PERCEPTIONS OF THE SUGAR-SWEETENED BEVERAGE TAX IN SOUTH AFRICA: A COMPARATIVE STUDY

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THANESHA REDDY JANKEEPARSAD

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ABSTRACT

This exploratory, comparative study aimed to investigate perceptions of the participants in the study in South Africa regarding the tax on sugar-sweetened beverages. The study further aimed to compare these perceptions with perceptions identified in selected foreign jurisdictions that have levied the tax on sugar-sweetened beverages.

A voluntary, paper-based, anonymous survey questionnaire that included both closed- and open-ended questions was selected as the primary method of data collection. This questionnaire was administered to post-graduate Bachelor of Commerce Accounting and Postgraduate Diploma in Accounting students, aged twenty-one years and older, studying at three residential universities in South Africa, during the 2018 academic year. An extensive analysis of literature available on sugar-sweetened beverage taxes, both locally and internationally, was conducted.

The two main constructs (construct 1: perception of the sugar-sweetened beverage tax and the price of sugar-sweetened beverages and construct 2: the social impact of the sugar-sweetened beverage tax) were then analysed using descriptive statistics. This study found that there is a significant association between gender and perception that the sugary beverage levy will be beneficial to health, with female perceptions of the benefit of the sugary beverage levy being greater than that of males. Respondents appear to have a positive perception of the sugary beverages levy, understand the sugary beverage levy, as well as the health benefits that will be derived from the levy. Respondents supported the tax on sugar-sweetened beverages if the revenue generated was used to improve the health care system and if the price of healthy foods decreased. Female respondents were found to drink fewer sugar-sweetened beverages than male respondents, but females reported higher sugar-sweetened beverage consumption during stressful periods.

The current study can possibly provide policy makers with more information regarding acceptance of the sugar-sweetened beverage tax and shape guidelines for future amendments of the tax imposed.

Keywords: sugar-sweetened beverage tax; South Africa; perceptions; socio-demographic factors; price; habits

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CHAPTER 1: INTRODUCTION

1.1 Research Context

Sugar-sweetened beverages have the potential not only to increase weight and the risk of Type Two (2) diabetes, but additionally may increase insulin resistance and inflammation (Malik, Schulze & Hu, 2006). A prospective cohort study carried out by Schernhammer, Hu, Giovannucci, Michaud, Colditz, Stampfer and Fuchs (2005) also indicated that the consumption of sweetened soft drinks may be linked with a greater risk of pancreatic cancer, predominantly in women with a high Body Mass Index or a low physical activity level and an underlying degree of insulin resistance. The consumption of soft drinks has also been linked to other health consequences, such as increased risk of dental caries due to the high sugar content and acidity, resulting in enamel erosion over time (Heller, Burt & Eklund, 2001).

A trend has also been documented regarding the increase in the consumption of sugar-sweetened beverages (Ng, Mhurchu, Jebb & Popkin, 2012). An estimated two-thirds of adult Americans are obese or overweight (Wang & Beydoun, 2007). By developing a logistic regression analysis using survey data, the study by Trujillo (2015) found that proposing a one-cent per ounce excise tax on sugar-sweetened drinks, resulted in a negligible reduction of the prevalence of overweight and obesity for a small subsection of California's overall population. This study concluded that a one-cent per ounce excise tax on sugar-sweetened drinks will not have the policy effect desired by its advocates. By contrast, a study by Lin and Smith (2010) found that a sugar tax will result in a decrease of 34 and 40 calories per day among adults and children, respectively. Furthermore, a finding by Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry (2015) has indicated considerable public support (50 percent) for a tax on sugar-sweetened beverages in a mid-Atlantic state in the United States.

The South African National Treasury (Republic of South Africa National Treasury, 2016) sheds light on the fact that global trends are increasingly focused on limiting the intake of sugars in the human diet to curb the burgeoning problems for governments arising out of the obesity epidemic. In South Africa, over the past 30 years, the problem

of obesity has grown. This has resulted in the country being ranked the most obese in sub-Saharan Africa (Republic of South Africa National Treasury, 2016). Modern scientific evidence (World Health Organisation, 2015) has shown that adults who consume less sugar have a lower body weight and that increasing the amount of sugar in the diet is associated with a weight increase. Kengne (2017) explains that the South African Medical Research Council and various collaborating parties recently undertook a continental study, which revealed that the incidence of obesity and diabetes is proportionately higher in southern Africa and northern Africa, particularly in South Africa and Egypt. Kengne also reports that there has been a gradual increase in the prevalence of diabetes during the period 1980 to 2014.

The Republic of South Africa National Treasury (2016) announced plans during April 2017, to introduce an excise tax on sugar-sweetened beverages to reduce excessive sugar consumption (which has come into effect on the 1st April 2018). The Treasury outlined the scope of the tax by defining the products that will be subject to the tax as "beverages that contain added caloric sweeteners, such as sucrose, high-fructose corn syrup, or fruit-juice concentrates, which include but are not limited to: (i) soft drinks, (ii) fruit drinks, (iii) sports and energy drinks, (iv) vitamin water drinks, (v) sweetened iced tea, and (vi) lemonade, among others. Any beverage that contains only sugar naturally built into the structure of the ingredients (i.e. intrinsic sugars) will be excluded from the tax (e.g. unsweetened milk and milk products and 100 per cent pure fruit juice)" (Republic of South Africa National Treasury, 2016:2-3).

Manyema, Veerman, Chola, Tugendhaft, Sartorius, Labadoarios and Hofman (2014) explain that the assumption made in research carried out in South Africa concerning the imposition of the sugar-sweetened beverages tax was that the demand for sugar-sweetened beverages is relatively price elastic. The finding by Manyema *et al.* (2014) was, however, subsequently found to be inconsistent with the study performed by Armstrong, Fourie and Rich (2016) and demand was, in fact, found to be inelastic. Theron, Rossouw and Fourie (2016) conclude that the predicted result of the findings by Armstrong *et al.* (2016) is that such a sugar tax will, in effect, translate into a minor impact on demand and will not, therefore, achieve its health objectives. If this is correct, only the revenue for the fiscus will be increased. As claimed by de Waal (2016), the proposed 20% tax on sugar-sweetened beverages will provide the

government with an extra R7 billion each year, but the tax will fail to achieve its stated health objective. Theron *et al.* (2016) submit that, if demand is in fact inelastic, these taxes will be especially detrimental to the poor, who spend a significant amount on such beverages.

Sa´nchez-Romero, Penko, Coxson, Ferna´ndez, Mason, Moran, Ávila-Burgos, Odden, Barquera and Bibbins-Domingo (2016: 21) explain that in the experience of Mexico's Sugar-Sweetened Beverage Tax, "acceptance by the population is greatest when it understands that the tax is meant to improve its health and well-being". Colchero, Molina, and Guerrero-López (2017) concluded that, after the imposition of a sugar-sweetened beverage tax in Mexico, the purchases of sugar-sweetened beverages decreased while the purchases of water increased, and that the impact of these changes was more significant in lower-income and urban households.

Julia, Méjean, Vicari and Péneau (2015) explain that excise taxes may not have the anticipated effect, highlighting the need for further research. Their study claimed that the French public perception of the sugar-sweetened beverage tax could be ascertained by determining the socio-demographic characteristics of supporters and opponents of the sugar-sweetened beverage tax in France, as socio-demographic factors will modulate their perceptions. Powell and Chaloupka (2009) claim that the success of the taxation of sugar-sweetened beverages is largely dependent on public perception of the actual purpose and possible impact of such taxes in meeting stated health objectives, that would then support its acceptance. Public acceptance of food taxes is greatly contingent on the intended objectives of the tax (Julia, Méjean, Vicari & Péneau, 2015).

The aim of the sugar-sweetened beverage tax in South Africa is to alter the behaviour of consumers and achieve health benefits. The present study therefore aimed to determine the perceptions of a limited sample of South Africans regarding the tax, based on certain economic factors, for example, the demand for such products, the ability to easily reduce consumption should these products become less affordable, whether participants perceive any likely benefit from such a tax, and whether socio-demographic factors pertaining to the participants reveal differing perceptions.

The Beverage Association of South Africa (2016) explains that in South Africa, sugar from sugar-sweetened beverages accounts for a mere 3% of South Africans' total calorie intake as compared to 7% of total calorie consumption from carbonated soft drinks in the United States of America, and 4 - 5% in Mexico. Thus, the research included a comparison of the perceptions of the Sugar-Sweetened Beverage Tax in South Africa with perceptions in selected foreign jurisdictions. The purpose is to add to the present literature on the sugary beverages levy.

1.2 Goals of the Research

The goal of this research was to investigate perceptions of the participants in the study in South Africa regarding the tax on sugar-sweetened beverages and compare these with perceptions identified in selected foreign jurisdictions that have levied the tax on sugar-sweetened beverages.

To achieve the broader research goal, the following sub-goals were undertaken:

- develop a theoretical framework to be used to test perceptions of the tax, based on international experience;
- investigate the awareness and understanding of the participants in the research regarding the sugar-sweetened beverage tax and its scope;
- determine the perceptions of the participants in the study in South Africa regarding the tax, based on the theoretical framework developed in the first phase of the research; and
- compare the perceptions of South African participants in the study with international perceptions.

1.3 Methods, Procedures and Techniques

The study adopted a post-positivist research paradigm, which defines participants' reality numerically, and employed natural science methods and techniques to study human behaviour (Khan, 2014). Tewksbury (2009) expresses the opinion that some of the benefits of quantitative research are that it is a good predictor, and it is cost and time effective. Thus, this research paradigm was selected for the study. The research

involved a combination of quantitative and qualitative techniques, based on a paper-based questionnaire that included both closed- and open-ended questions. Respondents may be guarded and unwilling to respond fully and honestly, due to not wanting to admit to abusing sugar-sweetened beverages, or denying that they are obese, or that the reason is sugar. An appropriate methodology would thus make use of an anonymous survey questionnaire.

The purpose of the study was not to generalise the findings of the research to the entire South African population, but to obtain an understanding of public perceptions of the tax on sugar-sweetened beverages. The target population for the survey was post-graduate Bachelor of Commerce Accounting and Postgraduate Diploma in Accounting students, aged twenty-one years and older, studying at the Universities of KwaZulu-Natal, Zululand and Fort Hare. Time, budget and distance were identified as constraints, resulting in the research being limited to these three universities.

The decision to use students as the units of analysis was based on the difficulty in gaining access to consumers of the sugar-sweetened beverages, and the assumption that postgraduate students are also consumers who will make their consumption decisions based on economic and socio-demographic factors. It was also assumed that the demographic profile of the students of the three universities is likely to be broadly representative of the demographics of the South African population.

Data was collected during the 2018 calendar year. Accounting lecturers at the universities concerned were requested to administer the questionnaires in class, to ensure a good response rate. The data was analysed using descriptive statistics for the closed-ended questions and thematic analysis for the open-ended responses. The descriptive analysis will involve the computation of frequency distributions (counts and percentages) of the responses to the questionnaire. Chi-square analyses were used to examine differences in proportions, as appropriate. Analysis of variance (ANOVA) and independent t-tests were conducted to examine group differences and $p<0.05$ was established as the level of significance. The Statistical Package for the Social Sciences (SPSS 25) and SAS Enterprise Guide 7.1 were used to analyse the data.

The data consisted of:

- legislation;
- the responses to the questionnaires; and
- articles in contemporary academic journals, conference proceedings, government publications, business newspapers and various websites.

1.4 Ethical Considerations

This study was subject to various ethical considerations applying to research involving human beings, and the procedures followed included:

- obtaining ethical clearance from the Rhodes University Department of Accounting Ethics Sub-Committee, the Rhodes University Human Subjects Ethical Standards Committee, and the gatekeeper consent of the appropriate persons from the selected universities; and
- ensuring that all the ethical requirements of research involving human participants were adhered to.

No ethical considerations arise in relation to the documents used in the research as all the documents to be used are publicly available.

1.5 Overview of the Thesis

- Chapter 2: The next chapter presents the literature review and the development of a theoretical framework. The theoretical framework was used to test perceptions of the sugar-sweetened beverage tax in a South African context, based on international experience.

- Chapter 3: This chapter presents the general research design selected for this study, including the target population, the sampling method, and units of analysis. The data collection plan and the methods employed to analyse the data are then discussed.

- Chapter 4: This chapter presents the results of the statistical analyses of the responses to the questionnaire. It discusses the methods (both quantitative and qualitative research techniques) employed to analyse the data, as well as the methods used to ensure the quality and accuracy of the research design.

- Chapter 5: This chapter presents the conclusion of the study and comprises a summary of findings, the conclusions drawn from the research objectives, and future research implications.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review that was undertaken, giving an overview of the imposition of a sugar-sweetened beverage tax internationally and in South Africa. Thereafter, the research objective of developing a theoretical framework (Mytton, Eyles & Ogilvie, 2014) to be used to test perceptions of the sugar-sweetened beverage tax in a South African context, based on international experience, is addressed. This theoretical framework is used to develop a questionnaire for this purpose (chapter 3).

An extensive literature review was conducted to analyse the imposition of sugar-sweetened beverage taxes in countries that have levied the tax. Previous studies have identified that sugar is considered to be highly addictive, so much so that it has been found that intense sweetness can surpass the cocaine reward, even in drug-sensitised and -addicted individuals (Lenoir, Serre, Cantin & Ahmed, 2007), leading to overeating and thus weight gain. The rise in the rates of obesity and obesity-related medical costs has resulted in countries around the world utilising food and beverage taxes as a means of curbing the obesity crisis. The chief contributing factor is the consumption of sugar from sugar-sweetened beverages, as liquid sugar is swiftly absorbed by the body, and sugar-sweetened beverages do not have nutritional value (Republic of South Africa National Treasury, 2017).

The contradictory findings in the field of a beverage tax are not conclusive enough to accurately predict the impact of such a tax on the beverage consumption. More research is necessary in this regard and thus this study aims to contribute to the existing research. Many countries have introduced a tax on sugar-sweetened beverages, each structured differently, in order to limit consumption of these products and thus prevent illnesses relating to excessive sugar consumption. These countries include Mexico, France, Denmark, and Iceland. Lowman (2016) reports that Iceland and Denmark withdrew the tax soon after implementation and that there is no clear evidence of a decrease in sugar use in either Mexico or France.

