

# A Parental Health Education Model of Children's Food Consumption: Influence on Children's Attitudes, Intention, and Consumption of Healthy and Unhealthy Foods

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This study proposes that parental mediation of television advertising and parental guidance of food consumption differentially influence children's attitude, intention, and behavior toward the consumption of healthy and unhealthy foods. Structural equation modeling based on a survey of 1,119 children aged 9–12 supported our model, revealing that parental education strategies influence children's food consumption in a complex manner that is highly context-dependent. Parental guidance of food consumption enhanced children's healthy food attitude and intention to consume, while reducing the intention to consume unhealthy food. However, parental mediation of television advertising influenced unhealthy food attitude to a greater extent than healthy food attitude. Implications for health promotion and education, as well as parents and policy makers are discussed.

Parents serve as crucial health promoters in the lives of their children (Andrews, Silk, & Eneli, 2010). There are three main rationales that explain parents' influence on their children's health (Grusec & Davidov, 2007). First, parents and children share common environments that put them together in intimate proximities. Second, parents and children share appropriate behavior to make family life more comfortable. Third, most societies consider parents as the primary caregivers of children, expecting parents to educate their children on behaviors that contribute to healthier lifestyles.

Research on parental influences recognizes parents' role in children's media consumption using the theoretical construct of *parental mediation*. Parental mediation refers to parents' varying strategies to monitor and supervise their children's media use in hope to maximize the positive impact of media while minimizing its negative influence (Warren, 2001). A substantial amount of research has examined the role of parental mediation in modifying children's responses to television, including television program-induced alcohol and smoking-related behaviors, materialism, and aggression (An & Lee, 2010; Dalton et al., 2006; Fujioka & Austin, 2003; Nathanson, 2004).

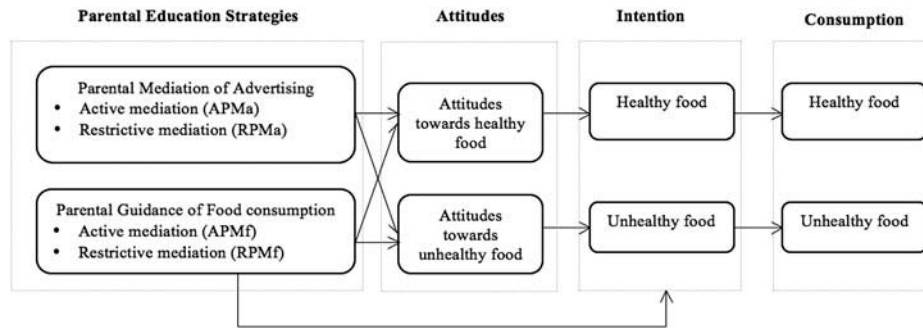
One line of parental mediation research explores the undesirable effects of advertising on children, due to the concern that children, especially younger ones, have yet to develop the necessary information-processing skills to understand the nature and intent of advertising (Buijzen, 2009). Studies found that parental advertising mediation can affect children's advertising-induced materialistic orientations, unhealthy eating habits, purchase request behavior,

and parent–child conflicts resulting from parents' denial of children's purchase requests (Buijzen, 2009; Buijzen & Valkenburg, 2005).

Another stream of research looks at parental guidance in guiding children in non-media consumption contexts, specifically food consumption behavior (Scaglioni, Salvioni, & Galimberti, 2008; Ventura & Birch, 2008), focusing on how parents educate their children regarding food consumption and how it influences children's eating behavior (Kremers, Brug, de Vries, & Engels, 2003). However, most past studies have examined the effect of parental practices and styles on children's unhealthy food consumption. Thus, little is known regarding the influence of parental guidance in the *healthy/desirable* food consumption context.

The objective of this study is to expand the traditional theoretical perspective on parental mediation of media to integrate parental mediation facets in health decision making pertaining to food consumption. In so doing, we developed a model of parental guidance of food consumption and parental mediation of television advertising and tested this model on both desirable (healthy) versus undesirable (unhealthy) food consumption attitude, intention, and behavior in children.<sup>1</sup> Our model (Figure 1)

<sup>1</sup>Nutrition researchers might approach food consumption from a more holistic manner, avoiding the healthy/unhealthy food dichotomy. However, this study utilizes the unhealthy/healthy dichotomy for the sake of utility in health promotion. This is based on a steady stream of literature in health promotion and education that focuses on promoting a healthier diet among people. The dichotomy is often based on the relative nutrient density of the foods in question. Foods high in calories and low in nutrients, such as snacks, chips, and fast food options, are generally classified as unhealthy, while foods that are relatively higher in fiber, vitamins, and protein are classified as healthy (e.g., Dixon, Scully, Wakefield, White, & Crawford, 2007; Hartmann, Siegrist, & van der Horst, 2013).



