. Finally, indulgent and uninvolved parents (low demandingness styles) were less likely to use most of the observed feeding behaviors compared to parents reporting high demandingness styles and did not significantly differ from one another. Examination of the effect sizes (data not reported in Hughes et al., 2011) showed that the significant effects of feeding style on observed feeding accounted for between 5% and 12% of the variance.

Emotional climate global ratings also differed as a function of self-reported feeding style (Hughes et al., 2011). Specifically, parents reporting an authoritarian or uninvolved feeding style (low responsive) exhibited the greatest negative affect; authoritarian parents showed the highest intrusiveness; and uninvolved parents showed the greatest detachment. Unexpectedly, indulgent parents showed high levels of detachment as well; they did not significantly differ from uninvolved parents. There were no significant differences between the four self-reported feeding styles on observer ratings of positive affect. Examination of the effect sizes (data not reported in Hughes et al., 2011) showed that the significant effects of feeding style on observed emotional climate ratings accounted for between 7% and 12% of the variance.

Videotapes made of the first 144 families who participated in the Hughes et al. (2011) study were coded (Power et al., 2018). Financial limitations prevented videotaping the last 33 families. Measures of parental demandingness and responsiveness were derived from the observed data using a procedure similar to the scoring of the CFSQ. Parental demandingness was assessed by calculating the mean rate of observed parental prompts to eat averaged across three meals. Responsiveness was assessed by calculating the mean proportion of total observed feeding behaviors that were child-centered (following the classification used to score child-centered feeding in the CFSQ). Using the same process used in scoring the CFSQ, parents were assigned to one of the four feeding styles using median splits on observed measures of demandingness and responsiveness. Results showed that correlations between the observed and self-report measures of these two dimensions were statistically significant: demandingness, $r(135) = 0.24, p < 0.01$; responsiveness, $r(135) = 0.18, p < 0.05$. Not surprisingly, given the rather low correlations between the observed and self-report measures of the two dimensions, the correspondence between the observed and self-reported feeding styles was not more than would be expected by chance alone. Rates of agreement by feeding style were: authoritarian (45%), authoritative (26%), uninvolved (22%), and indulgent (21%). Overall, parents showed the same feeding styles across the two methods only 28% of the time.

Two studies conducted by other investigators provide evidence for the relationship between self-reported feeding using the CSFQ and independent observations of feeding: a study of low-income parents of preschoolers recruited through Head Start and the Special Supplemental Nutrition Program for Women, Infant, and Children (WIC; Ontai et al., 2019) and a study of middle-class parents of 1–3-year-olds in Switzerland (Edelson et al., 2016). In the first study, 60 low-income parents

of preschoolers completed a modified, visually enhanced version of the CFSQ called the My Child at Mealtime (MCMT) self-assessment (Ontai, Sitnick, Shilts, & Townsend, 2016) and were videotaped during a home meal (87% of the meals were dinners). Scores reflecting observed ratings during the meal of child- and parent-centered feeding were correlated with self-reports of child- and parent-centered feeding on the MCMT. Results showed a significant, positive association between self-reported and observed feeding for parent-centered ($p < 0.05$), but not for child-centered feeding. Finally, in the second study, 60 parents videotaped all instances of feeding on a single day at home (Edelson et al., 2016). Coding of the videotapes showed that parents reporting an authoritarian feeding style were significantly ($p < 0.05$) more likely than parents reporting an authoritative style to pressure their child to eat during observed feeding (the main effect for feeding style in this analysis was $p < 0.07$).

Together, the results of these studies show statistically significant associations between observed and self-reported feeding on the CFSQ. The effect sizes were predominantly small, explaining between 3% and 12% of the variance (corresponding to correlation coefficients of 0.18–0.35). The one study that examined correspondence between observed and self-reports of the four feeding style categories (Power et al., 2018) showed no more agreement than expected by chance alone. This is not surprising given that parents were assigned to feeding styles based on median splits of the feeding dimensions of demandingness and responsiveness that showed statistically significant but low levels of agreement. Additional analyses showed that using a dimensional approach (i.e., examining main effects of demandingness and responsiveness along with their statistical interaction) was superior to classifying parents into feeding styles using median splits in predicting child BMI and individual differences in child eating behavior (Power et al., 2018).

