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## Family and Child-care Provider Influences on Preschool Children's Fruit, Juice, and Vegetable Consumption

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*Children's intakes of fruit, juice, and vegetables (FJV) do not meet the recommended minimum of five daily servings, placing them at increased risk for development of cancer and other diseases. Because children's food preferences and practices are initiated early in life (e.g., 2–5 years of*

*age), early dietary intervention programs may have immediate nutritional benefit, as well as reduce chronic disease risk when learned healthful habits and preferences are carried into adulthood. Families and child-care settings are important social environments within which food-related behaviors among young children are developed. FJV preferences, the primary predictor of FJV consumption in children, are influenced by availability, variety, and repeated exposure. Caregivers (parents and child-care providers) can influence children's eating practices by controlling availability and accessibility of foods, meal structure, food modeling, food socialization practices, and food-related parenting style. Much remains to be learned about how these influences and practices affect the development of FJV preferences and consumption early in life.*

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### Importance of Diet to Health

Dietary patterns with high intakes of fruit, juice, and vegetables (FJV) have been associated with multiple health benefits, including decreased risk for some types of cancer,<sup>1–5</sup> cardiovascular disease, stroke,<sup>6</sup> diabetes,<sup>7</sup> and, more recently obesity.<sup>8</sup> Eating more FJV daily could reduce lung cancer cases by 15%, and could reduce risk of cancers of the stomach, pancreas, and colon.<sup>9</sup> High FJV consump-

tion may help prevent cancers believed to be initiated at onset of puberty.<sup>10</sup> Because FJVs are generally low in fat, they are good substitutes for high-fat foods and may reduce the intake of dietary fat.<sup>11,12</sup> Because obesity has been shown to continue from childhood into the adult years,<sup>13</sup> interventions should target children as early as possible, e.g., during the preschool years. Eating behaviors are initiated in childhood and may persist into adulthood.<sup>14,15</sup> Thus, patterns in and influences on FJV dietary behavior should be carefully examined to identify targets (i.e., mediating variables) for intervention.<sup>16</sup> This paper reports patterns in young children's FJV intake and how parents and child-care providers influence young children's diets in order to design effective intervention programs. Relevant literature regarding children of other ages and adults is cited to identify issues to be addressed with preschoolers. Implications for intervention and further research are emphasized throughout.

### **Patterns in Preschool Children's Dietary Behavior**

National dietary guidelines recommend that Americans, including children 2 years and older, consume  $\geq 5$  servings of FJV daily.<sup>17,18</sup> Estimates of usual FJV consumption vary substantially across studies. Most children ( $\approx 97\%$ ) consume  $< 3$  vegetable servings per day.<sup>19</sup> French-fried potatoes alone constitute approximately 23% of all vegetables consumed.<sup>19</sup> The national average daily intake of FJV among 2–5-year-olds reported in 1995 was 3.3 servings,<sup>20</sup> which was substantially higher than the 2.2 servings reported by Dennison et al. in 1998<sup>19</sup> for 2- and 5-year-olds. Fruit juice contributed significantly to the total number of FJV servings consumed by young children (42%). Forty percent of 2-year-old children and 50% of 5-year-old children consumed  $> 2$  FJV servings/day.<sup>19</sup>

Studies have shown ethnic variation with FJV consumption.<sup>20</sup> Latino 4-year-old children consumed 2.8 servings of FJV,<sup>21</sup> Mexican-American and Euro-American children 2–19 years of age consumed more FJV than African-American children.<sup>22</sup> A multi-site study<sup>23</sup> revealed regional differences in ethnic correlates of FJV consumption among 8–11-year-olds: African-American children ate more fruit than Euro-American children in Georgia and Minnesota, but the reverse was true for vegetable consumption in Minnesota.

Notably, all of these studies revealed that on average young children consumed less than the recommended 5-A-Day. Much of the variation in mean values across studies is likely due to differences in dietary assessment methods. Improved methods of dietary assessment with young children that are not subject to the limitations of self-report of child or parent<sup>24</sup> are needed.

