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The Effects Of Friendship And Discussion On Individuals' Responses To Anti-Sugary Drinks Television Ads

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THE EFFECTS OF FRIENDSHIP AND DISCUSSION ON INDIVIDUALS'
RESPONSES TO ANTI-SUGARY DRINKS TELEVISION ADS

by

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                              5/15/13

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ACKNOWLEDGMENTS

I wish to express my sincere appreciation to the members of my advisory committee for their guidance and support during my time in the doctoral program at the University of North Dakota.

ABSTRACT

The current study tested if friendship and discussion would interact with anti-sugary drinks television ads exposure to promote attitudes, intentions, and behaviors consistent with sugary drinks consumption reduction. College students (N= 109) viewed anti-sugary drinks ads either with or without a friend, and either discussed or did not discuss the ads after viewing them. Changes in baseline sugary drinks health knowledge, attitudes toward reducing sugary drinks consumption, sugary drink consumption social norm perceptions, and intentions to reduce sugary drinks consumption were examined at post-exposure and one week follow-up. Changes in baseline self-reported sugary drinks consumption were also examined at one week follow-up. Viewing anti-sugary drinks ads resulted in better knowledge about sugary drinks consumption and health, more positive attitudes toward reducing sugary drinks consumption, greater intentions to reduce sugary drinks consumption, and lower self-reported sugary drinks consumption, although not all effects were maintained at follow-up. The presence of a friend and discussion did not have substantial effects on outcomes, although participants that viewed the ads with a friend showed more positive attitudes toward reducing sugary drinks consumption at follow-up.

CHAPTER I

INTRODUCTION

Introduction to the Issue and Current Project

In the decades following 1965, the United States experienced a dramatic decline in cigarette smoking. This reduction in cigarette use denoted a long-awaited victory for proponents of public health in their battle against "big tobacco." "Big tobacco" refers to the collection of tobacco industry giants, made infamous for their disreputable promotion of cigarette use in both adults and youth, despite awareness of tobacco's deleterious health effects (Brownell & Warner, 2009). The triumph over big tobacco, and the subsequent decline in cigarette consumption, has been marked as one of twentieth-century America's greatest public health achievements (Mercer et al., 2003).

However, time would soon present a new challenge for American public health: the ("big") food industry. Today, America's large-scale food industries pose challenges that are both similar and distinct from those encountered with the tobacco industry in earlier decades (Brownell & Warner, 2009; Erikson, 2006; Hornik & Kelly, 2007). Brownell and Warner (2009) outline four ways in which policies and practices of the American food industry parallel methods used by the tobacco industry. These similarities include: 1) misleading public health-messages, 2) attempts at governmental influence (e.g. lobbying), 3) erroneous challenging of scientific research, and 4) objectionable marketing practices, including how products are advertised to children (see Brownell and Warner, 2009 for a full review).

However, there are also differences between the two industries and their products. Primarily, food is something everyone must consume whereas tobacco is not necessary for survival. Further, there are no "secondhand" effects of food consumption that remotely parallel the negative effects of secondhand-smoke (Erikson, 2006). Because of these differences, some argue that there is no such thing as "good" or "bad" foods (Vartanian, Schwartz, & Brownell, 2007). Yet, the dramatic rise in obesity rates observed over the past three decades (Odgen & Carroll, 2010) have been linked to changes in eating habits and the caloric-content of foods, including: larger overall daily caloric intakes (Chun, Chung, Wang, Padgitt, & Song, 2010), greater use of calorie-dense sweeteners such as high-fructose corn syrup in many foods (Bray, Nielsen, & Popkin, 2004; Rutledge & Adeli, 2007), greater consumption of calorie-dense foods (e.g. "fast-food", "junk-food") (Pereira et al., 2005), and greater intake of sugary drinks, such as soda (Dennis, Flack, & Davy, 2009; Duffey & Popkin, 2007; Hu & Malik, 2010; Olsen & Heitmann, 2008).

These trends suggest that various food products (and the extent to which they are consumed) do play a role in health outcomes. Soda, in particular, represents a food product that may be most easily argued to be a "bad" food. The calories in soda are considered "empty carbs," as they contribute to glycemic load and energy intake, yet they have no nutritional value and no effect on satiety (Dennis et al., 2009; Flood, Roe, & Rolls, 2006; Harrington, 2008;). Further, soda consumption has been consistently linked to negative health outcomes such as obesity and type II diabetes (Dennis et al., 2009; Hu & Malik, 2010; Olsen & Heitmann, 2008). Researchers have also argued that hyperpalatable foods (those with excess fat and sugar) share features in common with

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drugs of abuse and are capable of triggering an addictive process (Gearhardt, Grilo, DeLeome, Brownell, & Potenza, 2011).

Most sodas, in addition to being high in sugar, are also caffeinated. Caffeine is a central nervous system stimulant, and although the potential for addiction to caffeine is minimal, it is known to alter mood and produce physical dependence (Brownell & Warner, 2009). Given its poor nutritional value, its relationship to disease risk, and its potential for addiction-like consumption, soda seems most similar to tobacco, at least when compared to other foods. As such, drawing from the knowledge of "what works" in tobacco control seems like a logical advancement for efforts that aim to address obesity by lowering soda, and other sugary drinks consumption.

The current study aimed to examine how knowledge gleaned from years of anti-tobacco media advertisements can be applied to the reduction of sugary drinks consumption, with an emphasis on how new areas of research in interpersonal communication and social networks can be used to advance such efforts. Specifically, this project examined how friends and discussion impact the effectiveness of anti-sugary drinks television ads on college students' attitudes and behaviors toward reducing sugary drinks consumption.

CHAPTER II

LITERATURE REVIEW

Prevalence of Obesity and Sugary Drinks Consumption

Over the course of the past thirty years, the United States has experienced a

dramatic rise in the rates of overweight and obesity observed in adult populations.

Currently, 33.8% of adults over the age of 20 are classified as obese, and 68% are

considered overweight (Flegal, Carroll, Odgen, & Curtin, 2010). The classification of

overweight status and obesity in adults is based on one's Body Mass Index (BMI). BMI

is obtained by dividing one's weight (in kilograms) by one's squared height (in meters).

The Centers for Disease Control and Prevention (CDC) provide the classification levels

for various BMI ranges; a BMI between 25 and 29 is considered overweight, and a BMI

of 30 and above is classified as obese (CDC, 2012). BMI does not distinguish lean tissue

from fat, and therefore does not directly represent one's adiposity. Because of this, it is

possible for one to have a high BMI due to substantial muscle mass but still be

considered at lower risk for weight-related health problems. Nonetheless, multiple

studies have demonstrated a consistent relationship between BMI, percent body fat, and

risk for negative health outcomes (CDC, 2012; Flegal et al., 2010). As such, BMI is

widely used in health research as a relatively straightforward tool for gauging overweight

and obesity.

The rates of adult overweight and obesity noted above were obtained using data

from the National Health and Nutrition Examination Survey (NHANES). The NHANES

is a large, nationally representative survey that has been administered continuously by the CDC since 1999 (Flegal et al, 2010). Prior to 1999, the CDC administered closely related nationally representative surveys that also examined health and nutritional information, with the earliest survey dating back to 1960. It is therefore possible to examine the trends in adult overweight and obesity that have developed over the past 50 years. Analyses of these data indicate that the rate of adult obesity doubled between the survey years of 1976-1980 and 2007-2008 (Odgen & Carroll, 2010). More recently, weight status appears to have stabilized, with no significant increases in prevalence of adult overweight status or obesity in either men or women since 2003 (Flegal et al., 2010). Yet, unfortunately, these rates have also not declined. Notably, the prevalence of childhood overweight status and obesity are equally as alarming as adult rates, with 20% and 15% of youth under the age of 18 classified as obese, and overweight, respectively (Odgen, Carroll, Curtin, Lamb, & Flegal, 2010). These rates represent a three-fold increase in childhood overweight and obesity status over the course of the past three decades (Odgen et al., 2010).

Overweight status and obesity are related to poor physical health outcomes, problems with social and psychological well-being, and significantly contribute to societal economic burden. Being overweight or obese is associated with an increased risk for cardiovascular disease, type II diabetes, nonalcoholic fatty liver disease, obstructive sleep apnea, arthritis, depression, poor self-esteem, and social withdrawal from peers (Goble, 2008). In addition, society tends to stigmatize overweight and obese individuals, leading to discrimination, victimization, and other negative social consequences (Goble, 2008). Increases in body weight have also led to increases in obesity-related medical

treatments and expenditures. In the earlier part of the 2000s, health care costs related to

overweight and obesity had increased an estimated 26.1% for out-of- pocket expenses,

and 36.8% and 39.1% for Medicare and Medicaid health-care costs, respectively

(Finkelstein, Ruhm, & Kosa, 2005). In 2005, experts estimated that the annual combined

(direct and indirect) medical cost of obesity was as high as $139 billion per year

(Finkelstein et al., 2005). By 2008, these costs had risen to $147 billion per year

(Finkelstein, Trogdon, Cohen, & Dietz, 2009). In general, when combining both private

and public payers, per capita medical spending for obesity is roughly 42% higher (an

average of $1, 429 more per year) than spending for normal-weight individuals

(Finkelstein et al., 2009).

Coinciding with the increase in rates of adult overweight and obesity, the United

States has also experienced an increase in the daily average consumption of sugary

drinks. "Sugary drinks" refers to a large category of beverages that contain added caloric

sweeteners, such as sucrose, high-fructose corn syrup, or fruit-juice concentrates (Hu &

Malik, 2010). Within this category are non-diet sodas, fruit juices and fruitades, vitamin

waters, sweetened teas, and energy and sports drinks. Using data from four nationally-

representative surveys, including most recently the NHANES III (survey years 1988 to

1994) and the NHANES 1999– 2002, Duffey and Popkin (2007) demonstrated a

significant increase in intake of sugary drinks in the U.S. across the past three and a half

decades. In particular, in 2002, adults over the age of 20 years reported consuming 21%

of their daily caloric intake from sugary drinks. This represents an average daily intake

of approximately 458 calories from these types of beverages. This is contrasted with the

average intake of sugary drinks by adults in 1965, which was approximately 236 calories

per day, or 12% of total daily calories (Duffey & Popkin, 2007). Soda, in particular, represented the sugary drink with the largest percent increase in consumption, with 20% more people reporting that they drank soda in 2002, as compared to 1965. In a separate analysis, also using NHANES III data, Chun and colleagues (2010) identified non-diet soda as the most significant source of added sugars in the American diet, adding 27 grams of sugar daily.

In another study using data from NHANES 1999-2002, Storey and colleagues (2006) found that beverage patterns vary based on age, sex, and ethnicity. This study is particularly useful, as it classified specific beverages types, allowing for separate analysis of non-diet carbonated soft drinks, fruit juice, milk, diet soda, and coffee and tea. Storey and colleagues (2006) found that White men between the ages of 20 and 39 consume approximately 675 grams of soda (non-diet) per day, which equates to about 1.8 12-ounce cans. White women of the same age consume about 465 grams of soda per day, or approximately 1.2 12-ounce cans. African American men in this age group drank significantly less soda than their White counterparts. This trend was not found for women.   However, Mexican American women between 20 and 39 consumed significantly less soda than their White female counterparts. Across genders, African Americans and Mexican Americans preferred fruit drinks/ades over soda, especially in older age groups, while White Americans showed preference for soda products.   It was also shown that, across ethnicities, consumption of soda increases over time, until about age 40; thereafter intake sharply declines. This data suggest White individuals between the ages of 20 and 39 represent the highest percentage of soda consumers.

Obesity and Sugary Drinks Consumption: Is There a Link?

There is evidence to suggest that the rise in sugary drinks consumption, especially soda, is linked to the rise in obesity rates. Support for this association comes from a multitude of studies that have documented a link between sugary drinks consumption and weight gain (Dennis et al., 2009; Hu & Malik, 2010; Olsen & Heitmann, 2008). However, controversy exists as to how increased sugary drinks consumption contributes to weight gain. What follows is a review of the evidence for the potential underlying mechanisms that may explain the observed connection between increases in sugary drinks consumption and the rise in obesity rates. Because most studies focus exclusively on soda products, the following review is constricted primarily to soda, but likely generalizes to other sugary drinks.

Increased caloric intake/lack of satiety. An increase in caloric intake due to consumption of calorie-dense sugary drinks is well-documented and provides a logical link between sugary drink consumption and obesity. Vartanian, Schwartz, and Brownell (2007) conducted a meta-analysis of 12 studies that examined the link between soda consumption and energy intake. They found effect sizes ranging from .13 to .38, depending on the type of study (cross-sectional, longitudinal, or experimental) and soda measurement (self-report or objective measure) under analysis. One proposed reason for why soda drinkers tend to have higher caloric intakes is that soda rarely contributes to feelings of satiety. Experimental studies have documented that during meals, soda-consumers do not compensate for the extra calories consumed via soda (Dennis et al., 2009; Flood et al., 2006).

Researchers believe the lack of caloric compensation in soda drinkers may be related to the extensive use of high-fructose corn-syrup, a cheap alternative to glucose, commonly used in soda products (Harrington, 2008). The break-down of fructose, unlike the metabolism of most carbohydrates, does not raise blood Leptin levels. Leptin is a hormone involved in appetite regulation and is needed for one to feel satiated. Higher levels of Leptin following meals usually results in appetite inhibition. It has been suggested that soda consumption leads to increased caloric intake, and weight gain, due to the presence of high-fructose corn syrup, and its non-effects on appetite suppression (Harrington, 2008). Others have suggested that in general, all beverages are less likely to be compensated for, as for years of human evolution the only available drink was breast-milk and water (Wolf, Bray, & Popkin, 2008).

Glycemic load/glycemic index. Although the relationship between consuming extra calories via soda and later weight gain seems straight-forward, research suggests this link is more complex. Multiple studies have shown that the relationship between soda consumption and energy intake remains after controlling for the overall amount of calories consumed (Olsen & Heitmann, 2008). In other words, in studies where overall caloric intake is equated across groups, soda drinkers still show a greater likelihood for weight gain. This suggests that soda is contributing to weight gain through mechanisms beyond the mere addition of calories from added sugars.

The glycemic index (GI) is a measure of the effect of carbohydrates on blood glucose levels. Foods with a high glycemic index are metabolized quickly and rapidly absorbed into the blood stream. As a result, high GI foods lead to sharp spikes in blood glucose, which results in sharp spikes in insulin production. Insulin is a hormone that

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regulates blood glucose levels by triggering uptake of blood glucose by cells for use as energy. Insulin also regulates the storage of unused glucose as fat.   When levels of insulin are abnormally high following meals (due to sharp spikes in blood glucose) a dysfunctional metabolic response is triggered that favors nutrient storage; the body quickly removes the excess blood sugar and stores it as fat. Blood-sugar levels then drop below normal physiological ranges (Makris & Foster, 2005). As a result, the person may feel hungry again soon after a meal.   Together, these effects are thought to increase hunger and cause weight gain. Further, chronically high GI diets are associated with insulin resistance, obesity, and an increased risk for type 2 diabetes mellitus (Hu & Makik, 2010). Soda contains quickly-absorbable carbohydrates, such as sucrose and high-fructose corn syrup. As such, soda is considered to have a high glycemic index. Evidence has accumulated to suggest that soda contributes to weight gain, and other health-related outcomes, via its role in increasing glycemic load, as described above (Harrington, 2008; Hu & Malik, 2010).

Reducing Sugary Drinks Consumption: What Works?

Given the relationship between soda consumption and obesity, health professionals have begun to examine how soda intake, and other sugary drinks, can be reduced through intervention. Strategies have included highlighting the nutritional information of these drinks prior to consumption, in the hopes that informed consumers will reduce intake on their own. Controlled trials have also been conducted to determine if providing alternative beverage options can be an effective and feasible way to reduce sugary drink consumption and lead to changes in weight status. Finally, attempts have

been made to change consumer behavior by altering the price and availability of sugary drink products such as soda.

