

Eating on the Run: Correlations of Time Factors and Food Preparation Habits in a Graduate Student Population.

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Abstract

Objective: Eating choices have considerable impact on health. Poor dietary choices can lead to weight gain, obesity and related health complications. Much research has investigated the factors affecting student meal choices of students in undergraduate programs, but relatively little research has investigated factors affecting graduate students. This study investigates correlations between time factors such as work load, credit load, and travel time, and meal preparation habits of graduate students.

Methods: 56 graduate students in a public health program were surveyed regarding time factors, attitudes towards food preparation, and actual food preparation habits by administering a short survey tool. Analyses were conducted comparing self-reported time factors and self-reported meal preparation habits.

Results: No significant correlations were found comparing time factors to meal preparation frequency or time spent preparing food. One weak correlation between time traveling and time spent preparing food was present (Spearman's rho of 0.34, $p < 0.01$), but the presence of high outliers in travel time brings this finding into question. Responses were also inconsistent with regard to meals consumed and meals prepared (t-tests and Kruskal-Wallis results for both resulted in $p < 0.02$). Attitudinal measures regarding food preparation showed high importance of food preparation and high perceived skills. Cronbach's alpha for the battery (0.64) prevented using the battery for further analysis.

Conclusion: The results of this survey were inconclusive in finding correlations between time factors and meal preparation habits. Future researchers should develop more granular tools to assess time factors, and refine the attitudinal portion of the survey to facilitate analysis. Future research may also investigate other time factors not investigated in this paper to see if other tradeoffs of time provide insight into graduate student meal preparation.

Introduction

Over the last few decades pre-made food has become a large source of meals in the US. Pre-made food includes meal options such as fast food, meals at grocery stores, and vending machine and cafeteria food at work and on school campuses. There are concerns that the quality and quantity of these meals eaten away from home have negative health implications in the US (Moore, 2009). Dynamics of food pricing, such as the relatively high cost of fruits and vegetables, and low cost of fast food appear to influence eating patterns (Powell, 2010). Potential problems stemming from poor diet include obesity, high blood pressure, high cholesterol, and other dietary and weight related concerns (Jia, 2005). Since students often make choices between purchasing and preparing food, it is important to understand what factors affect this choice in order to evaluate what may be done to improve the quality of food students are consuming.

The impact of pre-made food on high school and college students has been explored. The myth of the “freshman fifteen” weight gain has been investigated and found to be overstated but true (Levitsky, 2004). Other research shows that students preparing their own meals as opposed to purchasing meals generally made healthier food choices (Larson, 2006). What has not been as closely investigated are the factors influencing these meal habits besides the availability of pre-made food, especially in the graduate student environment.

Research conducted in undergraduate populations has found that time pressures can increase snack consumption at the expense of more traditional meals (Waterhouse, 2005). Specifically, stressors that undermine eating restraint lead to heightened levels of disinhibited eating (Lattimore, 2004). The quality of the foods students choose to consume is also negatively impacted by time pressures (Garcia, 2010). Time pressures are of key interest, then, in understanding food habits in students.

Another set of findings, that young adult knowledge of food preparation is both generally low, and overestimated (Byrd-Bredbenner, 2005), suggests that attitudes towards food preparation may influence student food choice. Research has also found that students who prioritize group meal events eat healthier meals (Ball, 2012). The results suggest that attitudes towards food, food knowledge, and household and social factors also influence student eating habits.

