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Using Plate Mapping to Examine Portion Size and Plate Composition for Large and Small Divided Plates

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Abstract

Does the size of a plate influence the serving of all items equally, or does it influence the serving of some foods – such as meat versus starch versus vegetables – very differently? To examine this, we utilize a promising new plate mapping method where people drew a meal on a paper plate to examine sensitivity to small versus large three-compartment divided plates in portion size and meal composition in a sample of 109 university students. The total drawn meal area was 37% bigger on large plates than small plates, that is, the portion of plate coverage did not differ by plate size. Men and women drew bigger vegetable portions and men drew bigger meat portions on large plates when compared to small plates. These results suggest that men and women are differentially sensitive to plate size for overall meal size and for meal composition. Implications for decreasing portion size and improving meal balance are discussed.

Keywords

Plates; Plate Mapping; Portions; Meals; Gender; Foods; Plate Size; Consumption Norm; Partitioned Plate; Divided Plate

1. Introduction

Food portion size is an important influence upon what people eat and the nutrients that enter their bodies. Plates are containers for serving and holding foods for consumption, and the size and shape of plates can influence how much food people put on their plates. While past studies have only focused on undivided plates, this study examined how people portrayed meals on different sized divided plates. Moreover, it expands upon a new method – plate

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mapping – that offers a potentially useful technique for the next generation of research involving the serving of food.

Divided plates segregate a plate surface into separate areas using raised ridges. Plates are objects of material culture into which eating values and norms are physically inscribed. Most plates are circular, and most divided plates have three compartments. One compartment is usually larger than the other two, representing social norms of a core “main course” (often a meat/protein food) plus two secondary “side dishes” (often a starch food and vegetable food) as represented by the cultural formula for a meal structure of A+2b (Charles and Kerr, 1988; Douglas, 1972; Murcott, 1982). Divided plates are also known as compartmentalized, partitioned, or segmented plates, and are commonly used for feeding children, institutional foodservice, and informal outdoor eating events. Prior studies have used divided plates and manipulated the size of foods in compartments (Kral, Kabay, Roe, & Rolls, 2012), but have not quantitatively examined the relationship of divided plate size with conceptions of appropriate food servings. This study used divided plates to examine how food portions and meal composition are associated with plate size.

Plate mapping asks participants to accurately draw and label the foods in a meal on a paper plate (Sharp & Sobal, 2012) to represent their cognitive schema of a platescape (Sobal & Wansink, 2007). Plate maps project cultural scripts for appropriate meal portions and sizes of food into plate drawings. Plate mapping has been previously used among college students (Sharp & Sobal, 2012) to examine plate sensitivity and plate composition.

Plate sensitivity refers to how people react to different types and sizes of plates. Research about plate size for non-divided plates shows that people draw bigger portions of specific foods and bigger overall meal sizes on larger plates (Sharp & Sobal, 2012). Laboratory studies, however, report mixed plate size effects on food serving and consumption (DeSantis et al., 2013; Koh & Pliner, 2009; Rolls et al.; Shah et al.; Yip et al.)

Plate composition describes the types of foods on plates as represented by the number of main and side dishes and the proportions of main and side dishes. Research about non-divided plate size has shown that people draw bigger main courses and vegetable portions on larger plates (Sharp & Sobal, 2012).

Plate size communicates information about the types and amount of food expected to be served on and eaten from a plate. Overall, larger plates and other food containers encourage people to serve and eat more food (Wansink, 2006) and different types of foods (Sharp and Sobal, 2012). Previous studies of plate size have largely been conducted in laboratory settings (DiSantis et al., 2013; Koh & Pliner, 2009; Rolls, Roe, Halverson, & Meengs, 2007; Shah, Schroeder, Winn, & Adams-Huet, 2011; Yip, Wiessing, Budgett, & Poppitt, 2013), but such direct observational methods are time consuming, expensive, and involve high response burden for participants. An alternative procedure for evaluating plate size is “plate mapping” (Sharp & Sobal, 2012).

