CARBOHYDRATE NEWS

Providing the most current and practical scientific information on carbohydrate and its role in nutrition and health.

Navigating Your Eating Environment

MINDLESS EATING

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In response to the growing rates of overweight and obesity worldwide, significant attention has been paid to the quality and quantity of food being consumed. The specifics regarding macronutrient distribution and calorie requirements for a healthy body weight have been extensively studied, but less research has examined the external factors that influence our food choices. Researchers have found that individuals make approximately 250 food-related decisions each day. These decisions are related to food selection, or *what* we eat, and food consumption, or *how much* we eat. Many of these choices are made without conscious thought and are influenced by hidden cues related to food presentation and the atmosphere in which we eat. It is suggested that these cues may cause unknowing over consumption of food. This phenomenon of over-eating because of the signals around us is referred to as "Mindless Eating"[1,2].

RESEARCHERS HAVE FOUND THAT INDIVIDUALS MAKE APPROXIMATELY 250 FOOD-RELATED DECISIONS EACH DAY... MANY OF THESE CHOICES ARE MADE WITHOUT CONSCIOUS THOUGHT AND ARE INFLUENCED BY HIDDEN CUES...

One current area of research has identified that certain aspects of the atmosphere in which we eat are important determinants of food consumption. Various characteristics of the environment or distractions within the environment may affect food intake in a positive or negative manner. Dimmed lighting, for example, generally increases consumption as it promotes relaxation. Individuals are more likely to enjoy another beverage or dessert around the dinner table when the lights are low. Similarly, loud noise or music leads to over-consumption as it can speed up the pace of eating. Eating quickly may cause increased intake because fullness is not monitored appropriately due to the delay in signalling from the stomach to the brain.

Distractions to eating, such as socializing with friends and family, have also been shown to increase food intake. Eating with others often lengthens a meal, which can lead to additional servings of food, more drinks, or partaking in dessert. Interestingly, meals eaten with one other person are shown to be 33% larger than those eaten alone[3]. As the number of people present during the meal increases, food consumption also rises[4]. Other people can also serve as role models by eating more slowly or by demonstrating what amount of food is acceptable to consume.

Another distraction of increasing importance is the television. Watching television while eating has been shown to increase consumption, because it extends the length of eating time and, more importantly, the viewer fails to monitor how much they are eating. Studies have also shown that people may snack while watching television or reading a book as part of a habit and not because they are actually hungry[5].

Other important determinants of food intake are related to the food environment, or the way food is presented. For example, the perceived taste of a food, the variety of food available, and bowl or package sizes are influential factors in determining the volume of food ingested. Interestingly, these factors are so powerful that they have been shown to deceive nutrition experts and subjects who are privy to the intentions of the study.

The sight, smell, or the name of a food product can influence the perceived taste of a food and thus increase food consumption. Simply seeing a food can lead to increased food intake. For example, secretaries who had candies placed in clear jars on their desks reached in the jar for candy 71% more often than those with their candies in white jars[6]. In the case of a pleasant odour of a food, it can be so persuasive in stimulating food intake that it has been used as a clever marketing tool. The "Cinnabon Effect" describes the association between an odour and consumption; a technique utilized to sell cinnamon buns in shopping malls. The name of a food can also increase consumption if the name creates an expectation of what that food should taste like. This is true even when the taste of the food does not live up to its name[7].

A variety or assortment of food can also encourage increased consumption. For example, subjects were given an assortment of 300 M&M candies that consisted of seven or ten different colors. Although the taste of each color was identical, those who had been given a bowl with ten colors ate 43% more (91 versus 64 candies) over the course of an hour than those who had been given seven colors. Therefore, participants who were given more colours of M&Ms were under the impression that there were more items to taste, which led to increased consumption[8].

More than 71% of a person's caloric intake is consumed using serving aids such as bowls, plates, glasses, or utensils. Larger packages and portions may suggest larger consumption norms of what is a "normal" or "appropriate" amount. Even nutrition experts, who were given a larger bowl, served themselves 31% more ice cream than those with a smaller bowl. Interestingly, they were unaware that they had consumed more. Similarly, a larger serving spoon increased their portion by 15%[9]. Another study served unknowing diners soup in "bottomless" bowls that were refilled through concealed tubing. They consumed 73% more soup than diners eating from normal bowls. Surprisingly, diners did not believe they had consumed more soup than the control group[10].