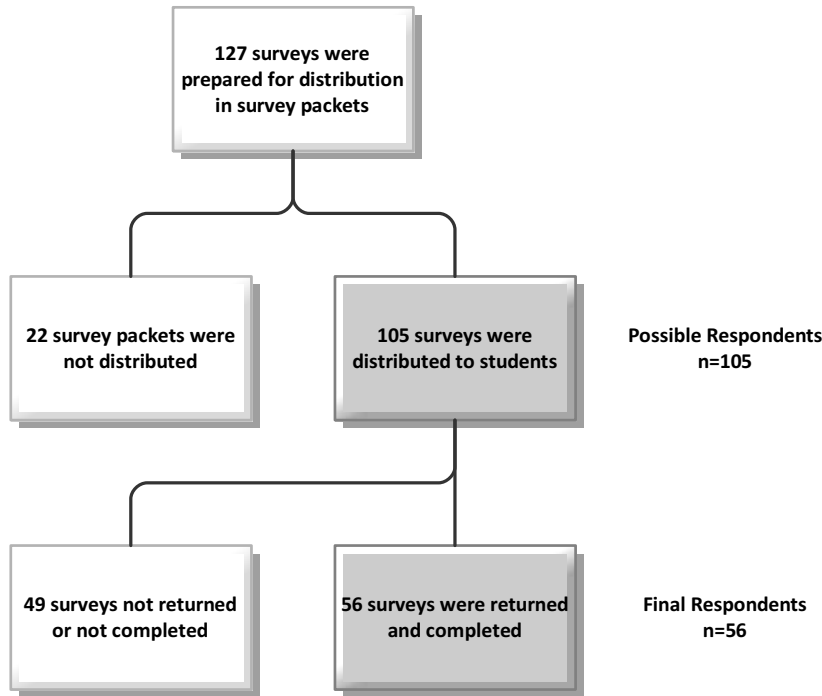
All of these previous studies have been carried out in high school, undergraduate or young adult populations. Graduate students represent a different population, often being older and more established in their lifestyles than younger populations. The age of graduate students can vary widely, as can the work load, school load, and living situation of each student. This study examines whether graduate student time commitments, work-loads, and living situations are associated with levels of meal preparation and meal purchasing as proxy variables for healthy eating choices. Specifically, this study aims to determine if heightened time commitments have a significant correlation with choosing pre-made meals as opposed to preparing meals.

Method

Sample

The sample for this study was drawn from three classes of graduate students registered for a cross-major course in the school of public health at a large public Midwestern university. This sample population represents a convenience sample of graduate students in the school of public health. The classes selected contained 145 students. 127 surveys were included in packets for distribution. 105 of the prepared packets were distributed. 56 surveys were returned. 49 surveys were not returned or not completed, resulting in a response rate of 53%. Figure 1 illustrates survey distribution.

Figure 1: Survey Distribution and Response Rate



Procedure

140 surveys were prepared for distribution to graduate students. Packets were created by randomly sorting surveys from this research project and others conducted for the class into groups of 3 surveys. As an incentive to complete surveys a small bag of assorted candy was placed in each survey packet. Surveys packet were delivered to the graduate class and offered to students to take. Students were able to complete the surveys they chose to take at any time.

Surveys were collected in subsequent class periods by volunteer members of the graduate student class conducting the surveys. Returned surveys were collected at intervals over the two weeks following distribution. The collected surveys were delivered to the student researchers during class following survey collection.

Measures

The survey created and administered for this paper contained a variety of questions regarding cooking habits, attitudes, demographics and related information.

In order to ascertain the impact of living situation on food preparation respondents were asked to identify who they lived with and what relationships respondents had with those they lived with. Examples of responses include identifying as a parent, spouse, child, or roommate.

Food preparation habits were investigated with questions regarding the number of meals respondents ate during the last week, how much time was spent preparing food, if the respondent was responsible for food preparation, and how many meals the respondent consumed and purchased in the last week.

To investigate the effect of time of food preparation habits respondents were asked to identify time spent traveling (number of minutes per day), time spent working (0-10 hours, 11-20 hours, 21-30 hours, 31-40 hours, or greater than 40 hours), and what the respondents academic credit load was (less than 6 credits, 6-12 credits, more than 12 credits).

To determine attitudes towards meal preparation respondents were asked to complete a series of ten likert-scale type questions on a scale consisting of “Strongly Disagree”, “Disagree”, “Neutral”, “Agree”, and “Strongly Agree” regarding attitudes towards food preparation, for example “Preparing my own meals is time and energy efficient,” “I enjoy preparing my own meals,” and “Time is an important factor in preparing my own meals.” This set of Likert-scale type questions was developed by the student researchers. The Cronbach’s alpha of the battery was determined to be 0.64. Given this score it is unlikely that the scale is reliable for rigorous analysis of the results.

Finally, in order to capture unplanned eating habits and motivations respondents were asked to identify how many unplanned eating episodes occurred in the last week by providing a number of episodes of unplanned eating. Respondents were provided a space to explain why the respondent thought they engaged in this behavior if applicable. Unplanned eating episodes were not defined specifically due to concerns creating a leading question.

Analysis

To identify how various factors correlate with food preparation habits data regarding time spent traveling, work load and credit loads were assessed to determine if any significant relationships exist

between the variables. Most of the variables presented non-normal distributions requiring non-parametric analyses.

Time factors (travel time, work and credit loads) were compared to meals prepared and time spent preparing meals through Spearman's Correlation. The number of meals prepared was calculated by summing the total number of each meal (breakfast, dinner and lunch) prepared for each respondent to create one combined variable. The time spent preparing meals was calculated by multiplying the average time spent on each meal by the number of times the meal was reported as prepared for a combined value.