**Fig. 1.** Conceptual framework of parental health education model in the context of children's consumption of healthy and unhealthy food.

puts forth the hypotheses that parental mediation of television advertising and parental guidance of food consumption influence the food consumption outcomes of children through the psychosocial mediators of attitude and intention to consume certain types of food. To our knowledge, studies focusing on advertising effects on food consumption have measured only a singular outcome—attitude toward junk food advertising and consumption of energy-dense food (Buijzen, 2009; Yu, 2011). We propose that it is critical to understand how parental influence factors motivate children to reduce unhealthy food intake while raising healthy food consumption as both food choice behaviors frequently occur in parallel.

### Theoretical Perspective: Parental Mediation of Media Consumption

Scholars recognize that parents affect the way children use and are influenced by media (Livingstone & Helsper, 2008; Nathanson, 1999). According to research on parent–child interaction processes, parents influence their children's behavior via communication styles, modeling, and rule-making. These processes, also known as the mediated effects model of parental influence (Burlinson, Delia, & Applegate, 1995), affect children's acquisition and development of social skills and cognitive competence, which help children function as members within a given social system (Moschis, 1985).

#### Parental Mediation of Television Advertising

Past studies on parental mediation have identified various strategies that parents engage to mediate children's television viewing. Three primary strategies of parental mediation are active mediation (i.e., parents' discussion with children about television content), restrictive mediation (parents' setting rules regarding the amount of time and types of content permitted), and co-viewing (parents' watching television with children without discussing television content), and research has shown mixed findings regarding their effects on children's television viewing (Buijzen & Valkenburg, 2005; Bybee, Robinson, & Turow, 1982; Nathanson, 2001).

Researchers have also specifically focused on the role of parents in modifying children's responses to *advertising* on television (e.g., Buijzen, 2009; Yu, 2011). According to this

perspective, parents tend to believe that advertising brings undesired effects to their children due to the concern that children have yet to develop the necessary cognitive skills to understand the intent of advertising (Buijzen, 2014). Parents thus perform mediation strategies to reduce advertising's potentially negative influence on children. Advertising mediation literature has likewise recognized strategies that parents use to modify the effects of advertising: active mediation, restrictive mediation, and co-viewing (Buijzen & Valkenburg, 2005; Fujioka & Austin, 2003).

However, scholars have argued that it is unclear whether co-viewing is conducted to mediate children's exposure to television content or simply reflects parents' preference for particular content (Austin, Bolls, Fujioka, & Engelbertson, 1999). Children may view co-viewing as parental agreement on content (Fujioka & Austin, 2003; Nathanson, 1999), and it may promote undesirable advertising effects (Nathanson, 2001; Robertson, 1979). The effectiveness of co-viewing is thus less convincingly established than that of the active and restrictive mediations (Valkenburg, Piotrowski, Hermanns, & de Leeuw, 2013). Thus, we focus only active and restrictive mediation in our research.

Arguments supporting active mediation suggest that the reasoning-oriented discussion embedded in the active mediation strategy can cultivate critical-thinking skills and skepticism in children, leading to reduced undesirable impact of advertising in the long run (Nathanson, 1999). In line with the arguments, active mediation was found to be more effective than restrictive mediation in reducing children's advertising-induced materialistic attitude and purchase requests (Buijzen & Valkenburg, 2005) and the impact of advertising on children's unhealthy food consumption among children aged 4 to 12 years old (Buijzen, 2009).

However, other studies have pointed to the effectiveness of restrictive mediation, relative to active mediation, in modifying the undesirable effects of advertising on children (Nathanson, 2001; Yu, 2011). Buijzen (2014) found that restrictive mediation was more effective than active mediation in reducing the influence of advertising on children aged 8 and younger because parents still hold control over their children's media consumption. Similarly, Yu (2011) found that restrictive mediation led to negative attitude toward

snack and fast food advertisements whereas active mediation had an opposite effect among children aged 7–12.

Compared to the literature on parental mediation of advertising in general, research focusing on food-related advertising and its outcomes is scant. Even the few studies focusing on food advertising measured only two dependent variables thus far, i.e., attitude toward fast food advertising and consumption of energy-dense foods (Buijzen, 2009; Yu, 2011). Additionally, these studies focused on mainly undesirable consumption behaviors. Our research aims to bridge the gap by assessing the effects of parental mediation of advertising on a number of food-related variables, including attitude toward, intention of, and consumption of healthy and unhealthy food.

### *Parental Guidance in Food Consumption Context*

In addition to the highly publicized studies on parental mediation of children's media use, research has pointed to the importance of parental guidance in other domains, including food consumption (Scaglioni et al., 2008; Ventura & Birch, 2008). Research in the domain of public health and nutrition have identified parental practices as key determinants in children's eating choices (Scaglioni et al., 2008; Ventura & Birch, 2008; Vereecken, Rovner, & Maes, 2010).