2.2 Taxes on Sugar-Sweetened Beverages Imposed in Certain Countries

In January 2014, Mexico imposed a tax on sugar-sweetened beverages levied at the rate of 1 peso per litre. The South African National Treasury (Republic of South Africa National Treasury, 2016) refers to the Mexican sugar-sweetened beverage tax as an example of what a comparable tax in South Africa will achieve. The policy paper (Republic of South Africa National Treasury, 2016) emphasises that the introduction of the tax was followed by a reduction in sales of taxed products in 2014 by 6 percent, and 8 and 11.1 percent in 2015 and the first half of 2016, respectively (Rivera, 2016). The conclusions were that the tax was not only reducing demand in the short term but will also help to further decrease the demand for sugar-sweetened beverage drinks over time. Further, Colchero, Guerrero-Lóapez, Molina, and Rivera (2016) found that the sugar-sweetened beverage tax reduced purchases of taxed beverages and increased purchases of untaxed beverages during the first year of implementation of the tax in Mexico and was effective in reducing sales of sugar-sweetened beverages and increasing sales of plain water both in the first (2014) and second (2015) year, after the implementation of the tax.

France introduced a soda tax in 2012 to discourage the consumption of sugar-sweetened drinks. Urbach (2016) notes that despite the tax being introduced to promote healthy behaviour, the motive behind the implementation of the tax is unclear, as the French government was facing having to introduce strict measures to prevent a debt crisis when the tax generated millions of euros in additional tax revenue. Retail gross profit margins increased for diet cola, although there was no change for regular cola for the period 2012 to 2013 (Republic of South Africa National Treasury, 2016).

In 2014 the Danish government abolished its tax on soft drinks. Urbach (2016) and Riemann (Online: n.d.) state that this was due to the fact that approximately 10% of tax revenue generated was utilised for administrative costs, the tax contributed to cross-border shopping in Germany, approximately 1 300 job losses occurred, and the tax was regressive in its impact, with low-income households bearing the brunt of the tax rather than wealthier households. Riemann (Online: n.d.) states further that 80% of Danes did not change their shopping habits.

Iceland abolished its tax on sugar-sweetened beverages and sugary goods in 2015, as a result of the government citing that this was vital to benefit households and simplify the tax system. Urbach (2016) explains that recently numerous countries have considered introducing taxes on sugar-sweetened beverages and foods considered unhealthy but have abandoned the idea following public debate, including the difficulty of implementing the taxes and the risk of job losses.

South Africa is following the trend by implementing the tax on sugar-sweetened beverages, which it imposed in 1993 and subsequently abolished in 2002 (Republic of South Africa National Treasury, 2016). National Treasury claims that the aim of the sugar-sweetened beverage tax is not to increase revenue for the fiscus but rather to overcome obesity. According to Urbach (2016), however, this rationale is not convincing for the following reasons. The experience in Mexico illustrates that a sugar-sweetened beverage tax can succeed in raising additional tax revenue, especially as demand for sugar-sweetened beverages is often so inelastic that people will continue buying them even if the price goes up. If, however, consumers decide against buying higher-priced sugar-sweetened beverages, they can always buy other untaxed sugary products, which means their sugar consumption will not decrease and obesity will not be reduced. Urbach (2016) concludes that South Africa cannot afford another tax that disproportionately affects lower income households.

2.3 Effectiveness of the Tax on Sugar-Sweetened Beverages

Manyema *et al.* (2014) explain that a 20% increase in the price of sugar-sweetened beverages will result in reduced purchasing and consumption of these items. Thus, the sugar-sweetened beverage tax may be considered an effective tool in discouraging unhealthy beverage consumption. The Beverage Association of South Africa (2016) maintain, however, that there is no irrefutable evidence from other markets that imposing a tax on sugar-sweetened beverages will reduce obesity, as the tax is discriminatory in that it applies to a single product category when in fact there are many that are high in calories.

An analysis and ranking of the most effective interventions to tackle obesity was concluded by McKinsey Global Institute's Report on Obesity (2014), which cites the

two most effective interventions in the United Kingdom as sugar reduction product reformulation and providing smaller portion sizes, with taxes not being among the top ten interventions. An Australian study by Veerman, Sacks, Antonopoulos and Martin (2016) on sugar-sweetened beverage taxes explained that a 20 per cent ad valorem tax on the retail price of sugar-sweetened beverages resulted in an estimated 12 per cent decrease in consumption of sugar-sweetened beverages, as well as an estimated decline in the prevalence of obesity of about 2.7 per cent among men and 1.2 per cent among women.

Waterlander, de Mul, Schuit, Seidell and Steenhuis (2010) focussed on various pricing strategies to stimulate healthy eating among residents of two Dutch cities, as well as the attitudes and perceptions of the tax on unhealthy food and revealed that participants found the encouragement of healthy foods to be more effective than a discouragement of the unhealthy foods. Waterlander *et al.* (2010) found that the pricing strategy was considered the least favourable strategy, since unhealthy food still remained attractive, the tax is a regressive method, and respondents found the tax patronising and that it may eventually even result in opposite effects. A study by Barry, Niederdeppe and Gollust (2013) found that, in a sample of 1 319 adults aged eighteen to sixty-four years old, an “underwhelming” 22% of respondents supported taxes on sugar-sweetened beverages as a policy to reduce their consumption.

The results from a 2011 national public opinion survey in the United States of America on the taxes on sugar-sweetened beverages (Barry, Niederdeppe & Gollust, 2013), indicated greater public agreement with anti- rather than pro-tax arguments. The fact that a tax on sugar-sweetened beverages is arbitrary because it does not affect consumption of other unhealthy foods (60%) was the most popular anti-tax argument. Respondents, however, reported the highest agreement with the argument that sugar-sweetened beverages were the single largest contributor to obesity (49%) and would generate revenue for obesity prevention (41%).

The studies of Caraher and Cowburn (2005) and Powell and Chaloupka (2009) both indicated that taxes on food usually prove to be an effective tool in discouraging the consumption of these products. The study by Härkänen, Kotakorpi, Pietinen, Pirttilä, Reinivuo and Suoniemi (2014) found the inverse of the conclusion of the study of

Waterlander *et al*. (2010) to be true, and in fact, discovered that a tax on food does not lead to regressive effects.

The lower economic class of people are targeted by such taxes since they have to pay a higher price, but Härkänen *et al*. (2011) submit that it is incorrect to focus solely on the monetary costs, rather it is necessary to also observe the beneficial health effects of the tax to these poorer income groups. The positive health effects are probably higher for the low- than for the high-income individuals, which is also confirmed by Tiffin and Arnoult (2011) who present the argument that the increase in inequality in income between the lower and the high-income individuals, will be reduced by the decline in health inequality. Thus, Härkänen *et al.* (2011) claim that a tax on harmful food results in a more equal distribution of welfare.

2.4 Sugar-sweetened Beverage Consumption in South Africa

Theron, Amissah, Kleynhans, Albertse and MacIntyre (2007) report that the diet of young children (ages 12 to 24 months) in urban South African communities revealed that carbonated drinks were one of the drinks consumed most frequently by this age group. The consumption of carbonated drinks was lower than maize meal and brewed tea, but greater than milk. It is submitted that consumption of sugar-sweetened beverages at an early age establishes unhealthy dietary habits leading to early onset of type 2 diabetes and obesity, which require chronic care over the child's lifetime. This will increase public healthcare costs in the long term.

The Republic of South Africa National Treasury (2016) reveals that the main reasons for the soft drink market being able to expand, include increasing the affordability, availability (strategic links with large supermarket outlets, convenience stores and the informal sector and small "spaza" stores in rural villages), as well as acceptability of these products. The serving sizes of sugar-sweetened beverages has also increased over the last several years.

Table 1 below is a summary of non-alcoholic beverage consumption by expenditure decile (Republic of South Africa National Treasury, 2016).

Table 1: Expenditure on non-alcoholic beverages by expenditure decile

Percentage distribution of annual household consumption expenditure of mineral water, soft drinks, fruit and vegetable juices by expenditure group and expenditure deciles (IES 2010)											
	Lower decile									Upper decile	
Expenditure deciles	1	2	3	4	5	6	7	8	9	10	Total
1: Mineral water (Aerated & still)	0.02	0.02	0.02	0.02	0.04	0.02	0.03	0.02	0.03	0.03	0.03
2: Aerated cold drinks	0.92	0.86	0.95	0.89	0.84	0.91	0.74	0.58	0.43	0.18	0.43
3: Energy drinks	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.02
4: Fruit & vegetable juices	0.17	0.17	0.15	0.19	0.16	0.20	0.19	0.18	0.18	0.12	0.15
5: Concentrates & powders	0.19	0.19	0.19	0.19	0.15	0.15	0.13	0.07	0.06	0.02	0.07
Sub-total - home cons (1:5)	**1.30**	**1.25**	**1.32**	**1.30**	**1.20**	**1.30**	**1.11**	**0.88**	**0.73**	**0.38**	**0.70**
6: Mineral water (Aerated & still)	0.002	0.004	0.003	0.002	0.003	0.005	0.007	0.006	0.004	0.003	0.004
7: Aerated cold drinks	0.12	0.15	0.12	0.14	0.14	0.18	0.13	0.11	0.07	0.04	0.08
8: Fruit & vegetable juices	0.04	0.05	0.05	0.05	0.03	0.04	0.03	0.02	0.02	0.01	0.02
Sub-total restaurants_cons (6:8)	**0.16**	**0.20**	**0.18**	**0.19**	**0.17**	**0.23**	**0.16**	**0.13**	**0.10**	**0.05**	**0.10**
Total (home plus restaurants)	**1.46**	**1.45**	**1.50**	**1.49**	**1.37**	**1.53**	**1.28**	**1.01**	**0.83**	**0.43**	**0.80**

Average annual household consumption expenditure of mineral water, soft drinks, fruit and vegetable juices by expenditure group and expenditure deciles (IES 2010) - RANDS											
Sub-total - home cons (1:5)	121	203	291	368	436	619	726	882	1 263	1 666	657
Sub-total restaurants_cons (6:8)	15	32	39	53	63	109	108	134	173	228	95
Total (home plus restaurants)	**136**	**235**	**330**	**421**	**499**	**728**	**834**	**1 015**	**1 435**	**1 893**	**753**
Total expenditure	**9 457**	**16 534**	**22 365**	**28 859**	**37 000**	**48 467**	**66 446**	**101 897**	**175 168**	**445 409**	**95 161**

Source: constructed from IES 2010[19]

It is evident from the table above that consumption expenditure on aerated cold drinks is higher for both home consumption and hotels and restaurants compared to other categories of drinks. The Republic of South Africa National Treasury (2016) explain further that the relative consumption of lower expenditure deciles as a percentage of expenditure on aerated cold drinks exceeds the consumption of higher expenditure deciles on similar beverage types and total consumption on non-alcoholic beverages as a percentage of expenditure is also higher in the lower expenditure deciles.

Many opponents of the sugar-sweetened beverage tax believe that it is regressive in nature, as lower income people suffer more from the higher prices than higher income people, which is thought to bring greater inequality among the social classes. The Republic of South Africa National Treasury (2016), however, state that when the goal of the tax is to promote better beverage consumption choices, regressivity is lessened when the low-income group reduces their purchases of the unhealthy item. This will

result in potentially improving health outcomes and reducing pressure on state resources in the future.

Lopez and Fantuzzi (2012) found in their study conducted in the United States of America, that those individuals with lower income and younger individuals are the highest consumers of carbonated soft drinks. As identified by Huffman and West (2007), however, few studies to date have examined sugar-sweetened beverage consumption trends in university students and those that exist propose that the majority consume sugar-sweetened beverages. This study will contribute to the current body of research and focuses on the perceptions of the sugar-sweetened beverage tax in South Africa of postgraduate accounting students at three universities.

2.5 Theoretical Framework

Several factors are associated with sugar-sweetened beverage consumption and each of these are discussed in developing a theoretical framework to be used to test the perceptions of the sugar-sweetened beverage tax in South Africa. The relationship between the factors discussed below and sugar-sweetened beverage consumption was identified by synthesising, analysing and comparing the results from prior research. The aim of a study by Scully, Morley, Niven, Crawford, Pratt and Wakefield (2017), for example, was to examine the associations between high consumption of soft drinks and selected demographic characteristics, weight status and health behaviours among Australian adolescents. Adolescents' perceptions of the availability, convenience and value for money of soft drinks were also explored. In the questionnaire to be developed for the purpose of the present study, all the identified factors are addressed by specific items.

2.5.1 Socio-demographic and Health Related Factors

Previous research on the consumption of sugar-sweetened beverages has indicated that consumption in both adults and children has been associated with obesity and diabetes, and influenced by numerous demographic characteristics, such as race, gender, age, and socioeconomic background (Rehm, Matte, Van Wye, Young, & Frieden, 2008). Hoffman (2013) explains that sugar-sweetened beverage

consumption can be correlated with a vast array of demographic factors and that, particularly among younger adults, multifactorial factors may relate to consumption patterns.

Davis (2016) states that socioeconomic status can impact the consumption of sugar-sweetened beverages and is usually measured using the educational level of the parents, their employment status and/or family income. Han and Powell (2013) found in a cross-sectional analysis examining a twenty-four-hour dietary recall of sugar-sweetened beverages and demographic and socioeconomic associations, that adolescents from low-income families had a higher probability of increased sugar-sweetened beverage consumption than those from high-income families. Further, Han and Powell (2013) found that adolescents with parents who had a high school education or less had a greater likelihood of increased sugar-sweetened beverage consumption than adolescents whose parents had college education or more. Neumark-Sztainer, Hannan, Story, Croll, and Perry (2003) submit that one possible reason for the correlation between socioeconomic status and sugar-sweetened beverages may be that those with a lower level of education or with a low income cannot afford higher priced fruits and vegetables or specialised ingredients and thus these families may be inclined to purchase other cheaper, processed, energy-dense foods and beverages.

The studies reviewed by Powell and Chaloupka (2009) indicated that when statistically significant associations were found between food and fiscal pricing (taxes or subsidies) and body weight outcomes, the effects were usually small in magnitude but sometimes larger for low socioeconomic status populations and for those at risk for overweight or obesity. Powell and Chaloupka (2009) concluded that non-trivial pricing interventions may have some measurable effects on Americans' weight outcomes, particularly for children and adolescents, low socioeconomic status populations, and those most at risk for overweight.

A study by Temple and Steyn (2011) found that in South Africa, on average, a healthier diet costs 69% more and is, as a result, unaffordable for most South Africans. The fact that healthy products are becoming more expensive while less healthy options are becoming more affordable, has confirmed results found in international studies (Jones,

Conklin, Suhrcke & Monsivais, 2014). Temple and Steyn (2011) submitted that there is therefore a correlation between high energy density diets and obesity and low socioeconomic status. The reason for this is that high energy foods are more financially affordable and thus more attractive, but these foods typically have an insignificant nutrient density, and people with lower incomes may consequently select a comparatively less healthy diet.

