

# An Examination of Sex Differences in Relation to the Eating Habits and Nutrient Intakes of University Students

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## ABSTRACT

**Objectives:** To examine sex differences in eating habits and nutrient intakes and explore whether eating habits mediate the effects of sex on nutrient intakes and whether sex moderates the effects of eating habits on nutrient intakes.

**Methods:** Cross-sectional survey of eating habits and food-intake frequency in a convenience sample of college students.

**Results:** Male students ( $n = 172$ ) consumed a higher energy content from fat, a larger amount of fiber, and more fruits and vegetables, and engaged less often in various healthful eating habits (eg, reading food labels, having breakfast) than female students ( $n = 316$ ). Sex predicted the 3 dietary nutrient intakes partially through eating habits. Interactions between sex and eating habits were nonsignificant.

**Conclusions and Implications:** Results reinforce that university students' nutrient intakes are less than ideal. Women and men may have different needs for nutritional improvement. However, the effects of health promotion concerning eating habits may be similarly effective between the sexes.

**Key Words:** eating behavior, college, food intake, sex, nutrients (*J Nutr Educ Behav.* 2012;44:246–250.)

## INTRODUCTION

The transition from high school to college poses many challenges for college students. Their newfound independence coupled with the social and physical environmental changes that occur may expose them to undesirable eating habits, resulting in poor nutrition and subsequent weight gain.<sup>1</sup> For example, college students, who are likely to be living away from home for the first time in their lives, are more likely to eat “outside” meals consisting of food that is higher in calories and fat content, and lower in dietary fiber.<sup>2,3</sup>

Various student groups may experience different kinds of challenges. Particularly, male students engage in less-healthful eating habits when compared with their female counterparts. They are more likely to eat fast

food,<sup>3</sup> whereas they are less likely to read food labels,<sup>4</sup> have breakfast,<sup>5</sup> and prepare their own food.<sup>5</sup> Regarding nutrient intakes, most studies show that male students consume more high-fat food.<sup>1,6</sup> However, the sex differences in fruit and vegetable consumption appear less consistent.<sup>6,7</sup> In national studies, although women reported having fruits and vegetables more times per day than men,<sup>8</sup> men consumed a greater amount of fiber and more servings of fruits and vegetables than women.<sup>9</sup> These nutrient components have been identified as key outcomes for health promotion; hence, promotion messages may need to be tailored to different sex groups.<sup>3</sup>

Several eating habits such as nutrition label reading,<sup>10</sup> eating away from home,<sup>11</sup> eating at fast-food restaurants, and skipping breakfast<sup>10</sup> can

be used to determine students' nutrient intakes. However, the unique contributions of these eating habits in predicting nutrient intakes have not been fully examined. Promotion programs may benefit from understanding whether these eating habits can explain the sex differences in nutrient intakes (Figure 1) and whether eating habits predict nutrient intakes differently across sex groups (Figure 2).

This study sought to investigate the contributions of a group of eating habits on nutrient intakes. Specifically, the first goal of this study was to examine sex differences in eating habits and nutrient intakes. Female students were expected to engage in more healthful eating habits and consume less energy from fat and less fruits and vegetables (in absolute amount rather than in frequency). The second and the third goals of the study were to explore whether eating habits mediate the effects of sex on nutrient intakes and whether sex moderates the effects of eating habits on nutrient intakes.

## METHODS

### Participants

Baseline data from an evaluation study of a university-level general

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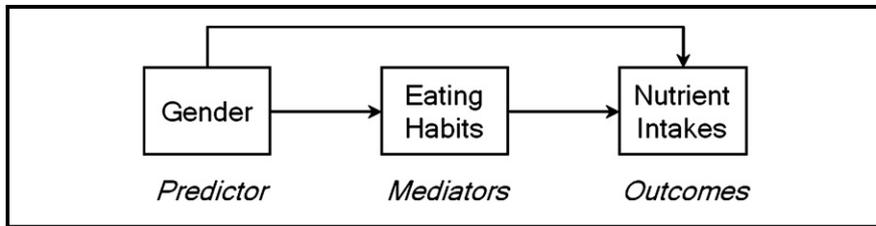
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**Figure 1.** In the mediation model, eating habits mediate the effects of sex on nutrient intakes.