Point of purchase. Survey data has shown that consumers grossly under-estimate the calorie-content, fat-content, and sodium content of many common menu items (Burton, Creyer, Kees, & Huggins, 2006). Adding information on caloric-content and nutritional value of foods at the point prior to purchase has been shown to have a moderate effect on consumer decision making (Harnack & French, 2008). Experimental data has shown that when consumers are provided with calorie information for various menu items they are more likely to choose "healthier" options than when this information is missing (Burton et al., 2006). Point-of-purchase interventions have also been applied to sugary drink consumption with success. Bleich and collegues (2012) demonstrated a significant decline in soda purchase among 12-18 year old Black adolescents after providing information on the physical activity equivalents required to "burn-off" one bottle of soda or fruit juice. Their study maintained good external validity, as it was conducted within a natural setting (four corner-stores in a low-income neighborhood from a large metropolitan area). Bergen and Yeh (2006) also found that point-of-purchase information influenced soda-consumer behavior. In their study, flyers were placed on vending machines around a college-campus, advertising and promoting beverages with zero calories. Although the intervention-machines (the ones with flyers) did not increase their sale of water or diet soda as compared to control machines, they did demonstrate significant reductions in the amounts of non-diet soda purchased.

Randomly controlled trials. The ability to randomly assign participants to either consume or not consume sugary drinks, while controlling important nuisance variables, is

considered the gold-standard method for examining the impact of sugary drinks on health outcomes. However, very few such trails have been conducted with sugary drinks (Allison & Mattes, 2009). Rather, most randomly controlled trials (RCTs) have been effectiveness trials, relying on educational interventions, incentives, and environmental manipulations to reduce sugary drinks consumption (Allison & Mattes, 2009). Because these trials do not strictly control the amount of sugary drinks being consumed, they are limited in their ability to conclude a causal relationship between sugary drinks and health outcomes, such as BMI.

Nonetheless, effectiveness trails have demonstrated modest associations between reductions in sugary drinks consumption and health outcomes. For example, in one of the more rigorously controlled RCTs, Ebbeling and colleagues (2006) delivered non-caloric beverages to the home of 53 randomly assigned adolescents (aged 13 to 18 years), with the goal of displacing sugary drink consumption. They noted a large reduction in self-reported sugary drinks consumption in their intervention group as compared to controls. However, in this study, only adolescents in the upper tertile of BMI ranges saw a reduction in their BMI following 25 weeks of intervention, and in this group it was only about a one point reduction in BMI (a change that is unlikely to be clinically significant).

James, Thomas, Cavan, and Kerr (2004) also utilized a randomized trial to reduce carbonated sugary beverages consumption in children aged 7 to 11 years. Their program used a year-long educational intervention employed in the classroom setting to target "fizzy" drinks (e.g. sodas) consumption. At the end of the year-long study, the intervention group had significantly reduced their odds of becoming overweight;

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however, these results were not maintained at a 2-year follow-up (James, Thomas, & Kerr, 2007).

In general, these results suggest that effectiveness trials are moderately effective as reducing sugary drinks consumption, but lack strong evidence to conclude that such reductions result in meaningful changes to health status.

Environmental control. Another approach utilized to reduce sugary drinks consumption involves altering the availability and/or cost of sugary drink products. Following recommendations from various professional organizations (e.g. Committee on School Health, 2004), many of the efforts to alter the environmental availability of sugary drinks has been concentrated in public schools. Numerous studies have examined the impact of reducing and/or removing sugary drinks from school cafeterias and school vending machines.

Data from over 60 middle schools in Washington state showed that availability of sugary drinks in schools accounts for approximately 17% of the variance in between-school sugary drinks consumption, suggesting that in-school access to these beverages contributes to consumption levels (Johnson, Bruemmer, Lund, Evens, & Mar, 2009). Further, when sugary drinks are removed from schools, youth show a significant reduction in their in-school sugary drinks consumption (Schawrtz, Novak, & Fiore, 2009; Taber et al., 2011a).

However, reducing or banning sugary drinks in school appears to have minimal effects on overall consumption levels or children's weight status and BMI (Blum et al., 2008; Chriqqui, Powell, & Chaloupka, 2011; Cunningham & Zavodny, 2011; Taber et al., 2011b). Data from large, nationally-representative, longitudinal data-sets

(Cunningham & Zavodny, 2011; Taber, et al., 2011b), as well as from smaller, state-wide

analyses (Blum et al., 2008) fail to show that reductions in availability of sugary drinks at

school alter the BMI of youth in either middle or high schools. These studies found that

although altering school policies changed in-school consumption, there was little effect of

patterns of consumption at home. For example, Cunningham and Zavodny (2011)

reported that fifth graders consume an average of 5.7 sugary drinks per week, but that

only 0.4 of these beverages come from school. Likewise, Taber and colleagues (2011b)

estimated that the average reduction in sugary drink consumption that results from

banning these beverages in school is only about 0.19 servings per day, or less than 50

kilocalories per day (it is thought that variations as large as 100-250 kilocalories per day

are needed to effect changes in BMI). These results suggest that sugary drinks

consumption, at least in American youth, must also be addressed outside of the school

setting, including focusing on altering the preferences and consumption patterns of

parents and other influential adults.

  Excise taxes. Some have argued that levying a "penny-per-ounce" excise tax on

sugary beverages may be an effective way to reduce consumption of these products,

resulting in lowered obesity rates (Andreyeva, Chaloupka, & Brownell, 2011; Wang,

Coxson, Shen, Goldman & Bibbins-Domingo, 2012). Proponents of such a tax argue that

the modest price increase would shift consumer behavior towards healthier beverage

alternatives, resulting in lowered obesity rates and risk for type II diabetes, lower health

care costs, and increases in government revenue. In their models, Andreyeva and

colleagues (2011) estimated that a penny-per-ounce excise tax would results in a 24%

reduction in sugary drinks consumption and would generate up to $118 billion in revenue

by 2015. Accounting for the likely compensation with other caloric beverages (such as milk or other fruit juice), Wang and colleagues (2012) estimated that increasing the cost of sugary drinks by a penny-per-ounce (or approximately $0.12 a can) would result in an average net weight reduction of 0.9 pounds at the population level. Although modest, this reduction could results in a 1.5% decline in adult rates of obesity, and a 2.6% reduction in risk for type II diabetes. Over the course of 10 years, these changes could result in up to $17.1 billion in health care cost savings.

However, critics of the excise tax caution that, overall, the research on the downstream results of this policy show changes to population level BMI that range from very small reductions to statistically insignificant, but nonetheless increased BMI (due to the potential to replace the taxed calories with equally-caloric or greater-caloric substitutes; Edwards, 2011). Given that "taxes are fundamentally unwelcome" (Edwards, 2011, pg. 418) and that current data are inconclusive as to how excise tax may actually affect behavior and BMI, the use of an excise tax on sugary drinks as a means to curb the obesity epidemic remains a controversial intervention.

Reducing Sugary Drink Consumption: Media Campaigns

One strategy that may be effective for reducing sugary drinks consumption is the use of anti-sugary drinks media campaigns that include television, radio or other advertisement forms. To date, there have been no national media campaigns targeting sugary drinks consumption. However, there are a variety of city- and state-wide campaigns in effect. In California, the Center for Public Health Advocacy (CCPHA) has initiated the "Kick the Can" campaign aimed at improving public education on sugary drinks and their link to disease, as well as promoting reform to state beverage policies

(CCPHA, 2012). In New York City, the Department of Health and Mental Hygiene (NYC DOH) has launched "Pouring on the Pounds" - a health education campaign that addresses the negative health effects of consuming sugary drinks. This campaign, which began in 2009, involves a series of flyers, posters, and 30-second media bits posted/aired throughout New York City. The campaign has introduced four television ads that use various marketing techniques to promote reductions in sugary drinks consumption (NYC DOH, 2011). In 2010, the city of Philadelphia, in coordination with the Annenberg Public Policy Center (APPC), launched the Philadelphia Healthy Lifestyle Initiative – a city-wide survey examining attitudes, intentions, and behaviors related to sugary drinks consumption. The results of this survey were used to develop a media campaign, including television advertisements, aimed at reducing sugary drinks consumption (Jordan, Piotrowski, Bleakley, & Mallya, 2012). For a listing and brief review of other state- and city- wide beverage campaigns please visit kickthecan.org.

The effectiveness of the majority of these campaigns in changing consumption behaviors has yet to be systematically evaluated. Philadelphia's campaign did conduct preliminary message testing to examine how residents responded to the campaign ads (Jordan et al., 2012). The results from this analysis were positive, showing that residents increased their intentions to reduce sugary drinks consumption following exposure to the ads (Jordan et al., 2012). In other public health areas, the effects of media campaigns on altering behavior have been systematically examined, with positive implications. For example, marketing campaigns in the United States, Australia, and the United Kingdom have effectively influenced attitudes, intentions to change, and actual behavior for issues such as increasing physical activity in adults (Peterson, Abraham, & Waterfield, 2005),

improving diet, exercise, and substance misuse (Gordon, McDermott, Stead, & Angus, 2006), and prevention of HIV infection, cancer screening, tobacco use, and nutrition and exercise (Wakefield, Loken, & Hornik, 2010). Tobacco control is one area where media campaigns have proven to be highly successful (Mercer et al., 2003). Together, this research suggests that media campaigns are likely to be successful when used as a tool to reduce sugary drink consumption. Given the parallels between tobacco consumption and sugary drink intake, it seems especially appropriate to explore the strategies used in anti-tobacco messaging as a model for the reduction of sugary drinks.

The majority of anti-tobacco campaigns use ads focused on exposing manipulative industry practices (often termed countermarketing ads) or ads that highlight the negative health consequences of cigarette use (Vogeltanz-Holm, Holm, White Plume, & Poltavski, 2009). Both forms of advertising have been found to be effective. For example, the U.S.' first anti-tobacco national countermarketing campaign, Truth®, was shown to positively influence both adolescents' (12-17 years of age) and young adults' (18-25 years of age) attitudes towards anti-smoking and was effective in increasing intentions to quit or never initiate smoking (Richardson, Green, Xiao, Sokol, & Vallone, 2010). Likewise, exposure to the Australian National Tobacco Campaign, which focused on using personalized and graphic depictions of the negative health consequences of smoking, resulted in significant reductions in adult smoking prevalence, both initially and up to two months following campaign exposure (Wakefield et al., 2008).

Further research examining the effective ingredients in ads suggests that certain ads are more effective based on their message-frame, the ensuing emotional arousal generated from the message frame, and the extent to which the ads are cognitively

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processed. Message frame refers to the positive or negative valence that an ad conveys

(Block & Keller, 1995). A positive frame would encourage one to quit smoking by

focusing on the positive things (both physical and socially-related) that are achieved with

quitting (social approval, longer life expectancy, etc.). Negative message frames attempt

to motivate quitting by accentuating the bad outcomes if one continues to smoke

(emphysema, lung cancer, social disapproval, etc). Negative message frames are often

termed fear-based, disgust-based, or shame-based appeals. Most research supports the

notion that negative-message frames tend to be the most effective advertising strategies

(Durkin, Biener, & Wakefield, 2009; Vogeltanz-Holm et al., 2009; Wakefield, Loken,

Hornik, 2010; Witte & Allen, 2000).

　　　　Negative message frames are theorized to be effective due to their ability to

promote both emotional and physiological arousal, which in turn enhances cognitive

processing, resulting in longer-lasting learning effects (Durkin et al., 2009; Vogeltanz-

Holm et al., 2009). For example, Leshner, Bolls and Thomas (2009) found that ads with

graphic components intended to evoke fear and disgust are the most effective within an

adult population. These authors theorize that graphic ads invoke the aversive

motivational system - a system designed to allocate resources so as to protect an

individual from harm. When the aversive motivational system is activated by graphic

ads, the viewer devotes cognitive resources in order to encode the message, thereby

increasing their recall of the message content. Vogeltanz-Holm and colleagues (2009)

confirmed this notion in youth populations, demonstrating that graphic ads are the most

highly recalled type of ads in youth aged 12 to 17 years. Durkin and colleagues (2009)

also showed that emotionally-salient anti-smoking ads (those rated by independent

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viewers as highly "emotional", "intense", or "powerful") were perceived by adults as more effective, were more likely to be recalled, and were more likely to be thought about and discussed.

Media Campaigns and Health Behavior Change Theories: The Role of Social Influence

Beyond what is known about message-frame, arousal, and depth of processing, health behavior change theories provide additional explanations for how media campaigns may influence behavior. Many of the most prominent theories include a component of social influence as one way of explaining how people make health decisions. These theories include Theory of Planned Behavior and Social Cognitive Theory. In addition, research on social networks and interpersonal communication suggest campaigns may achieve their effectiveness via social influence processes.

Theory of Reasoned Action/Theory of Planned Behavior. The Theory of Reasoned Action was developed by Azjen and Fishbein to help improve understanding of volitional behavior (Armitage & Christian, 2003). The primary tenet of this theory is that intention to perform a behavior is the best predictor of actual performance of a behavior. This model assumes that behavioral intention can be influenced by a person's attitude toward the behavior, as well as social pressures regarding performance of that behavior. This implies that the decision to engage in a behavior depends in part on the approval or disapproval of important others (subjective norms). Subjective norms will influence individuals' attitudes, and thus their intentions to engage in the behavior (Armitage & Christian, 2003). Overall, the Theory of Reasoned Action states that people are motivated to change their behavior when they possess favorable attitudes towards the

change and believe that the people closest to them will approve of their behavior change (National Cancer Institute, 2005).

After initial research on the Theory of Reasoned Action, it was noted that the theory could not account for all behavioral outcomes; it was particularly poor for behaviors that were not under an individual's complete control. To address this, Ajzen (1988, 1991) expanded on the Theory of Reasoned Action to include perceived behavioral control as an additional predictor of behavioral intention and action. One's perceived behavioral control is thought to be a reflection of their self-efficacy for action, and one's actual control over a behavior. The addition of perceived behavioral control to the Theory of Reasoned Action meant that behavioral intention and action were now predicted by attitude, social norms, and the ease of behavior change (which is determined by both self-efficacy and environmental factors) (Armitage & Christian, 2003). This integrated theory has become known as the Theory of Planned Behavior.

The Theory of Reasoned Action/Planned Behavior has been shown to have adequate predictive validity for forecasting behavioral intention and behavior. The theory has generated considerable empirical support and is used widely across disciplines such as psychology, nursing, information technology, and social policy. In fact, Theory of Planned Behavior is currently considered the dominant model of behavior change in the field of health psychology (Armitage & Christian, 2003).

Social (Learning) Cognitive Theory. Social Learning Theory, which was later renamed Social Cognitive Theory (SCT), assumes that much of our learning is based in social observations. SCT proposes that health behavior can be adopted by observing the benefits of action (or the consequences of inaction) in others (National Cancer Institute,

2005). Further, while Social Learning Theory primarily focuses on observational

learning, its more modern adaptation, SCT, posits that elements of self-efficacy and

outcome expectations are important in health-behavior decision making (National Cancer

Institute).

One of the primary principles in SCT is reciprocal determinism (McAlister, Perry,

& Parcel, 2008). According to reciprocal determinism, individual behavior is determined

by interacting pressures from one's individual, social, and environmental influences. The

individual factors that influence behavior include outcome expectancies (what one

expects to happen as a result of action and how much they value that outcome), social

outcome expectancies (beliefs about how different people will evaluate their behavior),

and self-efficacy (the extent to which one feels capable of effecting change). The social

factors that influence behavior include observational learning (what are the results of

action or inaction in others), as well as social outcome expectancies discussed above.

Environmental determinants of behavior include incentives to change provided by the

environment, as well as barriers to making change.   SCT has been successfully used as a

model for health behavior change in a variety of intervention programs, including

community-level projects to prevent heart disease, promote smoking cessation, and

reduce drunk-driving (McAlister et al., 2008).

Social networks. A social network refers to the group of interconnected social

relationships that surround an individual (Heaney & Israel, 2008). The term social

network was first introduced by Barnes in 1954 as a way to describe patterns of social

relationships that seemed qualitatively different from traditional social units, such as the

extended family or work group (Heaney & Israel, 2008). This work, initially conducted

in a Norwegian village, demonstrated that close-knit social networks provide affective and instrumental support, and exert significant pressure on members to conform to network norms. Research since these early studies has confirmed that health and health-related behaviors are socially-transmitted, meaning they can pass from person-to-person in a manner similar to how disease spreads. In disease pathology, most person-to-person transmission occurs due to physical contact. However, in a social network, the spread of health and health-behavior is thought to be driven by multifaceted processes, including: exchange of social support, influence of social norms and peer behavior, physical contact and pathogen exposure, and access to similar or shared resources (Smith & Christkais, 2008).

