“When my plate is empty”: Internal vs. external cues to meal cessation reported by children

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Abstract

Although interest in internal and external cues around eating trace back many decades, no published research explores the cues that children use (internal or external) of meal cessation. Combining qualitative and quantitative research methodologies, this study explores how 402 Canadian children (177 focus group participants; 225 survey respondents) responded to questions around ending a meal. The objectives were to investigate children’s *understanding* of meal cessation, and to determine whether age and gender influenced their tendency to identify internal or external cues. While no statistically significant difference was found between boys and girls in terms of using external or internal cues, both the quantitative and qualitative approaches reveal that younger children are more likely to cite external cues. Older children were more likely to report internal cues and less likely to report external cues. Yet the younger children’s tendency to cite the “empty plate” (instead of the “full stomach”) as the cue that dinner is over needs to be considered, not simply as a normative cue, but also in light of parental authority and practices of consumption. Stated differently, the external cues cited by children may not simply be about ignoring satiety cues; instead they might reflect other cultural practices around eating.

Introduction

Rising rates of childhood obesity have prompted an increased attention to the eating behaviors and practices of children, along with the factors influencing their food intake. Various policy initiatives at both the national (Canadian) and international level have sought to limit the marketing of foods to children based on the logic that external influences, such as commercial advertising, can influence the types of foods that children eat (PHAC, 2010; Task Force., 2010; WHO, 2010). For example, one study found a significant association between exposure to television advertisements for high-calorie, low-nutrient foods and the prevalence of excess body weight among children (Lobstein & Dobb, 2005); another used mathematical simulation models to estimate the degree to which childhood obesity rates would be lessened if unhealthy foods could not be advertised to children (Veerman, Van Beeck, Barendregt, & Mackenbach, 2009). In the quest to determine the influence of environmental cues on children’s consumption, researchers have studied the neural responses to food brand logos in obese and healthy weight children (Bruce et al., 2013), the impact of fast food packaging on preschoolers’ taste preferences (Elliott, Carruthers Den Hoed, & Conlon, 2014; Robinson, Borzekowski, Matheson, & Kraemer, 2007), the relationship between portion size and food intake in children (Rolls, Engell, & Birch, 2000), the relationship between plate/bowl size and portion intake in children (Di Santis et al., 2013; Wansink, van

Ittersum, & Payne, 2013) and how the social context affects their food preferences (Birch, 1980).

Implicit in these studies is the notion that there is, in fact, a “proper” amount to eat, and that external factors such as advertising, packaging, portion size, and social context override the internal cues to eating that we are born with. Given the importance of external cues to eating, the aim of the present study is to explore how children view internal and external cues to eating.

The internal–external distinction in adults

Although no published research examines how children view internal and external cues to eating, research has examined the degree to which adults recognize the external factors affecting their food intake (Hetherington, 1996). Findings suggest that external environmental factors can influence people’s food intake without their awareness (Vartanian, Herman, & Wansink, 2008), and that an over-reliance on external cues is more likely in some cultures (American over French) and in overweight adults compared to normal-weight adults (Wansink, Payne, & Chandon, 2007). Stanley Schachter and his colleagues pioneered research on the internal-external distinction in *adults* the late 1960s, suggesting that the eating behavior of obese subjects is primarily under external control and largely unrelated to internal cues (Schachter & Gross, 1968). Yet subsequent analyses of Schachter’s program of research point out that his view is, in fact, that external cues impact *everyone’s* food intake (although obese individuals are most affected by external cues) (Herman & Polivy, 2008). This is an important nuance since it draws attention to the fact that normal weight individuals are also influenced by external cues (p. 723). Eating behaviors are, moreover, complex. As one critic of the externality-obesity theory observed, “no single obese eating style. . . derives from being hyperresponsive to external cues” (Rodin, 1981, p. 366). Various factors determine an individual’s body weight—not simply responsiveness to external cues to eating (Rodin, 1981).

Probing internal and external cues is therefore important, but yoking externality strictly to obesity measures limits the perspective. Individuals may be susceptible to external cues but not (or not yet) obese. As Herman and Polivy argue, certain external food-related cues called *normative* cues affect all eaters indiscriminately (2008, p. 725). *Normative* cues are defined as “environmental indicators of what or how much one should eat” (p. 725), such as portion size. For instance, individuals often view the size of the portion as an indicator of the appropriate amount to eat, which has no relationship to how hungry one may be (p. 726).

