Impulsivity and Fast-Food Consumption: A Cross-Sectional Study among Working Adults

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ABSTRACT

Background Little is known about the decision-making process of adults who choose to eat at fast-food restaurants. Impulsivity is the concept that individuals value immediate rewards and disregard future costs.

Objective To determine the association between impulsivity and consumption of fast food among employed adults and to explore their reasons for eating fast food.

Design A cross-sectional, online survey was conducted; participants were recruited using a mass electronic mailing.

Participants/setting Four hundred seventy-eight adults employed in a university setting completed the survey.

Main outcome measures The association between frequency of fast-food consumption and impulsivity was assessed. Impulsivity is assessed by the area under the delay discounting curve (AUC). The AUC is estimated by using a binary choice delay discounting task incorporating hypothetical monetary rewards. Greater AUC reflects lower impulsivity.

Statistical analyses performed Analysis of variance, Student's *t* tests, and Pearson correlation coefficients were used to measure unadjusted associations among demographic variables, fast-food consumption, and AUC. Linear regression was used to assess whether AUC was a significant predictor of having consumed fast food in the past 7 days, controlling for age, total household income, and education.

Results The majority (67%) of the participants reported eating one or more meals from a fast-food restaurant or pizza place in the past 7 days. The mean number of meals was 2.8±2.5 per week among those who reported eating at a fast-food restaurant or pizza place. Both fast-food consumption and body mass index (BMI) were correlated with greater impulsivity. Controlling for age, total household income, and education level, fast-food consumption was negatively related to AUC (P=0.017). The most commonly reported reasons for consuming fast food were convenience and to socialize.

Conclusions These findings indicate that greater impulsivity was associated with greater fast-food consumption. Successful efforts to encourage healthful dietary behaviors might emphasize methods to overcome impulsivity, such as reward substitution and precommitment.

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ONE OF THE MOST PROMINENT TRENDS IN AMERICANS' dietary behaviors over the past 40 years has been the increase in foods and beverages prepared and eaten outside of the home.[1-3] This trend is evident in both the number of times individuals "eat out" and the amount of foods and beverages consumed during these occasions.[2] The dietary trend of "eating out" has been scrutinized because studies have shown that those individuals who consume foods and beverages away from home have high intakes of total energy, fat, saturated fat, carbohydrates, sugar, and sugar-sweetened beverages and low intakes of micronutrients.[3-6] Furthermore, longitudinal and cross-sectional studies have linked away-from-home food and beverage consumption to weight gain and obesity,[7] clinical indicators of type 2 diabetes,[8] and cardiovascular disease.[9]

Increased urbanization and globalization of the food industry have been cited as reasons for a shift in consumption toward more unhealthy food options.[10] As the dynamic of the household as well as the nature of the fast-food industry have evolved over the past several decades, Americans are "eating out" more often. In addition, the increased marketing, availability, and affordability of fast food coupled with households earning higher incomes (more women entering the workplace, more two-earner households, and smaller family size) have spurred Americans to opt for fast-food restaurants.[11-14] Recent work has shown that during and after the 2007-09 recession, the percentage of Americans eating at fast-food restaurants on any given day remained constant; however, the percentage eating at sit-down restaurants declined.[11] As the name implies, fast food is meant to save time and increase convenience in a society that has come to value

efficiency and immediate gratification.[15] Previous research has found that frequency of fast-food consumption is significantly associated with the perceived convenience of fast food, as well as a dislike of cooking.[16]

Impulsivity has been defined as action that reflects shortsightedness or lack of reasoned forethought with respect to decision making and has been operationalized in different ways.[17-19] A recent study has shown that foods that are highly palatable and readily available, such as fast food, are consumed in greater quantities by individuals who are impulsive.[20]A critical component of impulsivity is the tendency for an individual to choose immediate rewards over long-term benefits and to minimize the subjective value of possible long-term costs. The field of behavioral economics, a discipline focused on decision making that resides at the intersection of psychology and economics, offers a way to characterize an individual's degree of impulsivity by using a concept known as "delay discounting." Delay discounting is the idea that individuals devalue (discount) the future to varying degrees, depending on how far into the future rewards are received, incorporating the concepts of both time and value. Unfortunately, the tendency to discount the future is extremely strong and persuasive, leading individuals to place unequal weight on immediate short-term rewards relative to future costs and benefits.[21] For instance, consumers may opt for the immediate smaller reward (eg, taste and convenience) of an unhealthy snack that contains mostly empty calories over the delayed larger reward of a more healthful snack. From a health perspective, this explains why many unhealthy behavioral patterns emerge, involving immediate rewards (eg, consuming fast food because it is convenient and highly palatable) combined with delayed costs (eg, obesity or diabetes).[21]