Early studies of social networks were primarily exploratory and descriptive (Heaney & Israel, 2008). However, more current work on social networks tends to utilize mathematical models that show quantitatively how various social behaviors spread within a network. For example, an important study by Christakis and Fowler (2007) was the first to provide numerical data on how obesity travels throughout a social network. Using data from over 12,000 people assessed between 1971 and 2003, Christakis and Fowler showed that an individual's change in weight status between 1971 and 2003 could be predicted by the change in weight status of that individual's closest social ties during that time. In particular, the odds of becoming obese were increased by 57% if the individual had a close friend who became obese during the same time interval. Similarly, if one had a sibling or a spouse who became obese over the 32 year period, then that individual's odds of also becoming obese increased by 40% or 37%, respectively.

Since this initial study additional research has documented the spread of health and health-related behaviors via social network influences. Pachucki and colleagues (2011) demonstrated that food choices are concordant in social networks. Patterns of food choices in a spouse or close friend at earlier time-points predict an individual's current eating pattern. Meta-analytic evidence also shows that various weight and food-related behaviors travel in social networks. In particular, fast-food consumption appears to cluster in groups of adolescent boys, whereas body image concerns, dieting, and eating disorders cluster in adolescent girls (Fletcher, Bonell, & Sorhaindo, 2011).

Attitudes toward given health behaviors also appear to travel in social networks. For example, Coronges, Stacy and Valente (2011) showed that in adolescents, implicit cognitions about alcohol and marijuana are highly socially-contagious. These authors had adolescents from a public high school generate associations to cues such as "having fun" or "feeling relaxed." They did this at two time points, separated by three months. They coded whether or not responses to the above prompts included alcohol or marijuana associations. Social network data was also collected (e.g., each adolescent in the school listed five best friends). The authors showed that across time, an adolescent's likelihood to generate a drug association was predicted by the drug-associations generated by the adolescent's self-reported social network. In fact, peer influences were more predictive of later drug associations than the individual's baseline cognitive-associations. Nyhan, Reifler, and Rickey (2012) showed that an individual's attitude toward obtaining the flu vaccine was strongly associated with the attitudes toward the vaccine of individuals in their social network. Particularly, individuals with pro-vaccination social networks had stronger beliefs regarding vaccine safety, and greater intentions to obtain the vaccine.

Likewise, Mani, Caiola, & Fortuna (2011), showed that a patient's level of concern over consequences associated with his or her type II diabetes was predicted by the extent of diabetes in his or her social network. The authors concluded that higher disease burden across the network influenced the attitudes toward diabetes of each individual member.

As a result of the above research, social networks have gained increased consideration in clinical intervention research. For example, one analysis showed that obesity interventions targeting social networks are likely to be more effective than those targeting individuals. Bahr and colleagues (2008) used social network models to show that dieting with "friends of friends" is more likely to be effective than dieting alone, or even with just friends. Dieting with "friends of friends" forces shifts in cluster boundaries, which extends the influence of the intervention to more and more people. With time, these models show that interventions targeting wider social clusters may influence larger segments of the population.

Interpersonal communication. The role of interpersonal communication has also been widely studied for its role in individual health. Interpersonal communication is likely to enhance health by "developing and maintaining social networks, providing social support, and helping to manage stress" (Vismanath, 2008, pg. 278).

Communication can be studied at the individual, group, organization, and societal level. Finnegan and Viswanath (2008) provide a detailed review of how communication processes may interact with exposure to media campaigns at both individual and macro levels. For example, at the individual level, interpersonal communication and media interact in the ways predicted by the health behavior change theories reviewed above (changing attitudes and beliefs, altering social norms, etc.). At the macro level,

communication may improve the knowledge gap between behaviors and outcomes and set the "agenda" and "frame" for what society deems important.   Support for this notion comes from a naturalistic, qualitative study by Helme and colleagues (2011), in which they found that individuals often view health ads in the company of others, and that more often than not, they discuss these ads immediately following exposure. The authors maintain that campaigns can set the agenda for what people talk about, suggesting interpersonal discussion is a necessary (but not sufficient) precursor to attitude and behavior change.

Hornik and Yanovitzky (2003) also present a model for how the effectiveness of media campaigns may be enhanced by interpersonal discussion. Their model posits that an individual's attitudes, intentions, and actual behavior are influenced by three primary avenues: 1) direct individual exposure to campaign messages, 2) downstream environmental and incentive-based changes that surface from new policies and institutional alterations resulting from increased media attention (termed institutional diffusion), and 3) through changes to social norms and social acceptability of various behaviors due to interpersonal communication following message exposure (termed social diffusion).   In line with this work, other researchers in the area of communication theory have advocated for the use of conversations and discussions as a way to enhance campaign effectiveness (Hwang, 2012; Morgan, 2009; Southwell & Yzer, 2009). Indeed, as will be discussed shortly, discussion following ad exposure seems to enhance certain aspects of effectiveness.

Social Influence and Media Campaigns

Because social relationships, social networks, and interpersonal discussion play a large role in health behavior change theories, social influences should be considered when designing and disseminating health campaigns. A few preliminary studies have been conducted in which social influence is used to enhance campaign effectiveness. These studies, described in more detail below, have provided initial evidence that social influence can be an important facet in enhancing the success of media campaigns.

Dyads represent the smallest social network (Smith & Christakis, 2008) and as such, lend themselves most easily to study. Morton and Duck (2006) examined how dyadic processes between parents and children influence campaign outcomes. In particular, their study looked at the effect of interpersonal communication on the effectiveness of a national anti-drug campaign. They were interested in determining if naturally-occurring discussion of the campaign ads (e.g. discussions that occurred automatically between parent and child following exposure to the ads) would serve as a facilitator of campaign effectiveness. They found that an adolescent's perception of personal risk to the harmful effects of drugs was enhanced if they reported discussing the campaign ads with their parents. However, parents' reports of having discussed the campaign ads with their child were not related to adolescents' perceptions of risk. The authors propose that this mixed finding was due to the low correlation between parents' and adolescents' self-report for discussing an ad. The authors reasoned that, given the developmental period, adolescents who admitted discussing an ad with their parent were providing the less socially-desirable response, therefore suggesting the adolescent report of discussion was more valid. The authors concluded that there is preliminary evidence

to suggest that campaigns can enhance their effectiveness by encouraging interpersonal communication following exposure to ads.

Durkin and Wakefield (2006) also examined how interpersonal discussion affected recall for a national anti-smoking campaign in Australia. These researchers theorized that ads that elicit communication among family and friends "bring health messages into the realm of immediate and ongoing social influence," therefore making the health message more relevant (Durkin & Wakefield, 2006, pg. 3). To test this hypothesis, the authors conducted telephone interviews with participants in the 24 to 48 hours following natural exposure to the campaign. They found that respondents who reported discussing an ad with someone else had significantly higher reported motivation to quit smoking. It was noted that most of the discussions occurred between parent and child dyads.

Helme and colleagues (2011) also studied naturally occurring interpersonal discussion following exposure to safer-sex ads. Overall, the authors' data suggested interpersonal communication did improve ad effectiveness. However, their study also demonstrated that many conversations following ad exposure, although provoked by the ad, were irrelevant to the intended message (e.g., some participants discussed men negatively in response to an ad about sexually transmitted diseases, rather than talking about safer sex practices, which was the target message of the ad). It therefore seems imperative that advertisements promote the right type of conversations in order to be truly effective (Helme et al, 2011).

In a follow-up to the Durkin and Wakefield study (2006), Dunlop, Wakefield and Kashima (2008) again interviewed Australians exposed to the national anti-smoking

campaign, and found that those whom reported discussing any of the anti-smoking ads over the past two years were more likely to have made a quit attempt than those who did not discuss the ads with others. Of interest, these authors also examined which ads were most likely to stimulate interpersonal discussion. They found that the ads that utilized a negative visceral image or simulated a negative health effect were more likely to be talked about than ads that utilized a narrative, plot-based format to promote cessation. Sly, Heald, and Ray (2001) found similar results in a study conducted earlier, examining the effectiveness of the Truth® tobacco countermarketing campaign on youth aged 12 to 17 years. While these authors did not directly examine the effects of discussion on ad recall or ad effectiveness, they did find that youth were more likely to "talk to friends" about the campaign's countermarketing ads (described as "hard hitting" and "in your face") than they were to "talk to friends" about humor-oriented smoking cessation public service announcements (PSA) that had been aired at comparable times and frequencies. Further, the Truth® ads generated higher self-reported and confirmed awareness than the PSA ads, suggesting that discussion with friends is conceptually linked to ad effectiveness in youth (Sly et al., 2001; Vogeltanz-Holm et al., 2009).

Hwang (2012) also examined Truth® campaign data to test Hornik's social diffusion model (discussed above). Recall that the social diffusion model posits that conversations resulting from campaign exposure are a primary way in which media campaigns exert their influences on health-related attitudes, beliefs, and behaviors. Hwang used multilevel modeling to test the hypotheses that smoking beliefs of youth (aged 12 to 24) were influenced by both direct campaign exposure, and by campaign conversation that results from exposure. Support was generated for both hypotheses.

Particularly, not only did campaign exposure directly affect smoking beliefs, but exposure also stimulated conversations about smoking, which in turn affected smoking beliefs.

In one of the few studies conducted within the laboratory, Dunlop, Kashima, and Wakefield (2010) used an experimental manipulation to study the effect of interpersonal communication at the dyadic level following exposure to a health-promoting ad. In this study, participants were recruited in friendship dyads, and exposed to a radio ad promoting the Human Papilloma Virus (HPV) vaccine. Half of the dyads were asked to discuss the ad at completion of exposure and half were not given these instructions. A follow-up analysis was also conducted to see if conversations occurred outside the laboratory in the days following ad exposure. These authors were looking at the effect of conversation on perceived norms, attitudes, and intentions to obtain the vaccine. They also examined how ad format (narrative or advocacy) was related to outcomes. The ad format did not predict outside discussion during the follow-up period. Instructed discussion (e.g., the discussion occurring in the laboratory) showed mixed results. Discussion improved attitudes towards the vaccine, but had no effect on perceived norms, and in the narrative format, actually lowered intentions to obtain the vaccine. The authors concluded that discussion of ads within friendship dyads may improve the social acceptability of and attitudes towards a health message. However, discussing the ads may also lower intentions to act by depersonalizing the experience and lowering perceptions of personal risk. It is important to note that this study did not examine the effects of ad effectiveness on participants recruited as individuals, without a friend

present. As such, it is not possible to examine how the mere presence of a friend may have altered the outcomes.

Saba and Valente (1998) conducted one of the earlier studies looking at the effects of social network processes on campaign influence. Their study differs from the ones reviewed above in that they examined larger social networks (up to five peers that the target individual reporting associating with on a regular basis). The authors hypothesized that the interaction between an individual's ad exposure (both television and radio) to family planning practices and personal network exposure to family planning practices would work synergistically to enhance the individual's attitudes and intentions towards family planning.   They found that both ad exposure and personal network exposure were associated with individual outcomes, but the interaction of these two influences was not significant. The authors proposed a substitution model to explain this result: people rely on either media or personal networks to make health decisions, but not both.

The above studies provide promising albeit modest evidence that television ad campaigns can be enhanced via social influences. It seems plausible that exposing a dyadic social network to a health-related ad may enhance the effectiveness of the ad by improving both individuals' likelihood of altering behaviors.

Summary

Reducing sugary drinks consumption is a public health priority, as increases in sugary drinks consumption over the past few decades have been linked to increases in obesity, diabetes, and other health problems. Media campaigns have been successful in

improving public health in other areas, particularly in reducing the use of tobacco, and offer a model for addressing the reduction of sugary drinks.

It is theorized that campaigns achieve their effects by promoting new norms of behavior that influence one's attitudes and intentions towards changing unhealthy behavior. Social influence effects seem to be a primary way in which new behavioral norms are developed and promoted. Indeed, campaigns that utilize aspects of social influence, such as interpersonal discussion and social network exposure, seem to enhance the effectiveness of campaign objectives. More empirical studies examining the link between social networks, interpersonal discussion, and campaign effectiveness would be helpful in the design and dissemination of large-scale public health campaigns.

Study Objectives

The current study examined whether brief exposure to anti-sugary drinks television ads: a) increased knowledge of the health issues associated with consuming sugary drinks; b) shaped attitudes consistent with decreasing sugary drinks consumption; c) increased intentions to reduce sugary drinks consumption; and d) decreased sugary drinks consumption for one week following exposure. Furthermore, the current study aimed to determine whether the effectiveness of anti-sugary drinks television ads was increased by facilitating social influence factors. Specifically, the study examined whether viewing anti-sugary drinks ads with a friend and/or discussing the ads with another person, either a stranger or a friend, increased the likelihood of changing participants' knowledge about sugary drinks consumption and health outcomes, attitudes toward sugary drinks consumption, intentions to change sugary drinks consumption, and changes in sugary drinks consumption for one week after exposure. The decision to

evaluate changes in knowledge, attitudes, behavioral intent, and behavior is based in the

Theory of Planned Behavior (Armitage & Christian, 2003). In addition, because social

norms are important factors in an individual's attitude towards behavior change

(Armitage & Christian, 2003; McAlister et al., 2008) a measure of perceived social norms

for sugary drinks consumption was included in the evaluation.

The study used two experimental manipulations, both having two levels, to

examine the social influence factors of interest (e.g., social network influences and

discussion influences). The first manipulation, designed to examine social network

influences, was that of Friend Presence; participants were recruited to attend the study

session either with or without a friend (hereafter referred to as the With Friend and

Without Friend conditions). The second manipulation, designed to examine discussion

influences, was that of Discussion; in both the With Friend and Without Friend groups,

half of the participants were asked to discuss the ads after viewing them, while half were

not given these instructions. The two Discussion conditions are hereafter referred to as

With Discussion and Without Discussion. These manipulations resulted in four

experimental groups: One group wherein participants attended the session with a friend

and discussed the ads with this friend after viewing them (With Friend/With Discussion),

one group wherein participants attended the session with a friend but did not discuss the

ads after viewing them (With Friend/Without Discussion), one group where participants

attended the session without a friend, but discussed the ads with another participant after

viewing them (Without Friend/With Discussion), and one group wherein participants

attended the session without a friend and did not discuss the ads with anyone after

viewing them (Without Friend/Without Discussion). Participants' knowledge, attitudes,

social norm perceptions, and intentions related to reducing sugary drinks consumption were assessed before and immediately after viewing the ads, and at one week follow-up. Participants' consumption of sugary drinks was also assessed immediately before viewing the ads and again at the one week follow-up.

It was hypothesized that brief exposure to anti-sugary drinks television ads would increase participants' knowledge about sugary drinks and health outcomes, decrease negative attitudes toward sugary drinks consumption, increase intentions to decrease sugary drinks consumption, and reduce consumption of sugary drinks for one week following exposure to the ads. It was also hypothesized that individuals who watched and discussed the anti-sugary drinks ads with friends would show the greatest increases in knowledge about sugary drinks consumption and health outcomes, the greatest changes in attitudes supporting reduced sugary drinks consumption, the largest increases in intentions to reduce sugary drinks consumption, and the greatest reductions in sugary drinks consumption. Based on the literature reviewed above regarding the importance of interpersonal discussion to ad effectiveness, it was also hypothesized that the individuals without a friend present but who did discuss the ads with another participant would have the next greatest change in knowledge, attitudes, and behavior, followed by participants that attended the study with a friend but did not discuss the ads. Finally, it was hypothesized that participants viewing the ads without a friend and without discussing the ads with another participant would show the smallest changes in knowledge, attitudes, intentions, and behaviors related to sugary drinks consumption.

CHAPTER III

METHOD

Participants

Participants ($N = 125$), aged 18 years and older, were recruited from the

population of University of North Dakota undergraduate students. G*Power (Buchner,

Erdfelder, Faul, & Lang, 2006) analysis showed that 98 participants were needed for this

study's design to detect an estimated medium effect size ($f = 0.25$), with a 0.5 correlation

among repeated measures, and 0.8 power. Of the 125 participants recruited, 16 (13%)

did not complete follow-up data, resulting in a final sample size of 109 individuals.

Independent sample t-tests were conducted between individuals that completed follow-up

and individuals that did not complete follow-up on key characteristics, including: age,

sex, race, knowledge about sugary drinks and health outcomes at pre-test, attitudes

toward reducing sugary drinks at pre-test, total daily sugary drink consumption at pre-

test, and intentions to reduce sugary drinks at pre-test. Completers were not significantly

different from non-completers on any of the above variables, with the exception of daily

sugary drinks consumption. Non-completers were reporting significantly higher ($p < .05$)

daily sugary drinks consumption at pre-assessment ($M = 2.12$) than completers ($M =$

1.25).