Given the limitations of self-report measures and the multiple situational factors that can influence feeding (see discussion in the next section), the small effect sizes reviewed here help to validate the CFSQ. There are multiple sources of error in parental reports of childrearing practices including social desirability biases; faulty recall or recall biases; ambiguous, general, or leading questions; limited awareness of one's own behavior; and careless or random responding (Power et al., 2013). These errors, combined with the significant impact of situational factors, should inevitably result in small effect sizes when examining correspondences between observed and self-reported parenting. The effect sizes reported here were similar to those found in other studies of parenting outside of the feeding domain. In a recent meta-analysis of 36 articles, an average effect size of $r = 0.17$ was found for the relationship between observed and self-reported parenting practices (Hendriks, Van der Giessen, Stams, & Overbeek, 2018). They found two significant moderating variables in their analysis—effect sizes were higher for longer questionnaires and higher for negative parenting practices compared to positive ones. Consistent with this finding, the effect sizes in the Hughes et al. (2011) study were highest for global ratings of negative affect and the observed rate of scolding (both eta squares equaled 0.12, equivalent to a correlation of 0.35—unpublished results).

Stability of Feeding Styles and Practices: Observations and Self-Report

Given that parents demonstrate individual differences in feeding, and that feeding has been associated with various child outcomes (particularly childhood obesity), an important question concerns how stable is feeding over situations and time. That is, do parents typically exhibit the same feeding behaviors across meals and situations or do feeding behaviors vary across meals and time as a function of situational factors? For individual differences in feeding to have an effect, one would expect some consistency across situations. This person-situation (or state-trait) debate has a long history in the field of psychology (e.g., Hartshorne, May, Maller, & Shuttleworth, 1928; Hunt, 1965; Mischel, 1968; Newcomb, 1929).

The issues of both short-term and long-term feeding stability have been addressed (Silva Garcia et al., 2018) using data from the Hughes et al. (2011) study of low-income African-American and Hispanic parents, described above, and from a separate longitudinal study of 138 Hispanic parents with low-incomes observed feeding their children in a laboratory setting 18 months apart (Hughes, Power, O'Connor, & Fisher, 2015). Analyses addressed these two issues: (1) stability of feeding styles and practices across three meals observed within the short period of time of approximately 2 weeks (data from Hughes et al., 2011) and (2) stability of feeding styles and practices across an 18-month period (data from Hughes et al., 2015).

Based on literature from social psychology (i.e., Epstein, 1983; Fleeson & Nofle, 2008; Funder, 2016; Hunt, 1965; Mischel, 1968; Mischel & Peake, 1982), Silva Garcia et al. (2018) predicted that: (1) parents would exhibit moderate stability in feeding styles and practices observed over a period of 2 weeks, (2) parents would exhibit greater stability in feeding observed over 2 weeks compared to 18 months, (3) self-reported feeding would be more stable than observed feeding over 18 months, and (4) higher-order measures of feeding dimensions and styles (i.e., feeding measures aggregated across multiple individual behaviors) would show higher levels of stability over 2 weeks and 18 months compared to individual feeding practices (observed only).

Stability of Feeding Observed over a 2-Week Period

Results partially supported the first hypothesis by showing moderate stability of individual feeding practices over a 2-week period on the observed data from three dinner meals (Hughes et al., 2011). For 70% of the feeding practices, mean correlations across three meals for specific feeding practices ranged from 0.20 to 0.41. These included discouraging eating (0.35), encouraging the child to eat a different food (0.40), enthusiastic modeling (0.32), unelaborated commands (0.38), and verbal hints (0.37). Practices showing higher mean correlations were frequency of mealtime conversations about the child (0.63), total frequency of eating prompts

(0.62), use of spoon feeding (0.54), enforcement of table manners (0.47), and use of nonverbal gestures (0.44). Practices showing very low consistency across meals were discussions of food characteristics (0.19), use of questions/suggestions (0.13), and frequency of mealtime conversations about other people (0.09). Regarding the categories of feeding styles and the dimensions on which they are based, demandingness showed a relatively high level of stability (0.63), responsiveness a moderate level (0.33), and feeding styles low levels (0.21–0.23).

Together, these findings showed that although parents showed considerable consistency when trying to get their children to eat (as evidenced by high mean correlations for eating prompts, 0.62, and demandingness, 0.63), only moderate levels of stability were seen for how they accomplished their goal (i.e., practices used to encourage or discourage eating). These mean correlations (0.20–0.41) were very similar in size to correlations found for cross-situational stability of observed behavior in other domains. For example, many reviews of the stability of adult and child behavior across situations published in the 1960s (e.g., Hunt, 1965; Mischel, 1968; Vernon, 1964; Wallace, 1966) concluded that the size of correlations typically ranged from 0.20 to 0.30 and rarely above 0.40. More recent studies confirmed these effect sizes as well (Fleeson & Nofle, 2008). A range of factors can influence feeding on any given day (e.g., nature of interactions earlier in the day or at previous meals, parent or child emotional state, time of day, food served, child's level of hunger, length of the meal, presence of distractions) leading to low levels of stability. However, parental efforts at encouraging eating appear to be much more consistent than individual practices. Although parents may use different practices across meals to get their child to eat, the overall degree to which they try to achieve this goal is rather consistent. The degree to which differences reflect parental beliefs and attitudes about how much children should eat versus their reactions to picky eating or other child eating behaviors is a question for future research.