Gender has been studied in food and eating and shown to have an influence on both food choices and eating (O’Doherty, Jensen, & Holme, 1999). Men appear to be less concerned about health and may be more sensitive than women about plate size when they make food

choices, selecting less healthy foods like meats rather than fruits and vegetables (Rolls, Federoff, & Guthrie, 1991; Wardle et al., 2004). Gender may operate as a moderating variable in relationships between plate size and the sizes and types of foods on a plate, with women drawing bigger vegetable portions on larger non-divided plates (Sharp & Sobal, 2012). A review of previous plate sensitivity articles suggest that gender moderation has not been well represented in this literature. Koh and Plinter (2009), Yip et al. (2013), and Shah et al. (2011) all reported results using female participants while Penaforte et al. (2013) and Wansink, van Ittersum, and Painter (2006) state their findings from a mixed gender sample without reporting if responses differed significantly by gender. While Rolls et al. (2007) examined gender and found no significance in food consumption amounts when plate size was changed, Sharp and Sobal (2012) found that gender differences were significant when estimating expected meal size.

Divided plates have rarely been studied in food choice research. To fill this gap in knowledge, we used plate mapping to compare large and small divided plates. We propose four hypotheses about divided plate sizes and plate mapping 1) plate sensitivity, 2) meal norms, 3) meal composition (type of food and food course), and 4) gender moderation.

The plate sensitivity hypothesis posits that people are mindless about portion size and fill divided plates to capacity, drawing bigger overall meal sizes on larger divided plates. The plate sensitivity hypothesis proposes that larger plates will be covered with more food than are smaller plates.

The meal norms hypothesis posits that people draw meals to conform to normative conceptions about how full a plate should be, filling divided plates to levels that seem appropriate to the plate size. The meal norms hypothesis proposes that the same percentage of larger and smaller divided plates will be covered with food.

The meal composition hypothesis posits that plate size influences serving of different foods in uneven ways. The hypothesis has two parts. The type of food hypothesis proposes that bigger vegetable dishes will be drawn on larger divided plates. The food course hypothesis proposes that bigger main courses will be drawn on larger plates than smaller plates.

The gender moderation hypothesis posits that gender differences occur in plate size effects upon food choice. The gender moderation hypothesis proposes that men are more sensitive to plate size than are women, with men drawing larger main courses on plates than women draw on plates.

2. Methods

Students attending one university course in 2011 and students attending the same course in 2012 taught by the same instructor were asked to participate in this study. In 2011 students were asked to draw on a large divided plate and in 2012 students drew on a small divided plate in this quasi-experimental design (Shadish, Cook, & Campbell, 2001). Each class got plates of only one size to avoid potential biases if students noticed that plate sizes differed among members of the class.

The large plate had a total outside diameter of 10.25" and a depth of 1", had a 1" wide outer rim and the interior dividing ridges of the plate were .25" wide, making the total usable food area of 52.5 square inches, with 29.5 square inches in the main compartment and 11.5 square inches in each of the two symmetrical side compartments. The small plate had a total outside diameter of 9.5" and a depth of .5", had a 1" wide outer rim and interior divisions of the plate were .25" wide, making the total usable food area 43 square inches, with 21.7 square inches in the main compartment and 10.5 square inches in each of the two symmetrical side compartments.

At the beginning of class, one paper plate and an attached questionnaire were given to each student as they entered the classroom. The questionnaire provided consent information plus demographic questions about age and gender. The instructions for the plate drawing asked students to "Please accurately draw and label the foods in a meal that you would enjoy eating for dinner tonight. Please be as realistic as possible with your drawings of the foods." No images of foods or examples of drawings were provided to avoid cues that could bias the food drawings (Tversky & Kahneman, 1974). Each class received one size of plate that was from the same manufacturer (Chinet, De Soto, Kansas, USA) using the same material, design, and color to prevent potential biases if students had been given two different sizes or types of plates in the same classroom. Students were given class time to complete the plate drawing and questionnaire and turn in their materials. No compensation of course credit or other forms was given for participation. The University Institutional Review Board deemed this study exempt.

The researchers were not able to count the exact number of students attending each class session. The minimum estimated response rate was 76% in 2011 and 64% in 2012 based on the number of returned plates divided by the number of students officially registered for the course, although often registered students do not attend class. Based on researcher observations that 0 unused plates in 2011 and 2 in 2012 were returned after class, the response rate was higher than this minimum. Of the 55 plates returned completed in 2011 and 54 in 2012, 98 (90%) were analyzed after excluding 4 plates in 2011 and 5 plates in 2012 who did not follow the written protocols. No plates were excluded because participants were minors under age 18 or omitted their age in the questionnaire.