Participants in this study were predominately female ($n = 80$, 73.4% of the

sample). However, previous research has not found gender to be a significant factor in

campaign effectiveness, and further, other studies in this area have reported that

participants were primarily female (Leshner, Bolls, & Thomas, 2009), or only female (Dunlop, Kashima, & Wakefiled, 2010) participants. Table 1 displays additional demographic characteristics for participants in this sample by experimental condition.

Table 1

Demographic Characteristics of Participants by Experimental Condition.

Demographic Characteristics	With Friend/ With Discussion	With Friend/ Without Discussion	Without Friend/ With Discussion	Without Friend/ Without Discussion
Age[a]	19.24 (0.92)	18.96 (3.63)	19.68 (1.25)	20.00 (2.65)
Sex[b]				
Men	29.4	35.7	13.6	24.0
Women	70.6	64.3	86.4	76.0
Race[b]				
White	79.4	100.0	90.9	88.0
Black	8.8	0	0	4.0
Asian	2.9	0	4.5	4.0
Other	2.9	0	4.5	4.0
Marital Status[b]				
Single	47.1	64.3	77.3	80.0
Married	5.9	0	0	0
Committed Relationship	47.1	35.7	22.7	20.0
Yearly Income[b]				
Less than $10k	94.1	85.7	95.5	92.0
$10k-$25k	0.0	14.3	4.5	4.0
$25k - $50k	5.9	0	0	4.0

[a] Data is presented as the mean for each condition (with standard deviations).

[b] Data is presented as percent in each condition

Measures

  Demographics. Participants provided demographic information on their age, sex, race/ethnicity, income level, and marital status (appendix A). Table one presents these demographic data by experimental condition.

  Friendship Rating Scale (FRS). Participants completed the Friendship Rating Scale (FRS) if they attended the laboratory session with a friend or if they attended the laboratory session without a friend but still discussed the ads with another participant during the session (With Friend/With Discussion and With Friend/Without Discussion groups completed the FRS about the friend who attended the laboratory session with them, while participants in the Without Friend/With Discussion group completed the FRS about the participant with whom they were assigned to discuss the ads). The FRS (appendix B) was developed for use in this study as a way to measure the quality of the friendship manipulation. The FRS included questions about how long participants had known their friend/discussion partner, how they described the nature of the relationship, and their perceptions of the social support they receive from the person. These last four items were adapted from the Friends subscale from the Multidimensional Scale of Perceived Social Support (MSPSS). This scale was developed by Zimet and colleagues (1988) for use as a simple research tool to measure perceptions of social support from three distinct sources: family, friends, and significant others. Items are scored on a Likert scale, with higher scores reflecting greater perceived social support. The MSPSS as a whole, as well as the Friends subscale alone, has demonstrated good internal consistency, test-retest reliability, and adequate construct validity in college samples (Clara, Cox,

Enns, Murray, & Torgrudc, 2003; Zimet, Dahlem, Simet & Farley, 1988). The FRS was completed at pre-assessment only.

Knowledge about sugary drinks consumption and health outcomes (Knowledge Questionnaire). Knowledge of a campaign's message is an important precursor to change in attitudes and behavior, and should be included as a proximal measure of campaign effectiveness in evaluation studies (Bauman, Smith, Maibach, & Reger-Nash, 2006). Participants' knowledge about the relationship between sugary drinks consumption and health outcomes was measured using a nine-item, self-report measure labeled for this study as the Knowledge Questionnaire (appendix C). Participants responded to nine statements regarding the general relationship between sugars and various health outcomes, as well as specific information about sugary drinks consumption. Participants rated how true they believed the nine statements were on a 1 to 7 Likert scale. The scale was designed in this way to be consistent with the other measurement scales used in this study and to best capture variations in participant knowledge. Higher scores on items 1 – 7, and lower scores on items 8 and 9, reflected better knowledge about the relationships between sugary drinks consumption and health outcomes. Items 8 and 9 were reversed scored, so that higher scores on this measure reflected better sugary drinks and health knowledge.   Items 1 and 2 were adapted from the 1995 Diet and Health Knowledge Survey conducted by the United States Department of Agriculture (Obayashi, Bianchi, & Song, 2003). The remaining six items were specific to this study, and assessed the participants' knowledge of sugary drinks as it related to various health outcomes.   The Knowledge Questionnaire was given at the pre-,

post-, and one-week follow-up assessments. The questionnaire showed adequate reliability (Cronbach's α at pre-assessment = .68) in the present sample.

Attitudes toward reducing sugary drinks consumption (Attitudes Questionnaire). Attitudes towards reducing sugary drinks consumption were assessed by asking participants to respond to the prompt, "To me, reducing the amount of sugary beverages that I drink would be…". This prompt was followed by four pairs of opposing adjectives presented on a 7-point scale (appendix D). The opposing attitude adjectives were "harmful –beneficial", "inconvenient-convenient", "unpleasant-pleasant", "unacceptable-acceptable". Participants were asked to select the point along each scale that best reflected their attitude toward reducing sugary drinks consumption. The mean of the four scales was used as a measure of attitude towards reducing sugary drinks consumption, with higher scores reflecting more positive attitudes towards reducing consumption. These questions and procedures were based on recommendations for measurements of Theory of Planned Behavior constructs (Montano & Kasprxyk, 2008) and are adopted from previous research using the Theory of Planned Behavior to predict fast-food consumption (Dunn, Mohr, Wilson, & Wittert, 2011). This scale showed good reliability in the current sample (Cronbach's α at pre-assessment = .78).

Social norms perceptions. Measurement of social norms for sugary drinks consumption was included on the Attitudes Questionnaire. Research suggests that both descriptive norms (what others *actually* do) and injunctive/subjective norms (what others think or expect you *ought* to do) are both important aspects of social norm perception (Dohnke, Weiss-Gerlach, & Spies, 2011; Dunn, Mohr, Wilson, & Wittert, 2011). Descriptive norms were measured using a method adopted from Sorensen and colleagues

(2007). Participants were asked, "To the best of your knowledge, how many of your friends drink less than three 12-ounce servings of soda, sports or energy drinks, or other sugary drinks each week, not including diet beverages?"   Response categories range from 1 (no friends) to 7 (all of them). Consuming less than three 12-ounce servings of sugary drinks per week is the health standard recommended by the American Heart Association (2012). Higher scores on this item reflected greater descriptive social norms for reducing sugary drinks consumption. Injunctive social norms for sugary drinks consumption were measured using methods adopted from Dohnke and colleagues (2011) and Dunn and colleagues (2011). Participants were asked to rate on a Likert scale ranging from 1 (not at all true) to 7 (very true) the extent to which they agree with the statement "Most people who are important to me think I should reduce my sugary drink consumption." Higher scores on this item reflect greater injunctive norms for reducing sugary drinks consumption.

   Intentions to change sugary drinks consumption (Intentions Questionnaire). Intention to change sugary drinks consumption was assessed by asking participants if they intended to change the amount of their consumption of ten different beverages over the course of the next week. Participants could choose either, "Yes, I plan to increase consumption", "Yes, I plan to decrease consumption", or "No, I do not plan to change the amount I consume" (appendix E). Intentions to adopt healthier behaviors (e.g., increase consumption of non-sugary drinks and decrease consumption of sugary drinks) were scored in the positive direction (1), intentions to adopt unhealthier behaviors (e.g., decrease consumption of non-sugary drinks and increase consumption of sugary drinks) were scored in the negative direction (-1), and no intentions to change were scored 0.

Specifically, for sugary drinks (e.g., regular soda, other sugar sweetened beverages, sweetened energy drinks, and sweetened sports drinks), intentions to increase consumption were scored -1, no intentions to change were scored 0, and intentions to reduce consumption were scored 1. For non-sugary drinks (e.g., low-fat/no fat milk, regular milk, coffee or tea, water, 100% fruit juice, diet soda) intentions to increase consumption were scored 1, intentions to decrease were scored -1, and no intention to change was scored 0.

Intentions to change for the four sugary drinks were summed to get a total score for intentions to reduce sugary drinks, which could range from -4 to 4, with higher scores on this measure reflecting greater intentions to reduce overall sugary drinks consumption.

If participants indicated that they planned to change their consumption (e.g., increase or decrease), they were then asked to rate the extent to which they felt ready to change their intake on a Likert scale ranging from 1 (not at all ready) to 7 (very ready to change), with higher scored reflecting greater readiness to change consumption level.

Sugary drinks consumption (Consumption Questionnaire). Sugary drinks consumption was determined by asking participants to rate how often they drank ten different beverages during the past week. Beverages included: 100% fruit juices, regular soda, diet-soda, sweetened sports drinks, sweetened energy drinks, non-sweetened coffee, coffee drinks, and tea, other sugar sweetened beverages (e.g. lemonade, sweetened tea, etc.), water, regular milk, and low-fat or no-fat milk (appendix F). Response options included: I did not drink this beverage during the past seven days; 1-3 times during the past seven days; 4 – 6 times during the past seven days; 1 time per day; 2 times per day; 3 times per day; and 4 or more times per day. These questions were adapted from the 2010

National Youth Physical Activity and Nutrition Survey (NYPANS) developed by the Centers for Disease Control and Prevention (CDC, 2012).

Consistent with previous research (Park, Blanck, Sherry, Brener, & O'Toole, 2012), participants' weekly intake of sugary drinks was converted to daily intake. For example, the response option "1-3 times in the past seven days" was converted to a response of 0.29 times per day (2 divided by 7). "Four to 6 times in the past seven days" was converted to 0.71 times per day. Four or more times per day was converted to 4 times per day. Items classified as sugary drinks (regular soda, other sugar sweetened beverages, sweetened sports drinks, and sweetened energy drinks) were then summed to get an index of total daily sugary drinks consumption. Higher scores on this index indicate greater daily consumption of sugary drinks. Sugary drinks consumption was measured at pre-assessment and at one week follow-up.

For the sweetened sports drinks item, participants completed one additional follow-up question asking them to indicate what percent of sweetened sports drinks consumed over the past week was consumed during or immediately following exercise. This question was included because the American College of Sports Medicine recommends the consumption of carbohydrate-containing fluids during or immediately following intense physical exercise in order to prevent dehydration, delay fatigue, and maintain oxidation of carbohydrates (Convertino et al., 1996).

Advertisements

The ads used in this study came from the New York City Department of Health and Mental Hygiene (NYC DOH) "Pouring on the Pounds" campaign - a health education campaign that addresses the negative health effects of consuming sugary

drinks. This campaign posted flyers, posters, and aired 30-second media bits throughout New York City. The campaign has introduced five television and internet ads that use various marketing techniques to promote reductions in sugary drinks consumption (NYC DOH, 2011). These ads are titled by the NYC DOH as "Do you drink yourself fat?", "Man eating sugar", "Pouring on the pounds", "Man walking off soda.", and "50 Pounds". Please see appendix G for a description of each advertisement, as provided by NYC DOH.

Procedure

Recruitment. Participants were recruited through the online data management system utilized by the University of North Dakota (SONA Systems, Ltd. Version 2.72; Tallinn, Estonia). The study's description indicated that only individuals regularly consuming sugary drinks were eligible for participation. Regular consumption was defined as consuming at least one sugary drink a week. This qualifier was necessary to ensure that participants were candidates for reducing sugary drinks consumption (e.g., were members of the study's target population).

After sign-up, participants were randomly assigned to one of four experimental groups (see below for more information). Participants were notified via email if they needed to bring a friend with them to the laboratory.

Eligible participants were offered a total of one and a half hours of extra credit for their participation (one hour for the first session and a half an hour for the follow-up session). Participants were also given the chance to be entered into a drawing for a to-be-determined prize of approximately $200 value at conclusion of the study. All participants signed an informed consent to participate.

Experimental groups. In order to examine the social influence effects of interest (e.g., social network exposure and discussion), this study utilized two primary experimental manipulations: Friend Presence (intended to examine the effect of social network exposure) and Discussion (intended to examine the effect of discussion). Friend Presence had two levels: With Friend and Without Friend. In the With Friend conditions, participants attended and participated in the study with a friend present. In the Without Friend conditions participants participated in the study without a friend present. Discussion also had two levels: With Discussion and Without Discussion. In the With Discussion conditions, participants discussed the ads after viewing them. In the Without Discussion conditions, there was no discussion of the ads after exposure. These manipulations resulted in four groups, described in more detail below: With Friend/With Discussion, With Friend/Without Discussion, Without Friend/With Discussion, and Without Friend/Without Discussion. Participants were randomly assigned at recruitment to one of these four groups.

With Friend/With Discussion. Random assignment resulted in 34 people in the With Friend/With Discussion group. Participants in this group participated in the study with a friend present. Specifically, participants randomly assigned to this group were sent an email at sign-up that asked them to bring a friend to the laboratory with them ($n = 17$). A friend was defined to the participant as "A person who you enjoy doing things together with, count on to support you when you need it, provide support to when he or she needs it, and someone with whom you talk about everyday life, problems, concerns, ideas, and intimate thoughts." This definition was adapted from Demir and Orthel (2011, pg. 179). This definition was intended to help participants clearly identify what is meant

by a friend and is consistent with definitions offered in the empirical literature. Participants that were brought to the study via the friend recruitment method were included as participants, and after providing informed consent to participate, completed all the same measures as other participants. These individuals were also offered extra course credit for their participation.

Friends were asked to sit next to one another during the study session. After viewing the ads, the friends were also asked to discuss their reactions to the ads with one another. Specifically, the instructions given to this group stated: "Please briefly discuss your reaction to the ads with the friend that came to the lab with you. You have five minutes to discuss the ads. You can talk about your reactions to the ads, what you liked or disliked about the ads, and how you think the ad applies to your own life".

With Friend/Without Discussion. Random assignment resulted in 28 people in the With Friend/Without Discussion group. Like participants in the With Friend/With Discussion group, participants in this group participated in the study with a friend. Fourteen individuals were sent emails following sign-up that asked them to bring a friend with them to the study session. However, unlike the With Friend/With Discussion group, participants in this group were not given instructions to discuss the ads following exposure.

Without Friend/With Discussion. Random assignment resulted in 22 people in the Without Friend/With Discussion group. Participants in this group did not attend the study session with a friend, but rather were asked to come alone to the session. After viewing the ads, participants in this group were asked to discuss their reactions to the ads with another individual in the laboratory session. Discussion occurred in dyads. The

instructions for discussion were: "Please briefly discuss your reaction to the ad with the person sitting next to you. You have five minutes to discuss the ads. You can talk about your reactions to the ad, what you liked or disliked about the ad, and if you think the ad applies to your own life". If there was an uneven number of people in the study session, groups of three were formed as necessary.

Without Friend/Without Discussion. Random assignment resulted in 25 people in the Without Friend/Without Discussion group. Participants in this group did not attend the study session with a friend. They were not instructed to discussion the ads with anyone after viewing them.

Laboratory Session. Upon arriving to the laboratory all participants read and signed the informed consent. All participants completed the pre-test packet of measures, including: the Demographic Measure, the Knowledge Questionnaire, the Attitudes Questionnaire, the Intentions Questionnaire, and the Consumption Questionnaire. Participants in both With Friend groups, and those in the Without Friend/With Discussion group completed the Friendship Rating Scale.

Participants then viewed a series of five advertisements projected onto the front-board of the classroom via a PowerPoint presentation. The order of the ads was consistent across groups, as follows: Pouring on the Pounds, Man Eating Sugar, 93 Sugar Packets, 50 Pounds, Man Walking Off Sugar. This order reflects the release dates of these ads by the NYC Pouring on the Pounds campaign and as such was intended to replicate the natural exposure to these ads in NYC (NYCDOH, 2012).

In both With Discussion groups, five minutes were allotted to discussing the ads following exposure.   In the Without Discussion groups, no instructions for discussion were given.

Finally, all participants were asked to fill-out the post-intervention assessments: the Knowledge Questionnaire, the Attitudes Questionnaire, and the Intentions Questionnaire. Following completion of the session, participants were thanked for their time and given instructions for completing the follow-up portion of the study.

Follow-up. The follow-up session was conducted on-line through the University of North Dakota's Qualitrics data management system. Participants were sent an email in the morning of exactly one week following their laboratory session. This email provided a link to complete the follow-up questionnaires online. The follow-up questionnaires included the Knowledge Questionnaire, the Attitudes Questionnaire, the Intentions Questionnaire, and the Consumption Questionnaire. Participants' responses to the follow-up measures were matched to their earlier data using an identification number only.