### **Psychosocial Correlates of Children's Diets**

Some theorists believe that the first few years of life are a sensitive period for the development of food acceptance patterns.<sup>25,26</sup> By the age of 3, many children develop a dislike for certain foods, notably vegetables.<sup>27–30</sup> Preschool children were reluctant to eat, or even taste, vegetables,<sup>31–34</sup> which was reflected in the very low intakes of vegetables observed in this age group.<sup>30,35–38</sup> The most consistent characteristic predicting children's food selection has been preference,<sup>39–49</sup> i.e., "children eat what they like." However, food preferences accounted for less than 13% of the variability in FJV consumption.<sup>50</sup>

Children's food preferences were learned through repeated exposure to foods.<sup>39,44,51–53</sup> Children tended to reject unfamiliar foods (neophobia), but this initial rejection was modified through repeated exposure. A minimum of 8–10 exposures (each including at least a taste) to new foods<sup>39,44,51–53</sup> increased preferences for these foods. Children were more willing to try a novel food when it was accompanied by a familiar flavor than when it was served alone.<sup>54</sup> Attempts to induce children to consume novel foods,<sup>25,55,56</sup> and to change preferences for familiar ones,<sup>57</sup> have been more effective with younger<sup>53</sup> than with older children.<sup>43</sup> Thus, parents and child-care providers may provide opportunities for children to learn to like a variety of nutritious foods by exposing them to these foods, including a taste and a familiar flavor, early in childhood.

Preference for vegetables increased with age, perhaps as a result of increased exposure.<sup>58</sup> Focus group discussions conducted with fourth- and fifth-grade students revealed that the style of vegetable preparation affected vegetable consumption. Raw vegetables with a dip or cooked (but not overcooked) and served with cheese sauce or butter were preferred.<sup>59</sup> Preparation methods used to modify or soften the strong flavors of vegetables resulted in increased acceptance.<sup>46,60,61</sup> Little work has been done to assess the influences of increased dietary diversity within specific food groups on overall consumption. Among adults, dietary variety within sweets, snacks, condiments, entrees, and carbohydrate food groups was positively associated with energy intake and body fatness, whereas dietary variety within the vegetable food group was negatively associated with energy intake and body fatness.<sup>8</sup> Whether young children exposed to a larger variety of FJV have higher FJV preferences and intakes and lower energy intake has not been addressed.

Current methods for assessing food preferences with preschoolers are laborious. Improved and quicker methods for assessing FJV preferences in field circumstances are needed, especially with young children. The extent to which improved measures of FJV preferences predict FJV consumption is malleable and what procedures affect pref-

erences must be established. Because preschool children are at early stages of cognitive development, the relevance of cognitive variables such as self-efficacy or outcome expectancies<sup>62</sup> appear limited. Intensive interviewing with young children may be valuable to identify other important age-appropriate food-related cognitions at this age.<sup>63</sup>

### **Parental Influence**

The most influential aspect of the young child's immediate environment is the family.<sup>64–68</sup> Early parental influence was associated with the development of a child's relationship with food later in life.<sup>15</sup> For example, young adult eating habits such as eating all food on the plate, using food as an incentive or threat, eating dessert, and eating regularly scheduled meals were related to the same feeding practices reportedly used by their parents during their childhood.<sup>15</sup> Young adults' consideration of nutrition when selecting food was related to the memory of their parents talking about nutrition during childhood.<sup>15</sup> This is intriguing evidence that early parental influences can have long-term influences on a person's dietary practices.<sup>15</sup>

Parents can influence preschool children's dietary practices in at least five ways: controlling availability and accessibility of foods and meal structure, food modeling, food socialization practices, and food-related parenting style.

