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Influences of table setting and eating location on food acceptance and intake

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ABSTRACT

This study aimed to determine whether there is an interaction between “small” (i.e., table setting) and “large” (i.e., eating location) scales of the eating environments in affecting food acceptance and consumption. An identical roast chicken was presented at three table-setting conditions: plastic tray (PT), home-style table (HT), and gourmet table (GT) settings both in sensory testing booths and realistic contexts (e.g., classroom for PT, home-style dining room for HT, and restaurant for GT). Participants favored the appearance of food served at a gourmet table setting located in a restaurant setting significantly more than in a sensory testing booth. The participants were more willing to eat the food served using a gourmet table setting in the restaurant setting than in the sensory testing booth, leading to a significant increase in their food consumption. In addition, participants consumed food more slowly and perceived themselves to be less hungry when they ate in realistic contexts rather than in sensory testing booths. In conclusion, our findings demonstrated that food acceptance and intake can vary according to whether the small (table setting) and large (eating location) scales of the eating environments are well-matched or not.

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Introduction

Knowledge of a food by itself is insufficient to provide an answer as to why people may like or dislike it. In other words, preference for food is influenced not only by sensory pleasure of the food, but also by various contexts in which it is consumed. Meiselman, Hirsh, and Popper (1988) defined the “contexts” as “the numerous variables in our eating environments which make it easier or harder for us to begin, continue, or complete a meal.” Meiselman (1996) suggested that the food itself, the individual, and the eating situation are three main contextual variables that affect food acceptance and consumption. A number of studies have demonstrated that contextual variables associated with foods and individuals alter food acceptance and consumption (for a review, see Meiselman, 1996; Rozin & Tuorila, 1993). However, relatively little attention has been paid to the area of eating situation-induced food acceptance and intake.

There is growing empirical evidence that tableware items and containers modulate food perception (Hummel, Delwiche, Schmidt, & Hüttenbrink, 2003; Piqueras-Fiszman & Spence, 2011, 2012a, 2012b; Piqueras-Fiszman, Alcaide, Roura, & Spence, 2012).

For example, Piqueras-Fiszman et al. (2012) demonstrated that strawberry mousse was rated significantly sweeter when it was served on a white plate in contrast to being served on a black plate, thereby increasing participants’ acceptance for the mousse on a white plate. Similarly, the color of a drinking cup might alter the acceptance of a hot chocolate beverage, as well as the perception of its chocolate flavor intensity (Piqueras-Fiszman & Spence, 2012a). A series of studies have also shown that tableware/container size can affect the amount consumed (Rolls, Morris, & Roe, 2002; Wansink & Cheney, 2005; Wansink & Kim, 2005; Wansink, van Ittersum, & Painter, 2006); generally, a larger bowl or container increases the amount consumed, even though the foods themselves may not be preferred (Wansink & Kim, 2005).

It is also apparent that the nature of the eating location modulates food consumption (Meiselman et al., 1988) and acceptability (Bell, Meiselman, Pierson, & Reeve, 1994; Cardello, Bell, & Kremer, 1996; Edwards, Meiselman, Edwards, & Leshner, 2003; Green & Butts, 1945; King, Weber, Meiselman, & Lv, 2004; Meiselman, Johnson, Reeve, & Crouch, 2000; Petit & Sieffermann, 2007). Specifically, when identical foods were served in different places (e.g., laboratory, cafeteria, and restaurant), sensory pleasure derived from the food (Edwards et al., 2003; King et al., 2004; Meiselman et al., 2000; Petit & Sieffermann, 2007) varied among the different places. For instance, Meiselman et al. (2000) served exactly the

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same main dishes in three different places: a food science laboratory classroom, a student cafeteria, and a student-training restaurant. Not only did these treatments affect appreciation of individual sensory attributes, but also the main dishes were perceived as being best in the restaurant and worst in the laboratory. King et al. (2004) showed similar results that participants liked identical foods in the restaurant setting significantly more than when consumed in the traditional laboratory.

In most cases, consumer testing for food products has been conducted in laboratory settings under highly standardized and controlled test conditions (for details, see Meilgaard, Civille, & Carr, 2007), thereby ensuring consumer responses mostly based on the effects of test stimuli (Petit & Sieffermann, 2007). However, such strictly-controlled laboratory tests might not necessarily mimic consumer behaviors in real-world situations (Meilgaard et al., 2007; Meiselman, 1992). With previous studies in mind, this study aimed to highlight an interaction between small (i.e., table setting) and large (i.e., eating location) scales of eating environments with respect to consumers' food acceptance and intake. More specifically, we attempted to determine influences of the nature of table settings on participants' sensory pleasure and food consumption in two different contexts, i.e., in a controlled laboratory and in a real-world situation.

