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Food shopping profiles and their association with dietary patterns: A latent class analysis

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Abstract

Background—Food shopping is a complex behavior that consists of multiple dimensions. Little research has explored multiple dimensions of food shopping or examined how it relates to dietary intake.

Objective—To identify patterns (or 'classes') of food shopping across four domains (fresh food purchasing, "conscientious" food shopping, food shopping locations, and food/beverage purchasing on or near campus) and explore how these patterns relate to dietary intake among college students.

Design—A cross-sectional online survey was administered.

Participants/setting—Students attending a public 4-year university and a 2-year community college in the Twin Cities metropolitan area (n=1,201) participated in this study.

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Conflict of Interest Disclosure

The authors disclose no conflicts of interest.

Main outcome measures—Fast food and soda consumption; meeting fruit and vegetable, fiber, added sugar, calcium, dairy, and fat recommendations.

Statistical analyses—Crude and adjusted latent class models and adjusted logistic regression models were fit.

Results—An eight-class solution was identified: “traditional shopper (14.9%),” “fresh food and supermarket shopper (14.1%),” “convenience shopper (18.8%),” “conscientious convenience shopper (13.8%),” “conscientious, fresh food, convenience shopper (11.8%),” “conscientious fresh food shopper (6.6%),” “conscientious non-shopper (10.2%)”, and “non-shopper (9.8%).” “Fresh food and supermarket shoppers” and “conscientious fresh food shopper” had better dietary intake (for fast food, calcium, dairy, and added sugar) while “convenience shoppers” and “conscientious convenience shoppers,” and “non-shoppers” had worse dietary intake (for soda, calcium, dairy, fiber, and fat) than “traditional shoppers.”

Conclusions—These findings highlight unique patterns in food shopping and associated dietary patterns that could inform tailoring of nutrition interventions for college students. Additional research is needed to understand modifiable contextual influences of healthy food shopping.

Keywords

food shopping; eating behaviors; college students

Introduction

Food shopping is a complex behavior that can be characterized by various dimensions (e.g., location, frequency, quantity). Research on food shopping is limited and has focused primarily on socioeconomic position (SEP). For example, people in low SEP are more likely than those in high SEP to buy carry-out food and sugar-sweetened beverages,[1] and have more limited access to stores selling healthy foods.[2–4] In addition to this limited scope of work, another limitation of existing studies is that typically only one aspect of food shopping has been assessed. One study examining multiple food-related behaviors found that planning meals before food shopping was associated with greater fruit/vegetable consumption among women.[5] However, planning meals was assessed independently of other food shopping factors, and this approach may not capture the complex patterning of shopping behavior that may be important to understand in developing effective intervention strategies.[6]

In addition to these behavioral complexities, shopping behaviors are likely to be distinctive depending on stage of life and life circumstances. For example, research has shown that dietary quality is often exceedingly low while attending college.[7–12] Importantly, with 20.6 million students enrolled in post-secondary institutions in the U.S.,[13] the college setting may be an important venue for targeting and addressing wellness-related behaviors among a large population of adult students. Despite this, little research has focused on developing healthy eating-related interventions for the college setting.[14]

The objectives of the analysis were to: (a) identify food shopping patterns and (b) assess the relationship between food shopping and types of foods and nutrients consumed among a diverse sample of college students. We hypothesized that more favorable patterns of

shopping, such as purchasing more fresh foods and fewer convenience foods, would be associated with healthier dietary intake.

Methods

The Student Health and Wellness Survey (2010) assessed weight-related factors among college students in the Twin Cities area of Minnesota. Students from two institutions (a 2-year community college and 4-year university) were approached by study staff in high-traffic campus areas and invited to complete an online survey. Enrolled students ≥18 years of age were eligible to participate and provided consent online prior to data collection. For four study participants, their age based on the birthdate reported on their completed survey was 17 years of age. The University of Minnesota Institutional Review Board provided the researchers with authorization to maintain these age-ineligible participants' survey data in the dataset. The final sample was n=1,201 (2-year: n=598, 4-year: n=603). Additional details on the study have been described previously.[12,15] Study protocols were approved by the University of Minnesota Institutional Review Board.