According to this stream of research, parental practices refer to context-specific, goal-directed parental behaviors, that predict child food consumption behavior (Darling & Steinberg, 1993; Vereecken et al., 2010). Among the many parental practices (e.g., controlling availability, access, pressure, and reward), some of these practices are conceptually related to the two dimensions of parental mediation. For example, parental teaching about nutrition, which refers to parents verbally conveying nutrition knowledge to children in order to encourage healthier eating, is positively correlated with fruits and vegetables consumption and negatively correlated with sugar-sweetened beverage consumption (Melbye & Hansen, 2015). This suggests that a discussion-based guidance like active parental mediation might be more influential in children's food consumption choices.

Restrictive forms of guidance in food consumption contexts includes rule-making practices (Sleddens et al., 2014). Although most studies suggest that rule-making is effective in reducing children's unhealthy food consumption (Duraó et al., 2015; Gevers, Van Assema, Sleddens, de Vries, & Kremers, 2015; Sleddens et al., 2014), such as sugary drinks and snacks consumption, other studies, which are mainly experimental, have suggested that setting of rules might have unintended consequences (Boots, Tiggemann, Corsini, & Mattiske, 2015; Fisher & Birch, 1999, 2000). Specifically, studies found a "forbidden foods effect" where children who were restricted to a jar of cookies visible in their homes for five weeks subsequently made more positive comments about the cookies, more requests for the cookies, took larger portions, and ate more, when compared to children who were given free access to the cookies throughout the period (Fisher & Birch, 1999).

While research on parental practices in children's food consumption provide useful insights, past research has only looked

at children's actual behavior without taking into account the cognitively mediated variables such as attitude and intention. It is equally important to examine the cognitive aspect such as preferences of and attitude toward food, because these aspects are likely to lead to children's food consumption behavior in the long run (Skinner, Carruth, Bounds, & Ziegler, 2002; Wardle, 1995). Hence, we propose two related parental practice constructs in the context of food consumption, built on the two dimensions of parental mediation: parental active and restrictive guidance of food consumption. We then test the effect of active and restrictive parental guidance of food consumption on children's cognitive response to both healthy and unhealthy foods.

### **Conceptual Framework**

Our proposed framework, shown in Figure 1, puts forward two types of parental education strategies as starting points of influence. These are the primary guidance variables as children come into contact with either advertising or food. While prior studies on parental mediation focused on parental intervention of children's media use in general and parental influence on children's unhealthy food consumption in particular, our framework includes parents' intervention in both *healthy* and *unhealthy* types of food that children are likely to consume. The framework proposes that parental mediation of advertising as well as parental guidance of food consumption influence children's attitude, intentions, and behaviors toward the consumption of healthy and unhealthy types of food, as parents pass on values and attitude toward meals and victuals to their young. Building on prior research that have shown attitude and intention as mediational paths to behavior (Andrews et al., 2010; Fishbein & Yzer, 2003), we hypothesize that parental mediation of television advertising and parental guidance of food consumption will positively influence children's attitude toward and intention to consume *healthy* foods. On the other hand, we put forward that parental mediation of television advertising and parental guidance of food consumption will negatively predict children's attitude toward and intention to consume *unhealthy* foods. Finally, we posit that attitude toward *healthy* foods will enhance intention to consume and consumption of *healthy* foods whereas attitude toward *unhealthy* foods will heighten intention to consume and consumption of *unhealthy* foods. Figure 1 illustrates the general patterns of expected findings.

### **Method**

#### *Participants and Procedures*

To test the hypotheses, we conducted a survey with children aged between 9 and 12. Child respondents were recruited from six public primary schools from diverse geographic locations in Singapore. They included 1,119 third- ( $n = 44$ ), fourth- ( $n = 425$ ), fifth- ( $n = 372$ ), and sixth- ( $n = 236$ ) grade students, between 9- and 12-years-old with a mean age of 10.76 ( $SD = 0.89$ ). The sample included slightly more boys (55.5%) than girls (44.2%). Most participants had an acceptable BMI (63.4%), while some were underweight (11.3%), overweight

(7.8%), and severely overweight (3.4%) according to child BMI guidelines.

Prior to the survey, we obtained approval from Singapore's Ministry of Education and the university's Institutional Review Board. Each survey, lasting 25 to 35 minutes, was administered in school setting in the presence of a teacher and a researcher. In total, 1,330 survey questionnaires were distributed, and 1,119 were completed, yielding a response rate of 84.1%.