### **Availability and Accessibility**

Parents control most of the foods entering their home, the methods of food preparation therein, and the selection of where the family goes out to eat. Children's FJV consumption varied according to availability at home and at fast food restaurants, and lack of variety served.<sup>50,59,69–71</sup> Children chose to eat foods that they were served most often, and preferred what was available and acceptable in the parental household.<sup>53</sup> Availability and accessibility accounted for 35% of the variability in FJV consumption among elementary school girls, but not boys,<sup>72</sup> and for only 11% of the variability in children's FJV consumption among children as a group.<sup>50,73</sup>

Measures to assess FJV availability and accessibility need to be improved. Research needs to address how availability and accessibility affect consumption, e.g., simply being consumed because it is there, repeated exposures leading to increased preferences, or presence in the home reflecting the preferences of people there. Research is also needed to identify what influences availability and accessibility.

### **Meal Structure**

For preschool children, parents control what foods and when meals are offered, whether families eat together, and the frequency of eating out. Approximately 98% of stu-

dents reported at least three eating occasions, and more than 50% reported five or more per day.<sup>74</sup> A large percentage of students from all age groups consumed breakfast, lunch, and dinner. Younger students were somewhat more likely to consume breakfast, lunch, and afternoon snack.<sup>74</sup>

Several studies examined the contribution of breakfast to the nutritional quality of the diet among children.<sup>75–77</sup> In general, children who consumed breakfast regularly had more adequate micronutrient intakes and significantly better Healthy Eating Index scores for grains, fruits, milk products, and variety than children who did not.<sup>78</sup> Eating a nutritious breakfast may help control body weight<sup>79</sup> owing to a reduced dietary fat intake and minimized impulsive snacking.<sup>80,81</sup> Breakfast consumption among children, however, declined significantly between 1965 and 1991.<sup>76</sup>

Mothers who selected foods based on healthful considerations rather than on taste had children who ate more healthful diets<sup>82</sup> that were significantly lower in energy, fat, and sucrose, and higher in fiber and vitamin A.<sup>83</sup>

Approximately 30% of Americans reported they cooked dinner three or four nights a week, 25% once or twice per week, and 15% never cooked.<sup>84</sup> Children consumed more FJV at dinner earlier in the week (Sundays, Mondays, Tuesdays) because mothers tended to prepare large batches of foods on Sundays, which ran out by the middle of the week, when they were more likely to go out to eat.<sup>85</sup> Eating occasions (meals and snacks) away from home increased from 16% of all eating occasions in 1977–1978 to 37% in 1995.<sup>86</sup> FJV consumption varied as a function of FJV availability in local restaurants among adolescent boys.<sup>87</sup>

Increased frequency of a family dinner among 9–14-year-old children was associated with healthful dietary patterns, e.g., higher consumption of fruit and vegetables, fiber, folate, calcium, iron, and vitamins B<sub>6</sub>, B<sub>12</sub>, C, and E; lower consumption of saturated and *trans* fat, carbonated beverages, and fried foods; and a decreased glycemic load.<sup>88</sup> Children who had companionship at mealtimes ate more servings of the basic food groups.<sup>38</sup>

The percentage of individuals eating snacks increased from 60% in 1977–1978 to 75% in 1994–1996. Nearly all children 1–19 years old reported eating at least one snack per day.<sup>89</sup> Most children consumed snacks two to three times a day.<sup>90</sup> Approximately 36% of children consumed at least four different snacks. Two-thirds of students consumed an afternoon snack, almost two-thirds consumed an evening snack, and only 15% consumed a morning snack.<sup>74</sup>

Research needs to clarify the extent to which nutrient intake and food preferences vary by each of these eating patterns, and the stability of these patterns through childhood, adolescence, and adulthood. Documentation of the extent to which the eating out pattern varies according to socioeconomic status and national or regional economic

well being at any particular time (e.g., economic recession versus growth) may also prove useful.