Rehm, Matte, Van Wye, Young, and Frieden (2008) found that persons aged eighteen to twenty-four years old, males, those who are overweight, and those with an education level lower than a college degree, are probably recurrent sugar-sweetened beverage consumers. Recent studies have also indicated that greater sugar-sweetened beverage consumption, amongst females, is associated with lower household income, higher daily television viewing, being of African-American race, less daily physical activity, and a higher Body Mass Index. By contrast, Bleich, Cutler, Murray and Adams (2008) found that, irrespective of gender or socioeconomic status, consumption of sugar-sweetened beverages was higher amongst young African-American adults compared with White and Mexican-American adults.

West, Bursac, Quimby, Prewitt, Spatz, Nash and Eddings (2006) found that sixty-five per cent of students consume sugar-sweetened beverages daily. In comparison to women, men were more frequent consumers. Akin to other studies focusing on young adults, black college students reported higher sugar-sweetened beverage consumption compared to whites; and younger undergraduate students reported greater sugar-sweetened beverage intake in comparison to older undergraduate students.

Huffman and West (2007) discovered considerably higher consumption of sugar-sweetened beverages among normal weight students, in comparison to overweight students, especially among college age students from minority race groups, indicating that there is a readiness to change (reduce) sugar-sweetened beverage consumption amongst the overweight. The study by Bleich and Wang (2011) revealed that, among those diagnosed with diabetes, men consumed more sugar-sweetened beverages than women, younger adults more than older adults, non-Hispanic blacks more than whites, and low-income individuals more than higher-income individuals.

An article by McGranahan and Schanzenbach (2011) concluded that in general, in terms of both expenditure and calorific intake, less educated and poorer population groups focus a greater percentage of their total spending on sugar-sweetened beverages and obtain a larger fraction of their daily calorie intake from sugar-sweetened beverages. This implies that a soda tax would primarily affect these disadvantaged groups, in the absence of substantial differences in the elasticity of demand across groups.

2.5.2 Media and Marketing

Brownbill (2015) states that sugar-sweetened beverage companies, restaurants and retailers advertise sugar-sweetened beverages using radio and television, print media, in-store displays and social media, all of which captures the attention of young adults. He also claims that a large percentage of the users who view and who are targeted by sugar-sweetened beverage brand content on social media are young people, as social media is largely integrated into their lives and that this is especially true for those who reside on or near college campuses. Harris, Schwartz, and Brownell (2011) found that in recent times, beverage companies capitalise on the increasing use of the Internet and social media by creating company-sponsored websites, advertising on third-party websites, and engaging in social media. Beverage companies have Facebook® pages for their products, with photos, videos, contests and downloadable content and they also sponsor smartphone applications to promote their products among young consumers.

Hattersley, Irwin, King, and Allman-Farinelli (2009), in a qualitative study of the determinants of soft drink consumption in young adults aged eighteen to thirty years, found that heavy marketing of soft drinks in environments frequently visited by young people can significantly influence their consumption behaviour. The study by Koordeman, Anschutz, van Baaren and Engels (2010) revealed that young women aged eighteen to twenty-nine years living in the Netherlands had a greater likelihood to consume soft drinks when they were exposed to television advertisements containing soft drinks, than when exposed to water advertisements.

Yang and Chiou (2010) propose that the purchase and consumption of sugar-sweetened beverages may decline by increasing the cost of less-healthy beverages and decreasing the cost of healthier alternatives. The logic is that healthier low-fat, nutrient-dense food and beverages may be preferred if healthier beverages are cheaper and unhealthy foods are not easily available. Powell, Han and Chaloupka (2010) explain that healthy foods increasingly cost more, and fast food restaurants have become ever more available and accessible. Further, Chaloupka reports that data revealed that higher fast food prices and greater supermarket availability were related to higher fruit and vegetable consumption and a lower Body Mass Index.

A study by Bollard, Maubach, Walker and Mhurchu (2016) revealed that young adults' predicted preferences for, and reported probability of, consuming sugar-sweetened beverages, are considerably reduced by plain packaging and warning labels. Wiecha, Finkelstein, Troped, Fragala, and Peterson (2006) found that the use of school vending machines and fast-food restaurants are also associated with overall sugar-sweetened beverage consumption.

2.5.3 Lifestyle Habits

Lavin and Timpson (2013) define habit behaviours as those which are often repetitive, involuntary and can be difficult to control. Further, Lavin and Timpson (2013) submit that childhood and adolescence are key developmental stages where lifestyle habits are formed and set. In a study by Timpson, Lavin and Hughes (2015), a large number of adults explained that people would generally not be motivated to reduce their sugar-sweetened beverage consumption as a result of a 20% increase in price because they believed that sugar-sweetened beverage consumption was due to habit.

Butland, Jebb, Kopelman, McPherson, Thomas, Mardell and Parry (2007) found that specific environmental factors shape the availability and consumption of various foods and drink, thus affecting healthy behaviour choices. Osei-Assibey, Dick, Macdiarmid, Semple, Reilly, Ellaway, Cowie and McNeill (2013), in their recent review of studies examining the influence of the food environment on overweight and obesity in young children, found that one of the most impactful environmental exposures was the availability of sugar-sweetened beverages.

2.5.4 Dietary Behaviours

Hoffman (2013) states that larger portion sizes and fast food intake have been linked to increased sugar-sweetened beverage consumption, and these factors are typical dietary behaviours of college students. Harrington (2008) explains that sugar-sweetened beverages trigger overeating as they are regarded as high-glycaemic index liquids that increase post-prandial blood glucose levels, reduce insulin sensitivity and diminish satiety levels. Timpson, Lavin and Hughes (2015) explain that existing consumption is influenced by age, family and social reasons. Haftoglou (2015) stated that it is possible that adolescents' increased independence in decision making and food purchasing contributes to the trend. Lytle, Seifert, Greenstein and McGovern (2000) and Demory-Luce, Morales, Nicklas, Baranowski, Zakeri and Berenson (2004) have demonstrated that children's eating patterns may change over time with marked declines in dietary quality, as they transition into adolescence.

Sharkey, Johnson and Dean (2011) identified that frequent sugar-sweetened beverage intake is correlated with sporadic breakfast meals, low fruit and vegetable consumption, and food insecurity as a result of poverty levels. Hoffman (2013) explains that college students deal with numerous financial challenges, for example, tuition fees, loans, housing, and living expenditure and, in addition to this often-stressful transitionary phase, many come from geographically disadvantaged areas with long established dietary patterns.

2.5.5 Family Factors

Ambrosini (2009) submits that diet, and as a result sugar-sweetened beverage consumption, largely stems from the family environment. The Centers for Disease Control and Prevention (2010), one of the major operating components of the Department of Health and Human Services in America, with specific centres throughout the United States of America, have associated the consumption of sugar-sweetened beverages by children with permissive parenting habits and styles, parental sugar-sweetened consumption patterns, and increased access to sugar-sweetened beverages in both the home and school. This finding supports the fact that

a significant influence is exerted by the home environment and dietary patterns, specifically sugar-sweetened beverage consumption.

Timpson, Lavin and Hughes (2015) explained that respondents in their study indicated that their current attitudes and behaviours towards sugar-sweetened beverages were influenced by their upbringing. Respondents explained that sugar-sweetened beverages were either something that was never allowed, or was only allowed as a treat, or something that was regularly available in the home and thus consumed on a regular basis. Van der Horst, Kremers, Ferreira, Singh, Oenema and Brug (2007) examined perceived parenting practices of Dutch adolescents and discovered that adolescents had lower rates of sugar-sweetened consumption if they perceived their parents as more restrictive in terms of access to sugar-sweetened beverages in the home. Further, adolescents consumed fewer sugar-sweetened beverages if they perceived their parents as involved, i.e. those parents who make the time to encourage them or discuss important issues.

Hoffman (2013) states that parents, by serving as role models and providing beverage choices to their children, have a strong influence on establishing sugar-sweetened beverage consumption patterns. Hoffman (2013) further elaborates that many young adults and college students who have historically consumed sugar-sweetened beverages since childhood, drink these beverages frequently and in higher quantities. Huffman and West (2007) found that past and present home environments as well as parenting approaches from childhood, are factors influencing sugar-sweetened beverage consumption; family environment has a strong influence on the typical diet and health promotion of young, developing individuals and young adults. Buscher and Martin (2001) found that by altering college environments to reduce exposure to sugar-sweetened beverages, the intake of sugar-sweetened beverages decreased.

2.5.6 Physical Activity Factors

The World Health Organisation (2015) explains that engaging in a physical activity of moderate intensity for 150 minutes per week for adults is an essential step to prevent chronic diseases and maintain a healthy weight. Vanderlee, Manske, Murnaghan, Hanning and Hammond (2014) examined sugar-sweetened beverage consumption

and found that they are often associated with less physical activity. Vanderlee *et al*. (2014) submit that adolescents consumed 30% fewer sugar-sweetened beverages if they met the physical activity guidelines of 90 minutes per day, as compared to those who did not meet the guidelines.

Downs (2011) supports the theory that physical activity helps to guard against chronic diseases, including Type Two diabetes, heart disease, and cancer, as well as mental health. Further, Downs (2011) submits that other behaviours related with physical health, for example healthier eating habits, are often displayed by physically active individuals. The Centers for Disease Control and Prevention (2010) recommend that a minimum of 75 minutes of vigorous physical activity per week per adult. Downs (2011) states that participation in the minimum recommended amount of vigorous physical activity was limited to no more than 35-42% of college students and found that, after the age of twenty-four, vigorous physical activity typically reduces. It is submitted that college students appear to participate in a decreased level of physical activity after transitioning from high school to college. Downs (2011) further reports that considerably greater self-esteem and lower perceived stress were reported by constantly active students, in comparison to than their less-active counterparts. They also reported consuming substantially fewer unhealthy foods and more healthier foods.

2.5.7 Body Image

Gillen and Lefkowitz (2011) claim that students start making decisions about their health and social life independently of direct adult supervision during college years. The authors submit that it is during this time that college students are predisposed to develop unhealthy attitudes or behaviours with respect to the body, for example, eating less healthy foods, binge-drinking, or developing friendships with others who are concerned about appearances. Male students were found to be more content with their appearance in comparison to female students, but females became increasingly satisfied with their appearance over time. Further, race and ethnicity were found to influence perceived body image.

2.5.8 Stress

Hoffman (2013) found that college student health is particularly affected by stress, especially for those residing on campus. These students deal with making new friends, taking responsibility for their own finances, managing the demands of a heavier workload, and accomplishing all of this with little guidance or direction. Welle and Graf (2011) report that a study conducted by the American College Health Association found that 63% of college students report feeling “hopeless” at times, 94% report feeling “overwhelmed”, and 48% of females and 39% of males, report feeling so depressed it was difficult to function. Welle and Graf (2011) also found that there was a noticeable difference in stress tolerance and coping, between both gender and race.

Hoffman (2013) identified typical college student stressors as the pressure to perform well, starting college, and adjustment in living conditions. Welle and Graf (2011) demonstrated that obtaining eight or more hours of sleep, having sufficient leisure time, a balanced diet, avoiding problems with a substance, and being involved in an extracurricular sporting activities, are popular coping mechanisms utilised by college students to reduce perceived stress. Cruz, Fabián, Pagán, Ríos, González, Betancourt, González, Rivera-Soto and Palacios (2013) found, however, that only 60% of college students reported that physical activity is an effective coping mechanism for stress.

2.6 Awareness of the Sugar-Sweetened Beverage Tax

The questionnaire in the present study dealing with the tax on the sugar-sweetened beverages aims to investigate issues relating to pivotal factors as identified by Julia, Méjean, Vicari and Péneau (2015), such as acceptance of the tax, perceptions of its economic impact and its impending health impact. Further, attitudes about price modification, knowledge of the tax and its scope will also be explored in the present study. A significant number of the respondents in the study by Timpson, Lavin and Hughes (2015) mentioned that they would buy sugar-sweetened beverages because they are cheap. Thus, it can be deduced that price is an important consideration.
Timpson, Lavin and Hughes (2015) found that, despite evidence suggesting that food prices are determinants of consumption, the drivers appear to work in a different way

depending on age. For example, a significant number of adults indicated that if prices of sugar-sweetened beverage prices were increased, they may switch to buying from a different location, or bulk buying instead from discount stores. Young people, however, felt that most often they only wanted to buy one sugar-sweetened beverage at a time, and it would not be practical or convenient for them to buy more than one, and thus would not bulk buy. Smed, Jensen and Denver (2007) and Powell and Chriqui (2012) state that this could be influenced by how much money a young person has at his or her disposal, signifying that those from lower income households who could have less personal spending may be more sensitive to a price increase.

2.7 Diagrammatic Representation

The following diagram summarises the factors associated with the consumption of sugar-sweetened beverages and the one that follows depicts the translation of these factors into the model to be used for the present research.