The completed plate maps were coded by manually measuring the circumference of each drawn food on the plate to calculate the size of each separate food portion, following the procedure of earlier plate mapping studies (Sharp & Sobal, 2012). Horizontal food area is an appropriate estimate of food item volume (Pratt, Croager, & Rosenberg, 2011). Coders were trained, monitored, and checked by double coding each plate. Sums of all the food portions on each plate were calculated to represent the total plate area covered to examine the plate sensitivity hypothesis. The proportion of plate coverage was calculated to examine the meal norms hypothesis. Food items were coded by food type into the categories of meat, cereal grain, vegetable, root vegetable and tuber, fruit, legume, dessert, and other to examine the meal composition hypothesis. Drawn foods that included more than one different food were classified as the type that included the most calories or took up the most space. Foods were also coded into categories by size ranging from the largest food in the meal to the fifth

largest, which were used to represent the main course and side courses. The number of compartments in these plates containing food was also coded.

In this study the independent variable was plate size, and the dependent outcome variables were meal area, percent of plate covered, food type, and food item size. Gender was examined as a moderating variable and age was assessed to characterize the sample.

Analyses first produced descriptive statistics for all variables using percentages and means + standard deviations. Next, bivariate comparisons of larger and smaller plates were made using Chi-square and t-tests to examine the plate sensitivity, meal norms, and plate composition hypotheses. Finally, further bivariate comparisons between gender, plate size, and the plate drawing variables were performed to examine the gender moderation hypothesis.

3. Results

A total of 98 plates were included in the analysis. Men drew 32 (33%) plate maps and women drew 66 (67%) (Table 1). Similar numbers of larger plates ($n=49$, 50%) and smaller plates ($n=49$, 50%) were analyzed. The mean age of the sample was about 21 years.

All three compartments on the plates had food drawn in them on 84% (84) of all plates, 79% (42) among large plates and 79% (41) among small plates. The main compartment and only one side compartment had food drawn on 12% (12) of plates, 14% (7) of large and 10% (5) of small plates. When the main compartment was facing the eater, empty compartments occurred on the left side for 5% (5) of plates, 4% (2) among large plates and 6% (3) among small plates. Empty compartments occurred on the right side for 8% (4) of the total sample, 2% (1) among large plates and 6% (3) among small plates. Only the main compartment had food drawn on 2% (2) of all plates, none among large plates and 4% (2) among small plates. Zero plates included food drawings in side compartments but not the main compartments.

The plate sensitivity hypothesis that larger plates would elicit larger food area drawings than smaller plates was supported by these data. The total area of food drawn on larger plates was 37% bigger than food drawn on smaller plates (Table 1).

The meal norms hypothesis that the proportion of plate coverage would be the same between larger and smaller plates was supported. The percentage of the plate covered by drawn food was nearly significant between larger and smaller plates (Table 1).

Overall, 305 different food items were drawn on this sample of 98 plates (Table 1). The most frequent food type was vegetables (98), followed by meats (79), and then cereals (71). Fewer people drew roots (26) or fruits (14), and some drew a variety of other food types (17). Most people drew three food items, with 98 drawings of the largest food, 96 the second largest food, and 84 of the third largest food. Only 22 people drew a fourth food and 3 a fifth food.

The plate composition hypothesis predicted that the food types would differ between larger and smaller plates, with bigger vegetable portions and bigger main courses on larger plates,

and the hypothesis was supported by the data. The area covered by drawn vegetables was 46% (3.4 square inches) bigger on large plates than small plates, but the drawn areas of meats, cereals, and root vegetables did not differ significantly between large and small plates (Table 1). Food items sizes differed significantly between large and small plates, with the largest food 35% (4.2 square inches) bigger on large plates, the second largest food 38% (2.1 square inches) bigger, and third largest food 25% (1.4 square inches) bigger (Table 1).

The gender moderation hypothesis predicted that men would be more sensitive to plate size, especially main courses. There were no significant differences between men and women in total food area or proportion of plate covered for large and small plates. No significant gender differences occurred in food item size or most food types, except for meat on large plates (Table 2). Men drew 50% bigger meat portions (15.4 square inches) than women drew (10.3 square inches) on large plates, but there were no significant gender differences in food item sizes drawn on small plates. Comparing each gender between plates, we observed that men and women both drew bigger overall dinners on larger plates with a majority of the difference in size occurring in the largest plate compartment on the dish. Men drew significantly larger meat and vegetable portions when controlling for plate size and women drew significantly larger vegetable portions (Table 2).