### Measures

Our questionnaire included measures for parental mediation of food advertising, parental guidance of food consumption behavior, children's attitude toward, and their self-reported food consumption of healthy and unhealthy foods. For the sake of utility, we operationalized healthy foods as food that have greater nutrient density (e.g., fruits and vegetables), while unhealthy foods are those with lower nutrient density (e.g., sugary drinks and fast food). Confirmatory Factor Analyses (CFA) revealed that all the scales consisted of items that had factor loadings of .5 and above in both models, with acceptable fit indices. Specifically, both Model 1 (Figure 2: CFI = .96, NNFI = .96, RMSEA = .04, SRMR = .04) and Model 2 (Figure 3: CFI = .96, NNFI = .95, RMSEA = .04, SRMR = .04) indicate acceptable fits. Table 1 displays the descriptive statistics for the items and scales used in the study.

#### Parental Mediation of Food Advertising

was measured using an existing measurement scale (Buijzen & Valkenburg, 2005) by asking children to rate how often their parents practice each type of parental mediation regarding their television advertising viewing on eight 5-point scales, anchored on "never" (1) to "all the time" (5). Five items measured active advertising mediation (APMa) and three items measured restrictive advertising mediation (RPMa).

#### Parental Guidance of Food Consumption Behavior

was measured using an existing measurement scale (Buijzen & Valkenburg, 2005) by asking children to rate how often their

parents practice each type of parental guidance on seven 5-point scales, anchored on "never" (1) to "all the time" (5). Five items measured active food parental guidance (APGf) and two items measured restrictive food parental guidance (RPGf).

#### Attitude Toward Healthy and Unhealthy Foods

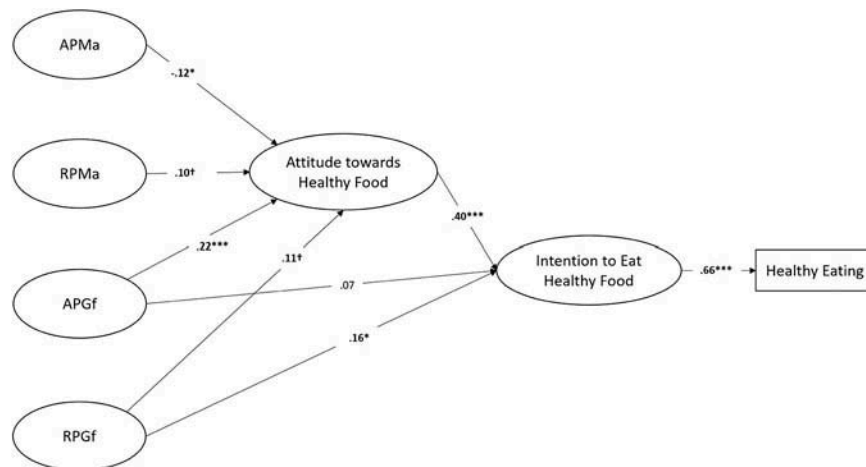
were measured using an adapted inventory of six cognitive and emotive responses to both healthy and unhealthy foods (Aikman, Crites, & Fabrigar, 2006). The responses consisted of adjective-pairs on a 5-point semantic differential scale.

#### Intention to Eat Healthy and Unhealthy Foods

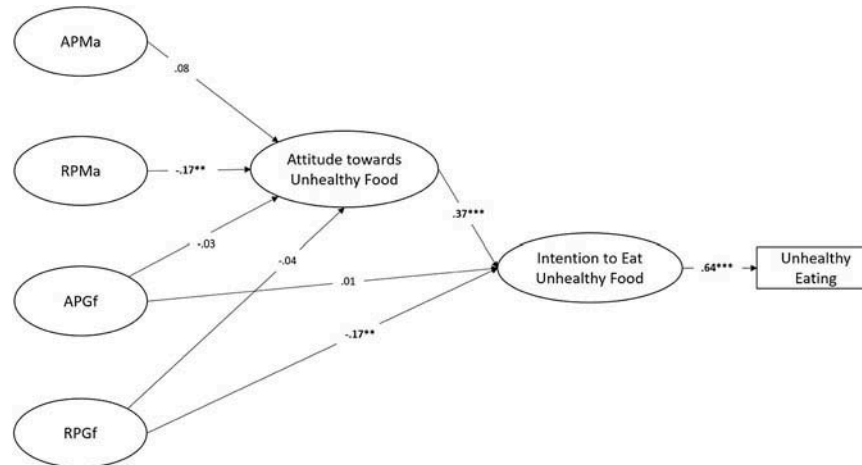
were measured by asking children how much they would like to eat a particular food item every week on 11-point scales, anchored on "zero" (1) to "eleven" (11). Three items were utilized to measure intention to consume unhealthy foods (burgers, chips, and soda). Three items were utilized to measure intention to consume healthy foods (milk, apples, and vegetables), while another three items were utilized to measure intention to consume unhealthy foods (burgers, chips, and soda). The items were adapted from Thompson and colleagues (2000). It should be pointed out that the phrasing of "would like to" might reflect the concept of desire rather than intention. Based on a pre-test with children in similar age ranges as our sample, we found that intention measures phrased with "intend to" might be difficult for some segments of our sample to understand. The measure was phrased in such a way as to minimize confusion for the sample of children, and retain a good level of validity, as some scholars argue that desire can be used as a good proxy of intention (Fishbein & Stasson, 1990).

