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Young Adult Eating and Food-Purchasing Patterns:

Food Store Location and Residential Proximity

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Abstract

Background—Young adulthood is a critical age for weight gain, yet scant research has examined modifiable contextual influences on weight that could inform age-appropriate interventions.

Purpose—The aims of this research included: (1) describing where young adults eat and purchase food, including distance from home, and (2) estimating the percentage of eating/purchasing locations contained within GIS-generated buffers traditionally used in research.

Methods—Forty-eight participants (aged 18–23 years, $n=27$ women) represented diverse lifestyle groups. Participants logged characteristics of all eating/drinking occasions (including location) occurring over 7 days ($n=1237$) using PDAs. Participants recorded addresses for stores where they purchased food to bring home. Using GIS, estimates were made of distances between participants' homes and eating/purchasing locations. Data collection occurred in 2008–2009 and data analysis occurred in 2010.

Results—Among participants living independently or with family ($n=36$), 59.1% of eating occasions were at home. Away-from-home eating locations averaged 6.7 miles from home; food-shopping locations averaged 3.1 miles from home. Only 12% of away-from-home eating occasions fell within ½-mile residential buffers, versus 17% within 1 mile and 34% within 2 miles. Additionally, 12%, 19%, and 58% of shopping trips fell within these buffers, respectively. Results were similar for participants residing in dormitories.

Conclusions—Young adults often purchase and eat food outside of commonly used GIS-generated buffers around their homes. This suggests the need for a broader understanding of their food environments.

Background

The transition from adolescence to adulthood is recognized as a time for excess weight gain.

¹ However, little scholarly work to date has examined the determinants of poor dietary patterns and weight gain, such as contextual factors influencing eating and food acquisition, during this age.¹ See Nelson et al.¹ for a recent review of this literature. Exploratory

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research is needed to better characterize food-environment factors that are most relevant to young adults' lives.

Previous work has demonstrated associations between neighborhood environments and dietary behaviors among other age groups,² though associations between local food environments and obesity are less clear.² There is ongoing debate as to the magnitude of environmental influences on behavior, and the means by which to measure environmental exposures.²⁻⁴ One methodologic research challenge here is the lack of agreement regarding the size of the most relevant exposure area within neighborhood environments. Is it ¼ mile, ½ mile, 1 mile, or 2 miles around one's home? To date, there currently is no standard neighborhood "buffer" size (i.e., defined distance around individuals' homes) that is widely accepted for research in this area.²

Scant research to date has sought to directly address this issue by assessing the distance individuals travel to eat and/or purchase food. Rather, most studies have employed buffers around individuals' homes that are somewhat arbitrarily defined and examined associations between available food outlets and individuals' dietary intakes. Often the underlying assumption with this analytic design is that food purchasing occurs within these buffers.² However, researchers have little evidence on which to base decisions for selecting a buffer size, and it is unclear the extent to which individuals are eating and purchasing food within any given distance from home.

Therefore, the current study aims were to: (1) describe where young adults eat and purchase food, including how far eating and purchasing locations are from home, work and school, and (2) estimate the percentage of eating/purchasing locations contained within GIS buffers traditionally used in research.

Methods

We recruited 48 participants (aged 18–23 years, $n=27$ women, 2008–2009) that were: (1) attending college/university, living on campus ($n=12$); (2) attending college/university, living independently from parents/family (off campus) ($n=12$); (3) attending college/university, living with parents ($n=12$); and (4) not attending college/university, living independently ($n=12$). Participants were recruited through 2- and 4-year colleges/universities, community settings and local websites.

Study procedures were approved by the IRB at the University of Minnesota. Participants attended two study visits. First, participants completed surveys assessing diet-related behaviors, and were given a Palm® Z22 PDA to record their food/beverage consumption over 7 days. At the second visit, participants returned the PDAs and completed surveys again.

PDAs were pre-programmed for data entry. Participants were instructed to log every eating/drinking occasion, as soon afterwards as possible. Participants completed a series of 14 items on the PDA that were used to characterize eating occasions, including location type (e.g., home, work) and address.

Participants answered survey questions about the number of times in the previous week they bought food to bring into their home or living space. Store addresses were recorded and verified by study staff. To maximize the data, responses were summed from time 1 and 2 to characterize food shopping over 2 weeks. Other data were self-reported (e.g., sociodemographics).

Analysis

Using ArcGIS 9.3 (Environmental Systems Research Institute, Redlands, CA), the following were geocoded: (1) locations of participants' home, work and school; (2) locations of eating occasions from PDAs; and (3) locations of food-shopping trips. This geocoding utilized Metropolitan Council– endorsed street networks,⁵ which capture major Minnesota metropolitan areas. Thirty PDA addresses (2%) were outside of these areas (e.g., participants traveling out of town), considered outliers and excluded.

After initial geocoding, research staff located many unmatched addresses along the street network. Final match rates were 100% for homes/schools/workplaces; 99.2% for stores; and 98.1% for eating locations. Network distances between participants' home/school/work and eating and food-shopping locations were calculated.⁶ Generalized residential street network buffers (1/2, 1, and 2 miles) were generated.⁶ Descriptive analyses were conducted in 2010 using SPSS, version 17.0 (SPSS Inc., Chicago, IL).

Results

Nearly half of participants were male (44%). Mean age was 20.5 (± 1.3) years, and 85% of participants were white. On average, participants logged 3–4 daily eating occasions (Table 1) and ate at a range of locations. Among those not living in dormitories, 59.1% of eating occasions occurred at home. Participants averaged 1.8–2.6 food-shopping trips over a 2-week period.