Figure 1: A conceptual model of key factors associated with sugar-sweetened beverage consumption (Timpson, Lavin & Hughes, 2015)

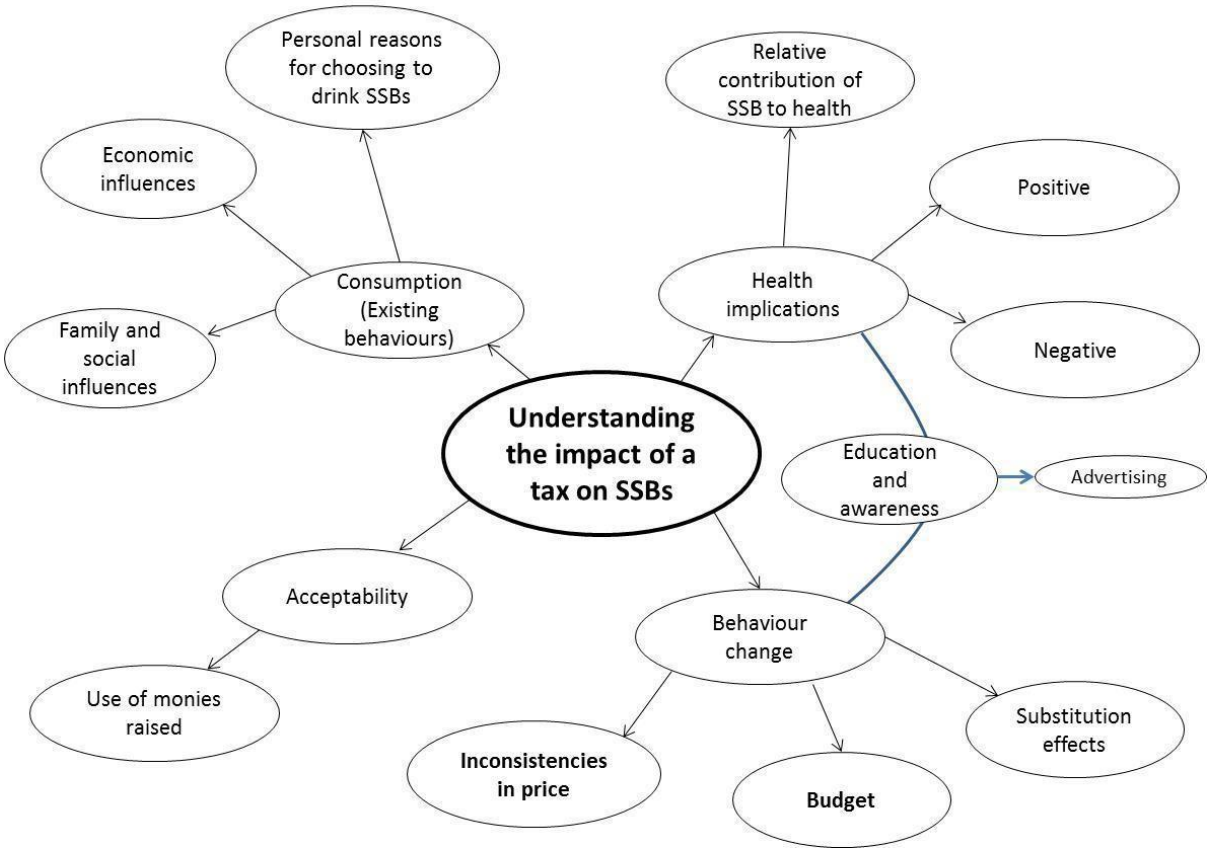
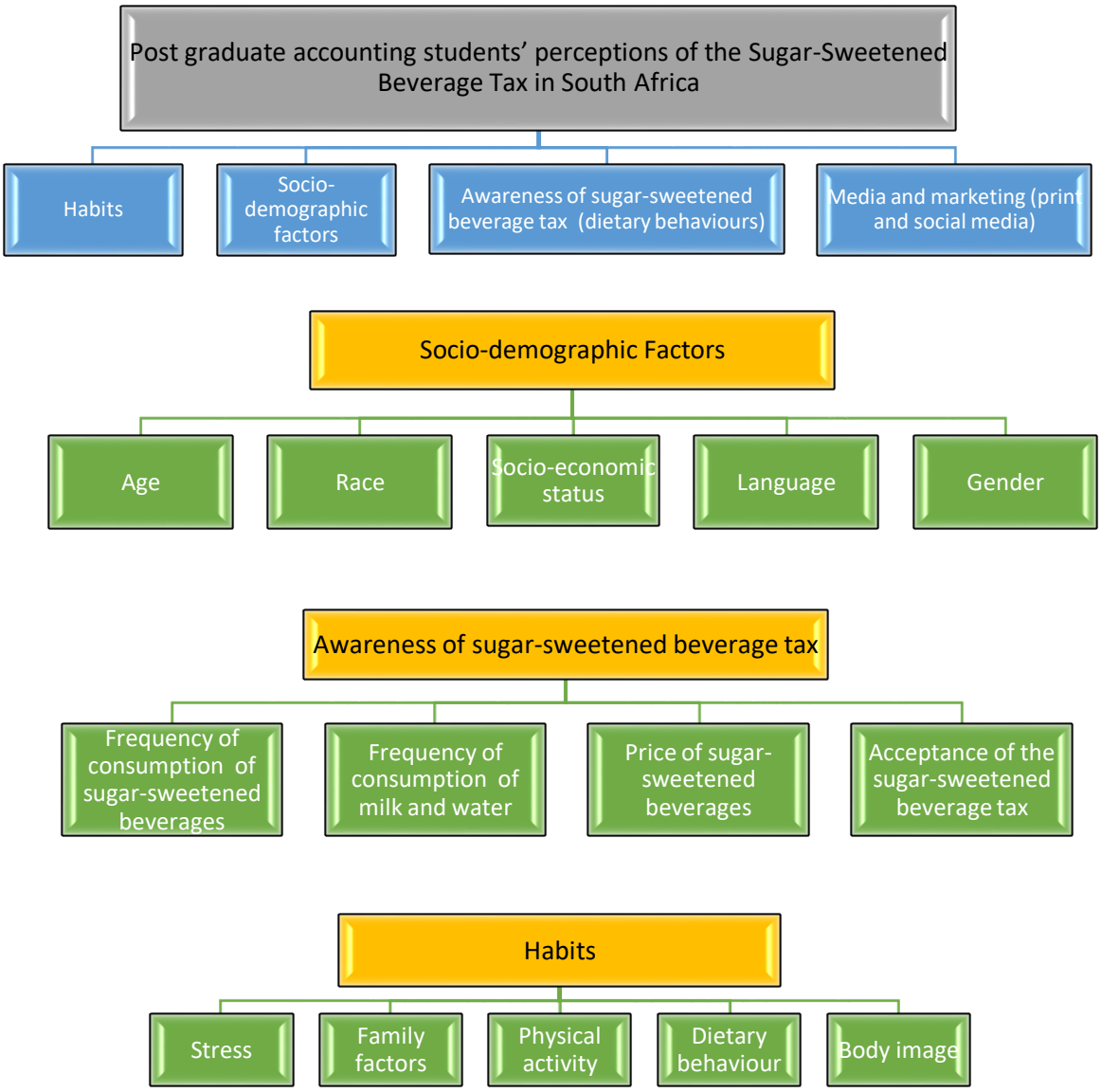


Figure 2: Research Model: Factors influencing a postgraduate students' perceptions of the Sugar-Sweetened Beverage Tax in South Africa



2.8 Explanation of the Role of Figure 2

Figure 2 provides a diagrammatical overview of factors influencing perception of the sugar-sweetened beverage tax. The key factors identified from the literature review are depicted, together with individual research constructs.

2.9 Summary of the Theoretical Model

Table 2: Summary of the theoretical model

Research Model	Research Constructs	Brief description of constructs
Sociodemographic factors	Age Race Language Gender Socio-economic status	Previous research on the consumption of sugar-sweetened beverages has indicated that intake in adults and children has been linked with obesity, diabetes, and several demographics such as race, gender, age, and socioeconomic background (Rehm, Matte, Van Wye, Young, & Frieden, 2008).
Media and marketing	Print and social media	Brownbill (2015) claims that sugar-sweetened beverage companies, restaurants and retailers advertise sugar-sweetened beverages using radio and television, print media, in-store displays and social media, all of which captures the attention of young adults.
Awareness of the sugar-sweetened beverage tax	Frequency of consumption of sugar-sweetened beverages versus frequency of consumption of water and milk Price Acceptance of the sugar-sweetened beverage tax	Pivotal factors, as identified by Julia, Méjean, Vicari and Péneau (2015), such as acceptance of the tax, perceptions of its economic impact and its impending health impact, as well as the consumption of sugar-sweetened beverages is investigated. Further, attitudes about price modification, knowledge of the tax and its scope will also be explored.
Habits	Dietary behaviour Stress Family factors Physical activity Body image	Lavin and Timpson (2013) define habit behaviours as those which are often repetitive, involuntary and can be difficult to control. Mechanisms for coping with stress, family influence and regularity of physical activity have all been identified as habits which affect perceptions of the sugar-sweetened beverage tax.

2.10 Conclusion

The present chapter, which presents the literature review, commences with a discussion of the imposition of a tax on sugar-sweetened beverages internationally and in South Africa. It is evident from relevant studies examined that there are various factors that influence perceptions of a sugar-sweetened beverage tax. A report by Wang (2010) identified that greater public support is gained for a sugar-sweetened beverage tax when the tax is introduced in the context of promoting health, and when the revenues are allocated for programs promoting childhood nutrition or obesity prevention.

The multifactorial factors affecting consumption of sugar-sweetened beverages are dependent on various sociodemographic factors, all of which, have been shown to be key factors to consider:

- age, race, socio-economic status, language and gender;
- awareness of the sugar-sweetened beverage tax;
- frequency of consumption of sugar-sweetened beverages versus frequency of consumption of water and milk;
- habits, such as dietary behaviour, family factors, physical activity, body image and stress;
- the price of sugar-sweetened beverages;
- the social impact of a sugar-sweetened beverage tax; and
- the fact that young adults are the prime targets of sugar-sweetened beverage marketing, a large proportion of which is disseminated through social media.

Taking these factors into account, a theoretical framework was developed, against which perceptions were tested.

This aim of this study is to specifically explore attitudes, behaviours and perceptions of postgraduate accounting students who would be affected by the sugar-sweetened beverage tax in South Africa. The study is designed to outline the key factors relating to sugar-sweetened beverage consumption and obtain an understanding of how these factors will impact perceptions of a sugar-sweetened beverage tax. This research will

contribute to the existing body of knowledge and the understanding of the driving forces behind sugar-sweetened beverage consumption, whilst providing additional evidence and context to perceptions of the sugar-sweetened beverage tax in South Africa.

The next chapter (Chapter 3) provides an overview of the research design and methodology, the research setting, the sampling and the research instrument (development of a questionnaire based on the theoretical framework). It will also describe the data collection, including the distribution of the survey. The analysis techniques used for both the structured questions and the open-ended questions are described. Finally, ethical considerations are discussed.

CHAPTER 3: METHODOLOGY

3.1 Introduction

In this chapter an overview of the research design and setting, sample size, sampling technique, target population, units of analysis, research methodology, research instrument and the pilot study are discussed. The data collection, including the distribution of the survey are explained. The analysis techniques used for both the structured questions and the open-ended questions are then described. Finally, ethical considerations are discussed.

3.2 Description of the Research Design and Research Setting

This research can be positioned within a post-positivist paradigm, as Miller (2007) explains that post-positivists believe that a reality exists, but, unlike positivists, believe that reality can be known only imperfectly. While positivists believe that research is or can be value-free or value-neutral, post-positivists take the position that bias is undesired but inevitable, and therefore the investigator must work to detect and try to correct it. Post-positivists work to understand how their values and beliefs may have influenced their research, including through their choice of measures, populations, questions, and definitions, as well as through their interpretation and analysis of their work.

This is an exploratory study among university students in South Africa, designed to obtain their perceptions of the sugar-sweetened beverage tax. This study is referred to as cross-sectional because the information that is gathered represents what is going on at only one point in time (Olsen & George, 2004:7).

The research involved a combination of quantitative and qualitative techniques, based on a paper-based questionnaire that included both closed- and open-ended questions. Common examples of sugar-sweetened beverages were also provided on the final page of the questionnaire. Respondents may be guarded and unwilling to respond fully and honestly, due to not wanting to admit to abusing sugar-sweetened beverages,

or denying that they are obese, or that the reason is sugar. An appropriate methodology was thus to make use of an anonymous survey questionnaire.

3.3 Sampling

The study used respondents located in two provinces in South Africa, i.e. KwaZulu-Natal and Eastern Cape. The purpose of the study is not to generalise the findings of the research to the entire South African population, but to obtain an understanding of public perceptions of the tax on sugar-sweetened beverages.

3.3.1 Target Population

The target population for the survey was post-graduate Bachelor of Commerce Accounting and Postgraduate Diploma in Accounting students, aged twenty-one years and older, studying at the Universities of KwaZulu-Natal, Zululand and Fort Hare during the 2018 academic year. The estimated population comprised approximately 405 students (University of Zululand: 55 students, Fort Hare: 140 students, University of KwaZulu-Natal: 210 students), however, only 325 questionnaires were distributed. Time, budget and distance were identified as constraints, resulting in the research being limited to these three universities.

3.3.2 Units of Analysis

Neuman (2011: 69) defines the unit of analysis as: “The units, cases, or parts of social life that are under consideration. They are key to developing concepts, empirically measuring or observing concepts, and using data analyses”. The units of analysis in this study consist of students who are natural persons from all population groups, who speak a multitude of languages, and differ in terms of their socio-economic status and background.

The decision to use students as the units of analysis was based on the difficulty in gaining access to consumers of the sugar-sweetened beverages, and the assumption that postgraduate students are also consumers, who will make their consumption decisions based on economic and socio-demographic factors. It was also assumed

that the demographic profile of the students of the three universities is likely to be broadly representative of the demographics of the South African population.

3.3.3. Sampling Method

A purposive, non-probability, convenience sampling technique was used. Kothari (2004:17) explains that "…purposive sampling is considered desirable when the universe happens to be small and a known characteristic of it is to be studied intensively. Also, there are conditions under which sample designs other than random sampling may be considered better for reasons like convenience and low costs". The deliberate sampling method therefore is considered the most logical and feasible manner by which to identify the target population and units of analysis for this study.

3.4 Data

Data was provided by responses to a questionnaire based on the theoretical framework developed in Chapter 2, including:

- key demographic questions (gender, race, age etc.);
- beverage consumption (sugar-sweetened beverages, milk and water), serving size, as well as frequency of consumption; and
- knowledge and awareness of the sugar-sweetened beverage tax.

The questions were designed to include various types of responses, including a Likert scale.

Data was collected during the 2018 academic year at three universities in two provinces in South Africa, i.e. the Universities of KwaZulu-Natal, Zululand (both located in KwaZulu-Natal) and Fort Hare (located in the Eastern Cape).

Accounting lecturers at the universities concerned were requested to administer the questionnaires in class, to ensure a good response rate. The timing of the survey was scheduled in such a way that it did not clash with student test or exam periods to

increase the response rate. Students were informed that a survey will be conducted at their standard lecture venues. These venues were chosen because class attendance at a post-graduate level is crucial and a diverse sample of the student population will be included across the three universities. Distribution and completion of the surveys was controlled by the lecturer concerned at the respective institute. An informed consent form accompanied each survey.

Students were made aware of the fact that participation was completely anonymous and voluntary, and all data would be confidential, used only for research purposes. The survey took approximately 15 minutes to complete.

3.5 Design of the Questionnaire

The questionnaire consisted of questions adapted from factors identified in the literature review and designed to test each variable, based on relevant previous studies on sugar-sweetened beverage consumption. The questionnaire included an introductory letter and an informed consent form, which declared that survey participation is voluntary, and that the responses will be kept anonymous. Participants were required to agree to these terms before commencing with the questionnaire.

The first part of the questionnaire dealt with establishing the demographic and income profile of the target group. Section two of the questionnaire tested each construct from the framework developed in Chapter two. A five-point Likert-type scale with anchors on ‘‘strongly agree’’ and ‘‘strongly disagree’’ was used.