Independent variables: Shopping Measures

Fourteen food shopping behaviors from four domains were assessed: fresh fruit and vegetable purchasing, "conscientious" shopping (i.e., buying foods from organic, local, or sustainable sources), type of shopping locations, and food/beverage purchasing on-/near-campus. Based on previous research, these domains were identified as the most salient for healthy eating among a college population.[10,11,16] "Conscientious" shopping has been associated with healthier diets,[11] while on-/near-campus shopping has been associated with less healthy diets, among college students.[10] In addition, access to supermarkets compared to convenience stores, tend to be associated with healthier diets.[16] For many of the food shopping items, test-retest and/or construct validity have been established in previous research.[11,17–20]

Purchasing fruits and vegetables was assessed using a question adapted from previous research:[19,20] "During the past 30 days, about how often have you (a) purchased a fresh vegetable(s)? (b) purchased a fresh fruit(s)?" Response options ranged from never to ≥3 times/day and were dichotomized at ≥1/week. Participants provided separate responses for vegetables and fruit.

"Conscientious" food shopping was assessed using five items assessing the frequency of purchasing items that were: (a) organically grown, (b) made with organic ingredients, (c) not processed, (d) locally grown, (e) grown using sustainable agricultural practices. Responses were dichotomized into "never/rarely," and "sometimes/often."[11] This question was adapted from Project EAT, a large study of adolescents and young adults.[17]

Type of purchasing location was assessed by asking: "During the past 30 days, about how often have you purchased food from…" Locations include "(a) a supermarket, such as [local examples provided]," (b) "a convenience store (including any corner stores or food stores that are smaller than a supermarket)," (c) "any stores like Target, Super Target, Costco, or

Sam's Club," and (d) "a food co-operative (co-op) such [local examples provided]." Response options ranged from never to ≥3 times/day.

Finally, food and beverage purchasing patterns on-/near-campus were assessed by asking: "During a normal week, how many days per week do you (a) buy food from a vending machine on campus, (b) buy a beverage on campus, (c) buy food or a beverage from a restaurant or store within walking distance of campus."[18] Response options ranged from 0 to 7 days.

To facilitate interpretability, food shopping variables were recoded into dichotomous indicators (using cut-offs of ≥1/week for purchasing fresh fruit and vegetable, food shopping locations, and on-/near-campus shopping and "sometimes/often" for food shopping from alternative production practices). Cut-offs were determined based on a reasonable distribution and alignment with expected shopping needs (e.g., frequent shopping of fresh foods that is needed to maintain a consistent supply).

Outcome Variables: Food Consumption

Fast food, soda, fruit and vegetable, calcium, dairy, fiber, added sugar, and fat consumption were assessed. These aspects of food consumption are highlighted in the Dietary Guidelines for Americans[21] and are key dietary challenges for many college students.[22] Fast food was assessed as frequency of eating food from establishments where food is ordered at a counter or drive-through window during the past 30 days.[23] Soda consumption was assessed by asking: "During the past month, how often did you have regular, carbonated soda, pop, or soft drinks that contain sugar? (Do not include diet soda.)" Response options ranged from never to ≥5 times/day.[23] Fruit and vegetable consumption (in cups) was calculated from past month reported consumption of fruit juice, fruit, salad, French fries, potatoes, vegetables, tomato sauce, and salsa by taking the midpoint of each response option and summing across different items, consistent with previous research.[24–26] Calcium, dairy, fiber, and added sugar, were assessed as part of the National Cancer Institute Five-Factor Screener,[24] while fat was assessed using a modified Percentage Energy from Fat Screener.[15,24]

With the exception of fast food and soda, all dietary variables were dichotomized based on meeting national recommendations for health.[27–32] Personalized recommendations, based on participant age, sex, and physical activity level (for fruits and vegetables and added sugar only), were calculated for fruits and vegetables, added sugar, and calcium, aligning with national recommendations.[27–30] For fiber, individuals met recommendations if they consumed between 21–38 grams/day based on age and sex; for dairy, meeting recommendations were those who consumed ≥3 servings/day; and for fat, if participants consumed <35% of calories from fat they met recommendations. Additional details on these consumption variables have been previously published,[12,15] including validity results.[23,25,26,33] For fast food and soda consumption, dichotomization cut-points were consistent with previous studies: ≤1/week (fast food) and ≤1/day (soda).[8]