Materials and methods

Participants

A total of 193 volunteers (91 men and 102 women) with an age range from 19 to 63 years participated in this study. The participants were recruited from the University of Arkansas community (Fayetteville, AR). Data from 6 volunteers (3 men and 3 women) who reported clinical histories of major diseases such as diabetes and cancer, olfactory impairment, or eating disorder were excluded. Body mass index (BMI) was determined based on self-reporting of both height and weight. Data from 3 underweight (i.e., BMI < 18.5) female volunteers were also excluded. The result after this screening was 184 participants (88 men and 96 women; 183 Caucasians and 1 Latino American) who took part in sensory tests held either in individual sensory booths (47 men and 47 women) or in more realistic contexts (41 men and 49 women). The participants were assigned to one of two groups: sensory booth group and realistic context group. The two groups were not significantly different from each other in terms of gender ratio ($\chi^2 = 0.36$, $P = 0.56$), body mass index ($t_{182} = 0.43$, $P = 0.67$), and general liking of roast chicken ($t_{181.61} = 1.44$, $P = 0.15$). The general liking of roast chicken in everyday life was assessed on a 9-point hedonic scale ranging from 1 (dislike extremely) to 9 (like extremely). Participants in the sensory booth group [mean (M) \pm standard deviation (SD) = 28 \pm 4 years] were somewhat younger than those in the realistic context group (32 \pm 10 years; $t_{117.06} = -3.14$, $P < 0.01$). The experimental procedure was thoroughly explained to all participants prior to participation.

Food sample and preparation

For the food sample, a ready-to-eat (RTE) herb-roasted chicken (LEAN CUISINE, Nestlé USA, INC., Solon, OH) was used. The food sample was purchased from a local market (Fayetteville, AR) and stored at approximately -4°C before preparation. The RTE food sample was prepared following instructions given on the package. Briefly, the sample was heated in a microwave (Model No: JES1160DPWW 1100 W, General Electric, Fairfield, CT) at 60% power for 9 min and then allowed to rest in the microwave for 3 min before serving. The portion size was about 225 g (180 kcal).

Table setting

As shown in Fig. 1, there were three table-setting conditions: plastic tray, home-style table, and gourmet (for details, see below).

Eating location

Sensory booths

Influences of table setting condition on food acceptance and consumption were determined in a highly-controlled environment. The three different table-setting conditions were set up in 12 identical sensory-testing booths (i.e., 4 booths for each table-setting condition) at the University of Arkansas Sensory Service Center (Fayetteville, AR). Specifically, for the plastic tray setting (Fig. 1(a)), one portion size of the food sample was placed on a plastic tray identified by a three-digit code and presented along with a set of plastic fork and knife. One-hundred milliliters of water in a 150-mL plastic cup were also provided. For the home-style table setting (Fig. 1(b)), the same food was placed on a round white porcelain plate (25 cm diameter) identified by a three-digit code and accompanied by a set of stainless steel fork and knife; all were placed on a light-brown place mat (46 \times 30 cm). One-hundred milliliters of water were also provided in a glass tumbler. Finally, the gourmet table setting (Fig. 1(c)) was placed on a white linen tablecloth covering a booth table. The same food as before was placed on a gourmet china-plate (28 cm diameter) identified by a three-digit code, along with a set of gourmet flatware. One-hundred milliliters of water in a gourmet glass goblet were also provided.

Realistic contexts

To test influences of table setting on food acceptance and consumption in a natural eating situation, the three table-setting situations described above were set up in "realistic" configurations. Specifically, the plastic tray setting was temporally established on a desk in a small class-room. The home-style table setting was set up on a round, wooden table in an experimental home-style dining room. Finally, the gourmet table setting was set up in an experimental restaurant. All three setups were located in the School of Human Environmental Sciences building at the University of Arkansas (Fayetteville, AR).

Procedure

As previously mentioned, participants were randomly attributed to one of two groups: sensory booths and realistic contexts. Participants in each group were randomly assigned to one of three table-setting conditions: plastic tray, home-style table, and gourmet table settings. Each participant was then asked to evaluate an identical food sample in one of three table-settings placed either in an individual sensory booth or in a realistic context.

To control participants' hunger status, this study was conducted between 11:00 a.m. and 1:00 p.m., and all participants were instructed not to eat, drink, or smoke for one hour prior to their participation; drinking water was allowed. Prior to being served food, participants were asked to rate their current hunger status on a 9-point Likert scale ranging from 1 (not hungry at all) to 9 (extremely hungry). They were also required to rate an impression of the appearance of the table setting on a 9-point hedonic scale ranging from 1 (dislike extremely) to 9 (like extremely).

After each food sample was weighed, it was served at one of the three table-settings. Before consuming the food, participants were asked to rate an impression of appearance of the food on a 9-point hedonic scale ranging from 1 (dislike extremely) to 9 (like extremely). Participants were also asked to evaluate their willingness to eat the served food on a 9-point Likert scale ranging from 1

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