This is important, given that childhood is a time when behavioral habits and attitudes toward food are still being formed. Indeed, there are “consequences of belonging to the ‘clean plate club’” for children (Wansink, Payne, & Werle, 2008, p. 994; see also Berge, Wall, Neumark-Sztainer, Larson, & Story, 2010), and this research seeks to provide a probe into children’s understanding of meal cessation. Inspired by a 2007 study on adult perspectives on various internal or external cues to meal cessation (Wansink et al., 2007), the present study asks where external and internal cues rank in children’s understanding of ending a meal. Using quantitative and qualitative research methods, it details the response of 402 Canadian children who were asked (in either a focus group or a survey),

about meal cessation. We examine how children's age and gender influence their tendency to cite internal or external cues when discussing meal cessation. In so doing, we seek to illuminate whether external cues to eating (i.e., normative cues) are identified as more or less salient to children as they get older, or to girls compared to boys. As Rodin observed, it is "likely that some features of responsiveness to external cues can be learned or modified during early childhood" (1981, p. 364). Given this, it is productive to unveil children's perceptions on internal and external cues to eating.

Methods

This study used a mixed methodology approach. Both qualitative (focus groups) and quantitative (survey) data were collected from a total of 402 Canadian children in order to examine the role age and gender play in influencing the identification of internal and external cues of meal cessation. Parental consent, child assent, and institutional ethics approval were obtained for all aspects of the study. For study 1, participants were recruited by a professional recruiting firm. For study 2, children were given consent forms at their school to give to their parents. In both studies, consent forms and backgrounders describing the study objectives were sent to parents for their written consent. For the parents who agreed to have their child participate, children's written consent was also attained. Prior to the start of the focus group or survey, the intent of the study was explained verbally all children participants. Children were informed that they were not required to participate and could opt out of the study at any time.

Study 1: Focus groups

First, focus groups were conducted with children in grades 1–6. Focus groups were selected for several reasons. Not only are focus groups particularly useful for exploratory research, a key benefit in using this method with children is that it recognizes the participants as experts, seeking "to discover children's view of their world" (Heary & Hennessy, 2002, p. 48). The primary aim of a focus group is "to elicit a discussion that allows the researcher to see the world from the participants' perspectives" (p. 47).

A total of 52 focus groups were held in three Canadian cities (Calgary, AB, Ottawa, ON and Fredericton, NB), selected to provide representation from Western, Central and Eastern Canada. These focus groups comprise a broader, federally funded research project that was designed to understand how children make sense of food marketing, packaging and nutrition. Each focus group was one hour in length, during which children voiced opinions on a number of questions related to food and, in particular, packaged foods targeted at children. For this study, we analyzed children's responses ($n = 177$) to the single question: "how do you know when you are done eating dinner?" (Dinner, in the Canadian context, refers to the evening meal, typically eaten at home, and often with other family members).

Data collection

For the focus groups, children were divided by grade and gender into small groups of 4–6 participants. Separate boys and girls groups were held for Grades 1–2, 3–4, and 5–6. This corresponds to ages 6–7, 8–9 and 10–11 (and up to 12) respectively, with some

overlap, depending on the child's birth date. The small group size was selected in light of previous recommendations regarding the optimal size of children's focus groups (Eder & Fingerson, 2002; Gibson, 2007, 2012), particularly for the age range we were focusing on (Kennedy, Kools, & Krueger, 2001). Smaller groups work to increase the comfort level of shy children and to encourage participation. Moreover, as the literature on focus group research underscores, the more the participants have in common, such as gender and age, the more likely they are to be comfortable in the focus group and to engage in the discussion (Gibson, 2012; Heary & Hennessy, 2002). As such, the methodological design worked to encourage participation, and also meant one could reveal potential differences in opinion according to age and sex.

A trained moderator, following a semi-structured moderator's guide, led the discussion. A round-table format was used in the focus groups. This provided each child the opportunity to speak/ voice an opinion (although they were not obligated to do so), and allowed the researchers to track responses separately from each child). Children's responses were audiotaped and transcribed verbatim. The question "how do you know when you are done eating dinner?" was analyzed specifically for the purposes of this study, and not as part of the larger project.