Covariates

Covariates included gender, race/ethnicity, employment, parental education, relationship status, having children, living situation, self-perception of being an adult, and being on a

college meal plan.[7,9,12,19] Racial/ethnic categories included “non-Hispanic white,” “black,” “Asian or other Pacific Islander,” and “Other race(s) and Hispanic.” Employment categories ranged from 0 to ≥30 hours. Relationship status was categorized as single vs. non-single (which includes “in a committed relationship or engaged,” “married,” “separate or divorced,” and “widowed”). Number of children was dichotomized into some vs. none. Living situation categories included, “Rent/share rent,” “Parent/family home,” “University housing,” and “Own a home/other.” Self-perception of being an adult was assessed as: “How often do you think of yourself as an adult?,” with responses: “Never/rarely,” “Sometimes,” and “Often/always.” Participation in a meal plan was asked only of participants at the 4-year institution, and was dichotomized as yes vs. no (including 2-year college participants).

Analysis

After examining descriptive characteristics of the sample, LCA was used to identify homogenous, mutually exclusive groups of individuals based on food purchasing behaviors. Of the original 14 food purchasing items, three were dropped due to high correlation with other variables and one was dropped for low endorsement. Thus, ten variables remained: bought fresh fruit, bought non-processed foods, bought organically grown foods, bought food from sustainable agriculture, shopped at convenience store, shopped at supermarket, shopped at stores like Target, bought food from vending machine on campus, bought a beverage on campus, and bought food/beverage from restaurant/store near campus. We used standard criteria (i.e., Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), Bootstrap Likelihood Ratio Test (BLRT), separation and entropy, class size, and interpretability) to select the best-fitting model.[34,35] We compared results between an unconditional LCA and inclusive LCA.[36] Descriptive labels for each class remained consistent with few changes in item-response probabilities and class membership with inclusion of covariates. Therefore, we present unconditional LCA results here to ease interpretability, but use inclusive LCA results for regression models in order to reduce bias.[36]

Using an inclusive maximum-probability approach,[36] participants were assigned to their most likely class based on posterior probabilities of membership in each class after including covariates and each of the eight outcomes. Class membership was used in logistic regression models to estimate the relationship with the food consumption outcome variables, controlling for covariates and school. For regular soda consumption, all participants in the traditional shopper referent group met recommendations, resulting in a zero cell for not meeting recommendations. Therefore, in order to estimate this model, we added a nonevent to this group, for the regular soda consumption outcome only. Respondents with missing values for covariates (ranging from n=2 (0.2%) for relationship status to n=48 (4.0%) for parental education) were dropped. We compared the dropped respondents to the retained respondents and found no significant differences between the two groups in the food consumption outcome variables. The final analytic sample for regression models ranged from 971–1,110 depending on the outcome (i.e., fast food, soda, fruit and vegetable, calcium, dairy, fiber, added sugar, and fat consumption). All analyses were performed using SAS, Version 9.2 (2008, Cary, NC: SAS Institute Inc.).

Results

Overall, the majority of respondents were female (52.8%), non-white (56.8%), had parents with a college degree or beyond (53.0%), were employed (68.6%), single (63.0%), did not have children (90.9%), considered themselves an adult “all of the time” (63.6%), and were not enrolled in a meal plan (84.6%). About half of respondents lived in their parent or family home (48.3%), while about one-third rented or shared rent (34.5%). The median age of our sample was 20 years (range: 17–51 years).

For food shopping behaviors, 46.6% of respondents bought fresh fruits ≥1/week. Within the “conscientious” shopping domain, 48.7% sometimes/often bought non-processed foods, 38.5% bought organically grown foods, and 38.9% bought foods grown using sustainable agricultural practices. Only 29.0% of participants reported shopping at convenience stores ≥once/week, while 39.4% shopped at supermarkets at least once/week. Buying food or beverages on-/near-campus was common with 64.8% buying a beverage on campus ≥once/week and 56.9% buying food or beverage near campus ≥once/week.