Impulsivity has been examined in regard to several negative health behaviors and has been found to be greater in smokers,[22] alcohol abusers,[23] and illicit drug users[24] compared with controls. Despite a growing body of literature on impulsivity in addictive behaviors, relatively few studies of impulsivity in preventive health behaviors, particularly dietary behaviors, have been performed. A limited number of studies have shown an association between individuals' impulsivity and their dietary behaviors.[25,26] Previous research has shown that lower impulsivity was associated with better overall diet quality as measured by the Healthy Eating Index[25] and by a food behavior checklist.[26] Although research has shown that people who live in areas with higher concentrations of fast-food restaurants relative to full-service restaurants tend to be more impulsive,[27] only one study has examined the association between impulsivity and actual consumption of foods away from home and ready-to-eat foods.[20] This study, which focused on overweight and obese women, found that those who were more impulsive tended to consume more calories from away-from-home and ready-to-eat foods than those who were less impulsive. However, no association was found between impulsivity and frequency of consumption of such foods.

Because of the lack of research in this area, we undertook this study to determine the association between impulsivity and consumption of fast food among middle-aged employed adults in a region with high rates of obesity and diabetes. A secondary objective was to explore middle-aged adults' reasons for eating at fast-food restaurants (eg, taste, price, convenience, and opportunity to socialize).

MATERIALS AND METHODS

Study Participants

A cross-sectional online survey was conducted with participants recruited by using a mass electronic mailing. The recruitment letter was sent via electronic mail to all full- and part-time employees (n=8,000) of a large university located in the southeastern United States; 478 completed the survey and were included in the analysis. Based on sample sizes of previous studies using a similar method for measuring impulsivity, a sample size of 200 was determined to adequately address the research question.[20,22-24,28,29] The criterion for inclusion in the study was age 19 years or older. The survey consisted of an online questionnaire that participants completed in October of 2012 at a location of their choosing. Only those participants who proceeded through the entire questionnaire were included in the data analysis. Auburn University's Institutional Review Board approved the study protocol, and all participants provided informed consent electronically.

Measures

Dietary Behaviors. Items from the National Health and Nutrition Examination Survey Flexible Consumer Behavior Survey were included to characterize eating behaviors, including participants' frequency of fast-food consumption and their reasons for eating at fast-food restaurants.[30] Consumption of foods away from home was measured by asking, "During the past 7 days, how many meals did you get that were prepared away from home in locations such as restaurants, fast-food places, grocery stores, cafeterias, or from vending machines?" A follow-up question, "How many of those meals did you get from a fast-food or pizza place?" was used to measure frequency of fast-food consumption. Reasons for eating fast food were measured, using questions such as, "Do you buy food from fast-food or pizza places because it is more convenient than cooking at home?" Similarly structured items were included related to cost, nutrition, taste, and the social aspect of buying food from fast-food or pizza places.

Impulsivity. To operationalize impulsivity, a widely used binary choice delay discounting procedure was employed that elicits self-reported preferences for money at varying values and delays.[31,32] Each participant was presented with the question, "Would you prefer $500 now, or $1,000 (X days/weeks/months/years) from now?" Seven delays were used, which included 1 day, 1 week, 1 month, 6 months, 1 year, 5 years, and 25 years. A decreasing adjustment algorithm was used so that values of the smaller, sooner reward varied depending on the participant's choice in the preceding question, with each adjustment being half the preceding adjustment.[33] The value of the larger, later reward remained constant at $1,000. For example, if a participant chose $1,000 one day from now over $500 now, the subsequent question would be, "Would you prefer $750 now or $1,000 one day from now?" Alternatively, if the participant's choice in the first question were $500 now, the subsequent question would be, "Would you prefer $250 now or $1,000 one day from