### **Parental Food Modeling**

Modeling, also called “observational learning,” is a concept in social learning theory.<sup>91</sup> Modeling has been specified to mean that people optimally learn behaviors by watching others, usually including learning how to do the behavior (a skill component) and seeing the other person positively reinforced for doing the behavior (a motivational component).<sup>91</sup> Children’s acceptance of foods followed the example (i.e., modeling) of parents and other siblings.<sup>56,57,92,93</sup> Mothers’ own food behaviors with regard to time of eating, types of food liked or disliked, and places where eating occurred in the home were correlated with children’s food behaviors.<sup>94</sup> Toddlers put food in their mouths more readily when they were following the example of their mothers than when they observed the same modeling behavior by a stranger.<sup>56</sup> Children tended to sample an unfamiliar food more readily when an adult was eating it, than when it merely was offered.<sup>56</sup> Children also resembled their parents in food neophobia.<sup>95,96</sup> Modeling, however, may be minimally influential in changing children’s food practices.<sup>97</sup> Research needs to determine the circumstances (characteristics of modeling activity, environment, and children) in which parental modeling influences children’s food preferences and consumption patterns.

### **Parental Food Socialization Practices**

Family food socialization is the process by which parents’ preferences, beliefs, and attitudes toward food shape their children’s food-related beliefs, attitudes, knowledge, preferences, and consumption, which in turn influence eating behaviors.<sup>42,67,98,99</sup>

The social affective context of even a single meal influenced children’s food habits and food intakes.<sup>42,100</sup> A meal situation experienced as negative by the child decreased their preference for the food eaten, whereas a positive meal experience increased their preference for the food eaten in that situation.<sup>100</sup> Parents who offered nutrition explanations or talked more specifically about the nutritional value of food had children who reported greater nutrition knowledge.<sup>101</sup> Frequent topics of discussion among mothers included, “what foods were liked,” “what foods were good for us,” “trying new foods,” and “what foods to prepare for meals.”<sup>102</sup> Fostering the child’s interest in food increased food acceptance.<sup>32,51,52,103,104</sup>

Because factors influencing a child’s food preferences and other beliefs have important consequences for what foods are eaten or not, research must more thoroughly analyze what parent communication practices influence child beliefs, how these are related to preferences and consumption, and how long these parent practices and influences persist.

### **Parenting Style**

Parenting style refers to behavioral methods used by parents to maintain, modify, or control children’s behaviors. Three common food-related parenting styles have been elucidated<sup>105</sup> that are reminiscent of Baumrind’s classification<sup>106</sup> of general parenting styles: permissive, authoritarian, and authoritative.

Permissive food-related parenting might be described as “letting the child eat what he wants.” An estimated one-fourth to one-third of the mothers indicated a permissive attitude toward children’s eating.<sup>107</sup> More permissive parenting style was related to drinking less milk<sup>82</sup> and lower intake of all nutrients, except fat.<sup>107</sup> Preschool children whose diets were in the lowest 10% with respect to nutritional quality had parents with a more permissive attitude toward child eating behavior.<sup>107</sup> Female parents of obese preschool children exercised less control over their child’s foods.<sup>94</sup> Female parents who worked more hours outside the home tended to exert less control over their children’s food behavior.<sup>94</sup> Mexican-American mothers were more permissive parents than Euro-American mothers.<sup>108,109</sup>

Authoritarian parenting reflects the parent’s attempts to one-sidedly control the child’s food intake and eating practices, through commands, instructions,<sup>110</sup> directives, or coercion. Authoritarian food parenting practices include using food to pacify, reward,<sup>42,111</sup> or punish, and prompting children to eat when not hungry.<sup>100</sup> Half of all parents reported using food as a reward for good behavior or withholding food as a punishment for unwanted behavior.<sup>38</sup> Children’s preference for the foods used as a reward tended to increase, but preference for the food for which the reward was used tended to decrease.<sup>112,113</sup> Authoritarian parenting practices were negatively associated with FJV consumption in children.<sup>114</sup> Parents’ comments to children about eating vegetables was associated with children’s lower preferences for vegetables.<sup>115</sup>

Characteristics of foods consumed or child characteristics appear to elicit certain parenting practices. Parents frequently limited their children’s consumption of foods perceived to be “unhealthy” by withholding those foods as punishment.<sup>38</sup> Contrary to parental beliefs, restricting children’s access to foods did not produce dislike for the restricted food.<sup>100</sup> Parents who described their preschoolers as “picky eaters” or problem eaters (i.e., disliking vegetables or new foods) were more likely to use negative and coercive instruction giving,<sup>116</sup> negative prompting, and negative eating-related comments.<sup>116,117</sup> Mothers frustrated by “picky eaters” reported catering to children’s demands, bribing them to eat, spoon-feeding, or playing games to increase intake.<sup>118</sup>