Stability of Feeding: 2 Weeks Versus 18 Months

The second hypothesis that parents would exhibit greater stability over 2 weeks compared to 18 months received some support, particularly for individual feeding behaviors. Data for the 2-week period was obtained from an observational study of home meals among Head Start families (Hughes et al., 2011) and data for the 18-month period was obtained from a longitudinal study of child eating self-regulation using observational protocols (Hughes et al., 2015). The same coding system was used in both studies. For many feeding behaviors (e.g., encouragement of table manners, encouragement to eat a different food, unelaborated commands, and enthusiastic modeling) mean correlations over 2 weeks and those over 18 months did not differ. These correlations were predominately between 0.20 and 0.40. For seven behaviors (i.e., frequency of eating prompts, encouragement to eat all of the food on the plate, verbal hints, verbal pressure to eat, nonverbal gestures, helping the child eat, and spoon feeding), the difference between correlations over 2 weeks

and those over 18 months was 0.20 or greater with stability being higher over 2 weeks compared to 18 months.

Surprisingly, the results for the feeding dimensions and styles were different. Although observed demandingness showed greater stability over 2 weeks (0.63) compared to stability over 18 months (0.34), observed responsiveness showed greater stability over the 18-month period (0.49 versus 0.33). Observed feeding *styles* showed low levels of stability over both the 2-week and 18-month periods (0.19–0.33) with one exception, for the uninvolved feeding style, there was low stability over the 2-week period (0.21), but no stability over 18 months (0.02).

Together, these findings partially supported the hypothesis that for some feeding measures there was greater stability over 2 weeks compared to 18 months; however, for most feeding (i.e., 65%), levels of stability were low to moderate and similar across these two time frames. These results support the notion that despite considerable situational variation, levels of stability observed over a short period is similar to that observed over a longer period for most feeding behaviors studied.

Self-Report Versus Observed Feeding over 18 Months

The third hypothesis that, over 18 months, self-reported feeding would show greater stability than observed feeding, was partially supported. Parents in the Hughes et al. (2015) study completed measures of feeding styles (CFSQ, Hughes et al., 2005) 18 months apart along with two feeding practice questionnaires—Child Feeding Questionnaire (CFQ, Birch et al., 2001) and Comprehensive Feeding Practices Questionnaire (CFPQ, Musher-Eizenman & Holub, 2007). Of the 14 CFPQ feeding practice subscales with adequate coefficient alphas, all except two showed high levels of stability over 18 months with correlations ranging from 0.38 to 0.66 (mean = 0.50). Monitoring subscales from the CFQ and the CFPQ showed lower levels of stability over time (correlations of 0.19 and 0.29, respectively). Self-reported feeding style dimensions of demandingness (0.62) and responsiveness (0.51) also showed high levels of stability over 18 months. Observed feeding practices over 18 months resulted in seven variables with correlations greater than 0.38: frequency of eating prompts (0.39), frequency of encouraging eating a different food (0.46), table manners (0.45), encouraging other food related behaviors (0.51), enthusiastic modeling (0.49), unelaborated commands (0.39), and observed responsiveness (0.49). Therefore, this hypothesis was only partially supported such that only some correlations for self-reported feeding were higher than those for observed feeding. This was also supported for data on the four feeding styles categories. Self-reported feeding styles yielded slightly higher levels of stability over 18 months (mean correlation = 0.29) compared to observed feeding styles (mean correlation = 0.21).

As argued by Mischel (1968) and others, a major reason for higher stability of self-reported behaviors over time is that these measures are more assessments of cognitive constructions of how parents see themselves rather than a reflection their

actual behavior. Moreover, when completing questionnaires, parents are forced to ignore situational variation and instead report on typical behaviors. Parents likely vary widely in awareness of their own feeding behaviors and how individual instances of feeding are weighed in generating a “typical” response. However, as discussed above, given that self-reports show small, but statistically significant associations with observed feeding, such self-reports appear to have some validity and reflect, at least to a modest degree, the actual behavior of parents. Because observations and self-reports each have their own limitations (Power et al., 2013), researchers may choose to use both methods for studies in this area. Despite this recommendation, the use of self-reported feeding questionnaires currently outnumbers observational assessments (Hughes et al., 2013).

