

## Healthy Vending: A Cross-sectional Evaluation of Public Perceptions and Behavior

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### Abstract

**Objective:** Assess the current attitudes about healthy vending practices and expand knowledge about public opinions and vending behaviors. **Methods:** A cross-sectional intercept survey was administered in high traffic areas at a large, urban public university to individuals 18 years or older. Descriptive and crosstabs analyses were conducted to determine overall purchasing habits and compare responses between groups (under 24 versus 24 and older; vending machine users to non-users).

**Results:** Results show support for healthy vending policies and increasing the availability of healthy options in machines among all respondents (n = 475), and suggest increasing availability may increase sales and usage, even among those who do not currently use vending machines. **Conclusions and Implications:** These findings can be used to demonstrate significant consumer support of healthy vending policies in a collegiate setting to vending providers and to public and private entities considering the implementation of such policies.

### Keywords

Health Promotion; Food Dispensers, Automatic; Cross-sectional Community Surveys; Health Knowledge, Attitudes, Practice

### Introduction

The health of a community is shaped by its nutrition environment. Vending machines—which are often the main food source for some places such as work environments and recreation centers—typically sell items of poor nutritional quality that tend to be high in sugar, fat, salt, and overall calories (Byrd-Bredbenner et al., 2012; Public Health Law Center,

2014). Even locations with alternative onsite options, such as hospitals or college campuses, which typically have cafeterias, markets, or quick-service food locations, also remain equipped with vending machines, because the alternatives are not always open, quick, or easily accessible. Healthy vending policies are often implemented to improve nutrition environments by increasing access to healthy food and beverage options by stocking items that meet specified nutrition standards. However, these policies are not widely adopted due to financial concerns (Wilbur, et al., 1981).

Marketing strategies utilized to help increase sales of foods and beverages in vending machines are commonly referred to as the “4 Ps:” product, promotion, placement, and price (Nemours Health and Prevention Services, 2014). Research shows that using these promotional approaches increases purchases of healthier options and does not adversely impact overall sales (Brown et al., 2014; French et al., 2010; French et al., 2001; Numerous Health and Prevention Prices, 2014).

While many studies have identified support among consumers for having more healthy options available in vending machines, these have been limited to workplaces and secondary schools (Brown et al., 2014; French et al., 2001; Kruger et al., 2017). In recent years, healthy vending research has expanded to include collegiate environments (Brown et al., 2014; Byrd-Bredbenner et al., 2012). Vending sales on post-secondary campuses are a significant source of revenue. It is estimated that in 2012, approximately 6.6% of this \$19.31 billion industry came from post-secondary campuses (Brown et al., 2014). In recent years, healthy vending research has increased including specific applications in collegiate environments; however, the quantity of relevant and recent literature is still quite small and significant gaps exist in the research. One study confirmed that campus vending machines offered few healthy choices, while another involved a 2011 nutrition intervention in which stickers and posters were used to advertise a “traffic light” system at five high-traffic vending machines on a university campus (Brown et al., 2014; Numerous Health and Prevention Services, n.d.). Researchers found small decreases in the sales of unhealthy and moderately healthy items, and a statistically significant increase in the sales of healthy items (Brown et al., 2014). Even with this slight expansion in research, literature understanding opinions and reason behind purchasing behaviors is still scarce.

To build the literature in the area of purchasing

behaviors, the current study was influenced by the Theories of Planned Behavior and Reasoned Action (TPB, TRA). While there is limited research looking at TPB and TRA related to vending machine use, there have been some studies looking at the application of these theories to nutrition knowledge, overall food choice, and consumption (Ajzen et al., 1980). According to this model, more positive attitudes and subjective norms towards healthy eating, and greater perceived control strengthens the individual's intention to select healthier food choices when at vending machines. The purpose of this study was to assess the current attitudes about healthy vending and vending behaviors at a university to provide evidence to assist vending machine operators in determining the potential profitability of increasing the availability of healthy options.