In order to assess response consistency the sum of individual meals reported as consumed were compared to the total number of meals reported as prepared and purchased. This was conducted through a one-sample t-test of means, and the Kruskal-Wallis median test for a multiplied value of meals eaten each day against combined score for meals prepared and purchased in the last week, and via a t-test of means and the Kruskal-Wallis median test for a combined score of meals prepared each day against total meals prepared in the last week. Tests for both means and medians were conducted as the sample distributions are non-parametric, and some responses contained suspiciously high outliers.

Analysis was conducted with STATA v12 software.

Results

Demographic Characteristics

Table 1 describes the demographic characteristics of survey respondents. The sample was 80% female. The majority of respondents were also living either alone, or with one or two other persons (75%). Most respondents were also either in a stable relationship (41%) or living with roommates (34%).

Table 1: Demographic Characteristics

<u>Gender</u>	<u>n</u>	<u>%</u>
Male	11	20%
Female	45	80%
<i>Total</i>	<i>56</i>	<i>100%</i>
<u>Household Members</u>		
Only Self	9	16%
1	21	38%
2	12	21%
3	5	9%
4	5	9%
5	2	4%
6	1	2%
19	1	2%
<i>Total</i>	<i>56</i>	<i>100%</i>
<u>Household Relationships</u>		
Child	3	5%
Spouse/Significant Other	23	41%
Parent	6	11%
Roommate	19	34%
Other	4	7%
<i>Total</i>	<i>55</i>	<i>98%</i>

Sample size does not always sum to 100% as not all respondents provided responses.

Time Factors

Table 2 describes the various time factors that might be related to food preparation. Most respondents spent less than two hours per day traveling (81%). Most respondents were also full time graduate students carrying more than 6 credits (86%). Hours worked was more evenly distributed across all five categories from 1-10 hours to 40+ hours worked each week.

Table 2: Time Factors

<u>Travel Time</u>	<u>n</u>	<u>%</u>
<30 Min	7	13%
30-60 Min	11	20%
60-120 Min	27	48%
120-180 Min	2	4%
>180Min	9	16%
<i>Total</i>	56	100%
<u>Credit Load</u>		
6-12 Credits	48	86%
<6 Credits	7	13%
>12 Credits	0	0%
<i>Total</i>	55	98%
<u>Work Load</u>		
0-10 Hrs	13	23%
11-20 Hrs	14	25%
21-30 Hrs	14	25%
31-40 Hrs	4	7%
40+ Hrs	10	18%
<i>Total</i>	55	98%

Sample size does not always sum to 100% as not all respondents provided responses.

Time Factors and Meal Preparation Correlations

Three time factors, time spent traveling (number of minutes per day), time spent working (0-10 hours, 11-20 hours, 21-30 hours, 31-40 hours, or greater than 40 hours per week), and respondent’s academic credit load was (less than 6 credits, 6-12 credits, more than 12 credits) were compared against the combined number of meals prepared per week and the combined time spent preparing food. Travel time was calculated by multiplying the average daily traveling time times seven to create a weekly value.

Only one comparison was found to be significant. Increased travel time appears to be weakly correlated to minutes spent preparing food (Spearman’s rho 0.344, p = 0.01). The correlation is very low, however. No other time factors appear to correlate to preparation.

Table 3: Time Factor and Meal Preparation Correlations

<u>Vs # of Meals Prepared</u>	<u>Spearman's Rho</u>	<u>p-level</u>
Travel	0.01	0.96
Work	0.11	0.44
Credit	0.00	0.99
<u>Vs Minutes Preparing Food</u>	<u>Spearman's Rho</u>	<u>p-level</u>
Travel	0.34	0.01*
Work	-0.10	0.49
Credit	0.11	0.41

Tests use spearman's correlation to determine dependence

Response Consistency

Two groups of questions requested similar information from respondents. Total meals eaten per week were measured both by asking how many meals were prepared and purchased in the last week, and how many meals respondents consumed on an average day. Total meals prepared per week were measured by asking how many meals the respondent had prepared in the last week, and asking how many times each meal (breakfast, lunch and dinner) was prepared in the last week.

Using these variables, the consistency of responses was tested using t-tests of means and the Kruskal-Wallis rank test for medians. Average meals per day was multiplied by seven and tested against the combined value of meals purchased and meals prepared. Meals prepared at home in the last week were compared to the sum of times each meal (breakfast, lunch and dinner) was prepared. Means and median tests for both sets of responses were significantly different, with p-values and confidence intervals displayed in Table 4.

