

Seating Proximity in a Cafeteria Influences Dessert Consumption among College Students

David F. Vanata, Ph.D., RD, LD

The Department of Family and Consumer Sciences/Dietetics

Ashland University

Ashland, OH, U.S.A.

Phone: (419) 289-5292, E-mail: dvanata@ashland.edu

Adrienne M. Hatch, M.S.

The Department of Foods and Nutrition

Purdue University

West Lafayette, IN, U.S.A.

Glen DePalma, M.S.

The Department of Statistics

Purdue University

West Lafayette, IN, U.S.A.

Abstract

Objective and Participants: *The objective of this study was to determine the effect of seating location on the number of trips to the dessert bar in a college dining hall setting. The authors examined the effects of 464 college students' seating location, group size, and gender on their trips to the cafeteria dessert bar.*

Methods: *Data were collected by observational methods during the lunch hours of 11:00-2:00 on multiple days.*

Results: *Students seated in the section nearest the desserts had the highest mean, while the furthest section had the lowest mean trips. As the group size increased, trips to the desserts increased. The interaction between females and group size suggests that as group size increased, females were more likely to get dessert.*

Conclusions: *Individuals' dessert consumption may be influenced by proximity, visibility, and group size.*

Keywords: proximity, social facilitation, group size, dessert, college students, cafeteria

Introduction

1.0 The environment where food is consumed has been shown to affect consumption both positively and negatively. Current concern over the increasing number of overweight and obese individuals has led to more attention focused on the eating environment. This includes the atmospherics, effort to obtain food, social interactions, and distractions that take place when food is eaten (Wansink, 2004). Recently, cues within the eating environment have been shown to affect intake (Scheibehenne, Todd, & Wansink, 2010; Shimizu, Payne, & Wansink, 2010). There is evidence that the closer an individual is to a food source, the more likely it is consumed in the diet. Wansink, Painter, and Lee (2006) found that proximity and visibility of food can lead to increased consumption in adults. Through manipulation in accessibility and visibility of office candy, it was shown how environmental cues such as convenience can stimulate food intake.

Proximity can facilitate food's visibility, causing an increase in hunger and temptation (Wansink, 2004), but the convenience of accessibility to food also plays a role in consumption (Davis & Carpenter, 2009; Laraia, Siega-Riz, Kaufman, & Jones, 2004; Mooney, 1990; Morland, Wing, Roux, & Poole, 2002; Sturm, 2008; Wansink, 2004). Studies examining the location of where an individual lives versus his/her proximity to a food supplier have shown how the availability, accessibility, and affordability of food determine dietary intake and health outcomes. The increasing distance from a supermarket is associated with increased chances of poor diet quality (Laraia et al., 2004). The food choices people make are limited to what is available to them, as was shown by individuals living in an environment less proximate to supermarkets, causing lower availability and an inconvenience factor (Morland et al., 2002). This has been shown in the youth population as well, in which students attending schools closer to fast food restaurants consumed fewer servings of fruits and vegetables and more servings of soda (Davis & Carpenter, 2009).

After manipulating the accessibility and visual salience of desserts to customers in a cafeteria, Meyers et al. (1980) suggested that people who typically eat high-calorie desserts may overcome certain environmental factors in order to obtain them. Therefore, perseverance may have more of a role under the circumstances of consuming a high-calorie food than its actual accessibility to the individual. The possibility remains that individual preference for consuming a certain food may overcome its ease of accessibility.

1.1 The impact of others on the amount of food an individual consumes is significant. The theory of “social facilitation” suggests that an individual will increase certain behaviors based on the sight and sound of others participating in the same behavior (Herman et al., 2003; Lumeng & Hillman, 2007). Others that are present during a meal potentially evaluate and guide the amount of food an individual consumes (Herman et al., 2003). Yet, individuals are not always aware of how external factors such as the presence of others actually influence intake (Vartanian, Herman, & Wansink, 2008). The two hypotheses explaining the social facilitation effect are the arousal hypothesis and the time extension hypothesis. The arousal hypothesis implies there is a greater stimulant of eating in larger groups, resulting in greater consumption and a faster eating rate; the time extension hypothesis implies that larger group size increases social interaction, extending meal duration, which will increase time spent in front of food and ultimately intake (Lumeng & Herman, 2007). This effect has been directly observed in the naturalistic environment in which group size does influence meal duration in the restaurant setting (Sommer & Steele, 1994).

