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AWARENESS AND OPINIONS ABOUT SUGAR-SWEETENED BEVERAGE POLICY IN A
UNIVERSITY SETTING

by

Helaina Thompson

A thesis submitted in partial fulfillment of the
requirements for the Master of Science
degree in Health and Human Physiology
in the Graduate College of
The University of Iowa

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Thesis Supervisor: Associate Professor Lucas Carr

ABSTRACT

The purpose of this study was to explore awareness and opinions about sugar-sweetened beverage policy—specifically pouring rights contracts—on a university campus. Participants were 915 students, staff, and faculty currently studying or under employment at the University of Iowa. Participants completed an online survey. Nearly two-thirds (64.2%) of participants reported not being aware of pouring rights prior to completing the survey. Over one-third (38.0%) of participants reported they agreed with universities engaging in pouring rights contracts, while 30.9% of participants neither agreed or disagreed, and 31.0% disagreed with universities engaging in pouring rights contracts. Respondents who identified as male, undergraduate students, and those who agreed that individuals are responsible for their own sugar-sweetened beverage consumption were more likely to support engaging in pouring rights contracts. Understanding awareness, support, and determinants of support for pouring rights contracts is important for those involved in establishing policies targeting sugar-sweetened beverage availability on college campuses.

PUBLIC ABSTRACT

The purpose of this study was to explore awareness and opinions about sugar-sweetened beverage policy—specifically pouring rights contracts—on a university campus. Pouring rights contracts are agreements between schools and beverage companies that involve large payments to schools in exchange for exclusive beverage marketing and sales rights on college campuses.

Participants in this study were students, staff, and faculty currently studying or under employment at the University of Iowa who completed an online survey. Nearly two-thirds of participants reported not being aware of pouring rights prior to completing the survey. Over one-third (38.0%) of participants reported they agreed with universities engaging in pouring rights contracts, but there was no simple majority support for pouring rights contracts among participants. Respondents who identified as male, undergraduate students, and those who agreed that individuals are responsible for their own sugar-sweetened beverage consumption were more likely to support pouring rights contracts. Understanding awareness, support, and determinants of support for pouring rights contracts is important for those involved in establishing policies targeting sugar-sweetened beverage availability on college campuses.

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CHAPTER 1: INTRODUCTION

Commercialization and availability of sugar-sweetened beverages has been shown to encourage sugar-sweetened beverage (SSB) consumption (Hattersley, Irwin, King, & Allman-Farinelli, 2009; Institute of Medicine, 2006; Scully et al., 2017). SSBs, which include soft drinks, fruit drinks, sweetened coffees and teas, and sports and energy drinks, are the leading source of added sugar in the American diet. The Dietary Guidelines recommend that a maximum of 10 percent of one's daily calories comes from added sugars. In the United States, all age groups exceed this recommended amount, and compared to other age groups, adolescents and young adults consume the greatest percentage of their calories from added sugars (United States Department of Health and Human Services [USDHHS] & United States Department of Agriculture [USDA], 2015). In line with growing evidence that high added sugar intake is positively associated with increased risk of obesity, type 2 diabetes, and cardiovascular disease, policies and recommendations limiting sugar-sweetened beverages are being increasingly considered and debated in the United States (Hu, 2013; Yang et al., 2014). Therefore, it is important to identify factors that contribute to SSB intake and solutions with potential to limit intake.

More than 40% of 18-24 year olds, or about 31 million young adults, are enrolled in a college or university in the United States (National Center for Education Statistics, 2018). In an effort to reach this large and captive audience, beverage companies—most notably Coca-Cola and Pepsi—have a history of pursuing pouring rights contracts with universities that involve large payments to schools in exchange for exclusive marketing and sales on campus (Almeling, 2003; Nestle, 2000). Critics of these contracts argue these companies target individuals in “emerging adulthood,” a life stage typically defined as 18-25 years of age, because it is a highly malleable period of time for establishing dietary patterns (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Proponents argue that when faced with tight budgets, pouring rights contracts offer schools significant financial support, however, critics say they contradict the health promotion mission of universities (Almeling, 2003).

A number of studies have explored attitudes toward SSB availability, marketing, and pouring rights contracts in elementary, middle, and high schools, through surveys and focus groups completed

with parents and school officials. Collectively, studies have found general support for removing SSB marketing in schools, but low familiarity with pouring rights contracts among parents (French, Story, & Fulkerson, 2002; Hendel-Paterson, French, & Story, 2004; Kubik, Lytle, & Story, 2005). Few studies have assessed attitudes toward pouring rights contracts in university settings and/or among college students. A group in Australia recently examined this topic among a sample of 913 college students and university staff, 53.8% belonging to a health science discipline. They found that the majority of participants (69%) were in favor of removing SSB sponsorships and promotions on campus. The authors suggested that overrepresentation of individuals in the health sciences discipline may have skewed the results in favor of regulating sugar-sweetened beverages (Howse, Freeman, Wu, & Rooney, 2017). To our knowledge, no such studies have been conducted in the United States.

Aims

Universities are important settings for exploring health policy and promotion, as they are often home to community health initiatives and research hospitals, as well as a concentration of many young individuals in the “emerging adulthood” age group. The aims of the study are to 1) explore awareness of pouring rights contracts among university stakeholders, 2) explore support for pouring rights contracts among university stakeholders, 3) understand determinants of support for pouring rights contracts among university stakeholders. Findings of the proposed study could inform the debate regarding the appropriateness of pouring rights contracts shared between beverage companies and institutions of higher education.