With the aim of establishing whether respondents would experience any difficulties in interpreting and completing the questionnaire, a pilot study was conducted. The questionnaire was critically evaluated and pre-tested by academics at various institutions across the country. All suggested amendments were considered and effected, if deemed appropriate. Feedback indicated that the survey was easily understood in that the questionnaire language was clear and unambiguous, produced reasonable answers and was ethically appropriate. This ensured the quality and accuracy of the research design. The questionnaire was designed to test the following variables:

3.5.1 Demographic Variables

Demographic variables that were tested comprised age, gender, race, home language, level of income and type of residence. The participants' ages were stated in years and gender was reported as male, female or "prefer not to say". Racial groupings included Black African, Coloured, Indian, White or Other. Residence categories included home, campus residence or off-campus residence. Income groupings for the net (after-tax) annual amount received comprised the following ranges: below R5 000, R5 000 to R10 000, R10 000 to R20 000, R20 000 to R40 000 and above R40 000.

3.5.2 Health

General well-being was assessed by inquiring: "Do you consider yourself to be overweight?" with a follow up question of: "If you were told by a health care professional to lose weight, would you consider reducing your intake of sugar-sweetened beverages?"

3.5.3. Physical Activity

Physical activity was determined by asking an open-ended question: "How much time do you spend weekly on physical exercise?".

3.5.4 Perceived Stress Response

The perceived stress response was measured by inquiring: "Do you increase your consumption of sugar-sweetened beverages when you are under stress?" (if the participants had indicated that, on average, they do consume sugar-sweetened beverages). The item was coded such that higher values indicated a correlation between a greater level of perceived stress and consumption of sugar-sweetened beverages.

3.5.5 Beverage Consumption

Responses regarding sugar-sweetened beverage preferences, availability, and frequency of consumption were requested. If participants did not consume sugar-sweetened beverages, they were asked if this was due to a medical condition. Water and milk intake and frequency of consumption was also determined. Categories included: never, 1-2 glasses a day, 3-4 glasses a day, 5-6 glasses or 7 or more glasses a day. Participants were asked what their childhood associations with sugar-sweetened beverages were. The question posed was: “As a child did you drink sugar-sweetened beverages?” and responses included: never, daily, weekly or on special occasions. Participants were also asked: “Are beverages, other than sugar-sweetened beverages, available on campus?”.

Table 3 below reflects the questions included in the questionnaire and cross-references to the origins in the literature.

Table 3: Questions included in the questionnaire and cross-references to the origins in the literature

Dichotomous responses	
Research construct	**Reference**
• **Socio-demographic factors**	
1. Please indicate your age: (a) 21-25 years (b) 26-30 years (c) 31-35 years (d) 36 years or older	Davis (2016), Hoffman (2013). West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006), Julia, Méjean, Vicari, and Péneau. (2015).
2. Please indicate your gender: (a) Male (b) Female (c) Prefer not say	Davis (2016), Hoffman (2013), West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006), Julia, Méjean, Vicari, and Péneau. (2015).
3. Please indicate your home language	Davis (2016)
4. Please indicate your race: (a) Black African (b) Coloured (c) Indian (d) White (e) Other (specify) (f) Prefer not to say	Hoffman (2013), Hoffman (2013), West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006)
5. Do you receive any form of income? (a) No (b) Yes – Part time/Casual work	Hoffman (2013), Julia, Méjean, Vicari, and Péneau. (2015).

(c) Yes – Full Time work	
6. If you answered YES to the previous question, what net (after-tax) amount do you receive annually? (a) Below R5 000 (b) R5 000 - R10 000 (c) R10 000 - R20 000 (d) R20 000 - R40 000 (e) Above R40 000	Davis (2016), Hoffman (2013), Bollard, Maubach, Walker and Mhurchu (2016)
7. Where do you reside? (a) Home (b) Campus Residence (c) Digs (Off-Campus Residence)	Davis (2016), Hoffman (2013)
8. Are sugar-sweetened beverages available at your place of residence? (a) Yes (b) No (c) Occasionally	Battram, Piché, Beynon, Kurtz and He (2016)
9. Do you consider yourself to be overweight? (a) Yes (b) No	Davis (2016), Hoffman (2013), Huffman and West (2007)
10. If you were told by a health care professional to lose weight, would you consider reducing your intake of sugar-sweetened beverages? (a) Yes (b) No (c) I don't drink sugar-sweetened beverages	Davis (2016), Hoffman (2013). West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006), Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry. (2015)
11. How much time do you spend weekly on physical exercise?	Davis (2016), Hoffman (2013), Edward (2016)
• **Habits**	
12. On average, how many sugar-sweetened beverages do you drink during a week?	Davis (2016), Hoffman (2013), Krukowski, Conley, Sterling and Rainville, (2016), Huffman and West (2007), West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006)
13. If you answered NONE to question 12, is this because of a medical condition?	Hoffman (2013)
14. If you <u>did not</u> answer NONE to question 12, do you increase your consumption of sugar-sweetened beverages when you are under stress? (a) Yes (b) No (c) Occasionally	Hoffman (2013)
15. If you <u>did not</u> answer NONE to question 12, do you wish to reduce your consumption of sugar-sweetened beverages? (a) Yes (b) No	Davis (2016), Hoffman (2013). West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006)
16. How often do you drink water? (a) Never (b) 1-2 glasses a day (c) 3-4 glasses a day	Hoffman (2013), Krukowski, Conley, Sterling and Rainville, (2016)

(d) 5-6 glasses a day (e) 7 or more glasses a day	
17. How often do you drink milk? (a) Never (b) 1-2 glasses a day (c) 3-4 glasses a day (d) 5-6 glasses a day (e) 7 or more glasses a day	Krukowski, Conley, Sterling and Rainville, (2016)
18. As a child, did you drink sugar-sweetened beverages? (a) Never (b) Daily (c) Weekly (d) On special occasions	Hoffman (2013)
19. Are beverages, other than sugar-sweetened beverages, available on campus? (a) Yes (b) No	Davis (2016), Hoffman (2013), Levy and Friend (2013)
Likert-type questions **For questions 21 – 46, the possible responses are:** **1 = strongly disagree** **2 = disagree** **3 = undecided** **4 = agree** **5 = strongly agree**	
Perceptions of the Sugary Beverages Levy (Sugar-Sweetened Beverage Tax)	
20. I understand the sugary beverages levy (sugar-sweetened beverage tax).	
21. The sugary beverages levy (sugar-sweetened beverage tax) will be beneficial to my health.	Julia, Méjean, Vicari, and Péneau. (2015).
22. A tax should be levied on sugar-sweetened beverages.	Julia, Méjean, Vicari, and Péneau. (2015).
23. A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system.	Julia, Méjean, Vicari, and Péneau. (2015).
24. A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease.	Julia, Méjean, Vicari, and Péneau. (2015).
25. Imposing a tax on sugar-sweetened beverages will increase their prices.	Julia, Méjean, Vicari, and Péneau. (2015).
26. A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich.	Julia, Méjean, Vicari, and Péneau. (2015), Barry, Niederdeppe and Gollust, (2013)
27. Having a tax on sugar-sweetened beverages will improve the health of the population.	Julia, Méjean, Vicari, and Péneau. (2015).
28. Clear labelling of sugar content makes me less likely to buy sugar-sweetened beverages.	Bollard, Maubach, Walker and Mhurchu (2016)
29. The reports that I see and read in the media about sugar and sugar-sweetened beverages discourage me from drinking sugar-sweetened beverages.	Hoffman (2013)

30. Advertising and marketing of sugar-sweetened beverage brands make me want to buy these products.	Bollard, Maubach, Walker and Mhurchu (2016)
Price of sugar-sweetened beverages	
31. I would purchase fewer sugar-sweetened beverages if the price went up by 20%.	Davis (2016), Krukowski, Conley, Sterling and Rainville, (2016)
32. I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%.	Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry. (2015)
33. As sugar-sweetened beverages were relatively cheap prior to the imposition of the tax, I have developed a habit of drinking these beverages.	
34. I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages.	
Social impact of sugar-sweetened beverage tax	
35. Childhood obesity is a problem for society.	Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry. (2015)
36. Childhood obesity is a serious problem.	Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry. (2015)
37. The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa.	Tugendhaft, Manyema, Veerman, Chola, Labadoarios and Hofman (2016).
38. The sugary beverages levy (sugar-sweetened beverage tax) will be effective in lowering obesity rates.	Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry. (2015)
39. The sugary beverages levy (sugar-sweetened beverage tax) is a practical approach to limiting sugar intake.	Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry. (2015)
40. A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres.	Barry, Niederdeppe and Gollust (2013)
41. Schools should be prohibited from selling sugar-sweetened beverages on school property.	Gollust, Barry, and Niederdeppe (2014)
42. The tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa.	
43. The tax on sugar-sweetened beverages will result in a loss of jobs.	Barry, Niederdeppe and Gollust, (2013)
44. Prominent calorie labels should be placed on sugar-sweetened beverages.	Gollust, Barry, and Niederdeppe (2014)
45. Television and radio stations should provide free air time for public service announcements on healthy eating and exercise.	Gollust, Barry, and Niederdeppe (2014)
Open-ended question	
46. Please make any comments that you may wish to add on the sugary beverages levy (sugar-sweetened beverage tax) and its implementation.	

Source: Own design

3.6 Data Analysis

The data from the completed questionnaires was checked, coded and entered into SAS Enterprise Guide 7.1 to analyse the data, and SPSS 25 Statistical Software was used for the factor analysis. The descriptive statistical analysis involved the computation of frequency distributions (counts and percentages) of the responses to the questionnaire. Measures of central tendency, including means, standard deviations, and range were conducted on all variables of interest. Analysis of variance were used to compare group means. Chi-square analyses were used to examine differences in proportions, as appropriate. To examine group differences, analysis of variance (ANOVA) and independent t-tests were conducted and $p<0.05$ was established as the level of significance.

Reliability and validity tests of the instrument used were carried out. Mean scores and Cronbach's alpha were used to test the reliability of the instrument, while factor analysis was used to ascertain its validity. A reliability and internal consistency test on the multiple item constructs was carried out on the data. The Cronbach's alpha(α) reliability coefficient was used to test the reliability of the items for the various constructs. The Cronbach's alpha is a reliability measure coefficient that reflects how well items in a set are positively correlated to one another. To analyse the validity of each of the constructs (i.e. the theoretical model), factor analysis was applied using SPSS 25.

3.7 Research Ethics

Research ethics complied with the following, prior to commencement of the study:

- obtaining ethical clearance from the Rhodes University Ethical Standards Committee;
- obtaining gatekeeper consent from each of the three universities involved;
- collecting data commenced after the approval of the University Ethical Standards Committee had been obtained;

- ensuring that each respondent signs an informed consent form (which informed participants about purpose of the study, details of the researcher and organisation, information on the voluntary nature of participation, the participant's ability to withdraw from the study at any time, the participant's role and the anonymity and confidentiality of the data they provided) prior to collecting data; and
- ensuring the anonymity of the data collected.

3.8 Conclusion

The present chapter, which presents the research design and methods, commences with a discussion of the general research design selected for this study, the target population, the sampling method, and units of analysis. Thereafter the data collection plan and the methods employed to analyse the data were discussed. The methods used to ensure the quality and accuracy of the research design, and the ethics applied to this study were then explained.

Both quantitative and qualitative research techniques were employed in this study, as they were considered important to elicit a broad understanding of the perceptions of the sugar-sweetened beverage tax in South Africa. A survey was used to collect data from post-graduate accounting students at three universities in South Africa regarding the sugar-sweetened beverage tax in South Africa. Participation was voluntary and a pilot study was conducted to enhance the questionnaire language, assess the time required to complete the questionnaire and identify any areas that required changes.

Ethical considerations were addressed by seeking consent from the participants before they became involved and participants were made aware of their ability to withdraw from the study at any time.

The next chapter (Chapter 4) presents the study results.

CHAPTER 4: PRESENTATION OF THE RESULTS

4.1 Introduction

This chapter presents the quantitative and qualitative data analysis, as guided by the research questions. SAS Enterprise Guide 7.1 was utilised to analyse the quantitative data gathered and SPSS 25 Statistical Software was used for the factor analysis. The results of the responses to the research instrument are described in this chapter.

Data was gathered relating to the demographic characteristics of the respondents and the two main constructs (construct 1: perception of the sugar-sweetened beverage tax and the price of sugar-sweetened beverages; and construct 2: the social impact of the sugar-sweetened beverage tax), which was then analysed using descriptive statistics. Questions relating to respondents' sugar consumption habits, the frequency and quantity of consumption of sugar-sweetened- and non-sugar-sweetened beverages, and childhood behaviours were also explored.

The descriptive statistics included cross-tabulations between variables, frequency distributions, means and standard deviations to analyse responses to the questionnaire dealing with the levy on sugar-sweetened beverages. Reliability and validity tests of the instrument used were carried out. Mean scores and Cronbach's alpha were used to test the reliability of the instrument, while factor analysis was used to ascertain its validity.

4.2 The Pilot Study

Thirty-three comments from eight academics at various institutions across the country who undertook the pilot study were collated and analysed. These included using a friendlier tone, amendments to avoid ambiguity and minor grammatical suggestions. The results of the pilot study indicated that it took approximately 15 minutes to complete the questionnaire and, in general, there was no difficulty in understanding the questions. The consensus was that the questionnaire comprised questions that were relevant to the aims of the study and would produce reasonable answers in

attaining the objectives of the study. All suggested amendments from the pilot study were considered and effected, if deemed appropriate.

4.3 Quantitative Results

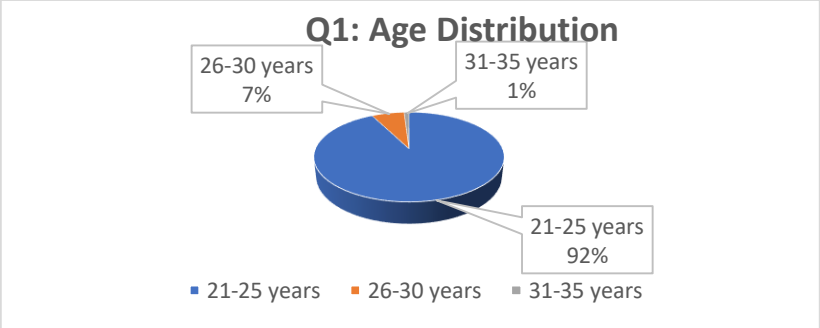
4.3.1 The Study Population

The sample consisted of university students. A total of 325 questionnaires were distributed to postgraduate accounting students across three universities. All 325 questionnaires were returned, however, 22 were excluded and were not considered for analysis due to missing responses (incomplete) and obvious errors, which resulted in 303 viable (completed) responses. This resulted in 93% of the questionnaires being subject to analysis (303 valid responses / 325 = 93%).