Statistical analysis

A grounded theory approach guided the analysis and assisted in the identification of themes; inductive coding techniques and iterative comparison was used (Crabtree & Miller, 1999; Pope, Ziebland, & Mays, 2000; Strauss & Corbin, 1998). NVivo qualitative research software was used to facilitate the coding process. Children's responses were coded (by two trained coders) as representing internal, external or fused cues. Definitions of internal and external cues are detailed below; a "fused cue" emerges when a child provides a "combination answer"—one that includes both internal and external cues to meal cessation. Proportions were used to describe the results of the entire sample, and chi-squared tests were used to assess the association between internal/external cues and demographic variables. Fisher's exact test was used for all two-by-two tables if any individual cell was less than 5. Statistical software (Stata SE, Version 12) was used for all analysis detailed in this article, and a p value of 60.05 is considered statistically significant. All coding was reviewed to ensure agreement amongst coders; the single instance of disagreement was resolved by the head researcher.

Study 2: Surveys

Answers that children provided in the focus group study were then used as the basis of a follow up, quantitative survey conducted with a different group of children (n = 225) in grades 3, 4 and 7 from Calgary, AB. The surveys were administered at a local elementary school and completed by each child as part of a classroom activity. The researcher and a research assistant were available during the survey administration to answer any questions the children might have. Both grade and gender were noted on every survey. The survey was designed to assess children's food choices and preferences, as well as their opinions on how they determine when dinner is over. Note that the survey did not request information about children's height or weight, as tracing the relationship between weight and eating cues was not the purpose of this study.

Data collection

Seven questions in the survey pertained to internal and external cues of meal cessation. Again, the internal and external cues of meal cessation cues emerged from the common answers children provided in the focus groups (the three cues of internal meal cessation echoed those found in Wansink et al.'s (2007) study on adult perspectives on internal vs. external cues to meal cessation). The survey explained that these questions were *about when you know that a meal (supper or dinner) is over*. Children were asked to circle their response on a 7-point Likert scale (1 = strongly disagree; 7=strongly agree) for a series of statements that represented internal or external cues.

Internal cue statements of meal cessation comprised the following:

- I usually stop eating when I start feeling full.
- I usually stop eating when I want to leave room for dessert.
- If it does not taste good, I will still eat it if I am hungry.

External cues were represented by the statements:

- I know dinner is over when my plate is empty.
- I usually stop eating when I have eaten what most people think is the right amount of food.
- Usually I look around to see if everybody else is finished dinner, and that's how I know I am also finished dinner.
- I usually stop eating when the TV show I'm watching is over.

Statistical analysis

Following Wansink et al.'s (2007) methodology, an *internal cue* score was derived by summing the responses to the internal cue statements and dividing by 3; an *external cue* score was obtained by tallying responses to the external cue statements and dividing by 4. The Shapiro–Wilk W test was used to assess for normality; non-parametric tests were used for all analyses as the derived external score was not normally distributed ($p < 0.001$). Proportions were used to describe the results for the entire sample. Chi-squared tests were used to assess the relationship between internal/external cues and demographic variables, with Fischer's exact test applied to contingency tables where any individual cell was less than 5. Finally, a stratified analysis was conducted for all individual questions to examine the joint effects of age and sex on responses.

Results

Study 1: Focus groups

Table 1 provides the demographic characteristics for the children's focus groups. Close to 70% of the children (68.4%; 121 children) voiced an external cue to the question "How do you know when you are done eating dinner?" Fourteen percent (25 children) stated an internal cue, 6.8% (12 children) provided fused cues and 10.7% (19 children)

could not be classified because they provided answers that were not relevant to the question (see Table 2).

The most prevalent external cue, cited by one out of four children, was the “empty plate”:

- “*When my plate’s empty*” (boy, Grade 5 (G5)).
- “*There’s nothing on my plate*” (girl, G3).
- “*You have to eat everything off your plate. You have to sit there until you finish it*” (girl, G3).

The second most common indicator of meal cessation for these children was cueing by other people:

- “*When everyone’s done*” (girl, G3).
- “*When my brother’s finished eating*” (girl, G1).
- “*When everyone starts getting up*” (girl, G5).

