

Can increased
portion sizes
affect
how much
we eat?



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CENTERS FOR DISEASE CONTROL AND PREVENTION





This presentation examines:

- Science underlying portion size and amount of food we eat in America
- How practitioners can counsel about portion size



Portion Size vs. Serving Size

Portion size is the amount of a single food item served in a single eating occasion; such as, a meal or a snack.

Serving size is a standardized unit of measure of foods: For example, a cup or an ounce is used in dietary guidance, such as the Dietary Guidelines for Americans.



Portion Size: Then and Now

Portion sizes of many foods have increased significantly over the past 2 decades

Larger portions are now offered all around us, including in —

- restaurants
- vending machines
- packaged foods in grocery stores

Does Portion Size Matter?

The basic rule of weight management is that people gain weight when they eat more calories than they expend.

Large portion sizes do not matter if a person:

- ◆ chooses to eat only an appropriate serving size rather than the whole portion served

OR

- ◆ eats fewer calories in subsequent meals and snacks to control overall calorie intake





But...

- ◆ Do people intuitively assess how much is an appropriate serving size?
- ◆ Do people actually eat only the appropriate serving size when more is offered?
- ◆ Do people adjust what they eat at subsequent meals after consuming large portion sizes?

Research shows

- people often eat the amount in front of them
- people difficulty assessing whether or not it is an appropriate amount

Portion Size Matters

Short-term studies show that people eat more when they are confronted with larger portion sizes.



Portion Size Affects Consumption

Macaroni and Cheese Study

51 adults received 4 meals of different portion sizes of macaroni and cheese on different days

- Ate more as portion size increased
- Consumed 30% more energy (162 cal) when offered the largest portion (1000 g) compared to the smallest portion (500 g)
- Reported similar ratings of hunger and fullness despite the intake differences
- After the study, only 45% of participants reported noticing differences in portion sizes served



Portion Size Affects Consumption

Submarine sandwich study

Subjects received different size (6-, 8-, 10-, and 12-inch) submarine sandwiches for lunch on 4 different days

Men and women ate significantly more as the size of the sandwich offered increased

Pasta study

In a restaurant setting, a pasta entrée was served in different portion sizes on different days

People ate more when offered larger portions

Rolls et al. *JADA* 2004.

Diliberti et al. *Obesity Res* 2004.



Does awareness of portion size matter?

Participants ate soup from normal bowls to determine typical intake for 3 days

On 4th day, researchers secretly substituted bowls that slowly refilled from a hidden reservoir

- ◆ Both obese and lean participants ate more than their usual portion
- ◆ Participants were informed of the trick
- ◆ Over the next 6 days,
 - ◆ Normal-weight participants adjusted their intake
 - ◆ Obese participants continued overeating.



Portion Size and Snacks Study 1

Participants received snacks of potato chips in identical bags increasing in size (from 28g to 170g)

- Men and women, intake increased significantly as package size increased
- Women ate 18% more and men 37% more from the 170g bag than when served an 85g bag

Participants did not adjust their intakes at dinner to compensate for the differences in snack intake

Combined calorie intake was much greater when they consumed the larger snack

Rolls et al. *Appetite* 2004.



Portion Size and Snacks Study 2

People in a movie theater were given medium (120 g) or large (240 g) buckets of popcorn.

- Subjects were divided into 2 groups based on whether they thought the taste was favorable or unfavorable
- Larger portion sizes increased the amount eaten regardless of how participants rated the popcorn's taste

Wansink and Park. *J Database Marketing* 1996.



Influence of Portion Size on Children Study 1

Study participants

- ♦ 30 preschool-aged children
- ♦ mean age 4 years; range 2.9-5.1

Received either an age-appropriate portion or a doubled portion of an entrée and side dishes

Larger portions led to significant increase in energy intake.

- ♦ Intake from entrée rose by 25%
- ♦ Total energy intake from meal by 15%

Increases were not significantly related to sex, order of the portion sizes served, or age.