Authoritarian feeding practices influenced children’s responsiveness to energy density and meal size.<sup>119</sup> Parental attempts to moderate their children’s intake of foods high in fat and sugar by restricting access increased the child’s behavioral response, food selection, and intake of

those foods, even when satiated.<sup>120,121</sup> This contrary reaction to restriction was especially true when the child was in an unrestricted setting.<sup>120</sup> Parents who made negative, noneating statements about their child had children who ate less and vice versa.<sup>122</sup> Children instructed to “clean their plates” were less responsive to energy-density cues than children taught to focus on internal cues of hunger and fullness.<sup>119,123</sup> As a result, authoritarian practices had unwanted effects: preschoolers’ weight-for-height measures were inversely correlated with parental encouragement to eat more, eat quickly, or clean their plate.<sup>119,123</sup>

Authoritative parenting uses questions, negotiations, and reasoning<sup>124</sup> in an attempt to shape or guide a child’s behavior, thereby facilitating the development of the child’s dietary self-control. Little research has been reported on authoritative food parenting practices. Authoritative parenting behaviors positively associated with number of servings of foods consumed by preschool children included: asking the child to make decisions about the type of food eaten; small portions given when introducing a new food; persuading the child to eat using discussion; explaining the health benefits of foods perceived as healthy;<sup>94,98</sup> and praising the child for eating healthy foods.<sup>38</sup>

Food-related parenting practices may vary by ethnic group. African-American families tended to be authoritarian,<sup>106</sup> frequently prompted their children to eat, and were generally successful in getting the children to eat through the use of commands, actions, and rationales.<sup>124</sup> Alternatively, African-American mothers frequently used reasoning (authoritative parenting) when discussing food-related topics with their families.<sup>124</sup> In rural Mexico, preschool children had 13.5 eating episodes, received 3.5 parental prompts to eat, and made more than nine requests for food in a day’s time.<sup>125</sup> Their parents granted 76% of the children’s requests for food (perhaps permissive parenting). Whereas parent’s encouragements to eat were not related to the child’s energy intake,<sup>125</sup> children who made nine or more verbal requests for food consumed more kilocalories. Focus group discussions with low-income Latino households in the United States revealed that the most common strategy to encourage children to eat was bribing<sup>126</sup> (authoritarian parenting), e.g., parents told their children they could not watch television or have dessert unless they ate the meal first. Some of the participants reported threatening their children to get them to eat (authoritarian food parenting style), e.g., telling the child, “your father will hit you” or “we will leave you at home alone.” Whereas Latino parents believed that using bribes at mealtimes were effective strategies,<sup>126</sup> research suggests that the use of bribes is adversely related to food preferences in young children.<sup>112</sup>

Whereas a substantial amount of literature is accumulating on food parenting practices, the most appropri-

ate measurement procedures need to be clarified. Further research needs to clarify the factors influencing the use of these parenting strategies, variations in these practices by socioeconomic, ethnic, and other groupings, and the long-term consequences on food preferences and consumption.

### **Child-care Center Food Practices**

Menu-planning guidelines<sup>127</sup> and nutrition standards<sup>128,129</sup> for child care provide important tools to assure that young children are exposed to and have opportunities to consume a variety of foods. Schools have many complex influences on children’s dietary practices.<sup>130</sup> Schools that offered more FJV had children who ate more FJV.<sup>50</sup> One of the nutrient standards for child-care programs has been that a variety of fresh fruit and vegetables should be served.<sup>127-129</sup> The majority of child-care center menus provided an acceptable variety of vegetables, but not fruit.<sup>131</sup> Half of the centers in another study did not include fresh produce on the menu, and the amount served was minimal.<sup>132</sup> The quality of meals served at some child-care centers was poor and FJV were lacking in quantity and variety.