#### Healthy and Unhealthy Food Consumption Behavior

were measured by asking children how often they consumed a particular food item on six 4-point scales, anchored on "none" (1) to "everyday" (4). Two separate additive scales were constructed to measure healthy foods (fruits & vegetables, grains and milk) and unhealthy foods (potato chips, burgers and candies), resulting in a maximum combined score of 12 for each



**Fig. 2.** SEM showing factors predicting healthy eating behavior among children. Standardized estimates are shown for paths between latent variables.  $\chi^2(293) = 749.932, p < .000$ ; CFI = .96; NNFI = .96; RMSEA = .04, SRMR = .04. † $p < .1$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



**Fig. 3.** SEM showing factors predicting unhealthy eating behavior among children. Standardized estimates are shown for paths between latent variables.  $\chi^2(293) = 736.594$ ,  $p < .000$ ; CFI = .96; NNFI = .95; RMSEA = .04, SRMR = .04.  $^\dagger p < .1$ .  $*p < .05$ .  $**p < .01$ .  $***p < .001$ .

behavioral category. The questionnaire also collected demographic and Body Mass Index (BMI) information.

## Results

Before testing the hypotheses, we examined the zero-order correlations among variables to detect multicollinearity in the dataset (Table 2). No high correlations were noted, suggesting there were no multicollinearity issues.

To test the hypothesized model (Figure 1), we used SPSS AMOS 22 to run Structural Equation Modeling (SEM). The maximum likelihood procedure was used to estimate the unknown parameters in both models. Figures 2 and 3 present results.

### Influence of Parental Mediation of Advertising

For healthy foods (Figure 2), we posited a positive relationship between parental mediation of advertising (APMa and RPMa) and children's attitude toward healthy foods. This was partially supported. RPMa had a marginally significant and positive relationship with attitude toward healthy foods ( $\beta = .10$ ,  $p < .10$ ). However, there was a significant and negative relationship between APMa and attitude toward healthy foods ( $\beta = -.12$ ,  $p < .05$ ).

For unhealthy foods (Figure 3), we predicted a negative relationship between parental mediation of advertising (APMa and RPMa) and children's attitude toward unhealthy foods. This was partially supported as RPMa had a significant and negative relationship with attitude toward unhealthy foods ( $\beta = -.17$ ,  $p < .01$ ).

### Influence of Parental Guidance of Food Consumption

For healthy foods (Figure 2), we posited a positive relationship between parental guidance of food consumption (APGf and RPGf) and children's attitude toward and intention to eat healthy foods. This was partially supported as APGf positively predicted

attitude toward healthy foods ( $\beta = .22$ ,  $p < .001$ ). RPGf had a marginally significant and positive association with attitude toward healthy foods ( $\beta = .11$ ,  $p < .10$ ). Although APGf did not significantly predict intention to eat healthy foods, RPGf positively predicted intention to eat healthy foods ( $\beta = .16$ ,  $p < .05$ ).

For unhealthy food (Figure 3), we posited a negative relationship between parental guidance of food consumption (APGf and RPGf) and children's attitude toward and intention to consume unhealthy foods. APGf and RPGf had no significant relationship with attitude toward unhealthy foods. However, RPGf was significantly and negatively associated with children's intention to eat unhealthy foods ( $\beta = -.17$ ,  $p < .01$ ).

### Child Attitude as Drivers of Food Consumption

Consistent with past research on the influence of attitude on behavior (Andrews et al., 2010; Fishbein & Yzer, 2003) children's attitude toward healthy foods was positively associated with their intention to eat healthy foods ( $\beta = .40$ ,  $p < .001$ ), which in turn was positively associated with their healthy eating behavior ( $\beta = .66$ ,  $p < .001$ ). Likewise, children's attitude toward unhealthy foods was significantly and positively associated with their intention to eat unhealthy foods ( $\beta = .37$ ,  $p < .001$ ), which in turn was associated with their unhealthy eating behavior ( $\beta = .64$ ,  $p < .001$ ).

## Discussion

### Theoretical Contributions

The purpose of this study was to determine how different dimensions of parental health education strategies influence children's attitude, intention, and behavior toward healthy and unhealthy food consumption. The research findings suggest that it is possible that parental health education strategies influence children's attitude, intention, and food consumption behavior in a multifaceted manner that can be dependent on the food consumption context.