Additionally, it has been found that males and females consumed the same amount of food when eating in smaller groups, but when eating in larger groups or by themselves, females ate less than males did; however, group-eaters consumed more than solo-eaters (Klesges, Bartsch, Norwood, Kautzman, & Haugrud, 1989). Social facilitation may cause a distorted perception of food intake, leading to an under-estimation of what was actually consumed, in addition to less attention given to satiety signals due to the distraction of socializing (Herman et al., 2003). Under the modeling theory, food intake is influenced by that of meal companions. The matching norm is based off of this theory, and states that people imitate the intake of those with whom they are eating. The other norm, minimal eating, involves eating less in order to make a good impression. Specifically, females adhere to this norm, in which individuals try not to eat any more food than the companion who eats the least, in hopes of receiving positive judgment. Hermans et al., (2009) found that females consumed more candy when in the presence of a high-intake peer compared to those in the presence of a low-intake peer, but this effect was only observed in an unsociable context. In males, hunger was found to influence the modeling effect on intake (Hermans, Herman, Larsen, & Engels, 2010). The presence of others during the meal, both familiar and unfamiliar, can increase the selection of sweet, higher fat foods, as research has shown that highly palatable, higher fat foods were selected 50% more often (Hetherington, Anderson, Norton, & Newson, 2006).

Past research has not related the seating location in a restaurant or cafeteria setting to a dessert bar, and therefore frequency of trips to the dessert bar as a result, while considering social facilitation effects. The purpose of this study was to determine the effect of seating location on the number of trips to the dessert bar in a college dining hall setting, while examining group size and gender. We hypothesized that students sitting in the section closest to the dessert bar would make trips more frequently than those sitting further away, and that students sitting in larger groups would make trips more frequently than those in smaller groups.

Method

2.0 Participants and Study Design

Participants were undergraduate students, ($N = 464$), enrolled at a Midwestern private-university. Observations took place during the lunch hours of 11:00 and 2:00, in a student dining hall. A total of 164 tables were observed. The University Human Subjects Review Board approved the study.

2.1 Procedure

For observational and study purposes, the dining hall was divided into four quadrants, labeled Quadrant I through IV, as shown in Figure 1, with Quadrant I closest to the desserts and Quadrant IV furthest away. Only one quadrant was observed per day. The number and gender of students at each table, the table’s quadrant, and whether each student made a trip to the dessert bar were recorded, as well as the frequency of trips to the dessert bar, if any, made by each male/female. If a student made a single trip to the dessert bar and selected multiple desserts, it was tallied as multiple trips for that table. Each quadrant was observed on multiple days to reduce possible confounders.

The types and varieties of desserts offered during the study remained consistent. Desserts options available during these days had a mean caloric value of 471 kcals per serving and ranged from 75 kcals for a chocolate angel food cupcake to 1031 kcal for a parfait.

2.2 Data analysis

Data were analyzed using an ANOVA procedure for the full model and a multiple regression procedure for the Quadrant I model using the Statistical Package for Social Sciences (SPSS version 17.0, Somers, N.Y.). The significance level was defined as $\alpha = .05$ for all procedures. The full model examined the independent variables of females, quadrant location, and group size, as well as the interaction between females and group size and that of females and quadrant. The response variable was trips to the dessert bar. The interactions were included to reduce variation, but that of females and quadrant provided no meaningful interpretation. A 'males' variable was not included in the model, as it would result in too much collinearity among the predictors. The group size variable (group 5) divided groups into 1 person, 2 people, 3 people, 4 people, and $5 \leq$ people. The quadrant variable was divided into the four quadrants, as described in the previous section.

Results

3.0 The lack of fit value for the full model was measured at $p = .525$, indicating a good fit. R^2 was equal to .614. The quadrant effect ($p \leq .05$) showed Quadrant I to have the highest mean ($x = 2.003$) and Quadrant IV to have the lowest mean ($x = 1.291$) number of trips; therefore, students in the closest proximity to the desserts made more trips, while students furthest away were less likely to get dessert. Though Quadrant I differed significantly from Quadrant IV in mean number of trips, the two middle sections showed no significance in relation to Quadrant IV. The group size effect showed a trend that as the number of people in the group increased, the number of trips to the dessert bar increased. The mean number of trips for a solo-eater was .213, compared to 2.830 for a group of five or more people. The interaction between females and group size ($p \leq .001$) suggests that as group size increased, females were more likely to get dessert, as those tables with no females present had a mean of .601, compared to a mean of 4.0 number of trips from tables with seven females present. Quadrant I was examined independently to assess gender's effect on dessert consumption. The multiple regression procedure, with dessert trips as the response variable, indicated both the number of males and number of females at each table to be significant ($p \leq .001$). The standardized coefficient for male was .395, and for female was .550. This indicated that when females sat in Quadrant I, they were more likely to get dessert than males sitting in this section.