Despite menu-planning guidelines<sup>127</sup> and nutrition standards,<sup>128,129</sup> child-care centers served too little food<sup>131,132</sup> and children were not meeting two-thirds of the Recommended Dietary Allowances (RDA) for several nutrients.<sup>133,134</sup> At one center, the 5-day cycle was the same set of menus used for the past 15 years with little variety in types of foods served. In some centers, children were allowed to bring money to purchase carbonated beverages, pickles, frosties or shakes, or candy bars,<sup>132</sup> which likely minimized their consumption of FJV offered in the meals served.

Food offered in child-care centers provides an opportunity to increase the amount of FJV consumed. Research on the policies in child-care centers, and on the acceptance and implementation of such policies should elucidate pathways for improving children’s dietary practices.

### **Child-care Provider Influences**

Traditionally, the family has been the primary influence on eating behavior of preschool children. Parents and siblings were the primary food role models; the mother was “gatekeeper,” determining what foods were purchased, prepared, and served.<sup>128,132,135,136</sup> Recently, some responsibility for development of children’s eating behaviors has shifted to child-care providers.<sup>137-139</sup> In 1995, 13 million of 21 million children younger than 6 years of age were in child care.<sup>140</sup> Among employed mothers, 39% of children younger than the age of 5 were cared for in another’s home and 26% were cared for in organized child-care facilities.<sup>141,142</sup> Parents reported that child-care providers

were at least as important, and possibly more important than family members in shaping food preferences of young children.<sup>138</sup> Because of this demographic shift, a body of literature has emerged on the influence of the child-care environment on the eating behaviors of children. All the ways in which parent-child food relationships have been characterized are applicable to caretaker-child relationships,<sup>38,143–146</sup> albeit that the nonfamilial nature of the relationship may impose differing nuances.

### **Availability and Accessibility at Daycare**

Influences on children's FJV consumption varied by meal and day of the week.<sup>73,85</sup> Weekday lunch consumption in schools with National School Lunch Program meals accounted for most of children's weekday servings of FJV. Availability of FJV served in school lunches was positively related to FJV consumption.<sup>50,85</sup> One could anticipate similar findings among preschool children, in that the daycare meals that offer more FJV should have children who consume more FJV during those meals. Research in daycare centers needs to address these issues.

### **Daycare Meal Structure**

The majority of children in child-care centers ate one or two daily meals plus snacks there.<sup>147</sup> Approximately one-third of total energy intake of Head Start children came from meals served there,<sup>147</sup> which provided as much as 70% of the child's daily energy requirement.<sup>148</sup> Children consumed 50–100% of their RDAs at the child-care facility.<sup>149</sup> Based on menu evaluation, some child-care centers served too little food,<sup>129,131</sup> the quality of meals served was poor,<sup>129,131,150</sup> and menus were inadequate in several key vitamins and minerals.<sup>64,65,131,133,148,151–155</sup> Excess fat and limited vegetables were found on child-care menus and in diets of young children eating away from home.<sup>131,146,156,157</sup>

It was recommended<sup>127,128</sup> that child-care providers allow children to recognize when they were hungry and when they were full. Family-style meal service assumes children have strong innate control over their energy requirements.<sup>119,148,158</sup> Surprisingly, the majority of child-care programs did not use family-style meal service,<sup>144</sup> and in 25% of observations, child-care providers hurried the children to finish their snack or meal.<sup>159</sup> Regulating young children's food intake is supposedly common practice in child-care facilities. Many caregivers fear that children will overeat or waste food if allowed to select their own portions. As a result, preschool children in group settings have not learned self control, and tend to eat more at snack time if allowed to self-select than if selections were restricted.<sup>158</sup> Although plate waste did not increase with self-selection, the younger children wasted more than the older children.

Periods of physical activity are part of the overall school day. When physical activity was scheduled before

lunch (rather than after), children ate more of the foods served.<sup>160–162</sup> Research must address the sequencing of periods of physical activity and meals and snacks for preschoolers, the methods of serving food, and the foods to be served to optimize child health, growth, and cognitive development.