education course in fitness and nutrition at Oregon State University were used. Of all undergraduate students in winter 2008, 47% were female; 73% were white; 20% were freshmen; and 86% were Oregon residents. Participants were recruited through class announcements. Students were asked to complete an online survey at the beginning and at the end of an academic term. Two waves of student recruitment occurred over 2 academic terms (ie, winter and spring terms of 2008). The participants were 582 students, and 488 of them (84%) completed all necessary information for the current analysis. The mean age of the sample was 19.6 years ( $SD = 2.4$ ), and most participants were female (65%), white (75%), and in their freshman year (63%). The average body mass index was within an ideal range,  $23.8 \text{ kg/m}^2$  ( $SD = 4.3$ ). In this sample, women, whites, and freshmen were overrepresented. Nevertheless, the sex and ethnicity compositions, as well as weight status of this sample, were comparable (statistically) to that of a recent large-scale study on college health, with 80,121 students in 106 participating schools.<sup>12</sup>

At Oregon State University, freshmen are strongly encouraged to live on campus. In fall 2008, most freshmen lived on campus (62%), and about half of the on-campus residents

were female (50%). Unlike students in a big city, off-campus students are not likely to live with their parents. For campus eating facilities, discounted meal plan options are available. In this study, no inclusion or exclusion criteria regarding living arrangements were used. This study was approved by the Institutional Review Board of the university where the data were collected.

### Measures

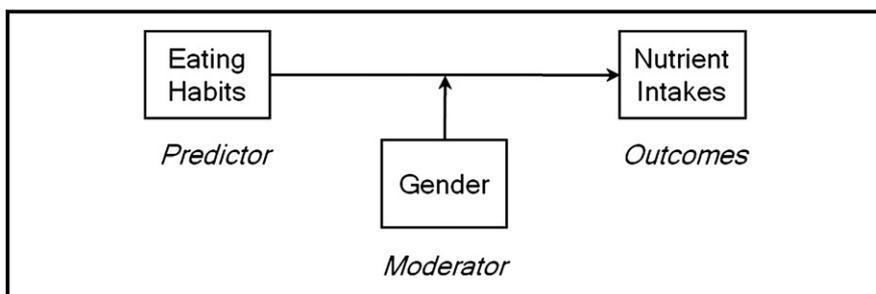
Nutrient intakes were assessed using a 17-item multifactor screener,<sup>13</sup> including 16 food groups and an item on the usual type of milk consumed. The screener was designed to estimate the servings of fruits and vegetables, the percentage of energy from fat, and the amount of dietary fiber. A stepwise multiple regression approach was used for the original development of this screener, in which food items that explained the most variability of dietary intakes in several external databases were included. The multifactor screener can yield useful estimates and was suggested for surveillance and epidemiological purposes.<sup>13</sup> It has been used in previous epidemiological and intervention studies.<sup>9</sup>

Single-item questions regarding the frequency of engaging in certain eating-related habits are widely used

in nutrition and health research and have been found to be predictive of nutrient intakes.<sup>10,14</sup> Six similar single-item questions were tailor-made for the purposes of this study by 2 researchers in nutrition and exercise sciences, and then revised by a panel of researchers and instructors of this general education course. Students were asked to indicate (1) how many times they prepared their own meals in the last week (0 times-21 times or more); (2) how many times they had fast food in the past week (0 times-21 times or more); (3) how many times they ate in the campus dining hall (0 times-21 times or more); (4) how often they read food labels before buying (1 = never, 5 = always); (5) how many times they had breakfast in the past week (0 times-7 times or more); and (6) other than breakfast, how many times they skipped a meal in the last week (0 times-14 times or more). The test-retest reliability of the items among the control group students ( $n = 39$ ) of this evaluation study were satisfactory (.65-.87) over a 10-week interval.

### Data Analysis

Applying the scoring algorithm described in Thompson et al,<sup>13</sup> percentage of energy from fat, amount of fiber intake, and servings of fruits and vegetables were computed. Sex differences in demographic factors, eating habits, and dietary intakes were tested using chi-square tests and  $t$  tests. Mediation effects were examined using a path analysis, in which sex, eating habits, and nutrient intakes were used as predictor, mediators, and outcomes, respectively (as shown in Figure 1). The moderating effects of sex were examined by entering sex, eating habits, and their interaction terms into a multiple regression. Interaction terms were created by first centering the variables of sex and eating habits and then multiplying sex by each of the 6 eating habits. Demographic characteristics were controlled for in both the mediation and moderation analyses. Gender differences and moderating effects were tested using Stata statistical software (version 11, StataCorp, College Station, TX, 2009). The path analysis and the test of indirect effects were



**Figure 2.** In the moderation model, sex moderates the effects of eating habits on nutrient intakes.

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