4.3.2 Socio-demographic Variables

The socio-demographic profile of the respondents was subdivided into various characteristics based on age, gender, home language, race, level of income, and type of residence. The sample consisted of 303 university students, ranging in age from 21 to 35 years, with the majority of the respondents (92%) between the ages of 21 to 25 years (Figure 3).

Figure 3: Age Distribution

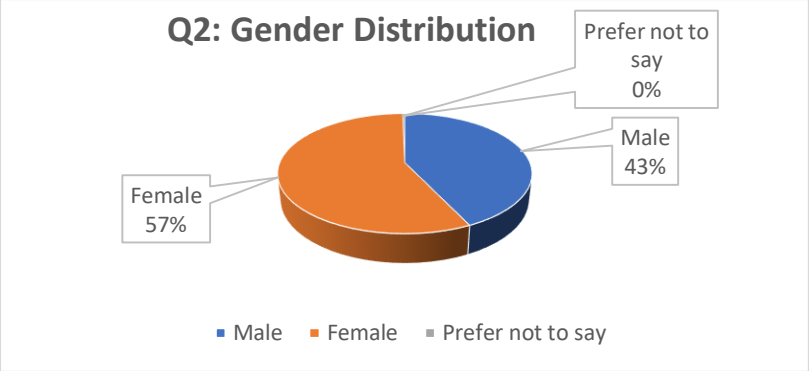


Source: Own design

Fifty-seven percent of the respondents were female, while 43% of the respondents were male, with one respondent preferring not to indicate gender (Figure 4). Most

participants (64.36%) were Black African (Figure 6) and the majority of participants (56.95%) lived on campus (Figure 9). An additional 39.07% of the participants were daily commuters to campus from their homes (Figure 9). The remaining 3.97% of participants lived in off-campus residences (Figure 9).

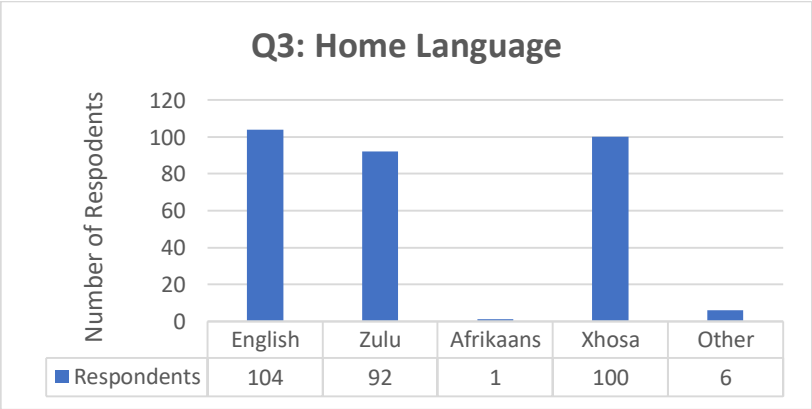
Figure 4: Gender Distribution



Source: Own design

Figure 5 indicates that 104 (34.32%) respondents indicated English as their home language, 92 (30.36%) indicated Zulu as their home language, one respondent indicated Afrikaans as his/her home language, 100 (33%) respondents indicated Xhosa as their home language and six respondents indicated “Other” as their home language.

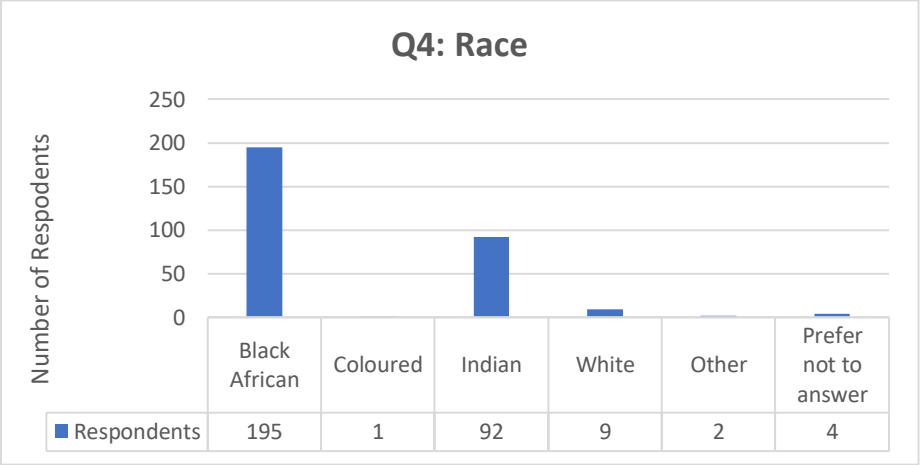
Figure 5: Home language characteristics of respondent



Source: Own design

As shown in Figure 6, the largest racial/ethnic group was Black African (195 respondents, which equated to 64.36%), one of the respondents was Coloured, 92 (30.36%) respondents were Indians, nine respondents were White, two were from other races and four preferred not to indicate their race.

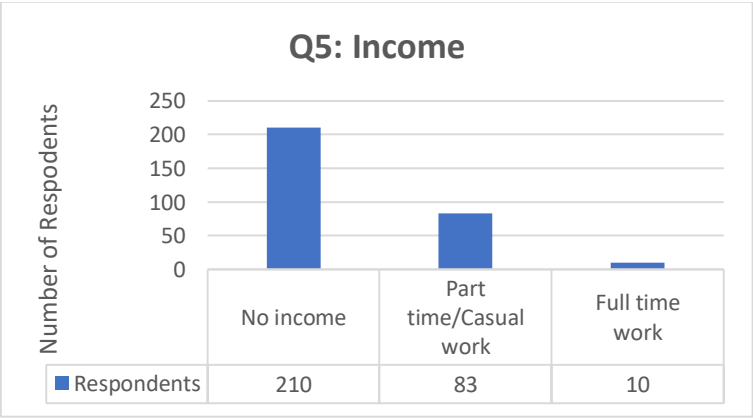
Figure 6: Characteristics of respondent by race



Source: Own design

The distribution of respondents by income is represented in Figure 7. Two-hundred-and-ten (69.31%) respondents indicated that they receive no income while 83 (27.39%) respondents indicated that they received income by doing part time or casual work. Ten other respondents, which make up 3.3% of all respondents, indicate they receive income by doing a full-time job.

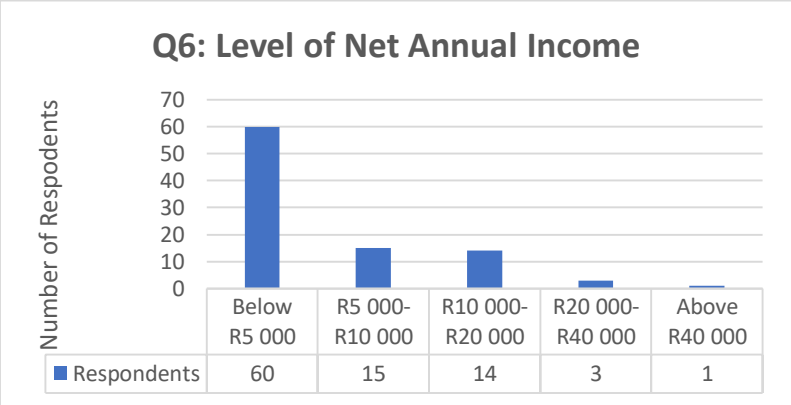
Figure 7: Characteristics of respondent by income



Source: Own design

The respondents who do receive income comprise 93 respondents. The distribution of these respondents by their net annual income is displayed in Figure 8. As shown, 60 earn below R5 000 as their net annual income, 15 earn between R5 000 - R10 000, 14 earn between R10 000 - R20 000, and three earn between R20 000 - R40 000. Only one of the respondents earns net annual income exceeding R40 000.

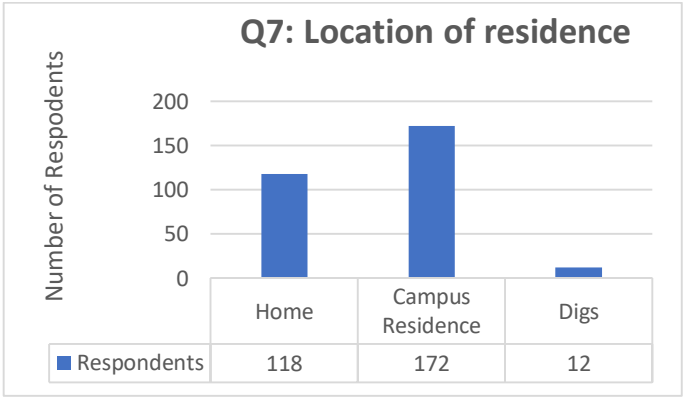
Figure 8: Characteristics of respondent by net annual income



Source: Own design

Figure 9 indicates that respondents who live on campus comprise 56.95% of the total respondents, respondents who live at home comprise 39,07% and respondents who live in digs make up 3.97% of the total respondents.

Figure 9: Characteristics of respondent by residence

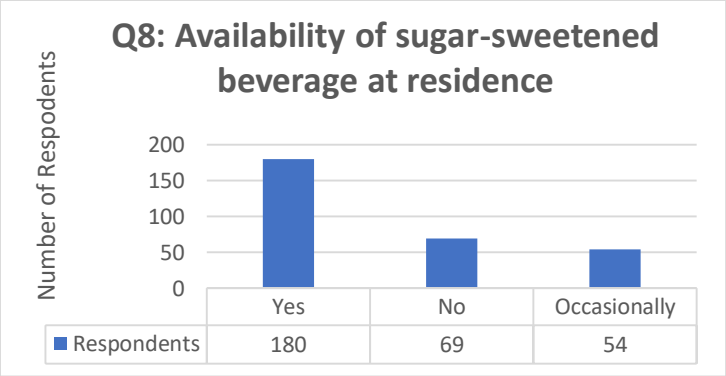


Source: Own design

4.3.3 Beverage Consumption

Respondents were asked if sugar-sweetened beverages are available at their residences and the responses are displayed in Figure 10. One-hundred-and-eighty respondents (59.41%) confirmed that sugar-sweetened beverages are available at their residences, 69 (22.77%) indicated that sugar-sweetened beverages are not available at their residences and 54 (17.82%) indicated that, occasionally, sugar-sweetened beverages are available at their residences.

Figure 10: Availability of sugar-sweetened beverage at residence

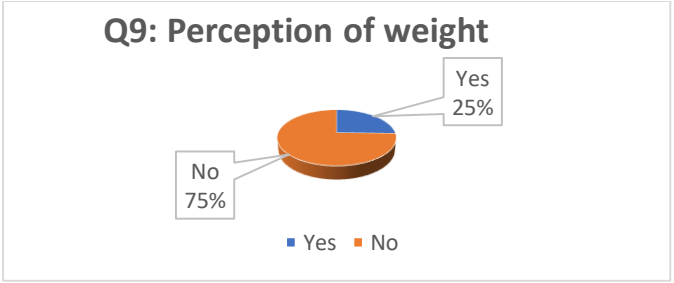


Source: Own design

4.3.4 Perception of Weight

The respondents were also asked if they consider themselves to be overweight. Their responses are presented in Figure 11. The result shows that 77 (25.41%) respondents indicated they considered themselves to be overweight, while 226 (74.59%) indicated they do not consider themselves to be overweight.

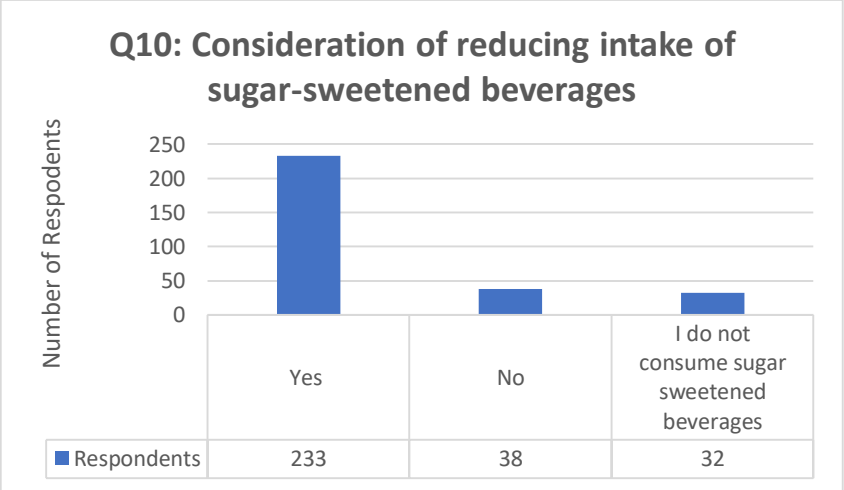
Figure 11: Weight perception of respondents



Source: Own design

When asked if they would reduce their intake of sugar-sweetened beverages when told by a health care professional to lose weight, 233 (76.90%) respondents, as shown in Figure 12 confirm that they will reduce intake, 38 (12.54%) indicated they will not consider reducing intake and 32 (10.56%) claimed they do not drink sugar-sweetened beverages.

Figure 12: If you were told by a health care professional to lose weight, would you consider reducing your intake of sugar-sweetened beverages?

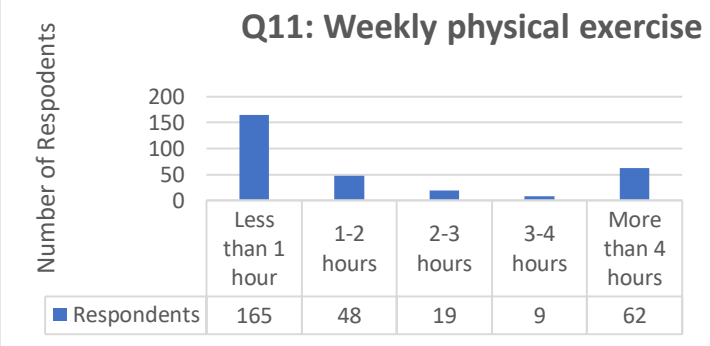


Source: Own design

4.3.5 Physical Activity

Figure 13 displays the distribution of responses when the respondents were asked the amount of time that they spend weekly on physical exercise.

Figure 13: Weekly physical exercise



Source: Own design

From the total number of respondents, 165 (54.46%) indicated they spend less than an hour on physical exercise, 48 (15.84%) indicated they spend between one to two hours, 19 respondents spend between two to three hours, nine respondents spend three to four hours and 62 (20.46%) indicated they spend more than four hours weekly on physical exercise.