For those not living in dormitories, away-from-home eating locations averaged 6.7 miles from home (median: 3.4 miles), and food-shopping locations averaged 3.1 miles from home (median: 1.7 miles). Average distances between eating locations and work and school were approximately 3–4 miles (data not shown). Median distances between away-from-home eating locations and work or school were approximately 0.5–1 mile, versus median distances between food-shopping locations and work or school, which were 2–3 miles. For participants residing in dormitories, off-campus eating locations averaged 11.5 miles from the dormitory (median: 6.2 miles), and food-shopping locations averaged 5.5 miles (median: 2.9 miles).

For participants not residing in dormitories, only 12% of away-from-home eating occasions fell within a 1/2-mile residential buffer, compared to 17% within 1 mile and 34% within 2 miles (Table 2). Overall, few food-shopping trips fell within these buffers. Results were similar for participants residing in dormitories.

Conclusion

Our findings indicate that young adults eat and purchase food at a wide range of locations. Notably, young adults appear to eat a substantial proportion of meals at home. Given that young adults are among the most frequent consumers of fast food¹ and have a high frequency of eating on-the-go,⁷ there tends to be a heavy focus on away-from-home eating for this age group. It is important to note that home environments may also have an important, understudied influence on this population.

Various features of the neighborhood environment also have been associated with dietary behaviors, like food purchasing and away-from-home eating.² However, much of this research has examined only ecologic associations.^{8–13} Studies employing residential buffers to identify local food environments have used a wide range of buffer definitions, including 100 meters,¹⁴ 1000 meters,¹⁴ 1/2 mile,^{15, 16} 1 mile,^{16–18} and 2 miles.¹⁶ Overall, researchers have long been challenged by the issue of how to conceptualize “place” in health-related

research.^{4, 19, 20} Matthews²⁰ cites the conceptualization of place as “one of the weakest areas of current practice in health and environment research.” The current findings support these assertions, suggesting that current, measurable definitions of “place” may not be useful for research purposes, particularly in assessing food-environment influences.

The current research is among the first of its kind in the U.S. to objectively examine how far individuals travel for eating or purchasing food. The results show that traditionally defined buffer sizes fail to capture substantial proportions of food purchasing and consumption locations in the current sample. In fact, less than half of away-from-home eating and food purchasing were captured by nearly all of the buffers. Other factors, such as proximity to worksites and schools, as well as complex daily travel patterns, are likely important to consider in conceptualizing neighborhood influences on food choices.

The results suggest that larger GIS-generated buffer sizes may need to be utilized. The practical problem of increasing buffer sizes beyond 2 miles is the subsequent decline in heterogeneity across study samples. The larger the buffer size grows, the more difficult it is to make anything but crude distinctions among neighborhoods (e.g., urban versus suburban). Furthermore, larger buffer sizes will encompass more purchasing opportunities, including those utilized by individuals and those that are not. While it is possible that food environments may influence individuals through multiple pathways, it is often assumed that neighborhood food environments are influential because individuals are eating and purchasing food in their neighborhoods. The current results suggest that this may not be true.

This work has several limitations. The current sample was drawn from one urban, U.S. region, which may limit generalizability. Although the small sample was well suited for this exploratory investigation, it limits the extent to which results can be stratified based on individual-level characteristics (e.g., SES). Data were not collected on other important variables, such as transportation modes. The current sample was primarily Caucasian, which reflects the overall racial composition of the region, but may not be generalizable to urban, minority groups or groups of varying SES. In addition, no differentiation was made among eating locations based on the type (or amount) of food/beverage consumed; future additional work is needed to explore these issues.

Overall, proximity may play a relatively minor role in many individuals' choices about where to eat or purchase food. Food-related decision making is highly complex. Individuals may make decisions about where to eat or shop based on food quality, pricing, variety, availability, travel patterns, social or cultural influences, and various other factors not quantified here. Additional research is needed to explore how individuals make decisions within various settings, and the multifaceted ways in which our surroundings can have an impact on routine health behaviors and long-term disease outcomes.

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Table 1

Characteristics of PDA food logs and eating-related behaviors

	Not living in dormitories (n=36 participants)	Living in dormitories (n=12 participants)
Eating occasions		
Number of eating occasions logged per day on the PDA (M)	3.5	4.1
Number of days logged (during 1-week assessment) (M)	6.8	7.0
Eating occasion, by location type (percent) ^a		
At home (not on campus) (%)	59.1	—
At work (not on campus) (%)	10.3	2.0
On campus (%)	9.5	81.2
Someone else's home (not on campus) (%)	7.8	6.7
Fast food restaurant or coffee shop (%)	5.7	2.9
Sit-down restaurant (%)	3.3	3.5
In car (%)	2.2	2.9
Other (%)	2.9	1.7
Food purchasing ^b		
Number of food-shopping trips (during past 14 days) (M)	2.6	1.8
Food purchasing by store type (percent)		
Grocery store (%)	54.8	28.6
Other stores (like Target) (%)	11.8	14.3
Superstore with grocery (like Super Target) (%)	12.9	42.9
Convenience store (%)	15.1	9.5
Warehouse store (like Costco) (%)	2.2	0.0
Other (%)	2.2	4.8

^a Not mutually exclusive; participants were instructed to select all that apply.

^b Defined as "buying food from a store to bring into one's home or living space."

Table 2

Percentage of away-from-home eating occasions and food-shopping trips captured using standard network buffer sizes.

	Within ½-mile residential buffer (%)	Within 1-mile residential buffer (%)	Within 2-mile residential buffer (%)
Not living in dormitories (n=36 participants)			
Percentage of away-from-home eating occasions	12	17	34
Percentage of food-shopping occasions	12	19	58
Living in dormitories (n=12 participants)			
Percentage of off-campus eating occasions	10	14	31
Percentage of food-shopping occasions	14	14	19