Instruction by parents was the third most frequent prompt:

- “*When my parents tell me dinner’s over*” (girl, G1).
- “*Because my dad always says dinner’s done*” (boy, G3).
- “*When my mom says I can go and I’m done eating*” (boy, G3).

Only 14.2% of children provided an ‘internal cue’ response to meal cessation. All of these children, with one exception, voiced the ‘full stomach’ as the sign to end a meal:

- “*Well, I stop eating when I am not hungry anymore*” (boy, G5).
- “*When I am full*” (girl, G3).
- “*Well, I do not eat a lot but I sort of feel like a little full like right here*” (points at stomach) (boy, G3).

Overall, no statistically significant differences in gender ($p = 0.5319$) or grade ($p = 0.0521$) were observed by location. However, a trend was clearly evident. Younger children were more heavily reliant on external cues. Younger children were considerably more likely to report external and considerably less likely to report internal satiety cues. Older children were more likely to report internal cues and less likely to report external cues. Although a statistically significant difference was only observed for external cues (see Tables 3a and b), this may be due to the small number of children who articulated internal cues to meal cessation.

Table 1 Demographics of focus group participants (n = 177).	
Variable	% (n)
Grade	

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Variable	% (n)
Grades 1 and 2	30.5 (54)
Grades 3 and 4	36.2 (64)
Grades 5 and 6	33.3 (59)
Gender	
Girl	54.8 (97)
Boy	45.2 (80)
Location	
Calgary	31.0 (55)
Fredericton	34.5 (61)
Ottawa	34.5 (61)

Table 2 Frequency of internal and external cues to indicate rationale for meal cessation (n = 177).	
Participant responses	% (n)
<i>External cues</i>	
When my food is gone or plate is empty	24.9 (44)
Everybody else is done eating/has left the table	17.5 (31)
Parents say I'm done	7.3 (13)
Time is up/time for dessert	6.2 (11)
<i>Internal cues</i>	
I'm full	13.6 (24)
If I do not like it I would stop eating	0.6 (1)

Table 3a Association between participant demographics and internal cues of satiety (n = 177).		
Variable	% (n)	p-value

Table 3a
Association between participant demographics and internal cues of satiety
(n = 177).

Variable	% (n)	p-value
<i>Internal cues (overall)</i>		
Grade		
Grades 1 and 2	7.4 (4)	0.075
Grades 3 and 4	12.5 (8)	
Grades 5 and 6	22.0 (13)	
Gender		
Girl	16.5 (16)	0.319
Boy	11.3 (9)	
Location		
Calgary	16.4 (9)	0.494
Fredericton	9.8 (6)	
Ottawa	16.4 (10)	
<i>When I'm full</i>		
Grade		
Grades 1 and 2	7.4 (4)	0.057
Grades 3 and 4	10.9 (7)	
Grades 5 and 6	22.0 (13)	
Gender		
Girl	15.5 (15)	
Boy	11.3 (9)	0.415
Location		
Calgary	16.4 (9)	0.559

Table 3a Association between participant demographics and internal cues of satiety (n = 177).		
Variable	% (n)	p-value
Fredericton	9.8 (6)	
Ottawa	14.8 (9)	

Table 3b Association between participant demographics and external cues of satiety (n = 177).		
Variable	% (n)	p-value
<i>External cues (overall)^a</i>		
Grade		
Grades 1 and 2	85.2 (46)	0.006
Grades 3 and 4	60.9 (39)	
Grades 5 and 6	61.0 (36)	
Gender		
Girl	63.9 (62)	0.162
Boy	73.8 (59)	
Location		
Calgary	61.8 (34)	0.098
Fredericton	78.7 (48)	
Ottawa	63.9 (39)	
<i>When my plate is empty</i>		
Grade		
Grades 1 and 2	31.5 (17)	0.179
Grades 3 and 4	17.2 (11)	
Grades 5 and 6	27.1 (16)	
Gender		
Girl	21.6 (21)	0.277