Participants that did not complete the follow-up measures within 24 hours were sent a reminder email, asking for completion in the next 24 hours. If a participant did not respond within 48 hours of the initial follow-up email, their data was excluded from analyses.

Data Analysis

First, preliminary descriptive analyses were examined to ensure that data were appropriately distributed for parametric statistics and log transformations were considered when data distributions were abnormal. Next, a one-way analysis of variance

(ANOVA) was conducted to ensure that the experimental manipulation of Friend Presence was achieved. This analysis examined whether or not there were group differences between participants attending the laboratory session with a friend (in both the With Discussion and Without Discussion groups) and participants not attending with a friend but discussing the ads with another participant after viewing them (Without Friend/With Discussion). This analysis was intended to determine if participants in the both the With Friend groups had higher Friendship Rating Scale scores (indicative of a supportive friendship) than participants in the Without Friend/With Discussion group.

Next, five 2 (Friend Presence: With Friend versus Without Friend) x 2 (Discussion: With Discussion versus Without Discussion) by 3 (Assessment: Pre, Post, and Follow-up) mixed ANOVAs were conducted to examine changes in knowledge about sugary drinks consumption and health outcomes (Knowledge Questionnaire), attitudes toward reducing sugary drinks consumption (Attitudes Questionnaire), perceived social norms regarding sugary drinks consumption (Attitudes Questionnaire), and intentions to change sugary drinks consumption (Intentions Questionnaire) across the three assessments. In these analyses, Friend Presence and Discussion were between-subject factors, while Assessment was a within-subject factor. Significant interactions were followed-up using simple effects analyses. All F tests associated with repeated measures were adjusted for sphericity as necessary by using Greenhouse-Geisser epsilon estimates. Also, to examine differences in intentions to change consumption by experimental condition, chi-square analyses of intentions to change sugary drinks consumption were conducted for each type of sugary drink at Pre-, Post-, and Follow-up assessment.

Next, a series of 2 (Friend Presence) by 2 (Discussion) between subjects

ANOVAs were conducted to examine readiness to change scores for participants that

indicated an intention to reduce sugary drink consumption at Pre-, Post-, and Follow-up

assessment. An ANOVA was conducted for each type of sugary drink at all three

assessments. For each ANOVA, only participants that indicated an intention to reduce

consumption at that assessment point were included in the analysis. Significant

interactions were followed-up using simple effects analyses.

Frequency and descriptive analyses were conducted on total daily sugary drinks

consumption across participants in order to understand the level of sugary drinks

consumption in the present sample. These analyses were also conducted for each type of

sugary drink. Finally, a 2 (Friend Presence) x 2 (Discussion) by 2 (Assessment: Pre and

Follow-up) mixed ANOVA was also conducted to examine differences in total daily

sugary drinks consumption (Consumption Questionnaire) from Pre- to Follow-up

assessments. Again, Friend Presence and Discussion were between-subject factors, while

Assessment was a within-subject factor. Additionally, 2 (Friend Presence) x 2

(Discussion) by 2 (Assessment) mixed ANOVAs were conducted for each of the four

sugary drinks to determine if there were significant differences in consumption levels

from Pre- to Follow-up assessment. Significant interactions were followed-up using

simple effects analyses. All F tests associated with repeated measures were adjusted for

sphericity as necessary by using Greenhouse-Geisser epsilon estimates.

CHAPTER IV

RESULTS

Descriptive Analyses

Descriptive statistics for the measures used in this study are presented in table 2

and by experimental condition in table 3.   Data were examined to determine

appropriateness for use with a mixed model, repeated measures design (Howell, 2010).

For variables with questionable distributions (as indicated by skewness and kurtosis),

analyses were conducted on log transformed data. However, transformations did not alter

outcomes; therefore, all analyses presented were conducted on non-transformed data.

Friend Presence Manipulation Check

In order to examine differences in perceived social support of participants self-

selecting as friends from those participating in a discussion without a friend present, a

one-way ANOVA (Friend Presence) was conducted on Friendship Rating Scale scores,

selecting only for participants in the With Friend/With Discussion, With Friend/Without

Discussion, and Without Friend/With Discussion groups. Results indicated a significant

effect of Friend Presence, $F(2, 81) = 126.76$, $p < .001$. Post-hoc analyses using Tukey's

honestly significant difference test indicated that participants in both the With

Friend/With Discussion and With Friend/Without Discussion groups were significantly

different ($p < .001$) from participants in the Without Friend/With Discussion group, but

these participants (e.g., those within the With Friend groups) were not significantly

different from one another. Participants in the With Friend/With Discussion group and the With Friend/Without Discussion group had significantly higher DRS scores ($M =$ 23.97, $SD = 4.81$ and $M = 22.5$, $SD = 5.12$, respectively) than participants in the Without Friend/With Discussion group ($M = 8.19$, $SD = 6.28$). Participants that were recruited and self-described themselves as friends reported significantly higher perceived social support than did individuals that participated in the discussion with someone they did not self-select as a friend.

Table 2

Means, Standard Deviations, and Distribution Characteristics for the Dependent Variables at Pre-, Post-, and Follow-up Assessments

Measure	Mean	Standard Deviation	Skewness	Kurtosis
Pre-Assessment				
Friendship Rating Scale	18.55	8.60	-0.54	-1.04
Knowledge	51.51	6.00	-0.52	0.49
Attitudes	5.38	1.06	-0.14	-0.79
Descriptive Norms	3.42	1.59	0.23	-0.87
Injunctive Norms	2.02	1.46	1.57	1.84
Consumption (times/day)	1.25	1.31	1.97	4.50
Intentions	0.85	1.11	0.84	0.51
Post-Assessment				
Knowledge	58.87	4.22	-1.43	2.92
Attitudes	5.96	1.02	-0.76	-0.60
Descriptive Norms	3.51	1.75	0.28	-1.02
Injunctive Norms	2.30	1.76	1.23	0.33
Intentions	1.53	1.36	0.40	-0.87
One Week Follow-up				
Knowledge	56.85	5.26	-1.22	1.48
Attitudes	5.89	1.11	-0.72	-0.47
Descriptive Norms	3.54	1.57	0.44	-0.41
Injunctive Norms	2.43	1.71	1.08	0.08
Consumption (times/day)	0.73	0.88	2.31	6.58
Intentions	0.96	1.30	1.09	0.74

Table 3

Means and Standard Deviations of Dependent Measures by Experimental Condition

Measure	With Friend/ With Discussion	With Friend/ Without Discussion	Without Friend/ With Discussion	Without Friend/ Without Discussion
Pre-Assessment	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Friendship Rating Scale	23.97 (4.81)	22.5 (5.12)	8.19 (6.06)	11.55 (6.33)
Knowledge	51.35 (5.40)	49.57 (5.32)	53.68 (4.39)	52.00 (7.96)
Attitudes	5.14 (1.02)	5.13 (1.13)	5.77 (0.95)	5.62 (1.02)
Descriptive Norms	3.09 (1.62)	3.39 (1.62)	3.91 (1.41)	3.48 (1.66)
Injunctive Norms	2.00 (1.56)	2.07 (1.65)	2.05 (1.50)	1.96 (1.27)
Consumption (times/d)	1.37 (1.56)	1.36 (1.43)	1.02 (1.05)	1.15 (0.99)
Intentions	0.97 (1.08)	0.69 (1.09)	0.82 (1.22)	0.91 (1.11)
Post-Assessment				
Knowledge	58.15 (4.02)	58.96 (3.51)	60.18 (2.86)	58.56 (5.86)
Attitudes	5.86 (1.03)	5.66 (1.04)	6.25 (0.90)	6.17 (1.05)
Descriptive Norms	3.21 (1.79)	3.43 (1.53)	4.27 (1.67)	3.33 (1.90)
Injunctive Norms	2.50 (1.96)	2.43 (1.83)	2.09 (1.63)	2.04 (1.55)
Intentions	1.47 (1.08)	1.50 (1.39)	1.82 (1.56)	1.39 (1.53)
One Week Follow-up				
Knowledge	56.88 (4.19)	56.93 (5.07)	56.43 (6.00)	57.00 (6.41)
Attitudes	6.06 (1.07)	5.82 (1.07)	6.21 (0.94)	5.47 (1.28)
Descriptive Norms	3.26 (1.52)	3.46 (1.55)	4.27 (1.42)	3.40 (1.68)
Injunctive Norms	2.32 (1.65)	2.43 (1.73)	2.57 (1.66)	2.52 (1.90)
Consumption (times/d)	1.01 (1.11)	0.83 (1.04)	0.49 (0.55)	0.51 (0.41)
Intentions	1.03 (1.14)	0.82 (1.19)	1.14 (1.21)	0.92 (1.50)

Knowledge about Sugary Drinks Consumption and Health Outcomes

A 2 (Friend Presence) x 2 (Discussion) x 3 (Assessment) mixed model ANOVA was conducted to determine the effect of Friend Presence, Discussion, and Assessment on participants' knowledge about sugary drinks consumption and health outcomes. Friend Presence and Discussion were between-subject factors, while Assessment was a within-subject factor. Results, using Greenhouse-Geisser adjustments, indicated a significant main effect of Assessment, $F(1.77, 179.50) = 114.31$, $p < .001$, $\eta^2 = 0.53$, and a significant interaction of Friend Presence by Assessment, $F(1.77, 179.50) = 3.50$, $p < .05$, $\eta^2 = 0.03$ (see figure 1). No other main effects or interactions were significant.
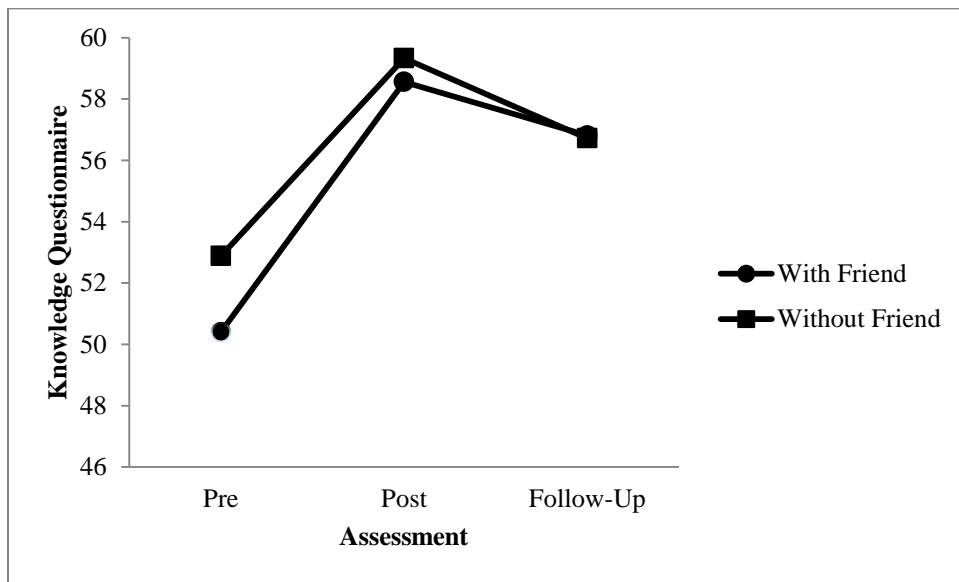
Figure 1. *Effect of Friend Presence and Assessment on Participants' Knowledge about Sugary Drinks Consumption and Health Outcomes. Knowledge was measured using the Knowledge Questionnaire, with higher scores reflecting better knowledge about sugary drinks consumption and health outcomes.*

Follow-up of the main effect of Assessment, using Bonferroni adjustment for multiple comparisons, revealed that participants, regardless of experimental condition, had significantly higher knowledge scores from pre-assessment ($M = 51.62$, $SE = 0.59$) to

post-assessment ($M = 58.95$, $SE = 0.42$), and from pre-assessment to follow-up

assessment ($M = 56.76$, $SE = 0.53$) but that their knowledge declined significantly from

post- to follow-up assessment.

Simple effects analysis performed on the significant Friend Presence by

Assessment interaction did not reveal any significant differences between With Friend

and Without Friend groups at pre-, post-, or follow-up assessment periods, although there

was a trend toward a significant group difference at pre-assessment, $F(1, 107) = 3.84$, $p =$

.053, $\eta^2 = .035$, with participants in the Without Friend group condition having slightly

higher knowledge scores ($M = 52.79$, $SD = 6.53$) than participants in the With Friend

condition ($M = 50.55$, $SD = 5.40$). Simple effects analysis of the effect of Assessment

within Friend Presence revealed that the same pattern of change in knowledge occurred

for participants in both the With Friend and Without Friend conditions. Specifically,

multiple comparisons using Bonferroni adjustments indicated that, participants in the

With Friend condition showed significant increases in knowledge from pre-assessment

($M = 50.45$, $SD = 5.39$) to post-assessment ($M = 58.53$, $SD = 3.82$) and from pre- to

follow-up assessment ($M = 56.80$, $SD = 4.54$), but showed a significant decline in

knowledge from post-assessment to follow-up. Participants in the Without Friend

condition demonstrated the same pattern of change in knowledge; they gained knowledge

from pre-assessment ($M = 52.82$, $SD = 6.67$) to post-assessment ($M = 59.27$, $SD = 4.79$)

and from pre-assessment to follow-up assessment ($M = 56.73$, $SD = 6.15$), and they also

showed a significant decline in knowledge from post-assessment to follow-up.

Attitudes Toward Reducing Sugary Drinks Consumption

A 2 (Friend Presence) x 2 (Discussion) x 3 (Assessment) mixed model ANOVA was conducted on participants' mean attitude score, as derived from the Attitudes Questionnaire. Using the Greenhouse-Geisser adjustment to account for deviations from sphericity, results revealed a significant main effect for Assessment, $F(1.85, 184.78) = 23.51$, $p < .001$, $\eta^2 = .190$, and a significant Friend Presence by Assessment interaction, $F(1.85, 184.78) = 9.37$, $p < .001$, $\eta^2 = .086$ (see figure 2). There were no other significant main or interaction effects.
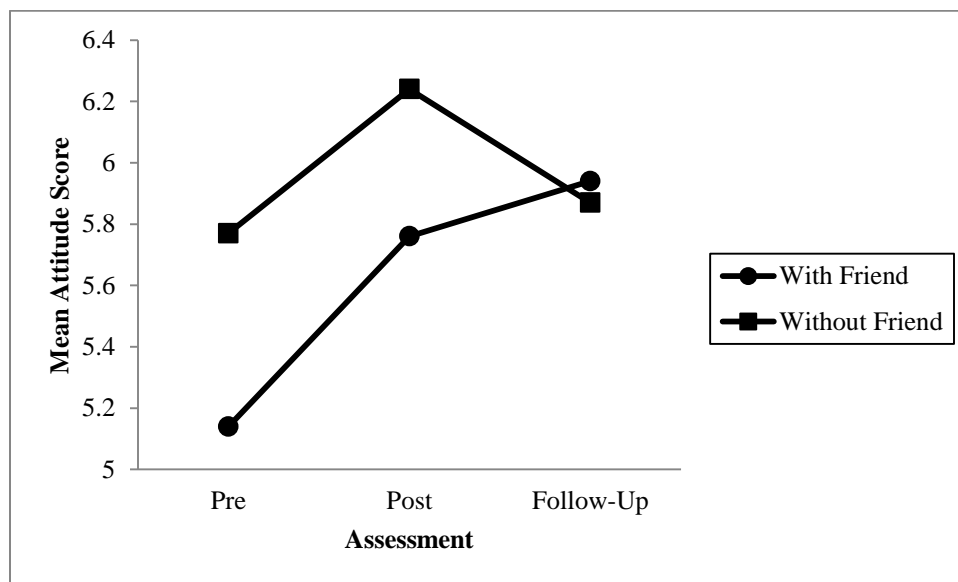
Figure 2. Effect of Friend Presence and Assessment on Participants' Mean Attitude Score, as Measured by the Attitudes Questionnaire. Higher mean attitude scores reflect more positive attitudes toward reducing sugary drinks consumption.

Follow-up analysis of the main effect of Assessment, using Bonferroni's adjustment for multiple comparisons, revealed that participants' attitudes toward reducing sugary drinks consumption became significantly more positive from pre-assessment ($M = 5.45$, $SE = 0.10$) to post-assessment ($M = 5.99$, $SE = 0.10$), and from pre-assessment to follow-up ($M = 5.91$, $SE = 0.11$). The gains in positive attitudes toward reducing sugary

drinks consumption were maintained from post-assessment to follow-up, as indicated by the fact that there was not a significant difference in mean attitude scores across these two assessment periods.