**Table 1.** Descriptive statistics for key and background variables.

	Mean	SD	$\alpha$
<b>Active Parental Mediation of Advertising</b>	<b>2.74</b>	<b>.90</b>	<b>.77</b>
How often do your parent/guardian(s) tell you the following statements?	2.49	1.25	
Advertisements show products as better than they really are.	2.70	1.22	
Advertisements do not tell the truth.	3.23	1.38	
The purpose of advertisements is to sell products.	2.94	1.20	
Not all advertised products are of good quality.	2.32	1.14	
Advertised products are not good for children.			
<b>Restrictive Parental Mediation of Advertising</b>	<b>2.11</b>	<b>1.04</b>	<b>.73</b>
You should turn off the TV or switch channels when advertisements are being shown.	2.07	1.32	
You should not watch TV advertisements at all.	1.96	1.22	
You should watch specific channels that broadcast relatively few advertisements.	2.31	1.33	
<b>Active Parental Guidance of Food Consumption</b>	<b>3.36</b>	<b>.92</b>	<b>.85</b>
How often do your parent/guardian(s) explain to you why it's important to eat healthily?	3.60	1.14	
How often do your parent/guardian(s) explain to you why you should eat more or less of a particular food?	3.57	1.08	
How often do your parent/guardian(s) discuss with you about the health benefits of a food?	3.21	1.17	
How often do your parent(s) discuss with you the importance of eating a variety of foods?	3.28	1.16	
How often do your parent/guardian(s) explain to you the effects of different nutrients (e.g., Vitamin C, calcium)?	3.15	1.23	
<b>Restrictive Parental Guidance of Food Consumption</b>	<b>3.26</b>	<b>1.07</b>	
How often do your parent/guardian(s) control the amount that you eat during meal times?	3.17	1.24	
How often do your parent/guardian(s) limit the amount of snacks that you eat?	3.36	1.25	
<b>Attitude Toward Healthy Foods</b>	<b>3.86</b>	<b>1.02</b>	<b>.93</b>
What do you think of when you eat the above food?	4.10	1.10	
Unpleasant/Pleasant	3.96	1.16	
Unfavorable/Favorable	3.91	1.22	
Not enjoyable/Enjoyable	3.79	1.21	
How would you feel after eating the above food?	3.57	1.20	
Not at all happy/Very happy	3.80	1.22	
Not at all fun/Very fun			
Not at all satisfied/Very satisfied			
<b>Intention to Eat Healthy Foods</b>	<b>4.41</b>	<b>2.07</b>	<b>.61</b>
I would like to eat/drink (0 to 10) _____ every week.	4.95	2.80	
Cup(s) of Milk	4.18	2.54	
Apple(s)	4.09	2.93	
Plate(s) of vegetables			
<b>Healthy Eating Behavior (Sum)</b>	<b>9.86</b>	<b>1.78</b>	
I eat fruits and/or vegetables	3.15	.92	
I eat grains (e.g., bread/rice)	3.73	.59	
I drink milk	2.99	1.06	
<b>Attitude Toward Unhealthy Foods</b>	<b>3.52</b>	<b>.90</b>	<b>.86</b>
What do you think of when you eat the above food?	3.14	1.20	
Unpleasant/Pleasant	3.60	1.22	
Unfavorable/Favorable	3.82	1.19	
Not enjoyable/Enjoyable	3.61	1.14	
How would you feel after eating the above food?	3.34	1.10	
Not at all happy/Very happy	3.61	1.18	
Not at all fun/Very fun			
Not at all satisfied/Very satisfied			
<b>Intention to Eat Unhealthy Foods</b>	<b>2.17</b>	<b>1.60</b>	<b>.72</b>
I would like to eat/drink (0 to 10) _____ every week.	1.67	1.61	
Burger(s)	1.78	1.75	
Packet(s) of chips	3.05	2.50	
Can(s) of soda			
<b>Unhealthy Eating Behavior</b>	<b>5.98</b>	<b>1.66</b>	
I eat potato chips	1.96	.70	
I eat burgers	1.90	.64	
I eat candies	2.12	.85	

*M* = Construct mean, *SD* = Standard deviation,  $\alpha$  = Cronbach's alpha.

**Table 2.** Zero-order correlations among the variables.

Variable	1	2	3	4	5	6	7	8	9
1. APMa	1								
2. RPMa	.50**	1							
3. APGf	.27**	.15**	1						
4. RPGf	.15**	.08*	.26**	1					
5. Attitude (healthy)	.03	-.04	.21**	.18**	1				
6. Intention (healthy)	.05	.01	-.07*	-.07*	.35**	1			
7. Healthy Eating	.04	-.12**	-.11**	-.13**	.53**	-.08*	1		
8. Attitude (unhealthy)	-.03	.07*	-.10**	-.13**	-.11**	-.21**	.30**	1	
9. Intention (unhealthy)	.03	.05		-.13**	-.28**	-.06	-.10**	.23**	1
10. Unhealthy Eating	-.01				-.28**	-.18**			.52**

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Specifically, we found evidence to suggest that parental guidance of food consumption promotes healthy food attitude and intention, while parental mediation of television advertising deters unhealthy food attitude. This implies that parental education strategies should be distinguished contextually (advertising vs. food), and its effects vary across different types of outcomes (eating of healthy vs. unhealthy foods).