Model fit criteria of the 9 estimated models are shown in Table 1. Using fit statistics and other selection criteria (i.e., entropy and interpretability), the eight-class solution was retained. Overall, AIC and BLRT results indicated this was statistically the best model and interpretability was appropriate. Growing evidence suggests that BLRT outperforms AIC and BIC for determining the number of classes.[34,35]

Figure 1 contains the probability of latent class membership and item response probabilities based on our unconditional eight-class LCA model. The eight classes were roughly equally prevalent (ranging from 6.6% to 18.8%). Class 1 (“Traditional shopper”; 14.9%) was characterized by a high probability of shopping at a supermarket or “stores like Target” (0.85 and 0.70, respectively), and buying foods and beverages on-/near-campus (0.79 for bought food from a vending machine on campus, 0.95 for bought a beverage on campus, and 0.76 for bought food/beverage from restaurant or store near campus). Class 2 (“Fresh food and supermarket shopper”; 14.1%) had high probabilities of buying fresh fruit (0.66) and shopping at supermarkets (0.61), but low probabilities of other shopping behaviors (ranging from 0.04–0.33). Class 3 (“Convenience shopper”; 18.8%), the largest class, had high probabilities of buying food or beverages on-/near-campus (ranging from 0.77–0.93) and low probabilities for the remaining indicators (ranging from 0.04–0.24). Class 4 (“Conscientious convenience shopper”; 13.8%) had high probabilities of “conscientious” shopping (0.84 for non-processed food, 0.77 for organically grown foods, and 0.73 for food grown using sustainable agricultural practices) and buying beverages on-/near-campus (0.85 for bought a beverage on campus and 0.80 for bought food/beverage from restaurant/store near campus). Class 5 (“Conscientious, fresh food, convenience shopper”; 11.8%) had high probabilities for nearly all of the indicators (ranging from 0.70–1.00), except for shopping at convenience stores (0.44) and supermarkets (0.59). Class 6 (“Conscientious fresh food shopper”; 6.6%), the smallest class, was characterized by a high probability of buying fresh fruit (0.94), buying organically grown foods (0.92), non-processed food (0.94), or food grown using sustainable agricultural practices (0.79), and shopping at supermarkets (0.94). This class had low probabilities of buying foods or beverages on-/near-campus (ranging

from 0.19–0.34). Class 7 (“Conscientious non-shopper”; 10.2%) had high probabilities of “conscientious” shopping (0.90 for non-processed food, 0.72 for organically grown foods, and 0.70 for food grown using sustainable agricultural practices); probabilities were low all other indicators (0.04–0.47). Class 8 (“Non-shopper”; 9.8%), had low probabilities across all indicators (0.00–0.35), suggesting that this class did not engage in frequent food shopping behaviors (i.e., ≥1/week).

Overall, including covariates in our LCA models did not substantially change our results, suggesting there may be other factors influencing shopping behaviors. However, certain covariates significantly predicted certain classes. For example, consistently across all eight outcomes, males were less likely than females to be a Class 4 “conscientious convenience shopper” than a Class 1 “traditional shopper.” Students at 4-year institutions were more likely than 2-year students to be a Class 4 shopper or a Class 8 “non-shopper” than a Class 1 “traditional shopper.” Compared to white students, black students were less likely to be a Class 2 “fresh food and supermarket” shopper than a “traditional shopper.” Students living in University housing were more likely to be a “non-shopper” than a “traditional shopper.” Having a meal plan was not associated with any of the classes. Also, for regular soda consumption only, covariates adjustment resulted in a solution that was not replicated from unadjusted latent class models. A Class 7 “Conscientious non-shopper,” was not identified; instead, a variation of Class 1 “Traditional shopper” was identified, differentially characterized by lower probabilities of buying fresh fruit (0.27).