Table 4: Consistency of Responses

	<u>Total Meals Mean / Median</u>	<u>Daily Avg Meals Mean / Median</u>	<u>95% CI</u>	<u>p-value</u>
T-test of means	16.3	21.3	-5 (-8.2,-1.7)	0.003*
Kruskal-Wallis (Median)	20	21	-	0.0023*
	<u>Home Prepared Mean / Median</u>	<u>Combined Meals Mean / Median</u>	<u>95% CI</u>	<u>p-value</u>
T-test of means	15.9	13.3	2.7 (1.2, 4.2)	0.0009*
Kruskal-Wallis (Median)	17	15	-	0.0261*

Attitudes

Data from Likert-scaled attitudinal questions were collapsed into “Agree”, “Neutral” and “Disagree”. Student attitudes towards the health benefits of cooking and perceived skills relating to preparing meals were high, with only meal preparation being time and energy efficient scoring an agreeable response below 70%. Time was considered an important consideration for preparing meals by 82% of respondents. Table 5 provides selected responses to the attitudinal questions.

Table 5: Attitudes Regarding Meal Preparation

<u>Question</u>	<u>Agree</u>	<u>Neutral</u>	<u>Disagree</u>
Preparing my own meals is time and energy efficient.	49%	29%	22%
Preparing my own meals is cost effective.	96%	4%	0%
Preparing my own meals can improve my diet.	95%	5%	0%
It is important to know how to prepare my own meals.	93%	7%	0%
I enjoy preparing my own meals.	70%	19%	11%
Time is an important factor in preparing my own meals.	82%	9%	9%
Cost is an important factor in preparing my own meals.	71%	18%	11%
I have the skills needed to prepare my own meals.	89%	11%	0%
I have the skills needed to prepare meals for others.	82%	15%	4%

Discussion

This study has many limitations which future research should aim to address. The sample size of the study is rather small with only 56 participants. This sample size was apparent in the distribution of household roles. Of the five responses, three were selected by less than ten participants (child, parent and other). Due to this small sample size, it was not possible to analyze correlations between household role and other variables. Further complicating the household role sample size, it is unclear if parents always share food preparation responsibility. This potential requirement could mediate the effect of time factors on food preparation. Conversely, respondents who are children may have little incentive to prepare food if parents fulfill this role.

Another limitation is that the convenience sample only selected from graduate students who are enrolled in the School of Public Health. It may be possible that Public Health students are more aware of dietary and related health issues than other graduate students. Future research targeting a broader

sample and identifying the source program of students may be able to clarify differences or similarities between educational programs.

The Likert-scale attitude assessment questions developed for this study provided a Cronbach's alpha of 0.64. Due to this low value no analysis of the attitudinal questions was conducted. Future research may benefit from pretesting attitudinal questions in order to ensure results are useful for analysis. Despite the inability to conduct further testing, students very strongly indicated the high importance of food preparation, the benefits of food preparation and high perceived skills in preparing food. Interestingly, although there was no correlation between time factors and food preparation habits, the vast majority of respondents (82%) stated time was an important factor in preparing food.

The distribution of the credit load of the students surveyed was overwhelmingly skewed to full-time students (86%), and gender was highly skewed towards female (80%). It is unclear if this is indicative of public health students in general, graduate students in general, or if the classes surveyed had disproportionate distributions of these variables. In order to more fully investigate this distribution it would be useful to determine the overall distribution of credit loads and gender among students in any population surveyed.

Common sense suggests more time spent traveling, working or studying would decrease time for food preparation, while the results indicate there is almost no correlation between the two factors. The small sample size and lack of consistent response suggests two possible explanations for this. The first explanation is that the survey tool was not a valid measure of the concepts investigated. The results in this study may prove to be an example to future researchers of how not to assess the interaction of time factors and food preparation habits. Some responses also had extremely high outliers, such as travel time. This indicates that the question may have been unclear. The second explanation may be that the sample size and sample population were either too small, or not indicative of graduate students in general.

A third explanation may be that the hypotheses presented are simply not borne out by the data. All humans must eat and so meal preparation time may require sacrifices of other time demands not measured in this study such as leisure or sleep. There are many factors that were not measured in this study, such as family food practices, how students procured food for cooking and meals purchased

outside the home, and geographical considerations regarding what food sources are readily available to students. Future research may wish to investigate these factors in order to better understand graduate student food habits.

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