



## Research report

## Relationship between needs driving eating occasions and eating behavior in midlife women

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## ABSTRACT

The purpose of this cross-sectional study was to determine the relationship between type of eating occasion based on need state segments experienced by 200 midlife women ( $46 \pm 6$  years) and food group, nutrient, and energy intake. Women completed an Eating Occasion Questionnaire for 3 eating occasions over a 3-day period for which they maintained diet records. Cluster analysis segmented 559 eating occasions into six need states. Energy, total fat, and cholesterol consumption per occasion were highest in “routine family meal” occasions of which more than 60% were dinner and eaten at home with their children. The percentage of eating occasions in which fruits/vegetables were eaten was also highest in “routine family meal,” followed by “healthy regimen.” More than half of “indulgent escape” eating occasions occurred away from home and about one-third were experienced as a snack. Saturated fat and sweets intakes were the highest in the “indulgent escapes” occasions. Eating occasions experienced by women according to needs surrounding the occasion should be considered when developing tailored interventions to improve intake.

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### Introduction

This report describes 6 types of eating occasions experienced by midlife women according to needs surrounding the occasion. Situational context with regard to need state may contribute to differences in food group, nutrient and energy intake across type of eating occasion.

Women tend to experience a gradual increase in weight with age (Field, Willett, Lissner, & Colditz, 2007; Gonzalez, White, Kristal, & Littman, 2006; Sternfeld et al., 2004). For women in midlife, an inverse relationship exists between total energy expenditure and age (Roberts & Dallal, 2005; Toozee et al., 2007) which may help to explain age-related increases in weight. Since weight gain has negative effects on risk for chronic diseases such as type 2 diabetes and prehypertension (Sullivan, Wyatt, Morrato, Hill, & Ghushchyan, 2005; Yang et al., 2007), eating and exercise habits need to be modified to prevent weight gain with age.

Need states of individuals have been defined by market researchers as inner and outer influences (or triggers) that impact

food purchase or consumption decisions (Riley & Leith, 1998). In this study, need states comprise the eating occasion and all internal and external drivers interpreted by the individual as perceived needs surrounding the eating occasion. Therefore need states may be based on rational and/or emotional needs underlying food choice within specific situations. Previous studies have examined perceptions of specific needs and their relationship to eating behavior. For example, Gilhooly et al. (2007) identified the need for overweight women to satisfy cravings with foods with high energy density and fat content, and low protein and fiber contents. For many women, the need to provide food for families was impacted by limited availability of time and resulted in the use of daily time management strategies such as planning and coordination with implications for food choice (Jabs et al., 2007). In an experimental situation, Pliner and Mann (2004) showed that women responded to a need to conform to social norms by eating quantities of food according to what they thought others had consumed. Impulsivity, which can be defined as the tendency to think, control and plan insufficiently, was linked to greater food intake in women (Guerrieri et al., 2007). In cross-sectional studies, the need to satisfy hunger with palatable foods contributed to greater energy intake in women (Green & Blundell, 1996) and eating frequency was positively correlated with intakes of total carbohydrate and sugars and total energy intake (Drummond, Crombie, Cursiter, & Kirk, 1998).

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Procedures involving segmentation of audiences have been applied to health communication, predictiveness of health behaviors or weight status, and dietary patterns (Albrecht & Bryant, 1996; Contento et al., 1993; Davison & Birch, 2002; Staten, Birnbaum, Jobe, & Elder, 2006). While these procedures have not been applied previously to need states regarding eating occasions, they may be a useful tool to identify and describe underlying needs based on distinct eating occasions affecting food choice among midlife women.

The purpose of this study was to determine the relationship between the types of eating occasions based on need state segments experienced by midlife women and food group, nutrient, and energy intake. Identifying these relationships may improve our ability to create effective intervention strategies to address eating behaviors and obesity prevention among midlife women by targeting specific needs within eating occasions.

## Methods

### Study design

The data reported in this study were part of a larger cross-sectional study conducted in two phases where attitude data about food and anthropometric data were collected from women as well as information about eating occasions. Data reported here pertain to eating occasions only.