### **Child-care Provider Food Modeling**

Early studies suggested that preschool children were more likely to eat foods if they saw an adult model eat the foods.<sup>57,92,145</sup> This, in part guided recommendations that child-care providers sit with children and consume the same foods during mealtime.<sup>47,57,163–165</sup> The percentage of child-care providers who actually followed these recommendations, however, was low.<sup>144</sup> Child-care providers not consuming the same food as the children often did not eat at all, or if they did, they often ate fast food and sodas.<sup>144</sup> Recent research found that teacher modeling was the only ineffective action of five mealtime actions to encourage children's new food acceptance.<sup>145</sup> These inconsistent results may be explained by differences in the conditions under which modeling was provided.<sup>97</sup> Teacher modeling was effective when the teacher displayed enthusiasm for the foods and showed that rewarding consequences came from eating them;<sup>92,97</sup> teacher modeling was ineffective<sup>145</sup> when it was presented with nonspecific comments of "I like to try new foods." Further research should clarify the circumstances (characteristics of teacher, teacher behavior, setting, and children) in which child-care provider food modeling may be effective.

### **Child-care Provider Food Socialization Practices**

Whereas child-care providers may agree that mealtime should be used as an opportunity to educate children about nutrition, only 50% of child-care providers made any comment about nutrition during meals.<sup>144</sup> More research needs to address how the child-care providers share their food-related knowledge, attitudes, and beliefs with the children, and the subsequent effects on child beliefs.

### **Child-care Provider Food Parenting Style**

The food parenting style of child-care providers can also be characterized as permissive, authoritarian, or authoritative. Five teacher actions to encourage preschool children's acceptance of new FJV presented during lunch were compared.<sup>145</sup> The five teacher actions included modeling; one authoritative food parenting style practice: offering choice (e.g., "Do you want any of this?"); two authoritarian food parenting style practices: insisting children try one bite, and a reward (special dessert); and a control condition of simple exposure. The five teacher actions produced differences in the foods sampled, number of meals, and number of bites. Choice, insisting, and reward were more effective than simple exposure to en-

courage number of foods, number of meals, and number of bites. Dessert reward and choice offering were equally effective in encouraging new food acceptance, but insisting produced fewer bites than choice offering. Repeated exposure to foods (an authoritative practice) increased consumption, especially if it involved opportunities for the children to handle the food and taste it.<sup>42,52,104,145,166</sup>

Whereas child-care providers engaged in conversation with children, the interaction often involved directives such as “you need to eat” (authoritarian food parenting style),<sup>144</sup> or the child was asked to take “one bite” of all foods before the child was permitted seconds.<sup>159</sup> Tangible rewards for eating encouraged children to eat more foods,<sup>52,61,145</sup> although later they liked these foods less.<sup>53,112,113,145</sup>

Future research needs to identify the circumstances (characteristics of teacher, teacher behavior, setting, and children) under which alternative food parenting styles result in increased consumption of FJV, as well as the long-term consequences of such practices.

## Summary

Because diet can make a substantial contribution to variation in health and disease, understanding how food choices develop is of critical significance. Early childhood and the feeding context are widely assumed to be critical to the establishment of lifelong healthy eating habits.<sup>14,64,67,167,168</sup> Healthier choices at one stage in life are associated with healthier choices at later stages.<sup>64,167,168</sup> However, data on the processes whereby parents and child-care providers influenced children’s eating habits were sparse.

Available literature suggests that parents and child-care providers influence eating practices of children in varied and complex ways. There is not extensive literature on environmental (i.e., parent and child-care provider) and personal (i.e., food preferences) influences on diet. Much of the previous work reported inconsistent findings and poorly understood mechanisms of influence. Influences on young children’s FJV consumption may vary by ethnicity, gender, age, socioeconomic status, and food group.

Family structure and relationships have changed in the last quarter century.<sup>169–171</sup> What was said about families and dietary behaviors in the past may not be true today. An up-to-date, systematic, and comprehensive understanding of how family and child-care providers influence children’s preferences and consumption is needed to design effective interventions that encourage more healthful eating behaviors.

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