How Visibility and Convenience Influence Candy Consumption

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James E. Painter, Brian Wansink and Julie Hieggelke*

Abstract

How do environmental factors, such as a food's visibility or convenience, influence one's consumption volume of that food? Knowing the impact of these factors could help individuals better monitor and manage consumption tendencies of which they or their families may be unaware (Rolls, Engell & Birch, 2000). Yet surprisingly little research has investigated the impact of either visibility or convenience on consumption. What has been done has generated largely inconsistent findings.

* James E. Painter is Assistant Professor of Nutritional Science and Quantity Foods Laboratory Manager; Brian Wansink is Professor of Nutritional Science, of Business Administration, and of Agricultural and Consumer Economics; and Julie Hieggelke is a graduate student. Please direct correspondence to Professor Brian Wansink, 350 Wohlers Hall, University of Illinois, Urbana, IL 61801, USA. Tel. +1 217-244-0208, Fax +1 217-244-7969, E-mail wansink@uiuc.edu

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How do environmental factors, such as a food's visibility or convenience, influence one's consumption volume of that food? Knowing the impact of these factors could help individuals better monitor and manage consumption tendencies of which they or their families may be unaware (Rolls, Engell & Birch, 2000). Yet surprisingly little research has investigated the impact of either visibility or convenience on consumption. What has been done has generated largely inconsistent findings.

Perhaps the two most cited studies on this topic compared food storage habits in homes of obese and non-obese families. Unfortunately, not only did they fail to establish causality, they also failed to find consistent results: the first showed that food was more visible in the homes of obese families, but the second showed the opposite (Terry & Beck, 1985). Visibility is one means by which the salience of a food is stimulated, and there is evidence that more salient foods are consumed more frequently than less salient foods. One study manipulated the usage salience of canned soup by asking panel study participants to write down a detailed description of the last time they had eaten soup. Those who generated a high level of usage salience consumed nearly 2.4 times as much canned soup over the next two weeks as did their counterparts in the control condition (Wansink & Deshpande, 1994).

While it has been shown that the salience of a stockpiled food mediates one's initial consumption volume of that food (Chandon & Wansink, 2002), the visibility of the food itself was not directly examined. In this study, we investigate how the visibility and the convenience of a hedonic food – chocolate – influences one's total consumption of it over a three week period. This addresses a topic that is relevant for dieters and for nutritionally conscious individuals. Do people eat more when a food is within sight, or when it is within reach?

To examine this, we enlisted sixteen office workers in a university setting (ten female; median age 43 years) who agreed to be involved in a study related to candy consumption. The study was reviewed and approved by the Human Subjects Committee of the University of Illinois.

The design involved three conditions between subjects, with repeated measures. In the first week of the study, participants were divided among three candy placement conditions. In each condition, the participants were given a closed container holding 30 chocolate candy "kisses." In the first condition, the container was placed on top of the desk, where it was visible and convenient. In the second condition, the container was placed in the participant's desk drawer, where it was convenient but not visible. In the third condition, the container was visible but inconveniently placed on a shelf two meters away so that the participant was required to leave the desk to obtain the candy.

Each evening for three weeks, the containers were collected and replaced with new containers also containing 30 fresh chocolate kisses. The number of chocolates consumed from each container was recorded daily. The replenished containers were kept in the same location for five consecutive days. On the 6th test day (Monday of the following week), the containers were rotated to a new placement condition for each participant. On the 11th test day, this was repeated. At the end of the three week (15 day) period, each participant was given a validated

questionnaire which asked them to estimate their consumption of candy over the past three weeks in each of the three conditions (cf. Sudman & Wansink, 2002). Measures of attendance, nutrition consciousness, and dietary habits were also taken.

While participants had agreed to be part of the study, they had not been provided with details about the study. When the study began, participants were given the chocolates and told they were going to be part of the study, but that they were also a partial "thank you" for their involvement. Each Monday when the containers rotated locations, the administrator who most directly dealt with the staff member inconspicuously changed the location of the candy. Because a learning effect might occur if participants noted the location change with suspicion, analyses were conducted between-subjects instead of within-subjects. Data were compared between the three conditions for the first week and the same three conditions in the second and third week. The patterns of results were similar among the three weeks, and therefore all data were used in the analysis.

A repeated measures, between-subjects analysis of variance was conducted using SPSS 9.1 software. The between-subjects factor was the location of the candies. The five days in each location were treated as repeated measures within that condition. Covariates for gender, age, and weight were also included in the analyses but were not statistically significant.

The visibility and the convenience of the chocolates significantly contributed to how many were consumed (Figure 1). On an average day, participants with candies *on* their desk consumed 2.9 more than those who had the container *in* their desk, $F(2,50) = 3.7$, $P < 0.04$, and 5.6 more than those who had to walk two meters to reach them, $F(2,50) = 5.7$, $P < 0.01$. With this operationalization, convenience contributed more to overeating than did visibility. That is, having to walk two meters to reach the candies led participants to eat 2.7 fewer chocolates each day than if they were conveniently located an arm's length away in one's desk, $F(2,50) = 3.2$, $P < 0.03$.

Placement also notably influenced estimates of how much they believed that they had eaten. Following the whole experiment, the participants had been asked to estimate how many candies they ate when the candy was in each of the three locations. While 5.7, 8.6, and 3.0 candies were eaten in the in-desk, on-desk, and two-meters-from-desk conditions, they respectively estimated that they ate 4.7, 9.7, and 1.1 candies (Figure 1). People overestimated their consumption of candy that was conveniently located on the desk by 12.7% (9.7 believed *vs.* 8.6 actual), but they underestimated their consumption of candy that was inconveniently located two meters from the desk by 63% (1.1 believed *vs.* 3.0 actual).

These results extend findings in children (cp. Fisher & Birch, 1999) and underscore the fact that the convenience and the visibility of a food can consistently increase its consumption by an adult. Surprisingly, however, people underestimate how much they consume when foods are less convenient and less visible. This is consistent with past evidence that a basic bias causes us to over-represent or overestimate the incidence or quantity of items that are more salient (or available) in memory (Lee & Sternthal, 1999). Such a bias could lead us to over-estimate the consumption of salient candies, held in a visible dish, but to underestimate our consumption of the less salient candies stored in the cupboard.

It seems that people feel a need to take a food's visibility and convenience into account when they try to estimate their prior consumption of it in such a way that a food that is inconvenient to consume may be eaten in larger amounts than are thought or recalled. Similarly,

dietary researchers need to take into account the visibility and convenience of foods because not doing so might lead to biases in consumption recall studies and diary panel estimates. One way to allow for such biases is to ask research participants to rate the visibility and convenience of the foods under investigation: these ratings can then be used either as covariates or as blocking or segmentation variables.

An encouraging implication is that, if visibility and convenience increase the consumption of chocolate, the same effect may also work for healthier or more utilitarian foods, such as fruits or vegetables (Hearn *et al.,* 1989). What makes the candy dish nutritionally dangerous might bring the fruit bowl back in vogue.

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Figure 1. Differences in actual and estimated candy consumption among locations of candy container. Closed columns: actual number of chocolate kisses eaten. Open columns: retrospectively estimated number of kisses eaten.