4. Discussion

Plates are common in many meals, and they may influence what and how much food people eat and their subsequent calorie and nutrient intake. We studied divided plates and found that their size was associated with drawn food portion sizes and types.

The plate sensitivity hypothesis was supported for divided plates. This may be explained by the DelBoeuf illusion where an object appears smaller when surrounded by larger items (Van Ittersum & Wansink, 2012; Wansink, Painter, & North 2005), with foods looking larger when they are on a smaller plate. While plates were covered with about the same percent of food, the larger plates held on average about 9.5" in² more food on them. In drawing bigger overall amounts of food, our large plate participants reinforce how environmental cues can be relevant when discussing food and nutrition

The meal norms hypothesis was supported for divided plates. People appear to cover about the same proportion of larger and smaller plates with drawn foods. This makes the plates appear contextually similar while offering differently sized meals.

The meal composition hypothesis was supported for divided plates. Larger plates had bigger main courses and vegetable dishes on them, congruent with prior studies of undivided plates (Sharp & Sobal, 2011). The overall larger vegetable dishes was primarily influenced by the high proportion of females in the sample, with women having more favorable attitudes toward vegetables and consuming them more often (Baker & Wardle, 2003; Emanuel, McCully, Gallagher, & Updegraff, 2012). In a similar fashion, the significant difference in predicted meat dish size in men across plate sizes is a topic that would benefit from additional scrutiny.

The gender moderation hypothesis was partially supported for divided plates. Men drew bigger meat portions on larger plates but no other significant food size differences were seen in this sample. When selecting foods, men with larger plates predominantly drew meat dishes in the main compartment, with 83% electing to do so. Women drawing on larger plates were more varied with meat, cereal, and vegetable dishes each being drawn as the main compartment dish about 33% of the time. This suggests the men in our study who were given large plates considered meat to be a main course and vegetables to be a side dish while women given large plates were more willing to use meat as a side dish and vegetables as a main course.

When comparing the largest foods on each plate, we found that individuals given the larger plates drew significantly bigger foods in the main compartment than individuals given the smaller plates. This size difference was also significant after controlling for gender. There may be a priming effect (Levitsky, Iyer, & Pacanowski, 2012) of larger plates that elicits bigger estimated portions than smaller plates even in the absence of any other tangible food cues.

Plate mapping was useful in examining plate size differences for divided plates. Participants quickly and inexpensively drew plate maps, and very few did not produce usable maps. Plate mapping may be a useful addition to other forms of dietary assessment (Gibson, 2005).

Comparing the findings of the present study of plate mapping on divided plates to prior data about plate mapping using non-divided open plate formats (Sharp & Sobal, 2012) revealed several differences in food choices between these two plate types in college students. Divided plates had more plate sensitivity, with a 1 inch difference in divided plate size diameter (equivalent to a 9.5 inches² area increase in overall size) producing the same increase in overall meal size (8.9 inches² versus 10 inches²) on divided than open plates with a 2 inch difference in diameter (equivalent to a 23 inches² increase in overall area). Divided plates exhibited more meal norm effects, with 52% of divided plate participants producing an A+2b format drawing compared to 36% of open plate participants drawing meals fitting the A+2b meal format. Divided plates had more meal composition differences, with the 84% of divided plate participants drawing at least three food items compared to 73% of open plates, and 96% of divided plates having at least two food items compared with 86% of open plates. With divided plates there was a significant difference in the size of meat and vegetables on large plates when gender was controlled, while on open plates there was no difference in the size of meats but there were gender differences in the size of vegetables drawn.

There were several limitations of this study. The quasi-experimental design was not as strong as a randomized controlled trial or cross-over design. Plate mapping is a newly developed measurement procedure and needs further testing and refinement. The sample was small, included only students, and had few men. Future studies should use different designs, measures, and samples to more fully understand divided plates, plate sizes, and food choices. There are also a number of cultural issues that could be explored. A study of plating preferences of Americans, Italians, and Japanese showed a wide range of how many items they preferred to have on their plate as well as the preferred location of main courses

(meat) compared to side dishes (Zampollo, Wansink, Kniffin, Shimizu, & Omori, 2012). A similar study involving parents and children showed that the children prefer the plating of food that has multiple separate piles of food (such as two small piles of each item instead of one larger pile) which do not touch each other (Zampollo, Kniffin, Wansink, & Shimizu, 2012).