Table 2 presents adjusted odds ratios (AOR) and confidence intervals (95% CI) of the dietary intake outcome variables comparing Classes 2–8 to Class 1 (“traditional shopper”). Classes 2 (“fresh food and supermarket shopper;” AOR (95% CI): 3.9 (1.7–8.9)), 6 (“conscientious fresh food shopper;” 4.2 (1.8–9.6)), and 8 (“non-shopper;” 3.6 (1.5–8.7)) were more likely to not eat fast food compared to Class 1. Classes 3 (“convenience shopper;” 0.1 (0.0–0.6)) and 8 (“non-shopper;” 0.1 (0.0–0.4)) were less likely to not drink soda than Class 1. Additionally, for soda consumption, compared to Class 1 (“traditional shoppers”), the variant characterized by less fresh food purchasing was also less likely to not drink soda (0.0 (0.0–0.1)). Compared to “traditional shoppers”, “conscientious convenience shoppers” (Class 4) were more likely to meet fruit/vegetable recommendations [4.5 (1.4–13.7)]. Classes 3 (“convenience shopper;” 0.4 (0.2–0.8)) and 4 [0.3 (0.1–0.7)] were less likely to meet calcium and dairy recommendations while Class 6 was more likely to meet calcium [3.5 (1.8–6.8)] and dairy recommendations [2.3 (1.2–4.5)] compared to Class 1. Classes 3 [0.2 (0.1–0.6)], 7 [0.3 (0.1–0.8)], and 8 [0.2 (0.1–0.8)] were less likely than Class 1 to meet fiber recommendations. Classes 2 [4.1 (2.3–7.2)], 6 [6.2 (3.5–11.0)], and 7 [3.0 (1.7–5.2)] were more likely to meet added sugar recommendations than Class 1. Finally, for fat, compared to Class 1, Classes 4 [0.4 (0.2–1.0)] and 5 [0.2 (0.1–0.5)] were less likely to meet recommendations.

Discussion

Overall, an eight-class solution was identified as the best fit from our unconditional LCA of ten food shopping indicators that covered four domains. These results indicated a relatively even distribution of college students across the eight classes, which included, “traditional

shoppers," "fresh food and supermarket shopper," "convenience shopper," "conscientious convenience shoppers," "conscientious, fresh food, convenience shoppers," "conscientious fresh food shoppers," "conscientious non-shoppers," and "non-shoppers." Our regression results suggest that compared to "traditional shoppers", "fresh food and supermarket shoppers" (Class 2) and "conscientious fresh food shoppers" (Class 6) had more favorable dietary intake, including lower consumption of fast food as well as meeting calcium and dairy (Class 6 only) recommendations, and added sugar recommendations. Classes 3 ("convenience shopper"), 4 ("conscientious convenience shopper"), and 8 ("non-shopper") tended to have less favorable dietary intake compared to Class 1. For Classes 5 ("conscientious, fresh food, convenience shopper") and 7 ("conscientious non-shopper"), food consumption varied slightly from Class 1, however patterns were not consistent. These findings highlight unique patterns in food shopping and consumption among college students.

In addition, these results point to interesting ways in which college students' practices regarding alternative food production co-vary with an array of food shopping behaviors. Classes 4–7 (over 40% of the sample) were characterized by conscientious food shopping; however, not all of these classes were consistently characterized by healthier food consumption. Previous research on the relationship between attitudes on food production and diet quality suggests a positive link,[11,17,37] but our study indicates that conscientious food shopping may also be coupled with less desirable food shopping behaviors, such as buying food and drinks from vending machines. The importance of alternative food production practices may be relevant to a broad audience, including "convenience" shoppers and those who do not engage in healthful dietary behaviors. More research on the relationship of attitudes on alternative food production and food shopping and consumption is needed.

Both Classes 2 and 6 (the two classes that were associated with better dietary intake) were characterized by fresh food shopping. This finding suggests that buying fresh food among college students may be beneficial to improving their dietary intake. With regard to intervention, increasing availability of fresh food and promoting their consumption among college students may encourage more healthful eating habits.[38,39]

Compared to existing studies, the use of latent variable modeling is a novel method to examine food shopping behavior. While previous studies have used single indicators of food shopping,[5,6] LCA allows multiple domains of a complex construct to be readily presented into meaningful typologies. In examining the classes identified here, we observed several notable findings. First, the specification of eight classes was more than expected, and this highlights the diversity in college student shopping behaviors. Second, four of the eight classes, representing nearly two-thirds of the sample, had high probabilities of shopping for food and/or beverages on-/near-campus. Previous research has shown that college students are likely to be eating while doing other activities or eating "on the run", factors that may be common when eating while at school.[20,40] This finding has implications for the food environment on and near college campuses and may help inform an important opportunity to support a healthy food environment for college students.

To the best of our knowledge, this is the first exploration of multiple domains of food shopping; however several limitations should be noted. First, participants were from one urban region in the U.S., which limits generalizability. Second, although this study utilized four domains of food purchasing, there may be other salient domains for the college student population, such as availability and accessibility. Finally, the cross-sectional nature limits the assessment of temporality between food shopping and consumption.