Influence of Portion Size on Children Study 2

Study participants

- ♦ 32 preschool-aged children
- ♦ mean age 4 years; range 3 - 4.3

Received 3 different amounts of a macaroni and cheese entrée over 3 weeks

Larger portions led to significant increase in intake of entrée and total energy from the meal in the older children, but not the younger children

Increases were not significantly related to sex, order of the portion sizes served, or age

Rolls et al. *JADA* 2000.



Influence of Portion Size on Children Study 3 and 4

Two analyses of cross-sectional national data

1. Related portion size z-scores to body weight and energy intake in children aged 1-2 years

- concluded that children may adjust their food intake based on portion sizes throughout the day to sustain their energy intake

2. Evaluated relationship of portion size to total energy intake among children 2-5 years

- suggested that portion size served to children does influence their caloric intake.

McConahy et al. *J Pediatr* 2002.

McConahy et al. *JADA* 2004.



How accurately do we assess portion size?

Generally people incorrectly assess how much they eat

Gender, age, weight, and level of education cause differences in estimating portion size

Food cues may override physiologic satiety cues, including

- Large portions
- Easy access
- Sensory attractiveness of food





What factors are associated with increased food consumption?

Other cues also cause people to eat more than they need, such as

- restaurant setting
- convivial atmosphere
- choosing foods with high energy density
- alcohol consumption



Research Gaps

- ◆ Long-term studies to determine the impact of portion size on energy balance or weight management
- ◆ Intervention studies on portion size and weight control, such as training people to recognize and select appropriate serving sizes to assess if that impacts total intake and body weight



Implications for Calorie Intake

Larger portion sizes...

- are pervasive in our culture
- increase calorie consumption in the short term
- hinder individuals' ability to accurately assess how much they are eating

As a result, we must promote...

- awareness of portion size can affect efforts to control calorie intake
- strategies for avoiding common pitfalls



Portion Control Strategy #1: Raise Awareness of Portion Distortion

- ◆ Oversized portions are common in grocery stores and vending machines in addition to restaurants.
- ◆ Help clients understand how increased portion size can translate into excess calories.
- ◆ Read food labels to help track portion sizes.
- ◆ The Portion Distortion Quiz from the National Heart Lung and Blood Institute (<http://hin.nhlbi.nih.gov/portion/>) illustrates how portion sizes of common foods have changed over the years.

Portion Control Strategy #2: Manage Large Restaurant Portions

Many restaurants serve more food than is appropriate for one person.

Some tips that may help clients control portion amount include:

- ♦ splitting an entrée with a friend
- ♦ asking the waiter to put half of the meal in a carry-out container before it's even brought to the table





Portion Control Strategy #3: Manage Portions at Home

To reduce the temptation of overeating at home, give clients the following tips:

- ◆ Serve reasonable portions on individual plates
- ◆ Avoid putting serving dishes on the table. Keeping excess food out of reach can prevent inadvertent overeating.



Portion Control Strategy #4: Monitor Snacking While Watching TV

When eating in front of the TV,

- ◆ Put a reasonable amount of food into a bowl or container
- ◆ Leave the rest of the package in the kitchen

Portion Control Strategy #5: Manage Hunger between Meals

Encourage clients to eat a snack, like a piece of fruit or small salad, if they feel hungry between meals to avoid overeating during the meal.



Portion Control Strategy #6: Control the Environment

Package size may influence consumption

- ◆ Divide contents of large packages into smaller containers
- ◆ Place appropriate portions in a bowl instead of eating from the package

Out of sight, out of mind

- ◆ Replace the candy dish with a fruit bowl.
- ◆ Put tempting foods out of sight.
- ◆ Put healthy fare in easy reach.
- ◆ Store excess food from bulk purchases in out-of-the-way places.



It's All about Balance

The bottom line

Number of calories consumed must not exceed number of calories expended

Monitoring portions is one way to control calorie intake



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[Mini Pecan Phyllo Tarts](#)

[Beet, Fennel, and Apple Salad](#)

[Roasted Red Pepper Almond Dip](#)

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