Implications of these findings for practice suggest that changing plate size and compartmentalization may modify meal size and composition. Plates are micro-level built environments that offer visible platescapes (Sobal & Wansink, 2007) where people construct meals. The size and format of plates may influence the amount and types of foods served, shaping food intake and nutrient ingestion. Some have recommended that reducing plate size may be used to manage body weight (e.g. Story & French, 2002), and divided plates may encourage selection and consumption of more distinct foods which leads to less food consumption and weight loss (Chang et al., 2012). However, further experimental studies are needed to support implementation of plate sizes and formats as interventions. For instance, compartmentalization might be a successful way to introduce children to a wider range of foods and to give meals an element of challenge to clean one's plate in a more discrete manner than if it is one larger group of food (Zampollo et al.).

In conclusion, this study replicated prior use of plate mapping, with many similar findings. Use of divided plates adds information about that type of plate design to the literature, and suggests that divided plates may have some different influences on food choices than non-divided plates.

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Highlights

Bullet 1: Divided plates communicate information about norms for food type and portion

Bullet 2: We used the method of plate mapping, where people draw a meal on a paper plate

Bullet 3: People were sensitive to plate size, drawing bigger meals on the larger plates

Bullet 4: Meal composition sensitivity occurred as people drew more vegetables on larger plates

Bullet 5: Men, but not women, drew bigger meat portions on larger divided plates

Table 1

Demographics, Plate Coverage, Food Type, and Food Size for Large and Small Divided Plates

	Total Sample		10.5" Plate		9.5" Plate		Difference	
		N		N		N	P value	
<u>Demographics</u>								
Male	34%	37	25%	13	43%	24		
Female	66%	72	75%	39	57%	33		
Height	67.1 ± 3.7	109	66.6 ± 3.4	52	67.6 ± 3.9	57	0.15	
Weight	142.8 ± 32.8	109	140.4 ± 31.8	52	145 ± 30.8	57	0.44	
BMI	22.1 ± 3.3	109	22.1 ± 3.3	52	22.1 ± 3.4	57	0.95	
Age	20.72 ± 1.6	109	20.8 ± 1.8	52	20.6 ± 1.4	57	0.49	
<u>Coverage</u>								
Total % Plate								
Covered	60% ± 20%	98	63% ± 18%	49	56% ± 17%	49	0.06	
Total Area Food								
Drawn	26.1 ± 12.1	98	33.1 ± 9.8	49	24.2 ± 7.3	49	0.001***	
<u>Food Type</u>								
Meat	11 ± 5.0	79	11.8 ± 5.8	38	10.2 ± 4.0	41	0.15	
Cereal Grains	9.8 ± 6.1	71	10.8 ± 6.7	44	8.2 ± 4.4	24	0.1	
Vegetable	9.1 ± 5.4	98	10.7 ± 6.1	51	7.3 ± 3.9	47	0.002**	
Root	7.6 ± 3.1	26	9.1 ± 2.9	7	7.0 ± 3.6	19	0.182	
Fruit	4.8 ± 2.2	14	4.7 ± 2.1	8	5.1 ± 2.5	6	0.75	
Legume	6.3 ± 2.8	6	9.6 ± .01	2	4.7 ± 1.6	4	0.015*	
Dessert	5.4 ± 3.6	2	2.9	1	8	1	-	
Other	7.8 ± 5.7	9	6.1 ± 2.3	5	9.9 ± 8.2	4	0.35	
<u>Food Item Size</u>								
Largest	14.4 ± 5.7	98	16.3 ± 5.9	49	12.1 ± 4.8	49	0.001***	
Second	8.2 ± 3.8	96	9.1 ± 4.3	49	7.0 ± 2.8	46	0.01**	
Third	6.4 ± 2.6	84	7.0 ± 2.7	42	5.6 ± 2.0	41	0.01**	
Fourth	5.0 ± 2.1	22	5.6 ± 2.0	12	4.2 ± 2	9	0.116	
Fifth	3.8 ± 1.3	3	4.5 ± .8	2	2.4	1	0.29	
<u>Food Item Size of Largest Dish</u>								
Meat	13.2 ± 5.0	51	14.8 ± 5.5	23	11.9 ± 4.2	28	0.04*	
Cereal	16.2 ± 6.1	24	18.5 ± 6.1	14	13.1 ± 4.7	10	0.03*	
Vegetable	14.7 ± 5.6	22	16.9 ± 6.2	12	12.2 ± 3.8	10	0.05*	
Root	6.2	1			6.2	1		