Qualitative data were collected in the first phase to develop a need state questionnaire (Eating Occasion Questionnaire) for administration in the second phase. Initially, qualitative data were collected using the think aloud method (Ericsson & Simon, 1993) from 12 women in their home while they prepared a meal or in a restaurant while they ordered and ate a meal. Results were used to develop focus group questions for a series of 7 focus group interviews ( $n = 34$  women) conducted to provide data to develop the Eating Occasion Questionnaire (Vue, Degeneffe, & Reicks, *in press*). Focus group findings indicated that women experienced need states dominated by lower order or functional needs such as coping with stress, balancing intake across occasions, meeting external demands of time and effort, and maintaining a routine. Need states with a higher level of emotional involvement included food as a means for reinforcing family identity, social expression and celebration. The questionnaire was pre-tested, revised and used in the second phase of the study along with collection of 3-day diet records. The study protocol was approved by the University of Minnesota Institutional Review Board utilizing informed consent procedures.

### Sample

Respondents learned about the study through advertisements, flyers and notices distributed through newsletters, campus bulletin boards, and city and local newspapers. Women were screened according to inclusion criteria via the telephone prior to scheduling outpatient visits. Inclusion criteria included being a healthy volunteer, a woman between the ages of 35 and 55 years, and not following a medically prescribed or vegan diet. Exclusion criteria included having existing chronic medical conditions (cancer, stroke, diabetes, heart disease, chronic respiratory disease, renal disease), and being pregnant or breastfeeding.

### Data collection

#### Dietary intake (3-day diet records)

Women initially met with a researcher at a convenient location (home, community center, or General Clinical Research Center

(GCRC), University of Minnesota). They were assigned three days for which to complete food records so that records were evenly distributed across all days of the week and months of the year. Women were given a carry-all bag containing a 3-ring notebook including instructions, record forms and Eating Occasion Questionnaires organized by day, a digital camera, laminated placemat, and microcassette recorder. They were asked to carry the bag with them throughout the 3-day recording period. For each eating occasion, women were asked to first take a digital photograph immediately before and after eating using the laminated placemat to center the food/beverage items. After taking the photographs, women were asked to complete the food record as well as verbally record answers to a series of questions into a microcassette recorder. Questions were provided on a small laminated cue card regarding each food consumed (type, source, brand, quantity (fl. oz, weight, cups, etc., and dimensions), how it was prepared, and if all food in the photograph was consumed during the eating occasion). Women were also asked to record the time, day and location of each eating occasion. At a second meeting with a researcher at the GCRC, the woman returned the equipment, digital images, and audiotape. A registered dietitian examined the photographs and listened to the tape recordings and followed up with clarifying questions as needed to maximize accuracy of the food record. Nutritionist 5 software (First DataBank, San Bruno, CA) was used by research assistants to calculate total energy and nutrient intake. A registered dietitian checked 10% of the diet records for accuracy.

Foods consumed during the 3-day period were classified into nine food groups (US FDA & DHHS, 2002); fruits/vegetables, dairy/calcium-rich foods, fast food, meal-type convenience foods, non-meal-type convenience foods, supplement/meal replacements, carbonated soft drinks, dairy sweets, and non-dairy sweets. Fruits/vegetables were grouped according to those listed in the fruits and vegetables groups in MyPyramid (USDA, 2005). This group included raw, frozen, cut, canned, or dried fruits/vegetables, mixed, boiled, or drained vegetables, 100% fruit juice, and mixture such as canned spaghetti tomato sauce and beef stew. Dairy/calcium-rich foods included milk, cheese, yogurt, and calcium fortified orange juice because these foods represented the main sources of dietary calcium for women (Gao, Wilde, Lichtenstein, & Tucker, 2006). Fast food was food purchased at fast food restaurants regardless of where it was consumed. Commercially packaged foods with minimum preparation needed at home and frozen dinners were considered convenience foods according to meal-type or non-meal-type. Examples of meal-type convenience foods included frozen pizza, mashed potato mix, and canned chicken gravy. Those of non-meal-type were hot cocoa mix and lemonade prepared from frozen concentrate. Foods in the supplements/meal replacement group included diet bars/powders/drinks and meal supplements. Dairy sweets included ice cream, frozen yogurt, and yogurt, while non-dairy sweets were cakes, pastries, tortes, cookies, gelatin, puddings, and frozen cakes. Some foods were classified into more than two groups and their intake was counted more than twice. For example, yogurt purchased at a fast food restaurant was counted three times as dairy/calcium-rich food, fast food, and dairy sweets.

#### Eating Occasion Questionnaire

Women were asked to complete an Eating Occasion Questionnaire for one eating occasion each day of the 3-day period for which they were keeping food records immediately after recording their food/beverage intake. The occasions were assigned to balance occasions across breakfast, lunch, dinner and snacks and days of the week across all women. Women were asked to rate their agreement with 129 statements about need states using Likert-style 6 point strongly disagree–strongly agree scales. The statements were

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