Stability of Higher-Order Measures of Feeding Dimensions and Styles

The final hypothesis was that higher-order measures of demandingness and responsiveness (dimensions of feeding styles), as well as the feeding styles themselves, would show higher levels of stability compared to individual feeding practices, despite the length of time between assessments. This was expected because these measures were created by aggregating across multiple feeding behaviors, thus resulting in a more reliable individual difference measure yielding greater stability over time. This hypothesis was partially supported for observed demandingness with the 2-week period of stability among some of the highest values observed (0.63). However, the stability of demandingness over 18 months was only 0.34 making it similar to that of individual feeding practices. The opposite was found for the dimension of responsiveness—stability over 18 months was one of the higher values observed (0.49); however, its stability over the 2-week period was similar to that of individual feeding practices (0.33).

Finally, the stability of observed feeding styles was low (across 2 weeks as well as 18 months) showing correlations similar to stability of individual feeding practices. Correlations ranged over 18 months from 0.02 for the uninvolved feeding style to 0.30 for the authoritarian feeding style (mean correlation = 0.21). These correlations were considerably lower than many of the individual feeding practices. One reason for the low levels of stability for feeding styles may be the use of median splits on the two dimensions when assigning parents to the four categories. This provides further support for the use of the demandingness and responsiveness dimensions as continuous measures in analyses of feeding styles and child outcomes (Power et al., 2018).

Bi-Directional Analyses of Feeding Styles and Child BMI

Despite the consistent relationship found between indulgent feeding on the CFSQ and child BMI (see Table 5.1), it is impossible to determine whether indulgent feeding contributes to the development of childhood obesity or whether childhood obesity leads to the development of indulgent feeding. Because a number of studies have demonstrated that childhood weight status can influence subsequent feeding behavior (Eichler et al., 2019; Jansen et al., 2014; Rhee et al., 2009), it is important to examine the possibility of bi-directional influences between indulgent feeding and child weight status over time. Hughes, Power, Fisher, and O'Connor (2020) examined this relationship in analyses of data from the Hughes et al. (2015) study. In order to secure data at three time points, after completion of the 18-month follow-ups described in Silva Garcia et al. (2018), parents were contacted an average of 24 months later and completed the CFSQ a third time. Their children were weighed and measured at this third time point as well and their BMI z-scores computed.

A cross-lagged panel analysis was conducted across the three time points using the continuous child BMI z-scores and dichotomous variables to represent three of the feeding styles (authoritative, authoritarian, and indulgent). Only three feeding styles could be examined simultaneously in this analysis. Adding a dichotomous predictor for uninvolved feeding would be mathematically redundant since parents reporting the uninvolved style would have a zero on all three feeding style variables. In the path model, we examined autoregressive paths for the three feeding styles and child BMI z-scores between adjacent time points, as well as examining all cross-lagged paths between the feeding style variables and the child's BMI z-scores (in both directions—from feeding style to weight status and vice versa). Feeding styles showed low to moderate levels of stability over time (standardized betas ranged from 0.20 to 0.41), whereas child BMI z showed very high levels of stability (betas = 0.91 and 0.94). Results are consistent with the Silva Garcia et al. (2018) results. Despite the high levels of stability in children's weight status, at both Time 1 and Time 2, indulgent feeding predicted child BMI z-scores at the next time point. The beta from Time 1 indulgent feeding to Time 2 BMI z-score was significant (beta = 0.11, $p < 0.05$) and the beta from Time 2 to Time 3 was marginally significant (beta = 0.08, $p < 0.07$). In addition, child BMI z-score at Time 2 positively predicted indulgent feeding and negatively predicted authoritarian feeding at Time 3. No other paths were significant.

Together, the findings demonstrated that despite considerable stability in child weight status over this 3-year period, increases in child weight status between adjacent time points were predicted by earlier indulgent feeding. Although a unidirectional effect was found from feeding to child weight status at the first two time points, this relationship became bi-directional between the second and third time points when the children were older.