CHAPTER 2: LITERATURE REVIEW

Sugar-sweetened beverages (SSBs) are defined by the Dietary Guidelines as “liquids that are sweetened with various forms of added sugars.” They include regular (not sugar-free or “diet”) soda, sports drinks, energy drinks, fruit drinks that are less than 100% juice, sweetened waters, and sweetened coffees and teas (USDHHS & USDA, 2015). SSBs are the leading source of added sugar in the American diet; a 12-ounce serving contains 35 to 37.5 grams of sugar and 140 to 150 calories on average (Malik, Popkin, Bray, Després, & Hu, 2010). The Dietary Guidelines recommends that a maximum of 10 percent of one’s daily calories comes from added sugars, and that an individual’s SSB consumption fits within that amount (USDHHS & USDA, 2015).

Frequent (or daily) SSB intake has been associated with an increased risk of several chronic diseases. In a systematic review conducted by the World Health Organization of 30 randomized controlled trials and 38 prospective cohort studies, increased consumption of SSBs was found to result in a significant increase in body weight and risk for obesity (Te Morenga, Mallard, & Mann, 2013). A meta-analysis of eight prospective cohort studies found that individuals with high SSB intake were 26% more likely to develop type-2 diabetes when compared to individuals who drank no or less than one SSB per month. High SSB intake has also been associated with an increased risk of cardiovascular disease. Individuals who drank more than one SSB per day had a 22% greater incidence of hypertension when compared to non-consumers in the Framingham offspring study. Women who drank more than four SSBs per day had a greater risk of hypertension when compared to non- and infrequent SSB consumers (44% and 28%, respectively) in the Nurses’ Health Studies I and II (Hu, 2013). Higher SSB intake has also been associated with increased risk of chronic kidney disease and non-alcoholic fatty liver disease (Cheungpasitporn et al., 2014; Wijarnpreecha, Thongprayoon, Edmonds, & Cheungpasitporn, 2016). Importantly, recent research has found SSB intake negatively impacts cognitive function and brain health (Anjum, Jaffery, Fayyaz, Wajid, & Ans, 2018). Burger (2017) found that regular SSB consumption decreased neural response during SSB intake and increased emotional stimuli while looking at a SSB logo.

Biological mechanisms responsible for the relationship between SSB intake and the increased risk for obesity and other chronic diseases include increased glucose intolerance, progression of insulin resistance, and increased leptin concentrations (Malik, et al., 2010; Ma, et al., 2016; Lana, Rodríguez-Artalejo, & Lopez-Garcia, 2014). Some studies also suggest that frequent SSB consumption does not suppress intake of solid food, leading to greater overall caloric intake and resulting in weight gain (Malik et al., 2010). Conversely, there is compelling evidence that reducing added sugars and SSB intake decreases weight gain in both adults and adolescents, which may reduce the risk of obesity and obesity-related diseases (Hu, 2013).

Overall, SSB consumption among children and adults in the United States has declined from 2003 to 2014, possibly due to increased awareness and discussion of the relationships between SSBs and obesity (Bleich et al., 2017). Residents of Iowa, however, report relatively high levels of SSB intake compared to other states in the United States. In 2013, 52.5% of Iowans ages 18 to 24 drank one or more SSB per day, compared to 43.4% nationally. Young adults ages 18 to 24 had the highest SSB intake compared to all other adult age groups (Park, Xu, Town, & Blanck, 2016).

Young adulthood is a critical time period for establishing diet patterns and adopting lasting health behaviors. During this life stage, individuals experience greater freedom in decision-making and self-identity development, including how one chooses to practice diet behaviors. Marketing campaigns have historically targeted the young adult age group for this reason (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008).

More than 40% of 18 to 24 year olds, or about 31 million young adults, are enrolled in a college or university in the United States, making institutions of higher education sought-after environments for beverage companies to sell SSBs (National Center for Education Statistics, 2018). Pouring rights contracts may be one reason why SSB consumption is higher among young adults. These agreements involve large payments to schools in exchange for exclusive marketing and sales rights on college campuses. While it is difficult to say exactly how many colleges and universities have pouring rights contracts, it is known that beverage companies regularly enter into pouring rights contracts with

universities and colleges. The University of Iowa has an existing contract with the Coca-Cola beverage company (Beverage Vending, Fountain Syrup, and Food Vending Agreement, 2008). Details of the contract stipulate the following:

- Coca-Cola has the right to place vending machines across campus and within University of Iowa Hospitals and Clinics. Currently, over 100 vending machines are in place.
- All fountain units on campus contain Coca-Cola products and Coca-Cola receives at least 65% of shelf space in campus convenience (“C”) stores.
- The University of Iowa “will use its reasonable efforts to maximize the sale and distribution of [Coca-Cola products].”
- The University of Iowa cannot promote products that compete with Coca-Cola products beyond point-of-sale advertising.
- Coca-Cola has the right to use the university’s name, logos, and trademarks on promotional materials and to designate itself as a “sponsor” of the university.
- In return, Coca-Cola pays The University of Iowa \$735,000 per year and \$25,000 per year in Student Activity Fund funding. The University of Iowa also receives a share of Coca-Cola commissions, which has been estimated at nearly \$3 million in the past ten years, and a growth fund, which has been estimated at nearly \$1 million in the past ten years.

Studies have found the school food environment to be an influence on the food and beverage intake patterns of young people (Mâsse, de Niet-Fitzgerald, Watts, Naylor, & Saewyc, 2014; Park, Sappenfield, Huang, Sherry, & Bensyl, 2010; Shi, 2010). In a survey of 4,322 Florida students in grades six through eight, Park et. al found that the greatest risk factor for purchasing foods and beverages from vending machines instead of buying school lunch was availability of vending machines in schools, increasing the likelihood by 3.5 times (2010). Perceiving SSBs as “convenient to buy” was a factor linked with higher SSB consumption in a study of 7,835 Australian secondary school students aged 12 to 17 years old (Scully et al., 2017). In another qualitative study involving Australian undergraduate students, availability and marketing of soft drinks cued students to consume SSBs: “But it’s like everything around

us in society, it's like promoting this sugary drink thing" (Hattersley, Irwin, King, & Allman-Farinelli, 2009, p. 1818).