### Methods

In collaboration with the Southern Nevada Health District staff in the Office of Chronic Disease Prevention and Health Promotion, the Nevada Institute for Children's Research & Policy developed an 18-item survey, based on a review of related literature, to assess the role of vending machines in food environments (3 questions), opinions and perceptions related to healthy vending (5 questions), current vending purchasing behavior (5 questions), factors affecting vending item selection (1 question), and basic demographics (4 questions).

Trained research assistants administered surveys in-person, on the campus of a large, urban, public university. The intercept survey method was chosen to capture data from a large number of participants in a short amount of time, providing the ideal platform to combine convenience and randomized sampling approaches (Flint et al., 2016). Data collection was completed at various high-traffic campus locations. To ensure representation of faculty and staff members, survey administrators also visited office and classroom buildings on campus. As an incentive to complete the survey, respondents were offered a snack that met healthy vending guidelines. Survey respondents were able to skip any questions they could not or did not wish to answer and still receive the incentive upon submitting the survey. While original data collection was deemed exempt, secondary data analysis of evaluation findings was reviewed and also exempted by the Institutional Review Board at the University of Nevada, Las Vegas. Chi-square tests were conducted to determine if there were statistically significant differences between age categories (under 24 and 24 and older), and between vending machine users and non-users.

### Results

A total of 475 surveys were collected from individuals 18 years or older. Descriptive analyses were conducted for each survey question. The majority of respondents (66.1%) were 18-21 years old, and 72.2 percent were students. Also, a majority of respondents (73.5%) indicated using vending machines, of which, 60.9 percent purchase both food and beverage items. Among vending machine users, purchasing behaviors appear similar, regardless of age. Most of these respondents purchase from vending machines at school (75.8%) while 31.4 percent make purchases at work; this difference is expected since most respondents reported being students. Almost all (93.3%) vending machine users purchase items infrequently; 69.3 percent make less than one purchase per week while 24.0 percent make 1-2 weekly purchases. Only 6.7 percent of users make an average of 3 or more weekly vending purchases. A number of factors affect how buyers select items they want to purchase from vending machines. Item price was a key consideration for 94.9 percent of respondents. Those under 24 (4.4%), were more likely than those 24 and over (10.5%) to consider financial reasons to be very important, particularly getting the best value for their money (4.4%),  $\chi^2(3, N = 430) = 9.69, p < .05$ . Only 26.5 percent of respondents reported that they did not use vending machines (non-users). The top three reasons for non-use were high item prices (58.0%), dislike of available options (46.4%), and minimal availability of healthy items (43.8%).

Among all respondents, there is significant support for the idea that vending machines can and should play a role in the creation of healthy environments by offering healthier food and beverage options. Interestingly, those who use vending machines (84.4%), were more likely to hold that opinion over non-users (70.4%),  $\chi^2(2, N = 471) = 14.46, p < .05$ . Users (55.1%) were also more likely to make a purchase if more healthy items were available in machines versus non-users (44.7%),  $\chi^2(3, N = 466) = 8.22, p < .05$ . Indeed, adding more healthy food and beverage options would help to increase the appeal of vending machine use, as non-users (14.4%) were 2.1 times more likely than users (6.7%) to describe current options as "only unhealthy,"  $\chi^2(4, N = 469) = 22.86, p < .05$ . There does not appear to be significant differences between respondents based on age for any of the opinion items.