Conclusions

Interest in research on parenting influences on child eating behavior has increased dramatically since the early 2000s. This may be due to the emergence of an interdisciplinary focus on the development of child eating behaviors by the disciplines of psychology, nutrition, and pediatrics. An early focus on the highly controlling feeding practices of restriction and pressure to eat has shown fairly consistent links to child weight status; however, little research was conducted on more positive feeding prior to 2000. The construct of parental feeding styles emerged in 2005, which was defined as a broader, more general approach to feeding similar to general parenting styles. Subsequent research has shown that authoritative feeding is associated with better child health outcomes relative to the other feeding style categories. Indulgent feeding is considered the most problematic feeding style with links to less healthy child eating behaviors and weight status across multiple cross-sectional and one longitudinal study. Bi-directional analyses showed that child weight was predicted by earlier indulgent feeding; however, this relationship became bi-directional at later ages. Regarding the stability of parental feeding over time, considerable consistency was seen in the degree to which parents tried to get their children to eat but only moderate levels were seen in how they accomplished this goal (i.e., the type of feeding practices they used to encourage or discourage eating). Furthermore, the higher-order measure of demandingness (observed) was among the highest stability values seen in feeding ($r = 0.63$). This level of stability was not seen in the observed higher-order measure of responsiveness—its stability was only $r = 0.34$ making it similar to feeding practices. Future research should focus on other socio-economic groups and child outcomes over time through longitudinal designs. Intervention programs may choose to target authoritative feeding at young ages to prevent the development of childhood obesity.

References

- Arlinghaus, K. R., Vollrath, K., Hernandez, D. C., Momin, S., O'Connor, T. M., Power, T. G., & Hughes, S. O. (2018). Authoritative parent feeding style is associated with better child dietary quality at dinner among low-income minority families. *American Journal of Clinical Nutrition*, *108*(4), 730–736.
- Bandura, A., & Walters, R. H. (1963). *Social learning and personality development*. New York, NY: Holt, Rinehart & Winston.
- Baumrind, D. (1967). Child care practices anteceding three patterns of preschool behavior. *Genetic Psychology Monographs*, *75*(1), 43–88.
- Baumrind, D. (1973). The development of instrumental competence through socialization. In A. D. Pick (Ed.), *Minnesota Symposium on Child Psychology* (Vol. 7, pp. 3–46). Minneapolis, MN: University of Minnesota Press.
- Baumrind, D. (1989). Rearing competent children. In W. Damon (Ed.), *Child development today and tomorrow*. San Francisco, CA: Jossey Bass.
- Belsky, J., Crnic, K., & Woodworth, S. (1995). Personality and parenting: Exploring the mediating role of transient mood and daily hassles. *Journal of Personality*, *63*(4), 905–929.

- Birch, L., & Marlin, D. (1982). I don't like it; I never tried it: Effects of exposure on two-year old children's food preferences. *Appetite*, 3(4), 353–360.
- Birch, L., McPhee, L., Shoba, B. C., Pirok, E., & Steinberg, L. (1987). What kind of exposure reduces children's food neophobia? *Appetite*, 9(3), 171–178.
- Birch, L. L., & Deysher, M. (1985). Conditioned and unconditioned caloric compensation: Evidence for self-regulation of food intake by young children. *Learning and Motivation*, 16(3), 341–355.
- Birch, L. L., & Deysher, M. (1986). Caloric compensation and sensory specific satiety: Evidence for self regulation of food intake by young children. *Appetite*, 7(4), 323–331.
- Birch, L. L., Fisher, J. O., & Davison, K. K. (2003). Learning to overeat: Maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *The American Journal of Clinical Nutrition*, 78(2), 215–220.
- 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(3), 201–210.
- Boots, S. B., Tiggemann, M., Corsini, N., & Mattiske, J. (2015). Managing young children's snack food intake. The role of parenting style and feeding strategies. *Appetite*, 92(1), 94–101.
- Bowlby, J. (1969). *Attachment and loss, volume 1: Attachment*. New York, NY: Basic Books.
- Cairns, R. B. (1983). The emergence of developmental psychology. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. I, pp. 41–102). New York, NY: Wiley.
- Cecil, J. E., Palmer, C. N., Wrieden, W., Murrie, I., Bolton-Smith, C., Watt, P., ... Hetherington, M. M. (2005). Energy intakes of children after preloads: Adjustment, not compensation. *American Journal of Clinical Nutrition*, 82(2), 302–308.
- Chomsky, N. (1959). Review of verbal behavior by B. F. Skinner. *Language*, 35, 26–58.
- Cooke, L. (2007). The importance of exposure for healthy eating in childhood: A review. *Journal of Human Nutrition and Dietetics*, 20(4), 294–301.
- Dimensions Research Database. (2019, August 8). Retrieved from https://app.dimensions.ai/discover/publication?search_text=child%20AND%20eating%20AND%20behavior&search_type=kws&search_field=full_search
- Edelson, L. R., Mokdad, C., & Martin, N. (2016). Prompts to eat novel and familiar fruits and vegetables in families with 1-3 year-old children: Relationships with food acceptance and intake. *Appetite*, 99, 138–148.
- Eichler, J., Schmidt, R., Poulain, T., Hiemisch, A., Kiess, W., & Hilbert, A. (2019). Stability, continuity, and bi-directional associations of parental feeding practices and standardized child Body Mass Index in children from 2 to 12 years of age. *Nutrients*, 11(8), 1751.
- Epstein, S. (1983). The stability of confusion: A reply to Mischel and Peake. *Psychological Review*, 90(2), 179–184.
- Faith, M. S., Berkowitz, R. I., Stallings, V. A., Kerns, J., Storey, M., & Stunkard, A. J. (2004). Parental feeding attitudes and styles and child body mass index: Prospective analysis of a gene-environment interaction. *Pediatrics*, 114(4), e429–e436.
- Faith, M. S., Scranlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. L. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research*, 12(11), 1711–1722.
- Fisher, J. O., & Birch, L. L. (1999). Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *The American Journal of Clinical Nutrition*, 69(6), 1264–1272.
- Fisher, J. O., Birch, L. L., Zhang, J., Grusak, M. A., & Hughes, S. O. (2013). External influences on children's self-served portions at meals. *International Journal of Obesity*, 37(7), 954–960.
- Fleeson, W., & Nofhle, E. (2008). The end of the person-situation debate: An emerging synthesis in the answer to the consistency question. *Social and Personality Psychology Compass*, 2(4), 1667–1684.