Simple effects analyses were used to follow-up the significant Friend Presence by Assessment interaction. These analyses examined the effect of Friend Presence on mean attitude score at pre-, post-, and follow-up assessments revealing that participants in the With Friend and Without Friend groups were significantly different at pre-assessment, $F(1, 107) = 7.76$, $p < .01$. $\eta^2 = .068$, and at post-assessment, $F(1, 105) = 5.04$, $p < .05$, $\eta^2 = .046$, but not at follow-up, $F(1, 104) = .337$, $p \geq .50$, $\eta^2 = .003$. Specifically, at pre-assessment, participants in the Without Friend conditions had higher attitude scores ($M = 5.69$, $SD = 0.98$) than did participants in the With Friend conditions ($M = 5.14$, $SD = 1.06$). This was also true at post-assessment, with participants in the Without Friend groups showing significantly higher attitude scores ($M = 6.21$, $SD = 0.97$) than participants in With Friend groups ($M = 5.77$, $SD = 1.03$). However, by follow-up, participants in the Without Friend groups were no different from participants in the With Friend groups, and interestingly, although they were not significantly different from one another, participants in the With Friend groups now showed more positive attitudes toward reducing sugary drinks consumption ($M = 5.95$, $SD = 1.07$) than did participants from the Without Friend groups ($M = 5.82$, $SD = 1.18$).

Simple effects analyses were also conducted to examine the changes in attitude scores at the three assessments within the two Friend Presence conditions. These analyses revealed significant main effects of Assessment for participants in the Without Friend conditions, $F(2, 82) = 6.37$, $p < .01$, $\eta^2 = .135$, and for those in the With Friend

conditions, $F(2, 122) = 33.37$, $p < .001$, $\eta^2 = .354$. Follow-up of these analyses, using a

Bonferroni adjustment for multiple comparisons, indicated that participants in the

Without Friend conditions showed significant increases in attitude scores from pre-

assessment ($M = 5.77$, $SE = 0.14$) to post-assessment ($M = 6.24$, $SE = 0.14$), and a

significant decrease in attitude scores from post-assessment to follow-up ($M = 5.90$, $SE =$

0.18) while participants in the With Friend groups demonstrated significant increases in

attitude scores from pre-assessment ($M = 5.14$, $SE = 0.14$) to post-assessment ($M = 5.77$,

$SE = 0.133$), and from pre-assessment to follow-up ($M = 5.95$, $SE = 0.14$), with no loss in

attitude gains from post- to follow-up assessment.

Social Norms Perceptions

Separate 2 (Friend Presence) x 2 (Discussion) x 3 (Assessment) mixed ANOVAs

using Greenhouse-Geisser adjustments for spherecity were conducted to examine

descriptive and injunctive norm ratings, as measured on the Attitudes Questionnaire. The

ANOVA examining descriptive norms showed no significant main effects or interactions,

but the ANOVA exploring injunctive norms revealed a significant main effect of

Assessment, $F(1.41, 144.83) = 4.76$, $p < .05$, $\eta^2 = .044$. Follow-up analyses, using the

Bonferonni adjustment for multiple comparisons, showed that participants' ratings of

perceived injunctive norms increased from pre-assessment ($M = 2.04$, $SE = 0.15$) to post-

assessment ($M = 2.28$, $SE = 0.18$) and from pre-assessment to follow-up ($M = 2.48$, $SE =$

0.17) regardless of experimental condition.

Intentions to Reduce Sugary Drinks Consumption

Tables 4 -6 present descriptive information regarding the number of participants

in each experimental group that reported an intention to increase, decrease, and keep

consumption the same for the ten beverages at pre-, post-, and follow-up assessments.

Chi-square analyses were conducted to determine if there were group differences in the

amount of participants reporting intentions to increase, decrease, or keep consumption the

same for the ten beverages at each assessment point. Results did not reveal any

significant group differences in the amount of participants intending to change

consumption levels for any of the ten beverages at pre-, post-, and follow-up assessment.

Table 4

*Number of Participants by Experimental Condition Indicating an Intent to Decrease,
Increase, or Not Change Regular Milk, Low or No-fat Milk, and 100% Fruit Juice
Consumption at Pre, Post, and Follow-up Assessments*

	Regular Milk			Low or No-Fat Milk			100% Fruit Juice		
	Pre	Po	FU	Pre	Po	FU	Pre	Po	FU
With Friend/ With Discussion									
Decrease	1	3	3	0	0	0	4	6	7
No Change	27	27	25	27	28	27	22	17	25
Increase	4	3	4	4	11	7	7	9	2
With Friend/ Without Discussion									
Decrease	2	2	2	0	0	0	4	7	3
No Change	23	23	24	21	23	24	17	16	21
Increase	1	2	2	6	8	4	6	4	4
Without Friend/ With Discussion									
Decrease	1	1	2	0	0	1	1	10	3
No Change	18	17	17	19	14	13	16	9	18
Increase	3	3	3	3	10	8	5	3	1
Without Friend/ Without Discussion									
Decrease	2	5	2	1	0	2	5	7	3
No Change	17	14	22	20	16	15	13	13	17
Increase	3	4	1	1	7	8	4	3	5

Note. Chi-square analysis indicated that there were no significant differences ($p > .05$) in

intentions to change consumption across assessment periods and groups for any of the

above beverages.

Table 5

Number of Participants by Experimental Condition Indicating an Intent to Decrease, Increase, or Not Change Coffee or Tea, Diet Soda, and Water Intake at Pre, Post, and Follow-up Assessments

	Coffee or Tea			Diet Soda			Water		
	Pre	Po	FU	Pre	Po	FU	Pre	Po	FU
With Friend/ With Discussion									
Decrease	9	14	6	5	9	5	0	0	0
No Change	22	17	28	28	23	27	9	5	10
Increase	2	1	0	0	1	2	23	27	24
With Friend/ Without Discussion									
Decrease	9	12	5	4	8	7	0	0	0
No Change	16	13	21	22	19	21	11	8	10
Increase	2	2	2	0	0	0	16	19	18
Without Friend/ With Discussion									
Decrease	5	6	4	4	5	6	0	0	0
No Change	15	15	18	18	17	16	8	4	5
Increase	1	0	0	0	0	0	14	18	17
Without Friend/ Without Discussion									
Decrease	3	9	6	3	8	6	0	0	0
No Change	18	13	18	19	15	19	9	8	6
Increase	1	1	1	0	0	0	13	15	19

Note. Chi-square analysis indicated that there were no significant differences ($p > .05$) in intentions to change consumption across assessment periods and groups for any of the above beverages.

Table 6

Number of Participants by Experimental Condition Indicating an Intent to Decrease, Increase, or Not Change Regular Soda, Sugar-sweetened Beverage, Energy Drink, and Sweetened Sports Drink Consumption at Pre, Post, and Follow-up Assessments

	Regular Soda			Other Sugar-Sweetened Beverage			Sweetened Energy Drink			Sweetened Sports Drink		
	Pre	Po	FU	Pre	Po	FU	Pre	Po	FU	Pre	Po	FU
With Friend/ With Discussion												
Decrease	13	17	15	11	20	13	3	5	2	6	6	5
No Change	19	15	19	20	12	20	29	28	30	26	27	29
Increase	0	1	0	1	0	0	1	0	0	1	0	0
With Friend/ Without Discussion												
Decrease	11	14	9	6	16	10	3	4	3	4	10	3
No Change	15	13	19	19	10	17	24	23	25	20	15	24
Increase	0	0	0	2	1	1	0	0	0	2	1	1
Without Friend/ With Discussion												
Decrease	8	12	10	6	12	6	3	7	6	2	9	4
No Change	14	10	12	16	10	15	18	15	16	20	13	18
Increase	0	0	0	0	0	1	1	0	0	0	0	0
Without Friend/ Without Discussion												
Decrease	8	8	8	7	12	8	3	5	4	3	8	5
No Change	14	15	17	15	10	17	19	18	20	18	15	19
Increase	0	0	0	0	1	0	0	0	0	1	0	1

Note. Chi-square analysis indicated that there were no significant differences ($p > .05$) in intentions to change consumption across assessment periods and groups for any of the above beverages.

A 2 (Friend Presence) x 2 (Discussion) x 3 (Assessment) mixed ANOVA was conducted on behavioral intention summary scores, as derived from the Intentions Questionnaire. This analysis examined the effect of Friend Presence and Discussion on participants' intentions to reduce total sugary drinks consumption at pre-, post-, and follow-up assessments. Results revealed a significant main effect of Assessment, F(2,

186) = 20.46, *p* < .001, η2 = .180, but no other main effects or interactions were present.

Follow-up of the main effect for Assessment, using a Bonferonni adjustment for multiple comparisons, showed that across groups, all participants' intentions to reduce sugary drinks consumption significantly increased from pre-assessment (*M* = .88, *SE* = .12) to post-assessment (*M* = 1.60, *SE* = .14), but then significantly decreased from post-assessment to follow-up (*M* = .96, *SE* = .13).

A series of 2 (Friend Presence) by 2 (Discussion) ANOVAs were conducted on readiness to change scores for each type of sugary drink at each assessment point, selecting only for participants that reported an intention to decrease consumption of that beverage at that assessment period. A total of twelve ANOVAS were conducted, none of which revealed significant group differences or interaction effects for any of the sugary drinks at any of the assessment points. This indicates that Friend Presence and Discussion did not significantly affect participants' readiness to reduce regular soda, sweetened energy drink, sweetened sport drinks, or other sugar-sweetened beverage consumption at any of the three assessment points.

Sugary Drinks Consumption

Frequency and descriptive analyses were conducted for total daily sugary drinks consumption during the past week at pre-assessment and for daily consumption during the past week of each type of sugary drink at pre-assessment. The mean total consumption of sugary drinks was 1.25 times per day. Regular soda was the beverage with the largest mean daily consumption (0.50 times per day), followed by other sugar-sweetened beverages (mean consumption of 0.46 times per day), sweetened sports drinks (mean consumption of 0.24 times per day), and then sweetened energy drinks (mean

consumption of 0 .06 times per day). The majority of participants in the current sample

(67.9%) reported consuming equal to or less than 1 sugary drink per day during the past

week. About 13.7% of participants consumed greater than 1 but less than 2 sugary drinks

per day. Approximately 3.6% of the sample reported consuming greater than 2 but less

than 3 sugary drinks per day. Approximately 10% of the sample reported consuming

greater than 3 but less than 4 sugary drinks per day. A minority of participants (4.5%)

reported consuming greater than or equal to 4 sugary drinks per day in the past week.

Overall, 78% of the sample reported consuming sugary drinks at levels above the

recommended amount of less than 3 8-ounce servings per week (as suggested by the

American Heart Association; 2012).

Descriptive analyses were also conducted to determine what percent of sweetened

sports drinks were consumed after prolonged periods of exercise in order to determine

whether or not sports drink consumption after exercise should be controlled for in the

following analyses. Of the fifty-one participants that reported drinking one or more

sweetened sports drinks in the past week at pre-assessment, 33.3% reported that none of

their sports drink consumption was preceded by exercise, 39.2% reported that between

5% - 50% of their sport drink consumption was preceded by exercise, 19.6% reported

that 55% - 95% of their sport drink consumption followed a period of exercise, and 7.8%

reported always consuming sweetened sports drinks only after exercise. To determine if

participants consuming sports drinks after exercise were responding differently than

participants that consumed sports drinks in absence of exercise, a 2 (Consumption Pattern

at Pre: Not After Exercise versus After Exercise) x 2 (Assessment: Pre and Follow-up)

mixed model ANOVA was conducted on participants' sweetened sports drink

consumption. Results did not reveal a significant interaction between Consumption

Pattern at Pre and Assessment, indicating that participants were responding the same to

the behavioral assessments regardless of whether or not they consumed sports drinks only

after exercise. Because of this, the results are presented for the total sample, without

controlling for when sports drink consumption occurred.

A 2 (Friend Presence) x 2 (Discussion) x 2 (Assessment) mixed ANOVA was

conducted on participants' total daily sugary drinks consumption scores as measured by

the Consumption Questionnaire. Results revealed a significant main effect of

Assessment, $F(1, 102) = 24.60$, $p < .001$, $\eta^2 = .194$, but no other main or interaction

effects. Regardless of experimental condition, participants' showed significant decreases

in total daily sugary drinks consumption from pre-assessment ($M = 1.23$, $SE = .129$) to

follow-up assessment ($M = 0.711$, $SE = .085$).

A 2 (Friend Presence) x 2 (Discussion) x 2 (Assessment) was also conducted for

each of the four sugary drinks to determine the effects of the interventions on daily

consumption levels for each individual sugary drink. For regular soda, results revealed a

significant main effect of Assessment, $F(1,105) = 16.32$, $p < .001$, $\eta2 = .135$. Across

participants, daily regular soda consumption significantly dropped from pre-assessment

($M = 0.49$, $SE = 0.07$) to follow-up ($M = 0.29$, $SE = 0.04$). There were no other main or

interaction effects. For sweetened energy drinks, there were no significant main or

interaction effects. Participants did not significantly reduce their consumption levels of

this beverage as a result of viewing the ads (M at pre-assessment $= 0.06$, M at follow-up $=$

0.06). For other sugar sweetened beverages, results revealed a significant main effect of

Assessment, $F(1,105) = 12.45$, $p < .01$, $\eta2 = .104$. Across participants, daily other sugar

sweetened beverage consumption significantly dropped from pre-assessment ($M = 0.45$,

$SE = 0.06$) to follow-up ($M = 0.25$, $SE = 0.04$). There were no other main or interaction

effects. For sweetened sports drinks, results revealed a significant main effect of

Assessment, $F(1,104) = 12.12$, $p < .01$, $\eta 2 = .105$. Across participants, daily sweetened

sports drink consumption significantly dropped from pre-assessment ($M = 0.23$, $SE =$

0.04) to follow-up ($M = 0.12$, $SE = 0.02$). There were no other main or interaction

effects. Figure 3 displays the mean change in daily consumptions across participants

from pre- to post assessment for each sugary drink. The beverages with the greatest mean

changes in consumption were regular soda (M change $= 0.20$) and other sugar sweetened

beverages (other SSBs; M change $= 0.20$), followed by sweetened sports drinks (M

change $= 0.11$). The ads did not significantly reduce reported consumption of sweetened

energy drinks (M change $= .00$).
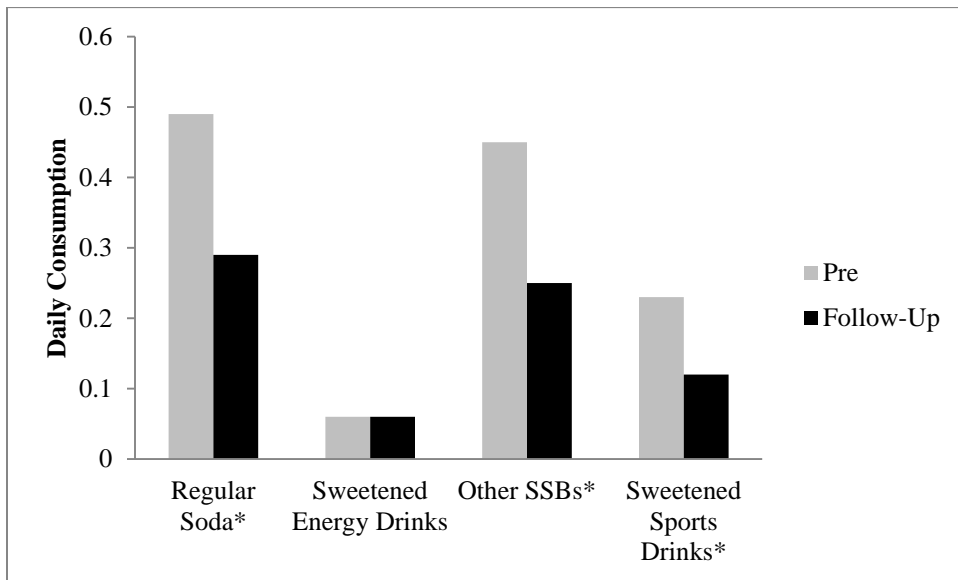
Figure 3. Change in Daily Consumption Levels of Four Sugary Drinks from Pre- to Follow-up Assessment. Beverages marked with a * showed significant (p < .01) declines in consumption across assessment periods.