#### *Unintended Effects of Active Parental Mediation of Advertising*

Regarding parental mediation of advertising, the findings of our study indicate that, in the context of healthy food consumption, parents' talking to children about advertising may have complex effects on children's food attitude. Our analyses revealed a weak but significant association between active mediation of advertising and children's attitude toward healthy foods. However, the direction of the association was counter to what was predicted.

A possible explanation is that the direction of causality might be the opposite of our model, such that parents engage in higher levels of active parental mediation when their kids have negative attitude toward healthy foods. Another possibility is that active parental mediation of advertising may lead to unintended priming effects, where the presentation of elements in the advertisements that are explained by the parents can activate children's unintended cognitions of advertising content (Byrne, Linz, & Potter, 2009). This unintended framing may impede the effectiveness of parental remarks on advertising (Nathanson & Yang, 2003). Additionally, researchers have suggested that youths can sometimes display a preference for products that their parents have made known to disapprove (Rummel, Howard, Swinton, & Seymour, 2000). As avid media users, children may think that they know more about advertising than their parents do and are less likely to regard parents as legitimate authorities to comment on advertising. This perceived competency among children may lead to psychological reactance (Byrne et al., 2009), resulting in children adopting the opposing attitude of what parents intend to promote. Future research should examine how children's perceived competency and other child-parent factors (e.g., children's age and perception of parents' knowledge of food advertising, etc.) affect their responses to parental mediation.

#### *Protective Effects of Restrictive Mediation of Advertising*

In the context of unhealthy food consumption, restrictive parental mediation of advertising was found to be negatively associated with children's attitude toward unhealthy foods, as in previous studies (e.g., Yu, 2011). This finding highlights the effectiveness of restrictive mediation in reducing the negative effects of F&B advertising on children's attitude. Specifically, TV food advertisements in Singapore have been suggested to be predominantly used to promote unhealthy foods (Huang, Mehta, & Wong, 2012). Parents' restrictive control of advertisements may reduce the chance of exposure to advertisements that might potentially influence children's attitude toward unhealthy foods.

#### *Positive Effects of Active Guidance of Food Consumption*

Regarding parental guidance of food consumption, the results suggest that active parental guidance of food consumption leads to positive attitude toward healthy foods. It is possible that children consider their parents as "authorities" when it comes to foods, particularly with regard to their healthfulness, since parents tend to make food purchase and consumption decisions for children. Parents are often the food "creators" in home environments, preparing and arranging meals and encouraging healthy eating. This may present parental education about food consumption in a highly credible light, leading to children's positive attitude toward healthy foods. This is in line with existing research, where parents' teaching about nutrition have been found to correlate with children's fruits and vegetables consumption (Melbye & Hansen, 2015).

#### *Direct Relationship between Restrictive Guidance of Food Consumption and Intentions*

While restrictive parental guidance of food consumption was found to be only marginally associated with attitude toward healthy foods, it was directly associated with intention to eat healthy foods. Since parents are authorities making food consumption decisions at home, they directly influence children's intention to consume foods offered despite children's pre-existing attitude toward the foods. However, simple

restriction without entailing deliberate explanations may be insufficient to influence children's overall attitude toward a subject (Fujioka & Austin, 2003). We also found that restrictive parental guidance of food consumption reduced children's intention to consume unhealthy foods. This is supported by research in the public health and nutrition domain, where parents rule-setting was found to be associated with reduced consumption of unhealthy foods such as sugary drinks (e.g., De Bruijn, Kremers, de Vries, Van Mechelen, & Brug, 2007).

Unlike healthy food consumption, unhealthy food attitude were not found to be influenced by active parental guidance of food consumption. One possible explanation is that attitude toward healthy food are more malleable compared to attitude toward unhealthy food. Children's preferences for unhealthy foods are probably acquired over their lifelong exposure to the marketing, advertising, and consumption of unhealthy foods. This might create more enduring attitude that are harder to change through active mediation.

#### *Contextualized Parental Mediation/Guidance*

Our data suggest that parental mediation influence children's attitude, intention, and food consumption behavior in a complex manner that is dependent on the food consumption context. For healthy foods, an active approach that utilizes explanations of healthy food consumption might be more effective in shifting attitude. For unhealthy foods, restricting the influence of advertisements might be more effective. Our findings also suggest a direct effect of restrictive parental guidance of food consumption on intention to eat both healthy and unhealthy foods. As Austin (1993) indicates, children may perceive certain parental mediation strategies to be more salient than others. Some past studies demonstrated this pattern and found restrictive mediation to be more effective, particularly due to its rule-making and controlling component (Buijzen, 2014; Nathanson, 2001). In two studies on parent-child correspondence, the researchers suggest that correspondence between parent and child was greatest when it comes to controlling activities (Austin, 1993) and rule-driven communication (Tims & Masland, 1985). Bearing in mind these possible explanations, it is possible that our original hypotheses were unsupported. We encourage future research to utilize and test these explanations.