Policies to reduce SSB consumption have seen somewhat limited levels of public support. SSB-related policies include taxes on SSBs, portion size restrictions, adding front-of-package nutrition labels, regulating marketing to children, and removing SSBs from school environments (Gollust, Barry, & Niederdeppe, 2014). Beliefs that individuals are largely responsible for their diets are negatively associated with support for upstream public policies aimed at reducing obesity risk (Niederdeppe, Shapiro, & Porticella, 2011). By contrast, beliefs that external, societal factors cause obesity are associated with greater support for such policies. Gollust, Barry, and Niederdeppe (2014) found 61.5% of 1,319 U.S. adults surveyed supported policies removing SSBs from schools. The authors noted that majority public opinion is an important factor in feasibility of policies to reduce SSB consumption.

In 2014, the Healthy Hunger-Free Kids Act was implemented in primary and secondary schools, which introduced competitive foods standards, including strict SSB restrictions, in schools that receive federal meal funding (Micha, 2018). The most recent data brief from the National Health and Nutrition Examination Survey concerning SSB consumption among U.S. youth does not include years following 2014. Prior to the implementation of the Healthy Hunger-Free Kids Act, studies exploring attitudes toward SSB availability and marketing in the school environment were conducted in secondary schools. In a cross-sectional survey of 350 parents and 490 teachers of middle school students from 16 schools in metropolitan Minnesota, nearly half (46%) of parents believed schools should not allow advertising for food and soft drinks, while 18% of parents were uncertain. 62% of parents felt soft drinks and candy should not be available for purchase at school. Among teachers, 63% believed schools should not allow advertising for food and soft drinks, and more than two-thirds (69%) of teachers felt soft drinks and candy should not be available for purchase at school (Kubik, Lytle, & Story, 2005). A study by French, Story, Fulkerson, (2002) found that of 336 Minnesota school principals, 64% believed students should only be provided healthy food choices at school.

In a 2012 study, 49.5% of middle school students and 69.8% of high school students nationwide attended schools with beverage contracts (Terry-McElrath, Turner, Sandoval, Johnston, & Chaloupka, 2014). To our knowledge, prevalence of such contracts among colleges and universities has not been reported, but the practice is considered widespread (Cecil, 2017).

Little is known regarding attitudes and opinions of formalized pouring rights contracts in general, especially in the United States. To explore parental attitudes toward soft drink vending machines in high schools, Hendel-Paterson, French, and Story (2004) grouped 33 parents of high school students at three Minneapolis-area schools into six focus groups. In their qualitative study, the authors noted that most parents had little awareness about the nature of SSB vending in schools or of the contracts schools held with beverage companies. Parents thought that vending machines were a way for schools to make money, and they felt that “if their child were going to drink a soft drink anyway,” they would rather see schools profit instead of gas stations or supermarkets. Nevertheless, parents agreed that if SSBs were not available in schools, students would drink something else, or nothing at all.

Opinions and attitudes of 913 university students and staff about university SSB regulation were assessed in a 2018 Australian mixed-methods study. An online survey was administered consisting of quantitative questions about SSB consumption and level of support for campus availability of SSBs, as well as open-ended qualitative questions. Respondents were categorized by age. While 69% of all respondents were in favor of removing SSB sponsorship and promotions from campus, younger respondents (less than 30 years old) tended to be less supportive (61.3% in favor) than older respondents (77% in favor). In general, SSB consumption among respondents was low, and knowledge of the risks of SSB consumption was high, however, the authors point out that health science students were oversampled in the studied population and thus the findings may not be representative of all students. Open-ended responses highlighted respondents’ desire for autonomy in choosing what to drink: “I think people have the right to make their own choices (even if they’re not always good ones)” (Howse, Freeman, Wu, & Rooney, 2017, p. 5).

No studies have explored the attitudes and opinions of pouring rights contracts among U.S. college students, although some universities are dropping their contracts with beverage companies in response to student backlash (Cecil, 2017). In 2015, the University of California, San Francisco removed all SSB sales from its campus following student protests. The university said it has seen a significant reduction in soft drink consumption among its employees since introducing the SSB sales ban (O'Connor, 2016).

Significance

Young adults have the highest SSB intake compared to all other adult age groups. High SSB intake is associated with an increased risk for a number of chronic diseases as well as impaired cognitive function. Pouring rights contracts encourage SSB availability and consumption among college students. Given the negative health outcomes associated with SSBs, pouring contracts that promote their sales and consumption are in direct conflict with the health mission of universities. While such contracts are common among colleges and universities in the United States, little is known regarding the attitudes and opinions of key university stakeholders (e.g., students, faculty, and staff). The results of this study may be used to inform campus health promotion efforts aimed at advancing the health and wellness of students, faculty and staff. The results may also inform campus finance departments of the wishes of university stakeholders regarding campus sales and promotion of SSBs. Although attitudes toward campus SSB availability and marketing may not prove significant enough to incite policy change, understanding the determinants of support for and against campus SSB policies is important (Niederdeppe, Shapiro, & Porticella, 2011).