**Table 1.** Factors Affecting Vending Item Selection & Opinions about Health Vending

<b>IMPORTANCE OF:</b>	<b>VERY</b>	<b>SOMEWHAT</b>	<b>NOT AT ALL</b>			
<b>Hunger (n=314)</b>	66.2%	31.8%	1.9%			
<b>Item Price (n=317)</b>	53.6%	41.3%	5.0%			
<b>Best Value for Money (n=315) <sup>+</sup></b>	56.2%	36.2%	7.6%			
<b>Buying “Usual” Snack (n=313)</b>	34.8%	50.2%	15.0%			
<b>How “Healthy” an Item Is (n=317)</b>	18.0%	61.5%	20.5%			
<b>Item’s Nutritional Content (n=314)</b>	22.6%	55.7%	21.7%			
<b>Watching Weight (n=315)</b>	20.6%	40.0%	39.4%			
<b>AGREES THAT:</b>	<b>YES</b>	<b>NO</b>	<b>UNSURE</b>			
<b>Vending Machines Can be Part of Healthy Environment (n=474) *</b>	80.8%	8.0%	11.2%			
<b>Healthier Options can Help Improve Overall Health of Environment (n=474)</b>	82.9%	7.2%	9.9%			
<b>Vending Machines <u>Should</u> have Healthier Food/Beverage Options (n=474)</b>	85.9%	4.9%	9.3%			
<b>Like to see Healthier Food/Beverage Options in Vending Machines (n=471)</b>	88.1%	3.2%	8.7%			
<b>More Likely to Purchase Healthier Food/Beverage Options if Available (n=469) *</b>	52.7%	10.2%	37.1%			
<b>BELIEVES THAT:</b>	<b>Mostly Healthy</b>	<b>Some Healthy</b>	<b>Mostly Unhealthy</b>	<b>Only Unhealthy</b>	<b>Unsure</b>	
<b>Current Food/Beverage Options Available in Vending Machines (n=471) *</b>	1.5%	29.5%	54.6%	8.7%	5.7%	
<b>BELIEVES THAT:</b>	<b>All</b>	<b>More than Half</b>	<b>About Half</b>	<b>Less than Half</b>	<b>None</b>	<b>Unsure</b>
<b>% Vending Machine Items that Should meet Guidelines (n=469)</b>	7.7%	42.4%	39.4%	7.9%	1.1%	1.5%

\* Significant difference found between users and non-users ( $p < 0.05$ ).

+ Significant difference found between those under 24 and those 24 and older ( $p < 0.05$ ).

## Discussion

This study found overwhelming support among respondents for healthy vending policies, with over 80 percent (regardless of current vending use status) believing that vending machines can be part of a healthy environment, could help improve the overall health of environments if more healthy options were available, and should carry healthier items in order to achieve this.

Respondents perceive most current vending options to be unhealthy and report widespread support for increasing the availability of healthy options in vending machines. Given that nutritional considerations did influence item selection among users, it may be beneficial for vending operators to offer healthier items to potentially increase usage rates. Other factors, particularly hunger level and cost, are more important to most consumers than being able to buy their habitual item. These findings are consistent with previous research which found that food selections in similar populations were most influenced by hunger and convenience<sup>9</sup> and that availability of healthier items was much more impactful than marketing or informational materials (Wilbur et al., 1981).

There are some limitations regarding this research. Relying on self-reported data may result in limitations based on respondent biases or inaccurate reporting. Also, the survey was only available in English, potentially excluding some community members. For every individual who completed the survey, approximately two other people were approached by the research team and declined to participate. There may be fundamental differences in opinions and behavior between those who chose to complete the survey versus those who declined. Although data were collected on a college campus, the university has a diverse student and faculty population, with students predominantly operating as commuters that indicated purchasing behavior in locations off campus. Therefore, it is possible that results could be applicable away from the university setting.

## Implications for Research and Practice

This study provides valuable context for wider community behaviors related to vending machine use and opinions regarding healthy vending policies. These results are consistent with previous studies on healthy vending policies, demonstrating the benefits of healthier vending machine items for both vending operators and consumers (Brown et al., 2014; French et al., 2010; French et al., 2001; Kruger et al., 2007). The changes needed to implement healthy vending initiatives successfully are often simple and

affordable. Previous efforts to implement these strategies in similar environments have proven to increase the sales of healthier items and overall revenue, encouraging these strategies as mutually beneficial for both suppliers and consumers (French et al., 2001). These findings help demonstrate to vending providers and those considering healthy vending policies that strong support exists for healthy vending programs among consumers and non-users looking for healthier alternatives.

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