Increased consumption from a larger bowl or wide glass is thought to be due to the size-contrast illusions that are created by containers, particularly those that are wide or large. These plates, bowls, and other serving aids provide a distorted perception of the quantity of food they contain and have been shown to lead to overeating. For instance, teenagers poured and drank 88% more juice or soda into short wide glasses than narrow tall glasses holding the same volume. Similarly, Bartenders poured 28% more liquid into a short, wide glass than a tall, narrow one[11].

The size of a food package also impacts food intake volume. With the presence of many wholesale food clubs, households are purchasing larger quantities of food in larger packages or standard size packages in bulk quantities. Bulk food is often kept in more visible locations because of space demands, which facilitates more regular consumption. Stockpiled foods have been observed to be eaten at nearly twice the rate of non-stockpiled foods. However, this rate decreases after one week likely due to "taste burnout"[12].

Many of these cues in our environment trick us into over consuming; even those who believe they are too smart to be deceived. Managing personal will-power or consistently being reminded to be vigilant about food choices often yields disappointing results. Current research provides insights into how an individual can re-engineer his or her eating and food environment with "mindless" solutions to these eating pitfalls. A number of suggestions are listed in the table above. Strategies to combat obesity should consider how a personally altered environment can help individuals more effortlessly control their consumption in a way that does not demand the discipline of dieting or unintended consequences of external intervention.

ALTERING ENVIRONMENTAL FACTORS TO DECREASE FOOD INTAKE
THE EATING ENVIRONMENT
Avoid dimmed light while eating meals.
Store tempting foods in less convenient locations.
Decide how much to eat prior to the meal instead of during it.
Pre-serve your portion before watching television and avoid a second helping.
THE FOOD ENVIRONMENT
Place tempting foods in opaque containers to make them less visible.
Avoid multiple bowls of the same food (e.g., at a party) due to a false perception of variety.
Never eat from a package. Always transfer food to a plate or bowl.
Reduce the visibility of stockpiled foods by moving them to a closet or the basement immediately after purchase.
Replace short, wide glasses with tall, narrow ones; use smaller spoons when eating from a bowl.

Brian Wansink, PhD, is the John Dyson Professor of Marketing and Director of the Cornell Food and Brand Lab in the Department of Applied Economics and Management at Cornell University. Find more information in his latest book *Mindless Eating: Why We Eat More Than We Think* (Bantam Books, 2006).

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CONSUMER KNOWLEDGE OF CARBOHYDRATES

Carbohydrates are an essential part of the diet. Carbohydrates, and sugars in particular, not only impart sweetness and numerous functional properties, they are the preferential fuel source for the brain, making them a critical component of the diet. The Dietary Reference Intakes (DRI) report suggests that a balanced diet should contain from 45-65% of energy as carbohydrates from varying sources. Further, the DRI report recommends that sugars, defined as all mono- and disaccharides, can contribute "a maximal intake level of 25 percent or less of energy". This level of consumption was suggested because some American subpopulations that exceeded this level had decreased intakes of some micronutrients[1]. The estimated average intake of "added sugars" in Canada contributes approximately 13% of daily calories[2].

Despite the important role of sugars in the diet, consumer research reveals that Canadians have a limited understanding of sugars, particularly in the context of energy intake and health. For example, the Canadian Sugar Institute commissions a national tracking survey on sugar trends every two years[3]. Based on the 2006 survey, only 50% of Canadians agreed that *sugar is a carbohydrate*, while 37% agreed with the statement that *sugar has its place in a balanced diet*, and only 18% agreed with the statement *sugar is a good source of energy*.

Survey respondents also demonstrated a poor understanding of calorie requirements and of the caloric content of sugar. When asked how many calories should be consumed as part of a balanced diet, the average estimate was 1614 kcal for women and 1736 kcal for men. These responses are below the estimated energy requirements for sedentary adults (Figure 1). On the other hand, estimates of caloric content of ingredients such as sugar and butter were far greater than the actual caloric values. For example, when asked how many calories are in a teaspoon of sugar, only 11% of responses were within 5 calories of the correct answer (16 kcal) with the average estimate by Canadians being almost 5 times this amount (73 kcal). The number of calories in 1 teaspoon of butter (35 kcal) was also overestimated, but to a lesser extent than sugar (Figure 2). Similarly, only 10% of respondents agreed with the statement that *sugar has half the calories of fat*. Taken together, these findings suggest that Canadians typically disproportionately overestimate the calorie content of sugar compared to butter and compared to total calories.

Participants in the survey also did not understand the health implications of sugars intake. After an extensive review of the scientific literature, the DRI report concluded that there was insufficient evidence to set an Upper Level (UL) for total or added sugars "based on the data available on dental caries, behaviour, cancer, risk of obesity, and risk of hyperlipidemia"[1]. In the 2006 tracking study, however, Canadians expressed agreement that sugar causes hyperactivity (42%), diabetes (43%), and obesity (34%).