Innovation

The majority of studies exploring attitudes toward SSB availability, marketing, and consumption in school environments have been carried out in secondary schools or in other countries, underscoring the current need to explore this topic among colleges and universities within the United States. Furthermore, many existing studies of the topic at hand have explored the attitudes of parents and teachers; few have

surveyed students themselves. One study to our knowledge has surveyed students about their opinions and attitudes toward SSB regulation in an Australian university setting. As researchers at the University of Iowa, we are well-positioned to address the topic of SSB promotion in a university setting within the United States. It is possible that the results of this study will challenge the paradigm that students and faculty desire SSBs and pouring rights contracts on their campuses.

CHAPTER 3: HYPOTHESES AND RESEARCH QUESTIONS

Hypotheses

H1. We hypothesize the majority of students and faculty/staff will be unfamiliar with the existence of pouring rights contracts.

H2. We hypothesize the majority of students and faculty/staff will support engaging in pouring rights contracts.

H3. We hypothesize students and faculty/staff who believe in the negative health impacts of SSB consumption will be more supportive of SSB regulations on campus, including discontinuation of pouring rights contracts, compared to those who do not.

H4. We hypothesize students and faculty/staff who believe that environments and policies are responsible for SSB consumption will be more supportive of SSB regulations on campus, compared to those who do not.

H5. We hypothesize students and faculty/staff who consume more SSBs will be less supportive of SSB regulations on campus, compared to those who consume fewer SSBs.

Research Questions

RQ1. What percentage of university students and faculty/staff is aware of the existence of pouring rights contracts?

RQ2. What percentage of university students and faculty/staff supports engaging in pouring rights contracts?

RQ3. What are the determinants of support for pouring rights contracts among university students and faculty/staff?

CHAPTER 4: METHODS

Participants and Setting

We recruited undergraduate students, graduate students, faculty, and staff currently attending or under employment at the University of Iowa between 18 and 85 years of age. These participants represented the voices of key stakeholders exposed to campus beverage policies. Participants were recruited through a single mass email sent to all students, faculty, and staff. A total of 48, 229 emails were sent. Within the email, participants were asked to complete a survey containing demographic questions, a beverage intake questionnaire, and questions regarding attitudes and opinions towards beverage policies and pouring rights contracts. Participants of all races, ethnicities, and sexes were included. Participants were given the option to enter a drawing to receive one of ten \$50 Amazon gift cards as an incentive to participate. Experimental protocols were approved by the Human Subjects Institutional Review Board and voluntary written consent was obtained from each participant.

Data was collected over a two-week period in March and April of 2019. A total of 1,156 survey responses were received, resulting in a 2.4% response rate. A total of 241 responses were not included in the final analyses for reasons of: participant did not consent (N=13), participant completed the survey in under 149 seconds (the length of the informational video described below) (N=42), participant answered a comprehension question about the video incorrectly or did not provide an answer (N=94), and/or participant left survey questions blank (N=92). A total of 915 survey responses were included in the final analysis.

Protocol and Measures

Participants were asked to complete the online survey via Qualtrics. First, the survey asked about general demographics, such as age, sex, and level of education, as well as participants' roles and disciplines within the university and whether or not they had taken a college-level nutrition course. Participants' typical beverage consumption habits were measured with the Beverage Intake Questionnaire (BIQ), which has been found to be a valid and reliable tool of dietary assessment. Comparing the BIQ

with traditional food intake records yielded a correlation of .59 ($P < .001$) when calculating energy consumed from SSBs. The BIQ categorizes beverages by type (for example, 100% juice drinks, regular soda, diet soda, etc.) and amount (in fluid ounces or cups) and asks participants to report frequency of consumption (Hedrick, Comber, Estabrooks, Savla, & Davy, 2010). We modified the questionnaire to include smaller amounts ('2 fl oz' and '4 fl oz'). Average daily number of kilocalories consumed from SSBs was calculated for each participant according to the BIQ scoring instructions, and each participant was then classified as above (>145 kilocalories) or below (<145 kilocalories) the average amount of SSB kilocalories consumed per day by adults in the U.S. (Rosinger, Herrick, Gahche, & Park, 2017).

Questions regarding personal attitudes related to SSBs were adapted for the current study from a study among Australian students by Howse et al. (2017) as well as from a study about attributions of responsibility for obesity by Niederdeppe, Shapiro, and Porticella (2011). Participants' personal attitudes on the health impacts of SSBs were measured with the following question using a five-point Likert scale: "I believe that consumption of sugar-sweetened beverages (which include soft drinks, sweetened teas and coffees, and sports and energy drinks) increases the risk of ill health." Participants' attitudes towards SSB availability and regulation on campus were measured with a nine-item survey using a five-point Likert scale. Those questions addressed SSB marketing on campus, environmental versus individual responsibility for SSB consumption, and removal of SSBs from campus. The five possible responses for each multiple-choice question were 'Strongly agree', 'Somewhat agree', 'Neither agree nor disagree', 'Somewhat disagree', and 'Strongly Disagree.'

Participants were then presented with a 159 second-long whiteboard animation video describing pouring rights contracts and outlining a list of the pros and cons of such contracts from both economic and health perspectives. The video was created using VideoScribe software by the main investigator of this study and was evaluated for factuality and impartiality by two faculty members in health promotion and one faculty member in mass communication. The content was evidence-based and presented as neutrally as possible. Statements that would likely be interpreted as "anti-" pouring rights accounted for about 32 seconds of the video. Statements that would likely be interpreted as "pro" pouring rights

accounted for about 33 seconds of the video. The video can be viewed at the following link:

https://www.youtube.com/watch?v=1HT_vtWZ-W8. Following the video, participants were asked to answer a question (“True or false? Young adults drink more sugar-sweetened beverages than any other adult age group”) to test their comprehension of the information presented.