*
p < .05**
p < .01***
p < .001

Table 2
Demographics, Plate Coverage, Food Type, and Food Size for Large and Small Divided Plates by Gender

	10.5" Plates		9.5" Plates		Difference		9.5" Plates		Difference		Between Plate Differences	
	Males	N	Females	N	p-value	Males	N	Females	N	p-value	Males	Females
Demographics												
Height	70.2 ± 3	13	64.4 ± 2.7	39	0.001***	70.7 ± 3.1	24	65.5 ± 2.7	32	0.001***	0.91	0.88
Weight	170.4 ± 47	13	130.4 ± 15.7	39	0.001***	168.7 ± 25.4	24	128.4 ± 21.9	32	0.001***	0.75	0.66
BMI	24 ± 4.7	13	21.4 ± 2.4	39	0.011*	23.7 ± 3.2	24	21 ± 3.1	32	0.01**	0.714	0.52
Age	21.2 ± 2.8	13	20.7 ± 1.4	39	0.37	20.7 ± 1.5	24	20.5 ± 1.2	32	0.65	0.56	0.553
Coverage												
Total % Plate Covered	65% ± 19%	12	62% ± 19%	37	0.64	56% ± 15%	20	56% ± 18%	28	0.98	0.13	0.18
Total Area Food Drawn	34.2 ± 10.0	12	32.7 ± 12.4	37	0.64	24 ± 6.5	20	24 ± 7.9	28	0.98	0.007**	0.001***
Food Type												
Meat	15.4 ± 6.8	11	10.3 ± 4.7	27	0.01**	10.7 ± 3.6	17	9.7 ± 4.4	23	0.37	0.023*	0.66
Cereal	9.7 ± 7.3	12	11.2 ± 6.6	32	0.51	8.0 ± 3.9	13	8.4 ± 4.9	14	0.29	0.51	0.17
Vegetable	9.6 ± 2.5	8	10.9 ± 6.6	43	0.61	6.4 ± 3.6	18	7.8 ± 4.1	28	0.4	0.03*	0.03*
Root	9.4 ± 2.3	4	8.7 ± 4.2	3	0.77	8.1 ± 4.8	9	5.7 ± 1.2	9	0.13	0.62	0.06
Fruit	-	-	4.7 ± 2.1	8	-	5.9 ± 2.1	4	3.5 ± 3.2	2	0.3	-	0.53
Legume	9.6	1	9.6	1	-	5.4	1	4.5 ± 1.9	3	-	-	0.14
Dessert	-	-	2.9	1	-	6.4	1	-	0	-	-	-
Other	-	-	6.1 ± 2.3	5	-	-	0	9.9 ± 8.2	4	-	0.35	-
Food Item Size												
Largest	17.8 ± 6.4	12	15.8 ± 5.8	37	0.33	12.2 ± 3.3	20	12.0 ± 4.9	29	0.88	0.003**	0.006**
Second	8.6 ± 2.7	12	9.3 ± 4.7	37	0.64	6.9 ± 2.8	20	7.0 ± 2.8	26	0.94	0.108	0.029*
Third	8.2 ± 2.8	11	5.6 ± 2.6	31	0.09	5.2 ± 1.9	20	5.8 ± 2.0	21	0.35	0.002**	0.26
Fourth	4.5	1	5.7 ± 2.1	11	0.59	5.7	1	4.0 ± 2.0	8	0.4	-	0.08
Fifth	-	-	4.5 ± .8	2	-	-	-	2.4	1	-	-	0.29

	10.5" Plates		Difference		9.5" Plates		Difference		Between Plate Differences			
	Males	Females	N	p-value	Males	Females	N	p-value	Males	Females		
<i>Food Item Size of Largest Dish</i>												
Meat	16.5 ± 6.2	13.4 ± 4.7	10	13	0.2	11.8 ± 3.1	13	12.0 ± 5.4	12	0.89	0.03*	0.481
Cereal	24.4 ± 2.0	17.5 ± 6.0	2	12	0.14	13.8 ± 4.0	5	12.4 ± 5.6	5	0.67	0.02*	0.131
Vegetable		16.9 ± 6.2	0	12		11.1 ± 3.3	2	12.4 ± 4.1	7	0.69	-	0.09

*
p < .05

**
p < .01

p < .001