More research is needed to determine modifiable contextual factors that contribute to food shopping and how those factors might be utilized in intervention strategies. For example, if a student does not have access to items needed to prepare meals at home, offering interventions that increase availability of basic food preparation items may be an appropriate factor to target in conjunction with food shopping.

Conclusions

In summary, our findings show that food shopping might be better represented as a multidimensional construct that is associated with dietary intake. These findings underscore the diversity in shopping behaviors among college students. Due to the complexity of food shopping and consumption behaviors, additional factors not investigated in the current study may need to be explored. Future research to identify these additional shopping behavior-related factors is needed in order to optimize strategies for supporting healthful eating among college students.

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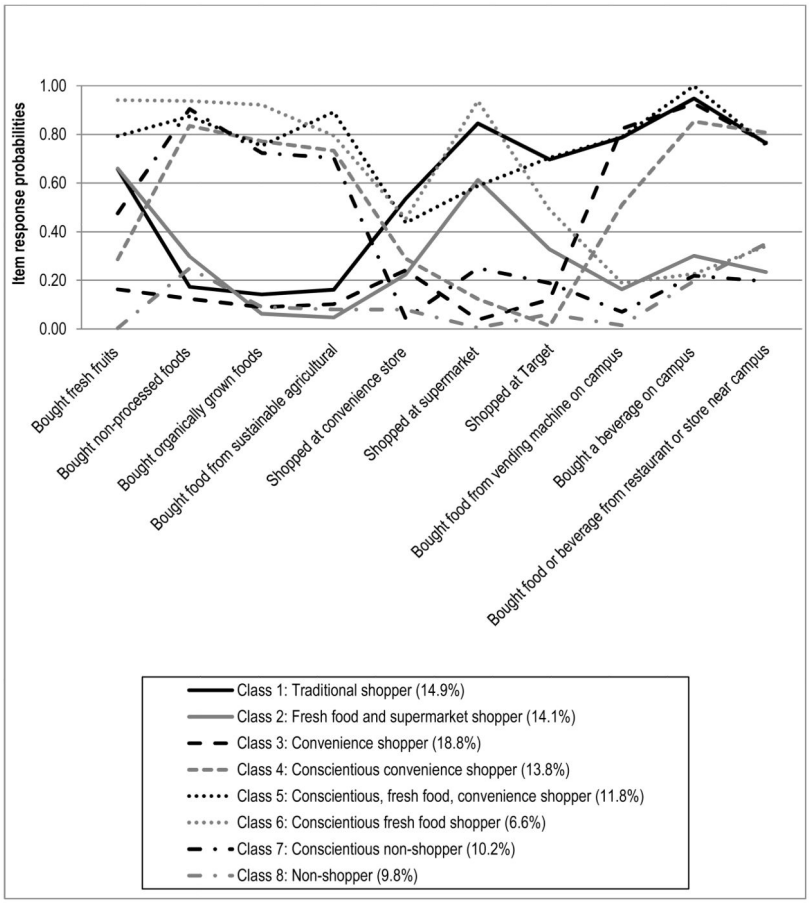

Figure 1.

Probability of latent class membership and item-response probabilities of retained unconditional eight-class solution among 2- and 4-year college students (n=1,201)

Table 1

Fit statistics for unconditional LCA models of ten food shopping behaviors[a] among 2- and 4-year college students (n=1,201)

	Likelihood	AIC	BIC	Entropy R^2	BLRT[b]
2 classes	−7516.00	1778.86	1885.76	0.72	
3 classes	−7324.51	1417.86	1580.77	0.71	0.01
4 classes	−7209.11	1209.06	1427.97	0.72	0.01
5 classes	−7135.47	1083.78	1358.69	0.71	0.01
6 classes	−7081.55	997.95	1328.86	0.71	0.01
7 classes	−7047.04	950.93	1337.84	0.71	0.01
8 classes	**−7023.42**	**925.69**	**1369.50**	**0.71**	**0.01**
9 classes	−7012.72	926.29	1425.20	0.72	0.72
10 classes	−7002.70	928.25	1483.16	0.73	