Participants awareness of the existence of university pouring rights was measured with a one-item survey with two possible responses to the following yes/no question: “Were you previously aware that this contract exists?” Attitudes towards university pouring rights were measured with a one-item survey of the following question: “I believe universities should agree to pouring rights contracts.” Using a five-point Likert scale, the five possible responses were ‘Strongly agree’, ‘Somewhat agree’, ‘Neither agree nor disagree’, ‘Somewhat disagree’, and ‘Strongly Disagree’.

Finally, participants were presented with two open-ended questions: “In your opinion, what are some arguments in favor of pouring rights contracts between beverage companies and universities?” and “In your opinion, what are some arguments against pouring rights contracts between beverage companies and universities?”

Statistical Analysis

An estimated 23,942 faculty and (non-student) staff were employed at the university at the time of the survey. We estimated a sample size of 379 employees necessary to estimate the true population proportion with a confidence interval of 95% and a margin of error of 5%. An estimated 23,989 undergraduate students and 7,667 graduate and professional students attended the university at the time of the survey. We estimated a sample size of 380 students necessary to estimate the true population proportion with a confidence interval of 95% and a margin of error of 5%.

Pearson’s Chi-square test was used to explore awareness of pouring rights contracts among students and faculty/staff, support for pouring rights contracts among students and faculty/staff, and associations between support for pouring rights contracts and other predictive variables of interest. During analysis, all levels of agreement were re-coded to ‘Agree,’ ‘Neither agree nor disagree’, or ‘Disagree.’

Adjusted residuals were calculated to investigate the magnitude of the differences between observed and expected values for each determinant category, indicating the contribution of each determinant to the significant Chi-square value, with significance at values >2.0 . All statistical analyses were performed using SPSS version 25. Qualitative analysis was carried out to analyze the responses provided from the two open-ended questions. An emergent coding method was used in which two investigators independently identified themes from 100 randomly selected respondents using an inductive approach. They then met to discuss similarities and differences in their interpretations. After reaching consensus, a total of 14 themes were selected. All responses were then coded by the primary investigator, and 11 additional themes were identified during the coding process. Of the 25 total themes identified, 13 themes were classified under “in favor” of pouring rights and 12 themes were classified under “against” pouring rights.

CHAPTER 5: RESULTS

Quantitative Analysis

Descriptive statistics are presented in Table 1 with percentages, means, and standard deviations. More individuals who identified as female (76.3%) participated than those who identified as male (23.2%) or other (.5%). The majority of participants were White (88.0%). A larger proportion of staff and faculty (55.4%) participated compared to students (44.6%). The mean age of participants was 33.5 years (± 14.3 years). On average, participants reported consuming 71.4 (± 134.0) kilocalories per day from SSBs, which is less than the national average of 145 daily kilocalories (Rosinger, Herrick, Gahche, & Park, 2017).

Nearly two-thirds (64.2%) of participants reported not being aware of pouring rights contracts before viewing the video. Faculty/staff were more likely (47.7%, $p < .001$) to report being previously aware of pouring rights contracts than students (21.1%) (see Table 2). Over one-third (38.0%) of participants reported they agreed with universities engaging in pouring rights contracts, while 30.9% of participants neither agreed or disagreed and 31% disagreed with universities engaging in pouring rights contracts. Students were much more likely (41.1%, $p = .032$, adjusted residual=2.5) to agree with pouring rights contracts than faculty/staff (35.3%, adjusted residual=1.9) (see Table 3).

Among university roles, undergraduate students were most likely (45.1%, $p = .019$) to support pouring rights contracts compared to graduate students (31.5%), staff (35.3%), and faculty (35.2%). More individuals who identified as male (46.7%, $p = .031$, adjusted residual=3.0) supported pouring rights contracts than those who identified as female (35.5%, adjusted residual=-2.8). Those who consumed more than the U.S. average amount of daily calories from SSBs were more likely (45.5%, $p = .018$, adjusted residual=2.0) to support pouring rights contracts than those who did not (36.6%, adjusted residual=-2.0). Those who had not taken a college-level nutrition course were more likely (39.7%) to support pouring rights contracts than those who had taken a college-level nutrition course (33.6%), but this finding was not significant ($p = .127$) (see Table 4).

No significant association ($p=.363$) was found between the belief that SSB consumption increases the risk of ill health, which the majority of participants agreed with ($n=852$, 93.1%), and support for pouring rights contracts. No significant association ($p=.761$) was found between the belief that universities should promote the health of students and staff, which the majority of participants ($n=872$, 95.3%) agreed with, and support for pouring rights contracts (see Table 4).

Participants who disagreed with the statement “I believe vending machines and soda fountains on campus encourage sugar-sweetened beverage consumption” were much more likely (48.4%, $p<.001$, adjusted residual=2.9) to support pouring rights contracts than those who agreed with the statement (32.4%, adjusted residual=-4.0), who were in turn much more likely to disagree with pouring rights contracts (39.7%, adjusted residual=6.6). Those who agreed that individuals are responsible for their own SSB consumption were more likely (39.2%, $p=.001$, adjusted residual=3.0) to support pouring rights contracts, while those who disagreed that individuals are responsible for their own SSB consumption were more likely to disagree (55.6%, $p=.001$, adjusted residual=2.8) with pouring rights contracts. Those who disagreed that campus environments and beverage policies are responsible for SSB consumption were much more likely (46.3%, $p<.001$, adjusted residual=5.1) to support pouring rights contracts. Participants who were previously aware of pouring rights contracts were more likely (43.6%, $p=.035$, adjusted residual=-2.6) to support pouring rights contracts than those who were not previously aware (34.9%, adjusted residual=2.6) (see Table 4).