- Funder, D. C. (2016). Taking situations seriously: The Situation Construal Model and the Riverside Situational Q-sort. *Current Directions in Psychological Science*, 25(3), 203–208.
- Gable, S., & Lutz, S. (2000). Household, parent, and child contributions to childhood obesity. *Family Relations*, 49(3), 293–300.
- Gubbels, J. S., Kremers, S. P., Stafleu, A., de Vries, S. I., Goldbohm, R. A., Dagnelie, P. C., ... Thijs, C. (2011). Association between parenting practices and children's dietary intake, activity behavior and development of body mass index: The KOALA Birth Cohort Study. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 18.
- Hartshorne, H., May, M. A., Maller, J. B., & Shuttlesworth, F. K. (1928). *Studies in the nature of character*. New York, NY: MacMillan.
- Hendriks, A. M., Van der Giessen, D., Stams, G. J. J. M., & Overbeek, G. (2018). The association between parent-reported and observed parenting: A multi-level meta-analysis. *Psychological Assessment*, 30(5), 621–633.
- Hennessy, E., Hughes, S. O., Goldberg, J. P., Hyatt, R. R., & Economos, C. D. (2010). Parent-child interactions and objectively measured child physical activity: A cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity*, 7, 71.
- Hennessy, E., Hughes, S. O., Goldberg, J. P., Hyatt, R. R., & Economos, C. D. (2012). Permissive parental feeding behavior is associated with an increase in intake of low-nutrient-dense foods among American children living in rural communities. *Journal of the Academy of Nutrition and Dietetics*, 112(1), 142–148.
- Hoerr, S. L., Hughes, S. O., Fisher, J. O., Nicklas, T. A., Liu, Y., & Shewchuk, R. M. (2009). Associations among parental feeding styles and children's food intake in families with limited incomes. *International Journal of Behavioral Nutrition and Physical Activity*, 6, 55.
- Horodyski, M. A., Brophy-Herb, H. E., Martocchio, T. L., Contreras, D., Peterson, K., Shattuck, M., ... Lumeng, J. C. (2018). Familial psychosocial risk classes and preschooler body mass index: The moderating effect of caregiver feeding style. *Appetite*, 123, 216–224.
- Hughes, S. O., Anderson, C. B., Power, T. G., Micheli, N. E., Jaramillo, S. J., & Nicklas, T. A. (2006). Measuring feeding in low-income African-American and Hispanic parents. *Appetite*, 46(2), 215–223.
- Hughes, S. O., Frankel, L. A., Beltran, A., Hodges, E., Hoerr, S., Lumeng, J., ... Kremers, S. (2013). Food parenting measurement issues: Working group consensus report. *Childhood Obesity*, 9(Suppl), S95–S102.
- Hughes, S. O., Patrick, H., Power, T. G., Fisher, J. O., Anderson, C. B., & Nicklas, T. A. (2007). The impact of child-care providers' feeding on children's food consumption. *Journal of Developmental and Behavioral Pediatrics*, 28(2), 100–107.
- Hughes, S. O., Power, T. G., Fisher, J. O., Mueller, S., & Nicklas, T. (2005). Revisiting a neglected construct: Parenting styles in a child-feeding context. *Appetite*, 44(1), 83–92.
- Hughes, S. O., Power, T. G., O'Connor, T. M., Fisher, J. O., Micheli, N. E., & Papaioannou, M. A. (2020). Maternal feeding style and child weight status among Hispanic families with low-income levels: A longitudinal study of the direction of effects. Manuscript submitted for publication.
- Hughes, S. O., Power, T. G., O'Connor, T. M., & Fisher, J. O. (2015). Executive functioning, emotion regulation, eating self-regulation, and weight status in low-income preschool children: How do they relate? *Appetite*, 89, 1–9.
- Hughes, S. O., Power, T. G., O'Connor, T. M., Fisher, J. O., & Chen, T. A. (2016). Maternal feeding styles and food parenting practices as predictors of longitudinal changes in weight status in Hispanic preschoolers from low-income families. *Journal of Obesity*, 4, 1–9. <https://doi.org/10.1155/2016/7201082>
- Hughes, S. O., Power, T. G., Papaioannou, M. A., Cross, M. B., Nicklas, T. A., Hall, S. K., & Shewchuk, R. M. (2011). Emotional climate, feeding practices, and feeding styles: An observational analysis of the dinner meal in Head Start families. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 60.