#### *Strong Relationships between Attitude, Intention, and Behavior*

Finally, attitude toward healthy foods predicted intention and consumption of healthy foods whereas attitude toward unhealthy foods led to intention and consumption of unhealthy foods. This corroborates past studies demonstrating that attitude toward healthy eating is a function of intention toward healthy eating, and is a strong predictor in motivating behavioral change (Andrews et al., 2010; Fishbein & Yzer, 2003).

### **Practical Implications**

#### *Implications and Caveats for Parents*

Parental guidance on children's food consumption needs to adapt to the types of food consumption behaviors that parents are interested in encouraging or discouraging. Promotion of a

child's healthy or unhealthy eating behaviors does not have a one-size-fits-all solution. For instance, a parent targeting reduction in favorable attitude toward unhealthy foods should restrict exposure to advertising and set limits on unhealthy food consumption. However, if a parent aims at promoting positive attitude toward healthy foods, a more ideal strategy would be to have discussions about the benefits of certain types of food with the child. Having said that, the style with which active and restrictive mediation or guidance is practiced is of great importance. Valkenburg, Piotrowski, Hermanns, and Leeuw (2013) note that parental mediation/guidance can be administered in either autonomy-supportive, controlling, or inconsistent ways. Autonomy-supportive parental mediation/guidance results in protective effects on children. However, when administered in a controlling manner, these protective effects might not take place. Indeed, research in parental control notes the distinction between psychological and behavioral control (Barber, Stolz, Olsen, Collins, & Burchinal, 2005). Specifically, psychological control is intrusive and hinders the socio-emotional development of a child by invalidating feelings and inducing guilt, while behavioral control refers to simple rule-setting. While psychological control is linked to maladaptive responses, behavioral control has been found to have protective effects (e.g., De Bourdeaudhuij, 1997; Vereecken, Keukelier, & Maes, 2004). Therefore, it is important for parents to bear in mind the styles with which active or restrictive mediation/guidance is administered.

#### *Implications for Health Promotion Professionals*

Our study holds important implications for targeted parental interventions regarding children's eating behavior. First, the American Academy of Pediatrics' guidelines, which Singapore's Pediatrics Society often utilize, recommend that parents focus on the nutritional needs of the child (Dietz & Stern, 2011). There remains a lack of theoretical sound commending how parents can influence children's eating behavior through communication and educational interventions. Pediatricians and health care professionals advising parents regarding children's eating behaviors can provide more specific and targeted strategies for parents to encourage healthier eating and discourage unhealthy eating based on the findings of our study. Moreover, by extending parental mediation to include a different facet (food consumption), our model suggests that, in the context of wider child proactive or avoidance behaviors (e.g., aggression, materialism, consumer skepticism), parental mediation of media alone may not fully explain child attitude formation. Other forms of parent-child communication that directly address the specific issue at hand (e.g., food consumption) need careful consideration.

### **Limitations and Future Research**

Our study is limited in the selection of age group studied (9–12). As discussed earlier, differential findings may emerge if the study was conducted with older age groups, where boomerang effects can occur when restrictive mediation is employed (Lwin, Stanaland, & Miyazaki, 2008). Future research should extend to a wider cross-section of children and youth.



Next, our study utilized a healthy/unhealthy foods dichotomy in our analysis. Some nutrition researchers have recommended more sophisticated ways to look at diet quality which is based on (1) converting food consumption to nutrient content, (2) food groups, or (3) a combination of both methods (Kant, 1996). Future research should utilize these perspectives with regards to food consumption outcomes. We also encourage future research to take into account the styles that parental mediation/guidance is administered in, as they can have strong moderating effects (Darling & Steinberg, 1993).

Our study is also limited by its reliance on children's report of parental mediation. Researchers have suggested that there might be differences between parent and child reports of parental mediation which might lead to various levels of mediation outcomes (Buijzen et al., 2008; Nathanson, 2001). Considering the possibility of disagreement between parents' and children's reports as suggested by past studies (eg. Fujioka & Austin, 2003), it would also be useful to examine the effects of agreement between parents and children on food consumption.

Finally, although television is one of the most preferred and frequently used media among children, children today spend substantial time on online and mobile media and are exposed to various forms of interactive advertising (Shin, Huh, & Faber, 2012). Future research is encouraged to look at the effects of food advertising in new media on children's food consumption attitude and behaviors.

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