Responses to Open-Ended Questions

A total of 1,499 answers to the open-ended questions were analyzed. Responses were broadly categorized as “in favor of” ($n=759$) or “against” ($n=740$) pouring rights contracts. Themes that consistently emerged are listed below. Each theme listed below was initially identified and agreed upon by both qualitative investigators. All themes identified are listed in Table 5.

Arguments in favor of pouring rights contracts

“Cold hard cash”

Funding emerged most consistently among responses in support of pouring rights contracts (n=497). Many participants (n=154) emphasized scholarships as important uses of the money pouring rights contracts provide higher education institutions: “They help in funding when the university budgets are low and also help funding scholarships. Since I’m on a scholarship, I know how important those are for students.” Furthermore, many participants (n=99) emphasized a current university climate of heightened budget concerns and tuition increases, in which pouring rights contracts provide “a reliable funding stream.”

“Individual responsibility”

A total of 140 participants said individual responsibility was an argument in support of pouring rights contracts. One participant said, “Everyone is responsible for their own health. Vending machines, cafeteria offerings, fountain drinks don’t make people drink more soft drinks, people make those choices.” Some participants said college students are adults, “and with adulthood comes learning to make good decisions.”

“People will get the drinks one way or another”

Many participants (n=69) reported those who consume SSBs will seek them out, regardless of whether or not they are available through campus outlets: “The Iowa City campus has several gas stations, head shops, and restaurants that all offer sugary beverages for consumption. This means to me that if the university gets rid of these contracts, students will still consume these beverages.” This argument was consistently presented in favor of continuing pouring rights contracts, because “the university might as well be getting some benefit from it [SSB consumption].”

Arguments against pouring rights contracts

“Health concerns”

Health concerns related to SSB consumption was the most commonly provided (n=358) argument against pouring rights contracts. One participant said, “Is it ethical to promote an activity that is clearly unhealthy? What kind of message does it send? Should soda be available for free in our cafeterias? Are we setting students up for long term health challenges?”

“Promotion leads to consumption”

Many participants (n=219) said promotion of SSBs through easy access and marketing may lead to increased SSB consumption. This concern was consistently presented as an argument against pouring rights contracts. One participant gave an example of how campus SSB promotion encouraged their own consumption: “I do think people get sugary drinks just for the sake of convenience. One of the only reasons I ever get them is because Flex Meals come with a drink, and all of the drinks (at least at the Burge C-store) are soda or lemonade... I don’t want to waste the food that I technically pay for, so I get the drink and end up drinking it.”

“Pouring rights limit competition”

A total of 116 participants said pouring rights contracts limit beverage choice on campus. A few participants mentioned specific beverages, such as Mountain Dew and Pepsi, that they wished to have access to but did not because of the contract held with Coca-Cola. Some responses (n=37) said pouring rights contracts have a limiting effect on the availability of healthy beverages: “Allowing certain beverage companies to have exclusivity on campus is wrong, especially when their competition may have a healthier product.”

“If we’re going to talk the talk, then we should walk the walk”

Failure to adhere to university missions arose as an argument against pouring rights contracts (n=84). Participants said universities were being “hypocritical” by accepting money from beverage

companies while promoting health research and initiatives. One response concluded, “We are a university with a large healthcare student body and hospital, therefore we should not be supporting an industry that we know is detrimental to people’s health.”

CHAPTER 6: DISCUSSION

To our knowledge, this study is the first in the U.S. to survey university stakeholders about their awareness and opinions about SSB policies and pouring rights on campus. Overall, there was no majority support for engaging in pouring rights contracts, however, the greatest proportion of participants (38.0%) supported pouring rights contracts, compared to those who disagreed with or felt neutral toward pouring rights contracts. Reasons for supporting pouring rights contracts included: funding, individual responsibility, and the belief that “people will get the drinks one way or another.” Reasons for disagreeing with these contracts were related to health concerns, the idea that promotion of SSBs leads to increased consumption, limiting beverage choices on campus, and being in direct conflict with the health-related mission of the university.

Nearly one third of participants were previously aware of pouring rights contracts. This may be due to widespread Coca-Cola marketing that accompanies University of Iowa sporting events (e.g. “Hawkeye Fans, experience the top Fight for Iowa Football Moments with an ice-cold Coca-Cola”) (Iowa Hawkeyes, 2018). The findings of this study are consistent with those of Howse et al. (2017) concerning participant’s beliefs about the health impacts of SSBs—in both studies, nearly all (93.1% and 94.8%, respectively) respondents believed that SSBs are detrimental to health. Furthermore, health concerns emerged as a consistent argument against pouring rights contracts during qualitative analysis. Nevertheless, beliefs about the health impacts of SSBs were not significantly associated with support for or against pouring rights contracts, which refutes our hypothesis, suggesting that education about the health impacts of SSBs may not be an effective intervention strategy alone to change opinions about institutional SSB policy. Our qualitative responses, in which many participants recited negative health impacts of SSBs alongside the benefits of funding provided by pouring rights contracts demonstrated this as well. Furthermore, the study conducted among Australian students by Howse et al. (2017) found similar results: “While results indicated a high level of awareness of the health impacts associated with SSB products, there was some resistance to SSB regulation, particularly environment-centered regulations (p. 7).”