4.3.6 Analysis of Likert Scale Questions

4.3.6.1 Perception of the Sugar-Sweetened Beverage Tax and the Price of Sugar-Sweetened Beverages

Table 4 displays the mean score of 14 items used to measure the perception of respondents of the sugary beverage levy and the price of sugar-sweetened beverages. The mean score of 3.42 for all 14 items indicates a positive perception of the sugary beverages levy and the price of sugar-sweetened beverages. The statement: “imposing a tax on sugar-sweetened beverages will increase prices” received the highest positive perception of this construct (mean=4.43), followed by the statement: “a tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease” (mean=3.92). The lowest mean score of 2.80 was for the statement “the reports that I see and read in the media about sugar and sugar-sweetened beverages discourage me from drinking sugar-sweetened beverages”.

Generally, the respondents have a positive perception towards this construct, understand the sugary beverage levy (mean=3.49) as well as the health benefit that will be derived from the levy (mean=2.91). The respondents have a positive perception of purchasing healthier beverages if the price of sugar-sweetened beverages went up by 20% (mean=3.17). Respondents also have a strong positive perception of developing a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages (mean=3.66).

Table 4: Mean score of 14 items used to measure the perception of respondents of the sugary beverage levy and the price of sugar-sweetened beverages

	Statements (perception and price)	Mean	Standard deviation	Min	Max
1	I understand the sugary beverages levy (n= 303)	3.49	1.11	1	5
2	The sugary beverages levy will be beneficial to my health (n= 303)	2.91	1.26	1	5
3	A tax should be levied on sugar-sweetened beverages (n= 303)	3.07	1.31	1	5
4	A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system (n= 303)	3.87	1.22	1	5
5	A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease (n= 302)	3.92	1.17	1	5
6	Imposing a tax on sugar-sweetened beverages will increase prices (n= 303)	4.43	0.88	1	5
7	A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich (n= 300)	3.79	1.16	1	5
8	Having a tax on sugar-sweetened beverages will improve the health of the population (n= 303)	3.24	1.24	1	5
9	Clear labelling of sugar content makes me less likely to buy sugar-sweetened beverages (n= 303)	2.88	1.35	1	5
10	The reports that I see and read in the media about sugar and sugar-sweetened beverages discourage me from drinking sugar-sweetened beverages (n= 303)	2.80	1.2	1	5
11	Advertising and marketing of sugar-sweetened beverage brands make me want to buy these products (n= 303)	3.04	1.24	1	5
12	I would purchase fewer sugar-sweetened beverages if the price went up by 20% (n= 303)	3.51	1.29	1	5
13	I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20% (n= 303)	3.17	1.18	1	5
14	I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages (n= 303)	3.66	1.31	1	5
	Mean score for all 14 items	**3.42**			
**	Question 33: “As sugar-sweetened beverages were relatively cheap prior to the imposition of the tax, I have developed a habit of drinking these beverages” was moved to “habits” (questions 12 -19) for statistical grouping purposes				

Source: Own design

4.3.6.2 Social Impact of the Sugar-Sweetened Beverage Tax

Table 5 displays the mean score of 11 items used to measure the social impact of the sugar-sweetened beverage tax. This construct had a mean of 3.66 indicating respondents believe that the sugar-sweetened beverage tax has a positive social impact. All items received a mean score above 3.0. The highest mean score for the social impact statements was: “childhood obesity is a serious problem” (mean=4.28), which was closely followed by the statement: “childhood obesity is a problem for society” (mean=4.26). The statement with the lowest mean score was that the “the tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa” (mean=3.07).

Respondents believe that “the consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa” (mean=3.99). Respondents believe that one of the positive social impacts is that “the sugary beverages levy will be effective in lowering obesity” (mean=3.2). The respondents were positive about the fact that “prominent calorie labels should be placed on sugar-sweetened beverages” (mean=3.96). This correlates with a study by Gollust, Barry and Niederdeppe (2014) where 65% of the respondents had the highest support for calorie labelling. Respondents strongly believe that there will be a positive social impact if “television and radio stations provide free airtime for public service announcements on healthy eating and exercise” (mean=3.92).

Table 5: Mean score of 11 items used to measure the social impact of the Sugar-Sweetened Beverage Tax

	Statements (Social impact)	Mean	Standard deviation	Min	Max
1	Childhood obesity is a problem for society (n= 303)	4.26	0.92	1	5
2	Childhood obesity is a serious problem (n= 303)	4.28	0.93	1	5
3	The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa (n= 303)	3.99	0.98	1	5
4	The sugary beverages levy will be effective in lowering obesity rates (n= 303)	3.20	1.12	1	5
5	The sugary beverages levy is a practical approach to limiting sugar intake (n= 303)	3.18	1.18	1	5
6	A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres (n= 303)	3.80	0.99	1	5
7	Schools should be prohibited from selling sugar-sweetened beverages on school property (n=303)	3.28	1.17	1	5
8	The tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa (n= 303)	3.07	1.08	1	5
9	The tax on sugar-sweetened beverages will result in a loss of jobs (n= 303)	3.27	1.03	1	5
10	Prominent calorie labels should be placed on sugar-sweetened beverages (n= 303)	3.96	0.86	1	5
11	Television and radio stations should provide free airtime for public service announcements on healthy eating and exercise (n= 302)	3.92	1.02	1	5
	Mean score for all 11 items	**3.66**			

Source: Own design

4.3.7 Analysis of Research Model Constructs

A reliability and internal consistency test on the multiple item constructs was carried out on the data. The Cronbach’s alpha(α) reliability coefficient was used to test the reliability of the items for the various constructs. The Cronbach’s alpha is a reliability measure coefficient that reflects how well items in a set are positively correlated to

one another. The coefficient ranges from 0 to 1, where a value closer to 1 will indicate good internal consistency. Cronbach alpha values greater than .70 indicate inter-item consistency. In Table 6, the Cronbach's Alpha for the two constructs, perception of respondents of the sugary beverage levy (1) and the price of sugar-sweetened beverages (2), had a value of 0.707, indicating consistency in items used to measure that construct. Similarly, the social impact of the sugary beverages levy construct had a Cronbach's Alpha value of 0.702, also indicating consistency in the items used to measure the construct. The overall reliability test for the 25 items gave a Cronbach's Alpha value of 0.801. This implies that reliance can be placed on the questionnaire to measure what it was intended to investigate and measure.

Table 6: Cronbach's Alpha for the two constructs

Dimension	Cronbach's Alpha (α)	Number of Items
Perception	0.707	14
Social impact	0.702	11
Overall	0.801	25

Source: Own design

4.3.8 Factor Analysis

To analyse the validity of each of the constructs (i.e. the theoretical model), factor analysis was applied using SPSS 25. The Kaiser-Meyer-Olkin (KMO) metric was used to analyse the adequacy of the sample. A KMO value greater than 0.6 will mean that the sample is adequate for factor analysis. Table 7 shows that the two constructs had a KMO above 0.6, which indicates that the sample size of 300 has met the requirement for factor analysis. Bartlett's Test of Sphericity measures if the correlation matrix is an identity matrix and if the correlation matrix is an identity matrix, then the factor model will be inappropriate. In Table 7, the Bartlett's test of sphericity showed that both constructs are significant with a p-value less than 0.0001, which means that the correlation matrix is not an identity matrix, therefore, the factor model is appropriate.

Table 7: Factor analysis

Constructs	No of items	KMO	Total variance explained	Bartlett's test of sphericity	Number of extracted factors
Perception	11	0.735	61.464	<0.0001	4
Social impact	11	0.652	64.241	< 0.0001	4

Source: Own design

4.3.9 Tests Employed to Establish Relationships Between Dependent and Independent variables

Refer to Addenda A, B, C and D for the results of the statistical tests of the relationship between the six independent variables, gender, age, home language, race, level of income and type of residence and the dependent variables, being the responses to the questions. In each case, significant results are indicated if the "p-value" is less than or equal to 0.05. Addendum A contains the results of the responses to questions 12 – 19 in the questionnaire, which are discussed below, and the detailed tables are in the addendum itself. Addendum B contains the results of the responses to questions 20 – 34 in the questionnaire, which are discussed below, and the detailed tables are in the addendum itself. Addendum C contains the results of the responses to questions 35 – 45 in the questionnaire, which are discussed below, and the detailed tables are in the addendum itself. Addendum D reports on non-significant results, which have been omitted from the discussion below. Various tests were used to analyse the data.

4.3.9.1 Independent t-test

To investigate the difference between two population averages, a t-test was used. A t-test is used to compare two means (the scores must be measured on an interval or ratio measurement scale). With a t-test, there is one independent variable and one dependent variable. The results of the application of the test are reflected in Tables 8 and 9 below.

4.3.9.2 Analysis of Variance Tests

The multifactorial analysis of variance (ANOVA) was used in this study to analyse if the mean values of dependent variables varied with respect to two or more categorical variables. In this study, in addition to gender, the effect of age, race, home language, level of income and type of residence were tested to analyse how much the variables contributed to the total variation in the consumption of sugar-sweetened beverages. P-values corresponding to a specific independent variable were determined, where a less than or equal to 0.05 level of significance would mean that at least one of the mean values within that independent variable was significantly different from the other. The results of the application of the test are reflected in Tables 8 and 9 below.

4.3.9.3 Pearson's Chi-Square Test for Association/Independence

This test of association is used to identify whether there is a relationship between two categorical variables. There is a significant association between the two categories if the probability value (p-value) is less than 0.05 level of significance. The results of the application of the test are reflected in Table 8 and Table 9 below.

4.3.9.4 Independent Variables

4.3.9.4.1 Gender: The independent variable (gender) can only have two levels (male and female). The dependent variables were responses to the questions in the questionnaire. The results of the tests relating to the relationship between gender and responses to the various questions in the questionnaire are reflected in Table 8 below.

4.3.9.4.2 Age: The second independent variable, i.e. age, can only have three levels (21 to 35 years, 26 to 30 years and 31 to 35 years). The dependent variables were responses to the questions in the questionnaire. As 92% of all respondents were between the ages of 21 to 25 years (Figure 1), reporting of the actual percentage results would be meaningless. The results of the tests relating to the relationship between age and responses to the various questions in the questionnaire are reflected in Table 8 below.

4.3.9.4.3 Home language: The third independent variable, i.e. home language, has five levels (English, Afrikaans, Zulu, Xhosa and Other). Ethnicity is considered to be much more significant than home language, and therefore the results of the tests relating to home language were ignored.

4.3.9.4.4 Race: The fourth independent variable, i.e. race, has six levels (Black African, Coloured, Indian, White, Other and Prefer Not to Say). The dependent variables were responses to the questions in the questionnaire. As 64% of the respondents in the sample were Black African, this would skew the reporting of the actual percentages of respondents in the different race groups who agreed or disagreed with the statements. The relationship between race and responses to questions in the questionnaire is discussed in Table 8 below.

4.3.9.4.5 Level of income: The fifth independent variable, i.e. level of income, has three levels (no income, part time/casual work and full-time employment). The dependent variables were responses to the questions in the questionnaire. It could be assumed that persons who are in employment would have a greater understanding of the new sugary beverages levy and measuring the relationship between the level of income and this dependent variable (question 5 in the questionnaire) could be meaningful. The relationship between the level of income and the health benefit to the respondent of the sugary beverages levy (question 21) and the effect of labelling, reports and advertising and marketing of sugar-sweetened beverages (questions 28 to 30) on the likelihood of the respondent purchasing these products could also be meaningful. However, as 69% of the respondents in the sample earn no income and they are all postgraduate accounting students, their levels of income would not be associated with certain of their perceptions of the sugary beverages levy (questions 22 to 27 in the questionnaire) or the social impact (questions 35 to 45) The meaningful relationships are discussed in Table 9 below. In the study by Han and Powell (2013), it was found that children from low-income households had higher odds of heavy total sugar-sweetened beverage consumption and higher caloric intake from sugar-sweetened beverages and fruit drinks than children from high-income households. Further, the study found that low- versus high-socio-economic status was associated with higher odds of heavy consumption of sugar-sweetened beverages, soda, and fruit drinks, among adults.

4.3.9.4.6 Type of residence: The sixth and final independent variable, i.e. type of residence, has three levels (home, campus residence and off-campus residence (digs)). The dependent variables were responses to the questions in the questionnaire. Krukowski, Conley, Sterling and Rainville (2016) found that adolescents seemed to understand that their home environment (in terms of what was available/accessible) affected consumption of sugar-sweetened beverages. Thus, it can be inferred that the increased availability of healthy beverage options on campuses will promote a healthier lifestyle for respondents. The relationship between types of residence and responses to questions relating to the consumption of sugar-sweetened beverages and healthier alternatives (questions 12 – 19) in the questionnaire are discussed in Table 9 below. It is submitted that home influence might have affected these responses. As the respondents were all students, their place of residence would be immaterial to their perceptions of and understanding of the sugary beverages levy (questions 20 – 30 in the questionnaire), the effect of the price of sugar-sweetened beverages on their consumption (questions 31 – 34), or the social impact of the levy (questions 35 – 45).

4.3.9.5 Relationships Between Independent and Dependent Variables

The statistically significant relationships between the dependent and independent variables are discussed in the Table 8 below.