- Hughes, S. O., Shewchuk, R. M., Baskin, M. L., Nicklas, T. A., & Qu, H. (2008). Indulgent feeding style and children's weight status in preschool. *Journal of Developmental and Behavioral Pediatrics, 29*(5), 403–410.
- Hunt, J. M. (1965). Traditional personality theory in the light of recent evidence. *American Scientist, 53*, 80–96.
- 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*(3), 495–501.
- Jansen, P. W., Tharner, A., van der Ende, J., Wake, M., Raat, H., Hofman, A., ... Tiemeier, H. (2014). Feeding practices and child weight: Is the association bidirectional in preschool children? *The American Journal of Clinical Nutrition, 100*(5), 1329–1336.
- Johnson, S. L., & Birch, L. L. (1994). Parents' and children's adiposity and eating style. *Pediatrics, 94*(5), 653–661.
- Johnson, S. L., & Taylor-Holloway, L. A. (2006). Non-Hispanic white and Hispanic elementary school children's self-regulation of energy intake. *American Journal of Clinical Nutrition, 83*(6), 1276–1282.
- Kleinman, R. E., Barness, L. A., & Finberg, L. (2003). History of pediatric nutrition and fluid therapy. *Pediatric Research, 54*(5), 762–772.
- Kremers, S. P., Brug, J., de Vries, H., & Engels, R. C. (2003). Parenting style and adolescent fruit consumption. *Appetite, 41*(1), 43–50.
- Kucharz, E. J., Shampo, M. A., & Kyle, R. A. (1994). Casimir Funk—Polish-born American biochemist. *Mayo Clinic Proceedings, 69*(7), 656.
- Lytle, L. A., Varnell, S., Murray, D. M., Story, M., Perry, C., Birnbaum, A. S., & Kubik, M. Y. (2003). Predicting adolescents' intake of fruits and vegetables. *Journal of Nutrition Education and Behavior, 35*(4), 170–175.
- Maccoby, E. E. (1992). The role of parents in the socialization of children: An historical overview. *Developmental Psychology, 28*(6), 1006–1017.
- Maccoby, E. E., & Martin, J. A. (1983). Socialization in the context of the family: Parent-child interaction. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. IV, pp. 1–101). New York, NY: Wiley.
- MacKay, H. M. M. (1928). Anemia in infancy: Its prevalence and prevention. *Archives of Disease in Childhood, 3*(15), 117–147.
- Mandara, J. (2003). The typological approach in child and family psychology: A review of theory, methods, and research. *Clinical Child and Family Psychology Review, 6*, 129–146.
- Mischel, W. (1968). *Personality and assessment*. New York, NY: Wiley.
- Mischel, W., & Peake, P. K. (1982). Beyond déjà vu in the search for cross-situational consistency. *Psychological Review, 89*(6), 730–755.
- Musher-Eizenman, D., & Holub, S. J. (2007). Comprehensive feeding practices questionnaire: Validation of a new measure of parental feeding practices. *Journal of Pediatric Psychology, 32*(8), 960–972.
- Newcomb, T. M. (1929). The consistency of certain extrovert-introvert behavior patterns in 51 problem boys. *Teachers College Contributions to Education, 382*, 123.
- Olvera, N., & Power, T. G. (2010). Parenting styles and overweight in Mexican-American children: A longitudinal study. *Journal of Pediatric Psychology, 35*(3), 243–249.
- Ontai, L. L., Sitnick, S. L., Shilts, M. K., & Townsend, M. S. (2016). My child at mealtime: A visually enhanced self-assessment of feeding styles for low-income parents of preschoolers. *Appetite, 99*, 76–81.
- Ontai, L. L., Sutter, C., Sitnick, S., Shilts, M. K., & Townsend, M. S. (2019). My child at mealtime parent self-assessment of food related behaviors: Validation with mealtime behaviors. *Appetite, 136*, 62–69.
- Power, T. G. (2002). *Parenting Dimensions Inventory (PDI-S): A research manual*. Unpublished manuscript, Washington State University, Pullman, WA.
- Power, T. G. (2013). Parenting dimensions and styles: A brief history and recommendations for future research. *Childhood Obesity, 9*(Suppl 1), S14–S21.