LCA: Latent class analysis; AIC: Akaike Information Criteria; BIC: Bayesian Information Criteria; BLRT: Bootstrap Likelihood Ratio Test

[a] Includes bought fresh fruit ≥1/week, bought non-processed foods, organically grown foods, or food from sustainable agriculture sometimes/often, shopped at a convenience store, supermarket, or stores like Target ≥1/week, bought food from vending machine on campus, bought a beverage on campus ≥1/week, and bought food/beverage from restaurant/store near campus ≥1/week

[b] p-value for *k*-class solution vs. (*k*+1)-class solution

Bolded solution indicates final selected solution

Table 2

Adjusted association between eight food shopping latent classes[a] and eight food consumption indicators among 2- and 4-year college students (n=1,201)

	Fast Food ≤1/week	**Regular Soda ≤1/day[b]**	**Fruit and Vegetable[c]**	**Calcium[c]**	**Dairy[c]**	**Fiber[c]**	**Added Sugar[c]**	**Fat[c]**
n (%)[d]	**1,110 (8.7%)**	**1,098 (93.0%)**	**1,055 (3.1%)**	**971 (22.1%)**	**1,096 (16.0%)**	**1,031 (9.7%)**	**1,049 (30.5%)**	**1,100 (91.6%)**
	OR (95% CI)							
Class 1: Traditional shopper	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Class 2: Fresh food and supermarket shopper	3.9 (1.7–8.9)*** †††	0.1 (0.0–1.0)	0.4 (0.1–2.2)	1.5 (0.8–2.7)	1.2 (0.6–2.4)	1.5 (0.7–3.2)	4.1 (2.3–7.2)*** †††	3.5 (1.0–13.4)
Class 3: Convenience shopper	0.9 (0.3–2.3)	0.1 (0.0–0.6)* †	--	0.4 (0.2–0.8)†	0.5 (0.3–1.0)	0.2 (0.1–0.6)** ††	0.9 (0.5–1.6)	0.7 (0.3–1.5)
Class 4: Conscientious convenience shopper	--	0.7 (0.1–8.2)	4.5 (1.4–13.7)* ††	0.5 (0.2–1.1)	0.3 (0.1–0.7)††	1.5 (0.7–3.3)	0.6 (0.3–1.2)	0.4 (0.2–1.0)†
Class 5: Conscientious, fresh food, convenience shopper	--	0.1 (0.0–0.8)*	0.7 (0.1–3.7)	1.6 (0.8–3.1)	3.1 (1.3–7.1)* †††	1.6 (0.7–4.2)	0.8 (0.4–1.7)	0.2 (0.1–0.5)* †††
Class 6: Conscientious fresh food shopper	4.2 (1.8–9.6)** †††	0.1 (0.0–1.2)	1.8 (0.6–5.6)	3.5 (1.8–6.8)*** †††	2.3 (1.2–4.5)* †	1.8 (0.9–3.6)	6.2 (3.5–11.0)*** †††	1.1 (0.4–2.9)
Class 7: Conscientious non-shopper	1.7 (0.7–4.4)	*e*	0.8 (0.2–3.4)	0.7 (0.4–1.4)	0.6 (0.3–1.3)	0.3 (0.1–0.8)* †	3.0 (1.7–5.2)** †††	1.2 (0.5–3.1)
Class 8: Non-shopper	3.6 (1.5–8.7)** ††	0.1 (0.0–0.4)** †††	--	0.7 (0.4–1.5)	1.4 (0.7–2.7)*	0.2 (0.1–0.8)* †	1.4 (0.8–2.5)	1.4 (0.5–4.1)

--Due to small sample sizes, quasi-separation occurred in these models and these values were not estimated

[a] Latent classes for regression analyses were identified using an inclusive maximum-probability method assigning individuals to their most likely class after adjusted for covariates and the outcome of interest

[b] Does not include diet soda

[c] Met recommendations

[d] analytic n and percent of participants who reported meeting recommendations

[e] Class was not specified and therefore no estimate is available

* p<0.05;

** p<0.01;

*** p<0.001 compared to Class 1 in models adjusted for school type

† p<0.05;

†† p<0.01;

††† p<0.001 compared to Class 1 in models adjusted for school type, race/ethnicity, gender, parental education, relationship status, having children, employment, living situation, thinking of self as adult, and having a meal plan

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