CHAPTER V

DISCUSSION

The current study examined the effect of anti-sugary drinks television ads on college students' knowledge about sugary drinks consumption and health outcomes, attitudes toward reducing sugary drinks consumption, perceived social norms for sugary drinks consumption, intentions to reduce sugary drinks consumption, and actual self-reported sugary drinks consumption. In addition, the current project examined how social network exposure – defined as viewing the ads with a friend – and discussion of the ads following viewing would strengthen the effect of the ads on the measured outcomes.

The study's main outcomes are summarized as follows: (1) exposure to anti-sugary drinks ads increased knowledge about sugary drinks consumption and health outcomes directly following exposure, but gains in knowledge were not maintained one week later; (2) exposure to anti-sugary drinks ads resulted in more positive attitudes toward reducing sugary drinks consumption immediately following ad exposure, and in participants that viewed the ads with a friend, attitude gains were maintained over the one week follow-up period; (3) exposure to anti-sugary drinks ads increased perceptions of social norms regarding lowering sugary drinks consumption both immediately following exposure and these perceptions were maintained at the one week follow-up; (4) exposure to anti-sugary drinks ads increased intentions to reduce sugary drinks consumption immediately following exposure, but intentions to reduce consumption were not

maintained over the one week follow-up period; (5) exposure to anti-sugary drinks ads resulted in lower self-reported daily sugary drinks consumption over a one week follow-up, with the largest decreases observed for regular soda and other sugar-sweetened beverages. These results lend support to three primary conclusions: (1) exposure to anti-sugary drinks television ads shows promise as an effective public health strategy for reducing sugary drinks consumption in college students; (2) the effectiveness of anti-sugary drink ad campaigns may depend on repeated exposures to the ads since in the current experiment single exposures did not result in lasting changes in knowledge gains and intentions to reduce consumption over the follow-up period; and (3) anti-sugary drinks ads may be more influential in promoting positive attitudes towards reducing sugary drinks consumption when the ads are viewed in the presence of a friend.

Knowledge about Sugary Drinks Consumption and Health Outcomes

Knowledge of sugary drinks consumption and health outcomes was examined in this study as a measure of ad effectiveness, as knowledge often serves as precursor to change in attitudes and behavior (Bauman at el., 2006). Results showed that the ads used in NYC's "Pouring on the Pounds" campaign increased college students' knowledge about the relationships between sugary drinks and health outcomes. Viewing the anti-sugary drinks ads in the current study resulted in a significant increase in knowledge scores from pre-assessment to post-assessment. Knowledge scores significantly dropped from post-assessment to the one-week follow-up, but remained significantly higher than before viewing the ads. It appears that the information presented in the anti-sugary drinks ads was immediately incorporated into participants' responses at post-assessment, resulting in a higher knowledge score. Some of this information was lost over the one

week follow-up period; however, the ads still appeared to improve knowledge overall, as total knowledge scores were significantly higher at follow-up as compared to pre-assessment.

Increases in knowledge about the relationship between sugary drinks consumption and health outcomes following ad exposure is an important result, as wide-scale improvements in knowledge following media campaigns can lead to shifts in public opinion regarding the importance of a given health issue (Finnegan & Vismanath, 2008; Morton & Duck, 2006). While the gains in knowledge about sugary drinks consumption and health outcomes were not maintained at follow-up, it is important to note that most ad campaigns involve repeated exposure to the ads. Repeated exposure is likely to help preserve the gains in knowledge about sugary drinks consumption and health outcomes that result from viewing the ads.

The effect of the experimental manipulations of Friend Presence and Discussion did not interact with the effect of the ads to strengthen knowledge outcomes. Friend Presence significantly interacted with Assessment in the mixed model; however, follow-up analyses did not reveal any noteworthy patterns that explained this interaction. Participants that viewed the ads without a friend trended toward higher knowledge scores at pre-assessment, which resulted in the With Friend groups appearing to gain a steeper increase in knowledge than participants in the Without Friend groups from pre- to post-assessment. However, these patterns failed to reach statistical significance. Contrary to hypotheses, there was not a significant interaction between Discussion, Friend Presence, and Assessment.

The lack of an effect or interaction of Discussion in this model was surprising given the extensive research documenting the beneficial role of discussion on facilitating other important outcomes, such as: increased perceptions of risk for a given health problem (Morton & Duck, 2006), more positive attitudes toward altering a given health behavior (Dunlup, et al., 2011), higher intentions to change a given health behavior (Durkin & Wakefield, 2006), and increased likelihood of having tried to change a given health behavior (Dunlop, et al., 2008). It may be possible that the null effect of Discussion on knowledge scores was due to ceiling effects. Knowledge scores were high immediately following ad exposure, with the mean score at post-assessment being 59 out of a possible 63 points. This suggests that the ads were very effective at improving knowledge regarding sugary drinks consumption and health outcomes. The large increase in knowledge due to the effects of the ad alone likely resulted in minimal variance that could be accounted for by other factors. Perhaps discussion would produce a more prominent effect if studied in a different population (e.g., younger children), or when the health message is more complex.

Attitudes Toward Reducing Sugary Drinks Consumption

According to the Theory of Reasoned Action/Planned Behavior, and confirmed through research, attitude toward performing a behavior is one of the most important predictors of behavioral intention and behavior (Jordan et al., 2012; Montaño & Kasprzyk, 2008). In the current study, attitudes toward reducing sugary drinks consumption were significantly improved following exposure to the anti-sugary drinks ads. Specifically, across all participants, average attitude scores toward reducing sugary drinks consumption increased from the pre-assessment to the post-assessment period, and

in participants that viewed the ads with their friends, these gains were maintained at the one-week follow-up. These results suggest that the anti-sugary drinks ads were effective in shaping short-term positive attitudes toward sugary drinks consumption reduction, but that the influence of friendship was the important factor in maintaining these attitude changes.

As reviewed earlier, previous research supports the notion that social influence exerted through social networks has an important role in shaping individual attitudes. In both adolescents (Coronges et al., 2011) and adults (Mani et al., 2011; Nyhan et al., 2012) the health-related beliefs and attitudes of an individual have been shown to be strongly associated with, and influenced by, the attitudes and beliefs of individuals in their social network. Smith and Christakis (2008) reviewed how social networks influence health, citing that provision of social support, social norms influences, physical contact, and shared resources all account for how social networks eventually impact individual health outcomes. The above studies, along with the current results, suggest that shared attitudes may be an additional way that social networks exert their influence on health and health behavior.

However, there is an important caveat in the interpretation of the attitude results. That is, participants in the With Friend and Without Friend conditions held different baseline attitudes toward reducing sugary drink consumption. Specifically, participants in the Without Friend condition had more positive attitudes toward reducing sugary drinks consumption at pre-assessment. These baseline differences bias the interaction, making it difficult to interpret. This caveat should therefore be kept in mind when making conclusions about the role of friendship in the current study.

Interestingly, the role of Discussion did not affect attitude changes in the current study, nor did it interact with Friend Presence to influence outcomes. This is unexpected given the previous literature highlighting the important role ad discussion plays in shaping attitudes toward health behaviors (Dunlop, Kashima, & Wakefield, 2010; Dunlop, Wakefield, & Kashima, 2008; Durkin & Wakefield, 2006). For example, Dunlop and colleagues (2010) used a laboratory manipulation to examine how discussion among friends affected reactions to an ad promoting the HPV vaccine. The authors found that friends who were instructed to talk about the health ad directly following exposure had more positive attitudes toward obtaining the vaccine than friendship dyads that did not discuss the ad. Their results highlighted the role of discussion, rather than social network exposure, on affecting attitude toward the vaccine. Hwang (2012) also demonstrated the influential role discussions have on smoking attitudes, finding that campaign-related discussions indirectly influence smoking beliefs following exposure to the Truth® campaign.

The present results differ slightly from the results of the two studies reviewed above, in that in the current study, the presence of a friend led to more positive attitudes toward reducing sugary drink consumption at post-assessment but engaging in discussion did not. However, it is possible that participants in the With Friend groups may have discussed the ads at more length following ad-exposure, regardless of whether or not they were instructed to do so. If this were the case, then discussion between friends may have been the important aspect of the Friend Presence effect noted at follow-up. For example, Dunlop (2010) showed that 47% of participants reported discussing the HPV ad in the five days following the completion of the study, with 80% discussing the ad with a

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friend. Hwang (2012) also showed that a large proportion of participants exposed to a media campaign later discuss it. It seems reasonable to assume that the current study had comparable rates of post-study discussion, with rates of discussion perhaps being even higher among the friends that viewed the ads together. However, without better control over naturally occurring discussions, it is difficult to fully disentangle the role of Friend Presence from that of Discussion on shaping health attitudes. Future studies should try to control or at least measure the extent of naturally occurring discussions outside of the laboratory. Nonetheless, because attitudinal effects were only observed among With Friend groups, the results of the present study, although modest, suggest that if discussion does play a role in promoting attitudinal shifts, than this discussion must occur between people with strong potential to socially influence one another (such as among friends, family members, or other socially connected dyads).

Social Norms Perceptions

Participants' perceptions of sugary drinks injunctive norms (e.g., their perceptions of how many of their friends think that they should reduce their sugary drinks consumption) increased following ad exposure and these increases were maintained at one-week follow-up. There were no effects of the ads, or of the experimental groups, on descriptive norm perceptions (e.g., participants' perceptions of how many of their friends consume sugary drinks above recommended levels).

It is possible that the ads did not affect participants' perceptions of how many of their friends consumed sugary drinks above recommended levels because the ads were not designed to target descriptive norm perceptions. Rather, the ads focused on informing the viewer of the health risks associated with consuming sugary drinks, and

targeted the general population of adults aged 18 to 44, rather than young adults (NYC DOH, 2009).

Intentions to Change Sugary Drinks Consumption

Participants reported significantly greater intentions to reduce sugary drinks consumption immediately after viewing the ads. This is an important result, as both theory and abundant research supports the notion that behavioral intention is an important predictor of behavior change (Armitage & Christian, 2003). However, the positive effects of the ads on intentions were not maintained at follow-up. Results showed that intentions to reduce sugary drinks consumption significantly dropped from the post-assessment period to the follow-up period. As suggested above, it is possible that repeated exposure to the ads, as is the case in most campaigns, may sustain the effect of the ads on increasing intentions to reduce sugary drinks consumption.

Contrary to hypotheses, Friend Presence and Discussion did not alone, or in combination, affect participants' intentions to reduce sugary drinks consumption. Previous research has shown mixed effects regarding the role of discussion on behavioral intention. Durkin & Wakefield (2006) reported that people whom discussed anti-smoking ads with others had higher intentions to quit than people that did not report discussing the ads. In their study, most discussions occurred between parents and their children. However, in the laboratory study conducted by Dunlop and colleagues (2010), talking about a health-promoting ad with a friend actually reduced intentions to obtain an HPV vaccine. The present results do not support or refute either conclusion. It seems further research is needed to clarify the exact role that discussion has on behavioral intention. Specifically, such research should examine how the relationship of the

discussion partner affects outcomes (e.g., family versus friends, parental-child dyads versus spousal dyads, same-gender versus different-gender friendship dyads, etc.). Also, there may be a difference between instructed discussion (as in Dunlop's study) and naturally occurring discussion (as in Durkin and Wakefield's study). It seems plausible that individuals that choose to discuss an ad are more motivated to alter their unhealthy behaviors, and are therefore more likely to report higher intentions to change. However, if a person is not ready to change their behavior, then discussion may serve to reinforce their initial attitudes. Therefore, an additional area of study may be examining how baseline attitudes and intentions toward a behavior influence the nature and content of discussion, and in turn, how these discussions then affect intentions to change behavior.

Because Friend Presence was found to interact with the ads in influencing attitudes, it is surprising that it did not show any interaction effects on intentions, especially in light of the research documenting that intentions are strongly influenced by attitudes (Jordan et al., 2012; Montaño & Kasprzyk, 2008). In the current study, attitude was only slightly improved. Perhaps greater changes in attitudes are needed in order to observe downstream effects on behavioral intention. Also, behavioral intention was measured on a more restricted scale than attitude, which may have obscured the ability to notice small, but important differences as a result of the Friend Presence manipulation. These are areas for future study.

Sugary Drinks Consumption

The majority of participants (67.9%) in the current study reported drinking equal to or less than one sugary drink per day over the past week. Compared with the consumption rates of adolescents from a national sample (Park et al., 2012), the young

adults in the current sample reported slightly lower overall mean daily sugary drinks consumption. Specifically, the average rate of sugary drink consumption in Park's study was 2 sugary drinks per day, whereas the average rate of consumption for participants in the current study was 1.25 sugary drinks per day. When compared with the guidelines provided by the American Heart Association (e.g., less than 3 8-ounce serving per week; 2012), a large percent of this study's participants (78%) consumed sugary drinks at a level above recommendations.   These data indicate that the participants in the current study consumed sugary drinks at a level consistent with national data, and also, were good candidates for reducing sugary drinks consumption.

Results indicated a significant decline in self-reported sugary drinks consumption across participants viewing the anti-sugary drinks ads. Specifically, from pre-assessment to follow-up, on average, participants reported reducing their daily sugary drink consumption by approximately 0.51 sugary drinks per day (dropping from 1.25 sugary drinks per day at pre-assessment to a 0.74 sugary drinks per day at follow-up).   This level of self-reported reduction equates to consuming approximately 3.6 less sugary drinks per week. This effect, especially if confirmed through objective analyses, has the potential to meaningfully impact health.

This is, to knowledge, the first study to demonstrate decreases in self-reported sugary drinks consumption following exposure to the anti-sugary drinks television ads used in this study. While media campaigns addressing sugary drinks consumption have been conducted in New York City (NYC DOH, 2011), Rhode Island (Kick the Can, 2013), Boston (Kick the Can, 2013), Multonomah Country, Oregon (Kick the Can, 2013), and Philadelphia (Jordan, et al., 2012), the effects of these campaigns on self-reported

consumption have not yet been reported. Evaluations of media campaigns in other public

health areas, however, have shown the positive effects of ads on altering behavior

(Wakefield, Loken, & Hornik, 2010). The current results extend the application of media

campaigns to sugary drinks consumption. It appears anti-sugary drinks television ad

campaigns have the potential to be an effective way to reduce sugary drinks consumption

at the population level, thereby having implications as an intervention for addressing the

growing problem of obesity.

The hypotheses regarding the influence of Friend Presence and Discussion on

sugary drinks consumption were not supported. There were no differences in self-

reported consumption across participants, regardless of whether or not participants

participated with or without a friend, and regardless of whether they did or did not

discuss the ads.   As was discussed above, while Friend Presence influenced attitude

scores, the overall change in attitude was relatively small. Perhaps greater changes in

attitude as a result of the experimental manipulations are needed in order to then see

effects on intentions and behavior. It is also possible that different effects would have

been noticed if the follow-up period was extended beyond one week. Additionally, it is

important to note that the changes in consumption reported here are self-reported. Future

studies should aim to examine the effects of anti-sugary drinks ads on consumption using

objective measures.

Implications for Theory

The results of the current study lend support to the Theory of Reasoned

Action/Planned Behavior, and Social Cognitive Theory.   In this study, the intervention

was shown to positively change participants' attitudes, perceived norms, and intentions

toward reducing sugary drinks consumption, and also, resulted in a decline in self-reported sugary drinks consumption. These results lend support to the predictions made by the Theory of Reasoned Action/Planned Behavior; intentions, attitudes, and perceived norms predict behavior. The validity of this conclusion was examined by conducting a post-hoc linear regression analysis that examined the predictors of sugary drinks consumption at follow-up. Knowledge about sugary drinks consumption and health outcomes, attitudes toward sugary drinks reduction, perceived descriptive and injunctive norms, and behavioral intentions to reduce sugary drinks consumption at post-assessment (immediately after viewing the ads) were entered as predictors of total daily sugary drinks consumption at follow-up. The model significantly predicted total daily sugary drinks consumption, explaining 24.9% of the variance, $R = .50$, $R^2 = .249$, $F(5, 92) = 6.12$, $p < .01$. In the model, attitudes toward reducing sugary drinks at post-assessment and injunctive norms perceptions emerged as the only significant predictors of sugary drink consumption at follow-up. Specifically, more positive attitudes toward reducing sugary drink consumption ($B = -.297$, $\beta = -.90$, $p < .01$) and lower injunctive norms perception ($B = .12$, $\beta = .05$, $p < .05$) predicted lower total daily sugary beverage consumption.