Beliefs about individual and environmental responsibility were strongly associated with support for and against campus pouring rights contracts and further confirmed by significant (>2.0) adjusted residual values. Nearly half of participants who disagreed with the statement “I believe campus environments and university beverage policies are responsible for sugar-sweetened beverage consumption among students and staff” supported pouring rights contracts. Similarly, nearly half of participants who disagreed with the statement “I believe vending machines and soda fountains on campus encourage sugar-sweetened beverage consumption” agreed with pouring rights contracts. Agreement with both statements regarding environmental influences above, as well as disagreement with the individual-centered statement “I believe individuals are responsible for their own sugar-sweetened beverage consumption,” was associated with disagreement with pouring rights contracts. These findings support our hypothesis and are in line with the findings of Niederdeppe, Shapiro, & Porticella (2011), who found that the belief that individuals are largely responsible for their diets was negatively associated with support for upstream public policies aimed at reducing obesity risk. A consistent theme that emerged during qualitative analysis of the present study—the belief in individual responsibility—is also in line with these findings. Howse et al. (2018) suggest capitalizing on individual-centered interventions in the present while building support for environment-centered interventions over the longer term. Interestingly, passage of the Healthy, Hunger-Free Kids Act indicates recent support for environmental regulations in primary and secondary school environments, although such support is not currently mirrored in university environments.

The results of this study may be of concern to university leaders and health experts, especially regarding the undergraduate population. Undergraduates are at an age of dietary habit development and often live, study, and work in the campus environment (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Male and undergraduate participants were more likely to agree with engaging in pouring rights contracts compared to their female and graduate student/faculty/staff counterparts. Furthermore, SSB intake is higher among males and young adults (CDC, 2017). This may indicate male undergraduates

as a specific target audience to prioritize in future interventions to change opinions about institutional SSB policy.

It could be argued that pouring rights contracts and the marketing of SSBs on campus are in direct conflict with university health initiatives. Among participants who reported arguments against pouring rights, this concern was commonly echoed as an argument 84 (11.4%) open-ended responses. At the University of Iowa, health initiatives include the Obesity Research and Education Initiative, Student Health, and liveWELL services for university employees. It could also be argued that pouring rights contracts and the marketing of SSBs on campus are in conflict with the overall health mission of the University of Iowa: “To maintain a safe, supportive, healthy, and humane environment” (The University of Iowa, n.d.).

Limitations

Due to the non-experimental design of this study, causality cannot be inferred. Participants in this study may have taken the survey because of a prior interest in SSB policies, therefore, self-selection bias may have occurred. On average, participants reported below average daily SSB caloric intake and above average education compared to the U.S. population (United States Census Bureau, 2018). Participants who identified as female and staff were overrepresented in this study. Therefore, the overall generalizability to both the University of Iowa population and broader populations may be limited. % health sciences

Strengths

The present study was strengthened by a large, campus-wide sample and high response rate. Overall, it advances our understanding of pouring rights contracts by exploring awareness and attitudes toward this topic in the understudied university population. This study was carried out in the state of Iowa, which holds the fourth highest obesity rate in the nation; therefore, it is an especially critical location to consider regarding policies and interventions to reduce the availability of beverages that contribute to high added sugar intake (The State of Obesity, 2017).

CHAPTER 7: CONCLUSION

Growing evidence suggests that high added sugar intake is linked to obesity, type 2 diabetes, and cardiovascular disease (Hu, 2013; Yang et al., 2014). Because SSBs are the leading source of added sugar in the American diet, there is heightened interest in policies that limit SSB availability (USDHHS & USDA, 2015). Regulation of campus SSBs through the termination of pouring rights contracts is one potential policy to reduce SSB consumption among young adults, therefore, understanding the determinants of support for and against campus pouring rights is important.

TABLES

Table 1. Participant characteristics

	n (%)
Sex	
Male	212 (23.2)
Female	698 (76.3)
Other	5 (.5)
Race/ethnicity	
American Indian or Alaska Native	3 (.3)
Asian	53 (5.8)
Black or African American	16 (1.7)
Native Hawaiian or Pacific Islander	3 (.3)
Other	35 (3.8)
White	805 (88.0)
University role	
Staff	453 (49.5)
Faculty	54 (5.9)
Undergraduate student	297 (32.5)
Graduate student	111 (12.1)
	Mean (SD)
Age	33.45 (14.3)
Average daily kcals from SSBs	71.41(134.0)

Table 2. Awareness of pouring rights contracts

	Not previously aware n (%)	Previously aware n (%)	X ² (df)	Cramer's V	P
University role					
Staff/faculty	265 (52.3)	242 (47.7)	69.836 (1)	.276	<.001
Adjusted residual	-8.4	8.4			
Students	322 (78.9)	86 (21.1)			
Adjusted residual	-8.4	8.4			
Total	587 (64.2)	328 (35.8)			

*Chi-square tests used

Table 3. Agreement with pouring rights contracts

	Agree with pouring rights n (%)	Neither agree nor disagree n (%)	Disagree with pouring rights n (%)	X ² (df)	Cramer's V	P
University role						
Staff/faculty	179 (35.3)	153 (30.2)	175 (34.5)	6.864 (2)	.087	.032
Adjusted residual	-1.9	-.5	2.5			
Students	169 (41.4)	130 (31.9)	109 (26.7)			
Adjusted residual	1.9	.5	-2.5			
Total	348 (38.0)	283 (30.9)	284 (31.0)			

*Chi-square tests used

Table 4. Associations with agreement with pouring rights contracts

	Agree with pouring rights n (%)	Neither agree nor disagree n (%)	Disagree with pouring rights n (%)	X ² (df)	Cramer's V	P
University role						
Faculty	19 (35.2)	14 (25.9)	21 (38.9)	15.1 (6)	.091	.019
Adjusted residual	-.4	-.8	1.3			
Staff	160 (35.3)	139 (30.7)	154 (34.0)			
Adjusted residual	-1.7	-.2	1.9			
Undergraduate students	134 (45.1)	93 (31.3)	70 (23.6)			
Adjusted residual	3.1	-3.4	.2			
Graduate students	35 (31.5)	37 (33.3)	39 (35.1)			
Adjusted residual	-1.5	.6	1			
Sex						
Male	99 (46.7)	56 (26.4)	57 (26.9)	10.608 (4)	.076	.031
Adjusted residual	3.0	-1.6	-1.5			
Female	248 (35.5)	224 (32.1)	226 (32.4)			
Adjusted residual	-2.8	1.4	1.6			
Other	1 (20.0)	3 (60.0)	1 (20.0)			
Adjusted residual	-.8	-.5	1.4			