Discussion

4.0 Proximity and social facilitation were shown to influence students' dessert consumption in the cafeteria setting. This study supports previous literature observations that a closer proximity to food can increase the likelihood of consumption; as the students located in the quadrant closest to the dessert bar made more frequent trips than those located in quadrants further away. This could have been due to the greater ease of visibility the students in Quadrant I had of the desserts, possibly leading to increased chances for temptation. The convenience factor could also have had a role in the frequency of trips from this section, as these students were closest to the desserts and had less of a distance to walk than those sitting in Quadrant IV, which was considered to be furthest from the dessert bar and had the lowest mean number of trips observed. The lack of significance in proximity effect from Quadrants II and III could be related to the conclusions of Meyers et al., (1980) where individual preference to consume dessert may overcome its inconvenience in distance from the individual. Students in the middle sections obtained dessert if desired, showing no significant differences in trips versus Quadrant I. Another possibility for the significance in trips between Quadrants I and IV could be that more dessert eaters purposely sit in the closest section of the cafeteria to the dessert bar. Those students wanting to avoid consuming sweet, calorie-dense foods may opt to distance themselves to avoid temptation by visibility. Because of the greatest number of trips from Quadrant I, this section was examined independently to determine whether a significant influence of social facilitation was present.

4.1 Females' trips to the dessert bar, while sitting in Quadrant I, were influenced by group size, suggesting they are more likely to get dessert when sitting in larger groups. This finding differs from that of Klesges et al. (1989) in which females ate less when sitting in larger groups, which also suggests adherence to the norm for minimal eating. This could be due to the desire to portray oneself as more feminine through eating less, or perhaps in the case of women eating among other women, a competitive motive, as was found by Roth, Herman, Polivy and Pliner (2001).

However, in our study, proximity's influence may have had a stronger effect on the females in Quadrant I to the extent where the matching norm was more prevalent in the larger groups of females who sat closer to the desserts, causing an increase in dessert consumption.

4.2 The hypotheses that larger groups stimulate greater arousal and extend meal duration, affecting food intake, have been studied. De Castro (1993) found that family and friends had a larger impact on social interaction during meals, elongating meal time and increasing food intake. Additionally, family and friends may cause disinhibition on restraint of intake because the individual is comfortable eating with them. Paneau et al. (2009) concluded that adolescents actually demonstrated a social inhibition effect rather than social facilitation, which may be a difference between adolescents and adults. Our study did show an increasing trend with a higher frequency of trips to the dessert bar related to the number of people in the group. This effect could have been related to the arousal hypothesis and the comfort of eating with familiar others. The modeling theory may have been more prevalent in larger groups; as two people decided to obtain dessert, others followed, eventually leading to the whole group making a trip to the dessert bar. Social facilitation of the larger groups may also provide a greater distortion in perception of intake, due to the greater chances of arousal when eating with more people. Individuals may believe they ate less than what was actually consumed, causing them to have a greater food intake (Herman et al., 2003). In the case of our study, underestimation of food intake while eating in a larger group may have rationalized a trip to the dessert bar. Based on the assumption that the students in larger groups were familiar with each other, our results can be supported in part by Hetherington et al. (2006) who concluded that eating with familiar people is less effortful, more pleasant and relaxing, causing less need to monitor intake, thus influencing the desire to eat dessert in a comfortable social cafeteria setting.

4.3 The familiarity factor of eating companions in the larger groups may have influenced dessert consumption. Clendenen et al. (1994) reported that subjects eating with friends, in pairs or groups of four, ate more than when eating alone, with consumption of dessert increasing when individuals ate with friends, independent of meal duration. Our study did not observe a difference in trips between an individual and a pair, or a difference in trips between groups of three or four people. However, there was a difference between groups of three or more compared to individuals, suggesting support for the observations of Clendenen et al. (1994). In our study, the solo-eaters had the lowest frequency of trips, which could be due to a greater focus on actual food intake and less distraction. Based off of conclusions by Clendenen et al. (1994) the solo-eaters may have felt less comfortable eating alone; thus leading to a reduced comfort level in making a trip to the dessert bar alone.

Limitations

5.0 Although our study provided significant findings related to the effects of proximity and social facilitation in a cafeteria setting, there were limitations which merit further research. Meal duration of the students observed was not measured, and thus the time extension hypothesis of social facilitation while eating in larger groups cannot be confirmed. Meal size and composition were not recorded; therefore, effects of hunger or desire to eat dessert could have influenced motivation to obtain it, thus introducing a potential confounding variable to the effects of proximity and social facilitation on dessert consumption. Additionally, the observed students' actual level of familiarity with their eating companions was unknown and based off of the assumption that group members were familiar with each other, as they chose to sit together.

Conclusions

6.0 This study showed significant effects of students' trips to the desserts based on location and group size in the naturalistic environment. Proximity effects were evident due to the difference in trips between the closest and furthest sections of the cafeteria. Social facilitation effects could have been due to the arousal hypothesis as well as the modeling theory and matching norm in larger groups. Though the norm for minimal eating was expected in larger groups of females, it was not apparent in those females sitting in the section closest to the desserts. Further research is needed to understand the differences in trips between Quadrants I and IV, as well as differences between genders. Recognizing environmental influences upon dietary behaviors is a primary step when developing strategies to improve or modify students' well-being and health.

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Figure 1. Cafeteria Layout Divided Into Quadrants