This analysis suggests that, in the current study, attitude was the strongest predictor of sugary drink consumption behavior. Injunctive norms also predicted lower sugary drink consumption, but in the unexpected direction. It is unclear why lower injunctive norm perceptions predicted lower sugary drinks consumption. It is possible that participants with low levels of sugary drinks consumption report believing that few

friends think they should lower their consumption because those individuals are already consuming at low levels.

In the preliminary analysis of anti-sugary drinks campaign effectiveness conducted by the city of Philadelphia and the APPC (Jordan et al., 2012, reviewed above), attitude toward sugary drinks consumption also emerged as the strongest predictor of intention to reduce sugary drinks consumption. In that analysis, attitude was a stronger predictor of intentions than both normative pressure and self-efficacy beliefs (Jordan et al., 2012).

Interestingly, attitude was also the only factor in the initial analyses that varied differentially as a function of Friend Presence. Participants in the With Friend groups maintained gains in attitude across the follow-up period, while participants in the Without Friend groups did not. Although the interpretation of this result is qualified by baseline differences in attitude across the two groups, it lends some support to Social Cognitive Theory, and other health behavior change theories that stress the importance of social network influences on individual behavior.

Limitations

There are important limitations in this study. First, due to the homogenous nature of the study's sample characteristics, the generalizability of the current results is restricted to White, college-aged individuals from a rural, Midwestern area. Future research should aim to explore the effectiveness of anti-sugary drinks ads on a larger and more diverse sample, including participants of different ages and ethnicities. Second, the study relied primarily on self-report measures for all outcomes under investigation. Self-report measures lend themselves more easily to inaccurate or socially desirable

responding. While the majority of assessments used in this study were well-studied, valid measures of the constructs of interest, future research may aim to utilize more objective measures, especially when examining behavioral outcomes. Another limitation to the current study was that participants were not asked at the follow-up assessment if they discussed the ads after leaving the study, which might have influenced some of the outcomes at one-week follow-up. Finally, the follow-up period in this study was brief, only one week long. A longer follow-up would provide important information on how long effects may be expected to last.

Summary and Future Directions

The current study is the first to measure college students' responses to anti-sugary drinks ads used in the NYC campaign and to show self-reported decreases in consumption at one-week follow-up as a result of viewing the ads. Specifically, this study showed that in college students, a single exposure to five anti-sugary drinks ads: (1) improved knowledge about the relationship between sugary drinks consumption and health outcomes; (2) resulted in an increase in positive attitudes toward reducing sugary drinks consumption; (3) led to greater perceived injunctive social norms regarding sugary drinks consumption; (4) resulted in an increase in intentions to reduce sugary drinks consumption; and (5) led to significant reductions in self-reported sugary drinks consumption in the week following ad exposure.   This study supports previous findings that indicate health media may be an effective strategy for addressing a variety of public health problems. However, several of the effects noted above were not maintained at follow-up. Repeated exposure to the ads may help reduce the loss of effects observed with time. Also, consumption was self-reported and therefore subject to socially

desirable responding. Future studies may wish to include repeated exposures, longer follow-up periods, and more objective measures of sugary drinks consumption levels.

Discussing the ads or viewing the ads with a friend did not have a substantial effect on participants' knowledge about sugary drinks consumption and health outcomes, perceptions of sugary drink consumption social norms, intentions to reduce sugary drinks consumption, or actual sugary drinks consumption levels. However, this study did show that participants who viewed the ads with a friend maintained their increases in favorable attitudes toward reducing sugary drinks consumption at follow-up. However, because participants viewing the ads with a friend held different baseline attitudes from individuals not viewing the ads with a friend, it is difficult to interpret this finding. Overall, the results from this study suggest that friendship and discussion had little impact on outcomes, at least in the current population of college students. Future studies could explore how of friendship and other social influences shape healthy attitudes in other populations (e.g., children, adolescents, older adults).

APPENDICES

Appendix A
Demographics

Today's date: _____

1.   How old are you? _____years old

2.   What is your sex?

   a. Male
   b. Female

3. Please specify your race/ethnicity:

   a. American Indian or Alaska Native
   b. Hispanic or Latino
   c. Asian
   d. Black or African American
   e. Native Hawaiian or Other Pacific Islander
   f. White
   g. Other _____

4. What is your current income level?

   a. Less than $10,000 per year
   b. Between $10,000 and $25,000 per year
   c. Between $25,000 and $50,000 per year
   d. Between $50,000 and $100,000 per year
   e. Greater than $100,00 per year

5. What is your current marital status?

   a. Single
   b. Married
   c. Divorced
   d. Separated
   e. Widowed
   f. In a committed relationship

Appendix B
Friendship Rating Scale

1. How long (in months) have you known the person sitting next to you?

   _____ months   *or*   ☐ I just met this person.

2. What is the nature of your relationship with this person?

   a. I have not met this person before today

   b. Best Friend

   c. Friend

   d. Significant Other

   e. Other (please indicate: _____)

3. Please consider the person sitting next you when responding to the following items.

The person next to me….

	Very Strongly Disagree						Very Strongly Agree
1. Really tries to help me.	1	2	3	4	5	6	7
2. Can be counted on to support me when things go wrong.	1	2	3	4	5	6	7
3. Is someone with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
4. Is someone I can talk to about to about my problems.	1	2	3	4	5	6	7

Appendix C
Knowledge Questionnaire

Please rate the extent to which you believe the following statements are true.

	Not at all True						**Very True**
1. Eating or drinking too much sugar causes health problems	1	2	3	4	5	6	7
2. Individuals should use sugar only in moderation	1	2	3	4	5	6	7
3. Water is a healthier alternative than fruit juice	1	2	3	4	5	6	7
4. Eating or drinking too much sugar can lead to diabetes	1	2	3	4	5	6	7
5. A person has to walk 3 miles to burn off the calories in one 20 ounce soda	1	2	3	4	5	6	7
6. Sugary drinks are one cause of today's obesity epidemic	1	2	3	4	5	6	7
7. Obesity can lead to diabetes, heart disease, and some types of cancer	1	2	3	4	5	6	7
8. Soda products contain essential vitamins and nutrients	1	2	3	4	5	6	7
9. Sweetened fruit juice is a healthier alternative than soda	1	2	3	4	5	6	7

Appendix D
Attitudes Questionnaire

Using the scales below, please respond to the following items.

1.   To me, ***reducing the amount of sugary drinks I consume*** would be…

1	2	3	4	5	6	7
Harmful to my health						Beneficial to my health

1	2	3	4	5	6	7
Inconvenient						Convenient

1	2	3	4	5	6	7
Unpleasant						Pleasant

1	2	3	4	5	6	7
Unacceptable						Acceptable

2.   To the best of your knowledge, how many of your friends drink less than three 12-ounce servings of soda, sports or energy drinks, or other sugary drinks each week, not including diet beverages?

1	2	3	4	5	6	7
None of my Friends						All of my Friends

3.   Most people who are important to me think I should reduce my sugary drink consumption.

1	2	3	4	5	6	7
Not at All True						Very True

Appendix E
Intentions Questionnaire

1. In the next week do you think you might change the amount of *low-fat or no-fat milk* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

1a. If you answered, "Yes" above, indicate how ready you are to change how much *low-fat or no-fat milk* you drink by circling one of the numbers below. If you answered "No" above skip to question #2.

    1   2   3   4   5   6   7

Not ready   Very
at all   ready

2. In the next week do you think you might change the amount of *regular milk* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

2a. If you answered, "Yes" above, indicate how ready you are to change how much *regular* milk you drink by circling one of the numbers below. If you answered "No" above skip to question #3.

    1   2   3   4   5   6   7

Not ready   Very
at all   ready

3. In the next week do you think you might change the amount of *regular soda or pop (non-diet)* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

3a. If you answered, "Yes" above, indicate how ready you are to change how much *regular soda or pop (non-diet)* you drink by circling one of the numbers below. If you answered "No" above skip to question #4.

    1   2   3   4   5   6   7

Not ready   Very
at all   ready

4. In the next week do you think you might change the amount of *diet soda or pop* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

4a. If you answered, "Yes" above, indicate how ready you are to change how much *diet soda or pop* you drink by circling one of the numbers below. If you answered "No" above skip to question #5.

1	2	3	4	5	6	7

Not ready   Very
at all   ready

5. In the next week do you think you might change the amount of *sugar sweetened beverages (e.g., lemonade, Snapple, sweetened coffee drinks, etc.)* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

5a. If you answered, "Yes" above, indicate how ready you are to change how much *sugar sweetened beverages* you drink by circling one of the numbers below. If you answered "No" above skip to question #6.

1	2	3	4	5	6	7

Not ready   Very
at all   ready

6. In the next week do you think you might change the amount of *sweetened sports drinks (e.g., Gatorade)* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

6a. If you answered, "Yes" above, indicate how ready you are to change how much *sweetened sports drinks (e.g., Gatorade)* you drink by circling one of the numbers below. If you answered "No" above skip to question #7.

1	2	3	4	5	6	7

Not ready   Very
at all   ready

7. In the next week do you think you might change the amount of *sweetened energy drinks (e.g., Red Bull)* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

7a. If you answered, "Yes" above, indicate how ready you are to change how much *sweetened energy drinks (e.g., Red Bull)* you drink by circling one of the numbers below. If you answered "No" above skip to question #8.

1	2	3	4	5	6	7

Not ready
at all

Very
ready

8. In the next week do you think you might change the amount of *water* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

8a. If you answered, "Yes" above, indicate how ready you are to change how much *water* you drink by circling one of the numbers below. If you answered "No" above skip to question #9.

1	2	3	4	5	6	7

Not ready
at all

Very
ready

9. In the next week do you think you might change the amount of *100% fruit juice* you drink?	**Yes, increase how much I drink**	**Yes, decrease how much I drink**	**No, I do not plan to change how much I drink**

9a. If you answered, "Yes" above, indicate how ready you are to change how much *100% fruit juice* you drink by circling one of the numbers below. If you answered "No" above skip to question #10.

1	2	3	4	5	6	7

Not ready
at all

Very
ready

10. In the next week do you think you might change the amount of *coffee or tea* you drink?	Yes, increase how much I drink	Yes, decrease how much I drink	No, I do not plan to change how much I drink

10a. If you answered, "Yes" above, indicate how ready you are to change how much *coffee or tea* you drink by circling one of the numbers below. If you answered "No" above skip to the next questionnaire.

1	2	3	4	5	6	7

Not ready
at all

Very
ready

Appendix F
Consumption Questionnaire

During the past 7 days, how many times did you drink…?

1. **100% fruit juices**, such as orange juice, apple juice, or grape juice? (Do **not** count punch, sports drinks, or other fruit-flavored drinks.)

_____ 1   I did not drink this beverage during the past 7 days

_____ 2   1 to 3 times during the past 7 days

_____ 3   4 to 6 times during the past 7 days

_____ 4   1 time per day

_____ 5   2 times per day

_____ 6   3 times per day

_____ 7   4 or more times per day

2. A can, bottle, or glass of **soda or pop**, such as Coke, Pepsi, or Sprite? (Do **not** count diet soda or diet pop.)

_____ 1   I did not drink this beverage during the past 7 days

_____ 2   1 to 3 times during the past 7 days

_____ 3   4 to 6 times during the past 7 days

_____ 4   1 time per day

_____ 5   2 times per day

_____ 6   3 times per day

_____ 7   4 or more times per day

3. A can, bottle, or glass of **diet soda or pop**, such as Diet Coke, Diet Pepsi, or Sprite Zero?

_____ 1   I did not drink this beverage during the past 7 days

_____ 2   1 to 3 times during the past 7 days

_____ 3   4 to 6 times during the past 7 days

_____ 4   1 time per day

_____ 5   2 times per day

_____ 6   3 times per day

_____ 7   4 or more times per day

4. A can, bottle, or glass of a **sports drink** such as Gatorade or PowerAde? (Do **not** count low-calorie sports drinks such as Propel or G2.)

_____ 1   I did not drink this beverage during the past 7 days

_____ 2   1 to 3 times during the past 7 days

_____ 3   4 to 6 times during the past 7 days

_____ 4   1 time per day

_____ 5   2 times per day

_____ 6   3 times per day

_____ 7   4 or more times per day

4a. What percent of sports drinks consumed over the past week did you ingest during or immediately following exercise that lasted an hour or more?

_____ 1   0% - None were consumed during exercise

_____ 2   5 – 25 %

_____ 3   25 – 45 %

_____ 4   50%

_____ 5   55 – 75 %

_____ 6   80 – 95 %

_____ 7   100% - All were consumed during or after exercise

5. A can, bottle, or glass of an **energy drink**, such as Red Bull or Jolt? (Do **not** count diet energy drinks or sports drinks such as Gatorade or PowerAde.)

    _____ 1   I did not drink this beverage during the past 7 days

    _____ 2   1 to 3 times during the past 7 days

    _____ 3   4 to 6 times during the past 7 days

    _____ 4   1 time per day

    _____ 5   2 times per day

    _____ 6   3 times per day

    _____ 7   4 or more times per day

6. A cup, can, bottle of **coffee, coffee drink, or any kind of tea**?

    _____ 1   I did not drink this beverage during the past 7 days

    _____ 2   1 to 3 times during the past 7 days

    _____ 3   4 to 6 times during the past 7 days

    _____ 4   1 time per day

    _____ 5   2 times per day

    _____ 6   3 times per day

    _____ 7   4 or more times per day

7. A can, bottle, or glass of a **sugar-sweetened beverage** such as lemonade, sweetened tea or coffee drinks, flavored milk, Snapple, or Sunny Delight? (Do **not** count soda or pop, sports drinks, energy drinks, or 100% fruit juice.)

    _____ 1   I did not drink this beverage during the past 7 days

    _____ 2   1 to 3 times during the past 7 days

    _____ 3   4 to 6 times during the past 7 days

    _____ 4   1 time per day

    _____ 5   2 times per day

    _____ 6   3 times per day

    _____ 7   4 or more times per day

8. A bottle or glass of **plain water**? (Count tap, bottled, and unflavored sparkling water.)

_____ 1   I did not drink this beverage during the past 7 days

_____ 2   1 to 3 times during the past 7 days

_____ 3   4 to 6 times during the past 7 days

_____ 4   1 time per day

_____ 5   2 times per day

_____ 6   3 times per day

_____ 7   4 or more times per day

9. **Regular Milk**? (Count the milk you drank in a glass or cup or with cereal.)

_____ 1   I did not drink this beverage during the past 7 days

_____ 2   1 to 3 times during the past 7 days

_____ 3   4 to 6 times during the past 7 days

_____ 4   1 time per day

_____ 5   2 times per day

_____ 6   3 times per day

_____ 7   4 or more times per day

10. **Low-fat or no-fat milk**? (Count the milk you drank in a glass or cup or with cereal.)

_____ 1   I did not drink this beverage during the past 7 days

_____ 2   1 to 3 times during the past 7 days

_____ 3   4 to 6 times during the past 7 days

_____ 4   1 time per day

_____ 5   2 times per day

_____ 6   3 times per day

_____ 7   4 or more times per day

Advertisement 1: Do you drink 93 sugar packets a day?

The 30-second spot shows how a day's worth of sugary drinks can add up. Building on a previous campaign, sugar content is measured in "packets" to illustrate how a daily routine of just a few sweetened drinks can cumulate to a whopping 93 packets of sugar by the end of the day.

These excessive amounts of sugar would amount to almost 1,400 empty calories of pure sugar – that's nearly ¾ of the daily recommended calories for most adults. The spot ends with devastating images of the serious potential health consequences of obesity and diabetes.

Advertisement 2: Man eating sugar

This eye opening 50-second spot features the same young man, seated at a lunch counter and blithely stuffing his mouth with packets of sugar while other diners look on in horror. The irony is that they're taking in just as much – if not more – from the sweetened sodas they're sipping.

Advertisement 3: Pouring on the pounds

Shocked? Disgusted? Most people don't realize how easy it is to gain weight from drinking sugary sodas, juice drinks, sport drinks and sweetened tea and coffee drinks. Just one 20-ounce bottle of soda can pack 250 calories and more than 16 teaspoons of sugar.

Is the lemon-flavored iced tea any better? Not by much – with 210 calories and 14½ teaspoons of sugar. Sugar-sweetened beverages add hundreds of calories to your diet each day. Try NYC's own high quality water and save both money and calories.

Advertisement 4: Man walking off soda

Are you pouring on the pounds? The man who drank the fat is back, and this time he's walking off a soda.

Advertisement 5: 50 Pounds

You may think sugary drinks are harmless, but they are a big reason for the obesity epidemic in America.

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