

College Cafeteria Signage Increases Water Intake but Water Position on the Soda Dispenser Encourages More Soda Consumption

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ABSTRACT

Objectives: To evaluate the effects of improved water location visibility and water dispenser position on the soda dispenser on undergraduate students' beverage choices.

Methods: Two focus groups with pilot intervention surveys before and after, adding a small sign above the soda dispensers' water button for 6 weeks in a large US university's all-you-can-eat, prepaid dining hall (measured with chi-square tests and logistic and ordinal logistic regression).

Results: Focus groups included 15 students. Survey participants included 357 students before and 301 after the intervention. After the intervention, more students reported ever having drunk water with the meal (66.4% to 77.0%; $P = .003$) and water consumption frequency increased ($P = .005$). Postintervention, the odds of drinking water increased by 1.57. Preference for other drinks was the main reason for not drinking water. A total of 59% of students had ever changed their preference from water to soda.

Conclusions and Implications: The clear indication of the water's location increased students' reported water consumption. Further investigation is needed into how a non-independent water dispenser influences students' beverage choice. Clearly labeled, independent water dispensers are recommended.

Key Words: water, sugar-sweetened beverages, soda, college students, cafeteria (*J Nutr Educ Behav.* 2017; ■:1-8.)

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INTRODUCTION

Consumption of sugar-sweetened beverages (SSB) is linked to increased prevalence of obesity, diabetes, cardiovascular diseases, and dental erosion worldwide.^{1,2} As a result, public health and health care practitioners promote the consumption of water and healthful beverages over SSB. Previous water promotion research, mostly focused on children and adolescents,

showed that availability of water stations and education³⁻⁷ in schools increased water consumption and decreased body mass index (BMI)⁴ or risk for becoming overweight.^{4,7}

A closer examination of older, college students' water and SSB consumption habits is crucial because healthy habits developed while transitioning out of high school are likely to be sustained later in life.^{8,9} In 2012, 41% of 18- to 24-year-olds were en-

rolled in college.¹⁰ College students (especially freshmen) are particularly at risk for gaining weight,¹¹ and their food purchases throughout each semester become less healthy with each passing week.¹²

Campus cafeterias are of critical interest. Almost 1.5 million students purchased a meal plan from 395 post-secondary institutions reporting data in 2015–2016 (National Association of College and University Food Services, unpublished data, 2016). Environment influences choice of both food and drink.^{13,14} The price of beverages, taste, and knowledge about the importance of health especially affect students' drink choices,^{15,16} particularly in the case of individual beverages not provided by fountains.¹⁷ Thus, it is important to assess the environmental factors encouraging college students to consume soft drinks over water in campus dining halls.

Many universities rely on all-you-can-eat/drink prepaid dining halls that have been shown to accentuate the severity of weight gain within freshmen populations.¹¹ In these cafeterias, no financial incentive

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pressures students to consume one drink over another. Although several studies analyzed college students' reasons for buying specific beverages, few studies^{15,16} investigated how students' beverage decisions were affected by a college cafeteria's physical environment (beverage locations and ease of obtaining certain beverages).

This intervention was based on the smarter lunchroom movement in high schools, which helped nudge students toward healthier food and drink choices through low-cost environment interventions.¹⁸ Those approaches have not been studied in college cafeterias, and particularly not in all-you-can-eat/drink, prepaid buffets. This study aimed to determine whether adding a sign designating the cafeteria's water location would increase students' self-reported water consumption. Secondary questions were why students do not drink water and whether students perceived the placement of the water on the soda dispenser as influencing their beverage choice.

METHODS

The study design included 2 focus groups and a pilot intervention with a survey completed before and after the intervention. Participants were undergraduate students from a large Midwestern university eating at the cafeteria on the day of the study.

Beverage Environment and Intervention

The study was conducted in an on-campus university cafeteria, solely providing an all-you-can-eat/drink, prepaid buffet and serving over 7,000 meals/d to guests and students, predominantly freshmen students living in the university residence halls.

In the cafeteria, cold water dispensers were part of the soda dispensers (Figure). The water buttons were labeled Agua or left blank. The pipe delivering water could also release an SSB, depending on the choice of beverage. This setting is common across many US fast-food restaurants and college cafeterias. The beverages available on the SSB dispenser were soda (including 2 diet flavors) and sport drinks. The hot water dispenser was not independent: a finger-

sized handle was attached to the coffee and hot chocolate dispenser.

This intervention was part of a number of small environmental changes in the cafeteria meant to nudge students toward healthier food choices (fruit in attractive bowls, half-sized desserts, and signage encouraging vegetable consumption). The water intervention consisted of a water sign taped to the cafeteria's 2 soda dispensers and 2 coffee dispensers (Figure).

Data Collection

Two evening focus groups were held 1 month after the cafeteria's fall semester opening and 5 weeks before the intervention. Students were recruited by research assistants seated outside the dining hall entrance and offered \$15 as compensation. Two different groups were asked open-ended questions about suggestions and satisfaction with the dining hall services and food. No specific questions about water or beverages were included. Focus group scripts were developed through a collaborative process between the research team and cafeteria stakeholders. An experienced qualitative researcher assisted in developing questions, facilitating focus groups, and coding data. Qualitative descriptive analysis¹⁹ was used and coding was based on editing analysis style²⁰ using inductive codes derived from the text. Two investigators independently reviewed all recordings and notes, identified any passage related to beverages, coded the beverage passages, and used an iterative process to compare results until agreement was reached. Then themes were summarized.

Before and after the intervention, students completed an anonymous survey. The surveys were conducted 9 weeks apart in late September and early December, 2014. Students were recruited at a table near the cafeteria entrance; the incentive for each survey round was a \$50 raffle. The intervention began in mid-October. Based on a 2-sample, 1-sided comparison of proportions, with 80% power to detect a 0.10 difference between groups, the researchers estimated the need for 268 respondents in each group (version 12.1, Stata, StataCorp, College Station, TX, 2011), and thus aimed for 300 respondents.

The pre-post surveys asked participants whether they consumed water and, in case of a positive answer, the frequency of consumption. Participants were also asked whether they knew the water dispensers' location. Participants selected reasons for their lack of water consumption. Finally, a question in the post-survey assessed how frequently students changed their mind from preferring water to soft drinks when standing in front of the soda fountain (Table 1). Survey questions were pilot-tested with undergraduate students to gauge an understanding of the questions. Likert scale answers were patterned after standard validated Likert answer choices.^{21,22}

Institutional review board approval was received from the University of Iowa. Documentation of consent was waived for the focus groups and surveys. Each participant received a letter with the elements of consent. Focus group participants gave verbal consent, and survey completion was considered consent to participate.

Data Analysis

Student responses were anonymous and therefore could not be linked across surveys. Pre-post samples were assumed to be independent because the data collected represented 5% of meals served in a single day and data were collected 9 weeks apart. It was thus unlikely that the same person participated in both surveys. Categorical variables were summarized by count (percentage). Pearson chi-square goodness of fit test by survey time point (pre- vs postintervention), gender, and freshman status (freshman vs other undergraduates) was reported. If the expected cell count did not exceed 5, as required by chi-square test assumptions, Fisher exact test was reported. Gender comparisons were conducted among students identifying as male or female (the group designated as other was too small). Results were robust in nonparametric sensitivity analyses.

The researchers used logistic regression to predict a student's log odds of drinking water. Both an unadjusted, bivariate model with survey point as an independent variable and a model adjusting for gender, freshman status, and knowing the water dispenser's

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