Table 3b Association between participant demographics and external cues of satiety (n = 177).		
Variable	% (n)	p-value
Boy	28.8 (23)	
Location		
Calgary	29.1 (16)	0.310
Fredericton	18.0 (11)	
Ottawa	27.9 (17)	
<i>When everyone else is done eating or has left the table</i>		
Grade		
Grades 1 and 2	22.2 (12)	0.504
Grades 3 and 4	14.1 (9)	
Grades 5 and 6	16.9 (10)	
Gender		
Girl	16.5 (16)	0.694
Boy	18.8 (15)	
Location		
Calgary	16.4 (9)	0.861
Fredericton	19.7 (12)	
Ottawa	16.4 (10)	
<i>When my parents say I'm done</i>		
Gender		
Girl	9.3 (9)	0.388
Boy	5.0 (4)	
<i>When it's time for dessert</i>		
Gender		
Girl	18.8 (3)	0.349

Table 3b Association between participant demographics and external cues of satiety (n = 177).		
Variable	% (n)	p-value
Boy	16.5 (8)	
^a Bolded text indicates statistical significance at alpha <0.05.		

Study 2: Surveys

Table 4 provides the participant demographic characteristics for the surveys. The survey results largely mirrored the findings of the focus groups. No statistically significant difference was found between boys and girls for either the internal or external score: the bivariate analysis revealed *age* differences in the children's answers (internal score $p = 0.01$, external score $p < 0.001$), but not gender differences (internal score $p = 0.74$, external score $p = 0.72$) (Table 5). Note that for the results presented in Table 5 the derived internal score was normally distributed ($p = 0.23$), while the derived external score was not normally distributed ($p < 0.001$). As the external score was not normally distributed, the non-parametric Wilcoxon rank-sum test was used for all analyses to allow for comparable results between the external and internal variable. For this reason, median (range) is presented instead of mean (SD). An examination of the joint effects of age and gender (Table 6) show that age differences persist for individual questions irrespective of gender.

Table 4 Demographics of survey respondents (n = 225).	
Variable	% (n)
Grade	
Grade 3	15.6 (35)
Grade 4	12.0 (27)
Grade 7	72.4 (163)
Gender	
Girl	47.6 (107)
Boy	52.4 (118)

Table 5 Association between internal and external scores with demographic characteristics (n = 225) ^{a,b} .			
Variable	Median (range)	Z	p-value

Table 5 Association between internal and external scores with demographic characteristics (n = 225) ^{a,b} .			
Variable	Median (range)	Z	p-value
<i>Internal cue items</i>			
Grade		2.527	
Grades 3 or 4	5 (1–7)		0.0115
Grade 7	4 (1–6)		
Gender		–0.331	
Girl	4.3 (1–7)		0.7404
Boy	4.3 (1–7)		
<i>External cue items</i>			
Grade		4.005	
Grades 3 or 4	4 (1–7)		<0.001
Grade 7	2.8 (1–6.3)		
Gender		–0.358	
Girl	3 (1.7)		0.7202
Boy	3.3 (1–6.3)		
^a Items are measured on a 1–7 scale (1 = strongly disagree; 7 = strongly agree). □ ^b Bolded text indicates statistical significance at alpha <0.05.			

Table 6 Internal and external satiety cues stratified by respondent age and sex (n = 225). ^a						
Variable	Girls			Boys		
	% (n)	X ² (df)	p-value	% (n)	X ² (df)	p-value
<i>I usually stop eating when I start feeling full</i>						
Grade		0.3911 (1)	0.532		0.1147 (1)	0.735
Grades 3 or 4	70.4 (19)			60.0 (21)		
Grade 7	63.4 (51)			56.6 (47)		

Table 6 Internal and external satiety cues stratified by respondent age and sex (n = 225). ^a						
Variable	Girls			Boys		
	% (n)	X ² (df)	p-value	% (n)	X ² (df)	p-value
<i>If it does not taste good, I will still eat it if I am hungry</i>						
Grade		12.3297 (1)	<0.001		8.9710 (1)	0.003
Grades 3 or 4	51.9 (14)			42.9 (15)		
Grade 7	17.5 (14)			16.9 (14)		
<i>I usually stop eating when I want to leave room for dessert</i>						
Grade		2.9990 (1)	0.083		2.6142 (1)	0.106
Grades 3 or 4	33.3 (9)			28.6 (10)		
Grade 7	17.5 (14)			15.7 (13)		
<i>I know dinner is over when my plate is empty</i>						
Grade		5.0714 (1)	0.024		10.0798 (1)	0.001
Grades 3 or 4	48.1 (13)			57.1 (20)		
Grade 7	25.0 (20)			26.5 (22)		
<i>I usually stop eating dinner when the TV show I'm watching is over</i>						
Grade		N/A ^b	0.034		N/A	0.009
Grades 3 or 4	14.8 (4)			14.3 (5)		
Grade 7	2.5 (2)			1.2 (1)		
<i>I usually stop eating when I have eaten what most people think is the 'right' amount of food</i>						
Grade		10.2064 (1)	0.001		4.5183 (1)	0.034
Grades 3 or 4	40.7 (11)			31.4 (11)		
Grade 7	12.5 (10)			14.5 (12)		
<i>Usually I look around to see if everybody else is finished dinner, and that's how I know I am also finished dinner</i>						
Grade		N/A	0.002		11.6917 (1)	0.001