Findings from the 2006 Sugar Tracking Study suggest that Canadians' knowledge of nutrition does not always reflect current scientific evidence. Therefore, health professionals are faced with the difficult challenge of developing evidence-based and consistent messages about carbohydrates (including sugars) in terms that Canadians easily understand and recall.

FIGURE 1. Energy requirements for men and women: Estimated[3] and recommended[1].

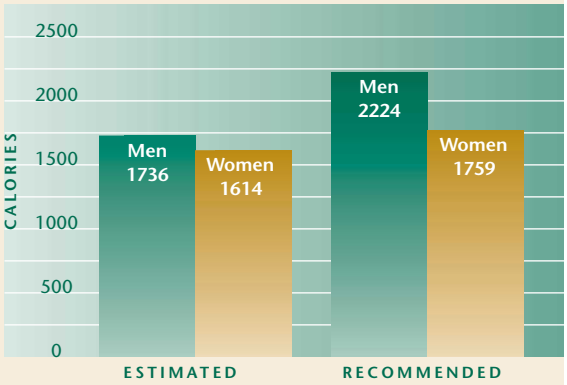
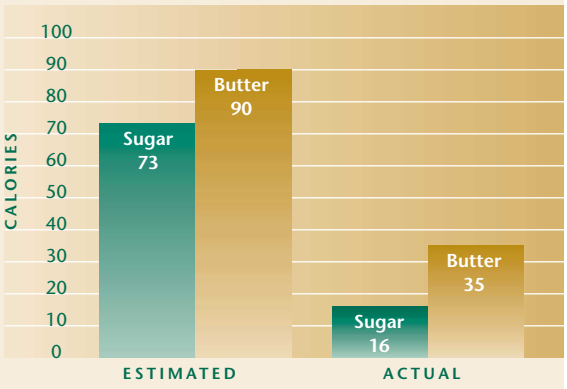


FIGURE 2. Calories in 1 teaspoon of sugar and butter: Estimated[3] and actual[4].



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RESEARCH REVIEW

SIMPLE CARBOHYDRATES AND OBESITY: FACT, FICTION AND FUTURE

Utrecht, The Netherlands
Supplement to the International Journal of Obesity, December 2006, Volume 30, Supplement 3.

These proceedings are a summary of an international workshop held on April 5-6, 2006 in Utrecht,The Netherlands. The papers presented in this journal supplement provide an interesting and authoritative perspective on a very complex topic in nutritional science.

The workshop was set up to discuss three major topic areas which included:

- the roles and mechanisms for the contribution of macronutrients (carbohydrates, protein and fat) on energy intake, body weight regulation, and obesity;
- review of the evidence regarding the relative impact of sugars-sweetened beverages and solid foods on energy intake and the development of obesity; and
- the complex assessment of the potential role of glycemic index and low GI foods in body weight control and the prevention and management of obesity and other chronic diseases.

For each of these topics, speakers prepared a paper in advance, which was sent to another expert in the area to prepare a critical review. Both individuals presented their papers, followed by a discussion by a panel of experts. The final version of these papers was updated prior to publication to include additional points addressed during the discussion.

ABSTRACT

EFFECT OF TELEVISION VIEWING AT MEALTIME ON FOOD INTAKE AFTER A GLUCOSE PRELOAD.

Bellissimo N, Pencharz PB, Thomas SG, Anderson GH. Pediatr Res. (2007) 61:745-9.

Television viewing (TVV) is considered a contributing factor to the development of childhood obesity yet it is unclear whether obesity results, in part, from increased energy intake during TVV. The objective of this study was to determine the effect of TVV on food intake (FI) of boys at a meal and its effect on caloric compensation at the test meal after a premeal glucose drink. On four separate mornings and in random order, boys received equally sweetened preloads containing Splenda sucralose or glucose [1.0 g/kg body weight (BW)] in 250 mL of water 2 h after a standard breakfast. Food intake from a pizza meal was measured 30 min later with or without TVV. Both preload treatment ($p < 0.01$) and TVV ($p < 0.001$) affected FI (kcal). TVV increased lunchtime FI by an average of 228 kcal. Glucose suppressed FI in the no TVV condition compared with control, but the effect was not statistically significant during TVV. Body composition and subjective appetite scores were positively associated with FI at the test lunch. In conclusion, TVV while eating a meal contributes to increased energy intake by delaying normal mealtime satiation and reducing satiety signals from previously consumed foods.

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