Table 4 – continued

Daily kcals from SSBs						
Less than ntl. average	282 (36.6)	235 (30.5)	253 (32.9)	7.980 (2)	xxx	.018
Adjusted residual	-2.0	-0.6	2.7			
Greater than ntl. average	66 (45.5)	48 (33.1)	31 (21.4)			
Adjusted residual	2.0	0.6	-2.7			
Have you taken a college-level nutrition course?						
Yes	85 (33.6)	78 (30.8)	90 (35.6)	4.127 (2)	.067	.127
Adjusted residual	1.7	-1.8	0.0			
No	263 (39.7)	205 (31.0)	194 (29.3)			
Adjusted residual	-1.7	1.8	0.0			
I believe vending machines and soda fountains on campus encourage sugar-sweetened beverage consumption.						
Agree	322 (37.8)	260 (30.5)	270 (31.7)	4.328 (4)	.069	.363
Adjusted residual	-.5	-1.0	1.6			
Disagree	11 (52.4)	6 (28.6)	4 (19.0)			
Adjusted residual	1.4	-.2	-1.2			
Neither agree nor disagree	15 (35.7)	17 (40.5)	10 (23.8)			
Adjusted residual	322 (37.8)	260 (30.5)	270 (31.7)			
I believe universities should promote the health of students and staff.						
Agree	328 (37.6)	270 (31.0)	274 (31.4)	1.863 (4)	.032	.761
Adjusted residual	-1.2	.1	1.1			
Disagree	5 (45.5)	3 (27.3)	3 (27.3)			
Adjusted residual	.5	-.3	-.3			
Neither agree nor disagree	15 (46.9)	10 (31.3)	7 (21.9)			
Adjusted residual	1.0	.0	-1.1			

Table 4 – continued

I believe vending machines and soda fountains on campus encourage sugar-sweetened beverage consumption.						
Agree	170 (32.4)	146 (27.9)	208 (39.7)	46.605 (4)	.160	<.001
Adjusted residual	-4.0	-2.3	6.6			
Disagree	76 (48.4)	47 (29.9)	34 (21.7)			
Adjusted residual	2.9	-.3	-2.8			
Neither agree nor disagree	102 (43.6)	90 (38.5)	42 (17.9)			
Adjusted residual	2.0	2.9	-5.0			
I believe campus environments and university beverage policies are responsible for sugar-sweetened beverage consumption among students and staff.						
Agree	77 (29.1)	61 (23.0)	127 (47.9)	63.338 (4)	.186	<.001
Adjusted residual	-3.6	-3.3	7.0			
Disagree	211 (46.3)	146 (32.0)	99 (21.7)			
Adjusted residual	5.1	.7	-6.1			
Neither agree nor disagree	60 (30.9)	76 (39.2)	58 (29.9)			
Adjusted residual	-2.3	2.8	-.4			
I believe individuals are responsible for their own sugar-sweetened beverage consumption.						
Agree	338 (39.2)	266 (30.9)	258 (29.9)	19.068 (4)	.102	.001
Adjusted residual	3	-.2	-2.9			
Disagree	8 (29.6)	4 (14.8)	15 (55.6)			
Adjusted residual	-.9	-1.8	2.8			
Neither agree nor disagree	2 (7.7)	13 (50.0)	11 (42.3)			
Adjusted residual	-3.2	2.1	1.3			

Table 4 – continued

Were you previously aware of the existence of pouring rights contracts?

Yes	143 (43.6)	92 (28.0)	93 (28.4)	6.721 (2)	.086	.035
Adjusted residual	-2.6	1.4	1.3			
No	205 (34.9)	191 (32.5)	191 (32.5)			
Adjusted residual	2.6	-1.4	-1.3			

*Chi-square tests used

Table 5. Short-answer arguments for and against pouring rights contracts, N=1,499*

	n (%)
<i>Arguments in support, n=759</i>	
Funding	497 (65.5)
Scholarship funding	154 (20.3)
Budget strain	99 (13.0)
Other/general funding	244 (32.1)
Individual choice/responsibility	140 (18.4)
“People will get the drinks one way or another”	69 (9.1)
SSB availability	51 (6.7)
Benefits of exclusivity	17 (2.2)
Sugar-free options offered	16 (2.1)
Profits for beverage company	12 (1.6)
Necessary for low blood sugar/low energy	8 (1.1)
Attract potential students	7 (0.9)
Free market	4 (0.5)
Create jobs	2 (0.3)
None**	13 (1.7)
Unclear response	60 (7.9)
<i>Arguments against, n=740</i>	
Health concerns	358 (48.4)
Promotion leads to consumption	219 (29.6)
Limit competition	93 (12.6)
In conflict with university mission	84 (11.4)
Corporate intrusion	61 (8.2)
Target susceptible audience	49 (6.6)
Limit healthy beverage options	37 (5.0)
Comparison to tobacco, drugs, alcohol	19 (2.6)
Environmental concerns	7 (0.9)
Disagreement with current funding scheme	3 (0.4)
None	24 (3.2)
Unclear response	79 (10.7)

*Percentages do not sum to the total within a given category because responses could be coded into multiple categories

**E.g. “I don’t have one.”

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