Table 6 Internal and external satiety cues stratified by respondent age and sex (n = 225). ^a						
Variable	Girls			Boys		
	% (n)	X ² (df)	p-value	% (n)	X ² (df)	p-value
Grades 3 or 4	25.9 (7)			31.4 (11)		
Grade 7	3.8 (3)			7.2 (6)		
^a Bolded text values indicates statistical significance at alpha 0.05. □ ^b “N/A” indicates that a Fisher exact test was used instead of a chi square test.						

Discussion

Overall, the quantitative and qualitative approaches reveal that younger children are more likely to cite external cues to indicate meal cessation. Older children were more likely to report internal cues and less likely to report external cues. These findings can be viewed through a broad lens: first, in recognizing that cultural forces are the key factors in food attitudes (Rozin, 1996), and that contextual and environmental influences on food choice matter. “Mostly, it seems that people are influenced in their food choice by learned aspects and attitudes” (Stroebele & De Castro, 2004, p. 830). This point is particularly significant when considered in light of children because they are still developing patterns of eating. More narrowly, the children’s focus groups suggest that the external/internal dichotomy is, to a degree, about the extent to which children use the “empty plate” vs. the “full stomach” to know when to finish eating. The “empty plate” dominates, especially with younger children. Yet an important consideration arises, because the top three external cues spontaneously cited—*when my plate is empty, when everyone else is done eating/has left the table, when parents say I’m done*—also suggest the significant authority of parents over dinner. A few children combined two of these external cues (e.g., “*You have to eat everything off your plate. You have to sit there until you finish it*”), which reveals how the empty plate was a command as well as a sign of meal cessation. Given this, the “empty plate” is not simply an external cue; it may also reflect a parental imperative.

Herman & Polivy affirm that normative factors affect everyone, and that “people are generally uncertain as to how much to eat on a given occasion and therefore rely on normative (appropriateness) cues as guides” (2008, p. 726). In this case, the normative factors may be cultural first. Simply put, the children’s empty plate answer is also tightly bound up with what the parent assumes to be a “proper” amount of food to feed his or her child. As earlier research by Birch and Fisher (1998) documents, parents play a significant role in determining their children’s food, feeding practices and patterns of intake. Parental modeling powerfully impacts children’s dietary attitudes and habits (Patrick & Nicklas, 2005). Yet there are “consequences of belonging to the ‘clean plate club’” for children: parents who insist children empty their plate may be setting them up to eat more than required (Wansink et al., 2008), or setting the stage for distorted eating

patterns later on (Berge et al., 2010). When parents urge children to “clean their plate(s)”, they are in fact redirecting their children’s attentiveness to their own internal cues to instead focus on external ones.

The survey results mirror the focus group finding that age, not gender, impacts the reliance on external cues. This lack of a difference between the sexes suggests that there are not different external (or internal) pressures on girls compared to boys for the age groups studied. Future research might probe the correlation between these cues for children, tweens, and teenagers since external cues for *teenage* girls and boys may be different. Future research might also track the “empty plate” vs. “full stomach” children longitudinally. Such research might ask: Are particular cues likely to become entrenched as children age? Are externally cued children more likely to become overweight compared to internally cued children? Finally, future research might productively explore the negotiations between parents and children at the dinner table, while carefully examining who filled children’s plates and the input children of various ages have over the foods (and quantity of food) placed on their plates. This would speak to the cultural interactions between parents and children around food and eating and children’s lived experiences of those interactions.