- Power, T. G., Silva Garcia, K., Beck, A., Goodell, S., Johnson, S. L., & Hughes, S. O. (2018). Observational and self-report assessments of caregivers' feeding styles: Variable- and person-centered approaches for examining relationships with children's eating behavior. *Appetite, 130*, 174–183.
- Power, T. G., Sleddens, E. F., Berge, J., Connell, L., Govig, B., Hennessy, E., ... St. George, S. M. (2013). Contemporary research on parenting: Conceptual, methodological, and translational issues. *Childhood Obesity, 9*(Suppl 1), S87–S94.
- Raju, T. N. (1998). The Nobel chronicles. 1929: Christiaan Eijkman (1858-1930) and Frederick Hopkins (1861-1947). *Lancet, 352*(9143), 1868.
- Rhee, K. E., Coleman, S. M., Appugliese, D. P., Kaciroti, N. A., Corwyn, R. F., Davidson, N. S., ... Lumeng, J. C. (2009). Maternal feeding practices become more controlling after and not before excessive rates of weight gain. *Obesity, 17*(9), 1724–1729.
- 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*(6), 2047–2054.
- Shloim, N., Edelson, L. R., Martin, N., & Hetherington, M. M. (2015). Parenting styles, feeding styles, feeding practices, and weight status in 4-12 year-old children: A systematic review of the literature. *Frontiers in Psychology, 6*, 1849.
- Silva Garcia, K., Power, T. G., Beck, A. D., Fisher, J. O., Goodell, L. S., Johnson, S. L., ... Hughes, S. O. (2018). Stability in the feeding practices and styles of low-income mothers: Questionnaire and observational analyses. *International Journal of Behavioral Nutrition and Physical Activity, 15*(1), 28. <https://doi.org/10.1186/s12966-018-0656-6>
- Sleddens, E. F., Gerards, S. M., Thijs, C., de Vries, N. K., & Kremers, S. P. (2011). General parenting, child overweight, and obesity inducing behaviors: A review. *International Journal of Pediatric Obesity, 6*(2–2), e12–e27.
- Tovar, A., Choumenkovitch, S. F., Hennessy, E., Boulos, R., Must, A., Hughes, S. O., ... Economos, C. D. (2015). Low demanding parental feeding styles is associated with low consumption of whole grains among children of recent immigrants. *Appetite, 95*, 211–218.
- Tovar, A., Hennessy, E., Pirie, A., Must, A., Gute, D. M., Hyatt, R. R., ... Economos, C. D. (2012). Feeding styles and child weight status among recent immigrant mother-child dyads: A cross-sectional analysis. *International Journal of Behavioral Nutrition and Physical Activity, 9*, 62.
- Vaughn, A. E., Ward, D. S., Fisher, J. O., Faith, M. S., Hughes, S. O., Kremers, S., ... Power, T. G. (2016). Fundamental constructs in food parenting practices: A content map to guide future research. *Nutrition Reviews, 74*(2), 98–117.
- 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*(1), 15.
- Vernon, P. E. (1964). *Personality assessment: A critical survey*. New York, NY: Wiley.
- Wallace, J. (1966). An abilities conception of personality: Some implications for personality measurement. *American Psychologist, 21*(2), 132–138.
- Webber, L., Cooke, L., Hill, C., & Wardle, J. (2010). Associations between children's appetitive traits and maternal feeding practices. *Journal of the American Dietetic Association, 110*(11), 1718–1722.
- Webber, L., Hill, C., Cooke, L., Carnell, S., & Wardle, J. (2010). Associations between child weight and maternal feeding styles are mediated by maternal perceptions and concerns. *European Journal of Clinical Nutrition, 64*(3), 259–265.
- Witkamp, R. F., & van Norren, K. (2018). Let thy food be thy medicine....when possible. *European Journal of Pharmacology, 836*, 102–114.