Overall, the quantitative and qualitative approaches reveal that younger children are more reliant on external cues, which supports the theory that children rely less on external cues as they age. Indeed, this overall finding may seem odd. It runs counter to studies documenting how infants are born with the innate ability to regulate energy intake based on internal hunger/satiety, but how children then start to rely more on external cues as they age (Birch & Deysher, 1985; Birch & Fisher, 1998; Birch, McPhee, Shoba, Steinberg, & Krehbiel, 1987; Davis, 1939; Foman, Filer, Thomas, Rogers, & Proksch, 1969; Rolls et al., 2000). Rolls, Engell, and Birch essentially sum up the body of literature on this topic in the following statement:

During the early years of life, eating occurs primarily in response to hunger and satiety cues. By adulthood eating is also influenced by environmental cues such as the presence of palatable foods, time of day, and social context. As children develop and make the transition to an adult diet, they learn social and cultural conventions regarding food and eating, and are socialized to adopt adult eating behaviors. . . (2000, p. 232).

Our finding that younger children are *more* reliant on external cues appears to contradict this literature. However, three significant considerations must be made. First, the data cannot simply be interpreted as if children “grow out of” using external cues—that increased age will mean that the external cues no longer matter. Even though older children rely *less* on external cues, their answers do *not* suggest that they develop internal cues that replace these external cues. Less reliance on external does not imply more reliance on internal. Secondly, the literature documenting a reliance on internal hunger/satiety cues typically deals with babies and very young children. As Rolls, Engell and Birch explain: “[e]vidence suggests that by the time children are 3 or 4 years old, eating is no longer depletion driven but is influenced by a variety of environmental factors” (2000, p. 232). The youngest children in our study were in Grade 1 (ages 5–6), when external factors have started to come into play. Finally, our research explores

children's *understanding* of when dinner is over, what children say or indicate signals the end of a meal. We are interested in what they *think*, which is distinct from the literature measuring what or how much they actually eat.

Limitations

Certain limitations of this study exist. A reasonable question may be raised about the extent to which children are able to identify and name the internal and environmental influences on their food intake. The consistency in the children's responses in the focus groups, however, suggest that the participants did have an understanding of what was being asked—and a clear opinion on the matter. Notably, the reasons that are easier to verbalize for children (or those that immediately come to mind) may not necessarily be those that bear the highest influence on food intake.

As with any study dealing with younger and older children, it is possible that the younger children interpreted the question differently from the other children. We sought to ensure that the children in both studies were clear on what the question was asking. As such, in the focus groups, the moderator posed the question “how do you know when you are done eating dinner”—but immediately clarified that she was specifically interested in children's thoughts on how “you know when dinner (or supper) is over”. This was to ensure that the children in the focus groups were interpreting the question as inquiring into when *you are done with the physical act of eating (rather than when you are done with the social act of sitting at the dinner table together)*, since the physical active of eating may end long before the social activity of sitting together).

A second limitation is that the study does not track the weight of the participating children. Correlating children's *understanding* of meal cessation with their actual weight would provide interesting data for analysis. However, this study is specifically interested in children's understanding of meal cessation, particularly since their attitudes toward eating are still being formed. Tracking weight does not contribute to this particular exploratory probe, and because the subjects are children they might be focusing on external cues and not (yet) overweight. Moreover, as Herman and Polivy (2008) establish, individuals of normal weight are also influenced by external cues. In this case, a child might be of normal weight and still use external cues to signal that dinner is over. In this regard, our study contributes to the body of literature that deals with questions of external and internal cues/consumption in children that does not deal with child weight status (see, for example, Birch & Deysher., 1985; Birch & Fisher, 1998; Birch et al., 1987; Rolls et al., 2000).

Conclusion

Overall, this research calls attention to the fact that practices of consumption matter. Focusing on these practices means “raising questions about rules and competent conduct in the process of consuming. . . about the production of routines; and about the power dynamics that define the relational social values of consumption practices” (Martens, Southerton, & Scott, 2004, p. 157). When viewed in this light, the external cues cited by children may not simply be about ignoring cues of satiety. The “empty plate” might also be about learning cultural rules around eating, while cues around leaving the table equally

speak to routines and power relations. Given this, a focus on children adds an extra, intriguing, dimension to the discussion of external vs. internal cues to eating.

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