Table 8: Statistically significant relationships

Gender				
Question – dependent variable	**Addendum**	**Test**	**Test Result**	**Comments**
Question 12: Average consumption of sugar-sweetened beverages	A1	t-test	p-value: 0.0238	This indicates that female respondents drink fewer sugar-sweetened beverages than male respondents This finding substantiates a study by West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays and Eddings (2006), who found that gender independently predicted greater caloric intake, with men reporting higher calories from sugar-sweetened beverages than women.
Question 13: Non-consumption of sugar-sweetened beverages due to a medical condition	A2	--	--	Approximately 12.5% (38/303) of all respondents reported not drinking sugar-sweetened beverages daily. Out of the 38 respondents who do not drink sugar-sweetened beverages, two males and two females said it is due to a medical condition. Thus, approximately 11% of the 38 participants report not consuming sugar-sweetened beverages as a result of a medical condition, while 10 males and 24 females indicated that it is not due to a medical condition that they do not consume sugar-sweetened beverages.
Question 14: Consumption of sugar-sweetened beverages when under stress	A3	Pearson's Chi-square	Chi-square: 25.19172 p-value: < 0.0001	This indicates a statistically significant association between gender and the habit of increasing consumption of sugar-sweetened beverages under stressful conditions, 57% (150/264) of respondents indicating that they do not increase their consumption of sugar-sweetened beverages when under stress, 58% (87/150) of whom were males.
Question 15: The desire to reduce consumption of sugar-sweetened beverages	A4	Pearson's Chi-square	Chi-square: 7.5622 p-value: 0.006	This indicates a statistically significant association between gender and the desire to reduce consumption of sugar-sweetened beverages. Overall 49.24% (130/264) of respondents reported that they do wish to decrease their consumption of sugar-sweetened beverages, 64% (83/130) of whom were females. This finding substantiates the study by Huffman and West (2007) which found that females tended to be more likely to report that they were actively reducing their consumption of high calorie beverages compared to males. West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays and Eddings (2006) also found that, although not significant, there were indications that women tended to be more likely to be in the action or

				maintenance stage of modifying their sugar-sweetened beverage intake.
Question 16: Consumption of water	A5	Pearson's Chi-square	Chi-square: 10.2339 p-value 0,0367	This indicates a statistically significant association between gender and the consumption of water; that is, males and females differ in their consumption of water, with females drinking more water than males, on average.
Question 17: Consumption of milk	A6	Pearson's Chi-square	Chi-square: 6.4736 p-value: 0.0393	This indicates that there is a statistically significant association between gender and the consumption of milk; that is, males and females are not alike in their consumption of milk, with 20% more females, compared to males consuming 1-2 glasses of milk per day. Overall, 12% more females appear to consume milk, as compared to males. This could be attributed to the fact that females tend to make healthier beverage choices in attempt to watch their weight. This finding substantiates that by Huffman and West (2007).
Questions 18 – 20	Addendum D			No statistically significant association.
Question 21: Beneficial health impact of sugary beverages levy	B1	Pearson's Chi-square	Chi-square: 18.0995 p-value: 0.0012	This indicates that there is a significant association between gender and perception that the sugary beverages levy will be beneficial to health. Sixty-four percent of respondents who agree/strongly agree with this statement are females, indicating greater support for the sugary beverages levy among females, as compared to males. On average, 39% of all female respondents support this statement, as opposed to 28% of all male respondents.
Question 22: Imposition of a tax on sugar-sweetened beverages	B2	Pearson's Chi-square	Chi-square: 9.8495 p-value 0.0430	This indicates that there is a significant association between gender and whether a tax should be levied on sugar-sweetened beverages, with 40% of respondents being in favour of the tax. Sixty-three percent of these respondents were female.
Questions 23 – 25	Addendum D			No statistically significant association.
Question 26: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich	B3	Pearson's Chi-square	Chi-square: 12.7203 p-value: 0.0127	This indicates that there is a significant association between gender and the fact that a tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich, with 61% of respondents agreeing with this statement, of whom 59% were females.
Question 27: Having a tax on sugar-sweetened beverages will improve the health of the population	B4	Pearson's Chi-square	Chi-square: 17.7499	This indicates that there is a significant association between the perception that a tax on sugar-sweetened beverages will improve the health of the population and gender, with 44% of respondents agreeing with this statement, of whom 56% were males.

			p-value: 0.0014	
Question 28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages	B5	Pearson's Chi-square	Chi-square: 17.1225 p-value: 0.0018	This indicates that there is a significant association between the perception that clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages and gender, with 64% of females agreeing with this statement.
Question 29	Addendum D			No statistically significant association.
Question 30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products	B6	Pearson's Chi-square	Chi-square: 13.2470 p-value: 0.0101	This indicates that there is a significant association between the perception that advertising and marketing of sugar-sweetened beverages makes people want to buy these products and gender, with 52% of females agreeing with this statement.
Questions 31 and 32	Addendum D			No statistically significant association.
Question 33: I have developed a habit of drinking these beverages	B7	Pearson's Chi-square	Chi-square: 14.4557 p-value: 0.0060	This indicates that there is a statistically significant association between gender and developing habit of drinking sugar-sweetened beverages. On average, more females (58%) disagree with the statement that they have developed a habit of drinking sugar-sweetened beverages.
Question 34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages	B8	Pearson's Chi-square	Chi-square: 13.0748 p-value: 0.0109	This indicates that there is a significant association between gender and developing a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages. Overall, more females (59%) believe that they could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages.
Question 35: Childhood obesity is a problem for society	C1	Pearson's Chi-square	Chi-square: 21.2336 p-value: 0.0003	This indicates that there is a significant association between gender and the belief that childhood obesity is a problem for society, with more females overall (59%), agreeing with this belief.
Question 36: Childhood obesity is a serious problem	C2	Pearson's Chi-square	Chi-square: 20.3708 p-value: 0.0001	This indicates that there is a significant association between gender and the perception that childhood obesity is a serious problem, particularly amongst females. Sixty percent of respondents who agreed or strongly agreed with this statement, were female. Donaldson, Cohen, Rutkow, Villanti, Kanarek, and Barry (2015) found that Democrats from a Mid-Atlantic state in the United States of America believed that sugar-sweetened beverage consumption

				was a major cause of childhood obesity and warranted societal intervention.
Questions 37 – 43	Addendum D			No statistically significant association.
Question 44: Prominent calorie labels should be placed on sugar-sweetened beverages	C3	Pearson's Chi-square	Chi-square: 10.2091 p-value: 0.0370	This indicates that there is a significant association between gender and the responses on the social impact item that prominent calorie labels should be placed on sugar-sweetened beverages, with more females overall (60%), agreeing with this statement.
Question 45: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise	C4	Pearson's Chi-square	Chi-square: 9.8444 p-value: 0.0431	This indicates that there is a statistically significant association between gender and the response on whether television and radio stations should provide free airtime for public service announcements on healthy eating and exercise. Seventy-two percent of all respondents agreed with this statement, 57 percent of whom, were female. In the study by Gollust, Barry and Niederdeppe (2014), only 51% of respondents supported this initiative, in comparison to the general overall (72%) support in this study.
Age				
Question 12	Addendum D			No statistically significant relationship. As 92% of all respondents were between the ages of 21 and 25 years, this is expected. West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006) found that age was a predictor of greater caloric intake and students aged 16 to 18 years and those aged 19 to 21 years consumed more calories from sugar-sweetened beverages than students older than 21 years.
Questions 13 – 19	Addendum D			No statistically significant relationship.
Question 20: Understanding of the sugary beverages levy	B9	Pearson's Chi-square	Chi-square: 15.3606 p-value: 0.0525	This indicates that there is a significant association between question 20 and age, with the majority of respondents (60%) indicating that they do understand the sugary beverages levy.
Questions 21 and 22	Addendum D			No statistically significant relationship.
Question 23: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system	B10	Pearson's Chi-square	Chi-square: 25.6974 p-value: 0.0012	This indicates that there is a significant association between question 23 and age, with 66% of respondents indicating that they agree that a tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system.

Question 24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease	B11	Pearson's Chi-square	Chi-square: 17.1627 p-value: 0.0285	This indicates that there is a significant association between question 24 and age, with 70% of respondents indicating that they agree that a tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease.
Question 25	Addendum D			No statistically significant relationship.
Question 26: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich	B12	Pearson's Chi-square	Chi-square: 19.0446 p-value: 0.0146	This indicates that there is a significant association between question 26 and age, with 61% of respondents indicating that they agree that a tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich.
Question 27	Addendum D			No statistically significant relationship.
Question 28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages	B13	Pearson's Chi-square	Chi-square: 15.9227 p-value: 0.0435	This indicates that there is a significant association between question 28 and age, with 45% of respondents indicating that they disagree with the statement that clear labelling of sugar content would make them less likely to buy sugar-sweetened beverages.
Question 29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages	B14	Pearson's Chi-square	Chi-square: 18.7437 p-value: 0.0163	This indicates that there is a significant association between question 29 and age, with 47% of respondents indicating that they disagree that the reports that they see and read in the media about sugar and sugar-sweetened beverages discourages them from drinking sugar-sweetened beverages.
Questions 30 – 32	Addendum D			No statistically significant relationship.
Question 33: I have developed a habit of drinking these beverages	B15	Pearson's Chi-square	Chi-square: 16.0034 p-value: 0.0423	This indicates that there is a significant association between question 33 and age, with 52% of respondents indicating that they disagree that they have developed a habit of drinking these beverages.
Question 34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages	B16	Pearson's Chi-square	Chi-square: 20.4245 p-value: 0.0088	This indicates that there is a significant association between question 34 and age, with 63% of respondents indicating that they agree that they could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages.
Questions 35 and 36	Addendum D			No statistically significant relationship.
Question 37: The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa	C5	Pearson's Chi-square	Chi-square: 29.5736	This indicates that there is a significant association between question 37 and age, with 72% of respondents indicating that they agree that the consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa.

			p-value: 0.0003	
Question 38	Addendum D			No statistically significant relationship.
Question 39: The sugary beverages levy is a practical approach to limiting sugar intake	C6	Pearson's Chi-square	Chi-square: 24.5119 p-value: 0.0019	This indicates that there is a significant association between question 39 and age, with 47% of respondents indicating that they agree that the sugary beverages levy is a practical approach to limiting sugar intake.
Question 40: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres	C7	Pearson's Chi-square	Chi-square: 37.7274 p-value: < 0.0001	This indicates that there is a significant association between question 40 and age, with 66% of respondents indicating that they agree that a tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres.
Questions 41 – 45	Addendum D			No statistically significant relationship.
Race				
Question 12: Average consumption of sugar-sweetened beverages	A7	ANOVA	p-value: 0.0095	This indicates that there is a significant difference in the weekly average sugar-sweetened beverage consumption based on race. A study by Edward (2016) found that native Hawaiian, multiple non-Hispanic, and Black students were the largest consumers of sodas as compared to other races. Han and Powell (2013) also confirmed that Blacks and Hispanics were more likely to consume sugar-sweetened beverages than Whites among children, adolescents, young adults, and adults. West, Bursac, Quimby, Prewitt, Spatz, Nash, Mays, and Eddings (2006) found that Black undergraduates reported higher sugary beverage intake than Whites, with 91% of Blacks reporting sugar-sweetened fruit drink intake in the past month, 50% reporting daily consumption and the mean estimated caloric intake from combined types of sugar-sweetened beverages was significantly higher among Black students than Whites.
Question 13	Addendum D			No statistically significant relationship.
Question 14: Consumption of sugar-sweetened beverages when under stress	A8	Pearson's Chi-square	Chi-square: 18.0275 p-value: 0.0545	This indicates that there is a significant association between consumption of sugar-sweetened beverages when under stress and race, with most respondents (57%) indicating that stress does not affect their consumption of sugar-sweetened beverages.

Question 15: The desire to reduce consumption of sugar-sweetened beverages	A9	Pearson's Chi-square	Chi-square: 23.1240 p-value: 0.0003	This indicates that there is a significant association between the desire to reduce consumption of sugar-sweetened beverages and race. Fifty-seven percent of all Black Africans agreed with this statement which comprised 74% of total "yes" responses.
Question 16: Consumption of water	A10	Pearson's Chi-square	Chi-square: 187.2467 p-value: < 0.0001	This indicates that there is a significant association between the average consumption of water and race, with most respondents (33%) indicating that they consume 3-4 glasses of water daily
Question 17: Consumption of milk	A11	Pearson's Chi-square	Chi-square: 29.3375 p-value: 0.0011	This indicates that there is a significant association between the average consumption of milk and race, with most respondents (51%) indicating that they never consume milk. This may be due to milk not being available in residences, or not affordable for students in digs.
Question 18: Consumption of sugar-sweetened beverages during childhood	A12	Pearson's Chi-square	Chi-square: 54.7444 p-value: < 0.0001	This indicates that there is a significant association between childhood consumption of sugar-sweetened beverages and race. Some respondents (35%) indicated that, as a child, they only consumed sugar-sweetened beverages on special occasions.
Question 19	Addendum D			No statistically significant relationship.
Question 20: Understanding of the sugary beverages levy	B17	Pearson's Chi-square	Chi-square: 68.3441 p-value: < 0.0001	This indicates that there is a significant association between understanding of the sugary beverages levy and race, with the majority of respondents (60%) indicating that they do understand the sugary beverages levy.
Question 21: Beneficial health impact of sugary beverages levy	B18	Pearson's Chi-square	Chi-square: 65.7330 p-value: < 0.0001	This indicates that there is a significant association between the beneficial nature of the sugary beverages levy and race, with a slightly higher number of respondents (35%) indicating that the sugary beverages levy will not have a beneficial impact on health.
Question 22: Imposition of a tax on sugar-sweetened beverages	B19	Pearson's Chi-square	Chi-square: 42.1484 p-value: 0.0026	This indicates that there is a significant association between whether a tax should be levied on sugar-sweetened beverages and race, with 41% of the respondents indicating that they agree that a tax should be levied on sugar-sweetened beverages.
Question 23: A tax should be levied on sugar-sweetened beverages only if the	B20	Pearson's Chi-square	Chi-square:	This indicates that there is a significant association between question 23 and race, with 66% of respondents indicating that they agree that

money is used to improve the health-care system			40.2934 p-value: 0.0046	a tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system.
Question 24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease	B21	Pearson's Chi-square	Chi-square: 33.6013 p-value: 0.0290	This indicates that there is a significant association between question 24 and race, with 70% of respondents indicating that they agree that a tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease.
Question 25	Addendum D			No statistically significant relationship.
Question 26: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich	B22	Pearson's Chi-square	Chi-square: 55.4265 p-value: < 0.0001	This indicates that there is a significant association between question 26 and race, with 61% of respondents indicating that they agree that a tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich.
Question 27: Having a tax on sugar-sweetened beverages will improve the health of the population	B23	Pearson's Chi-square	Chi-square: 50.7385 p-value: 0.0002	This indicates that there is a significant association between question 27 and race, with 44% of respondents indicating that they agree that having a tax on sugar-sweetened beverages will improve the health of the population.
Question 28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages	B24	Pearson's Chi-square	Chi-square: 57.6596 p-value: < 0.0001	This indicates that there is a significant association between question 28 and race, with 45% of respondents indicating that they disagree that clear labelling of sugar content would make them less likely to buy sugar-sweetened beverages.
Question 29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages	B25	Pearson's Chi-square	Chi-square: 58.5712 p-value: < 0.0001	This indicates that there is a significant association between question 29 and race, with 47% of respondents indicating that they disagree that the reports that they see and read in the media about sugar and sugar-sweetened beverages discourages them from drinking sugar-sweetened beverages.
Question 30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products	B26	Pearson's Chi-square	Chi-square: 52.8558 p-value: < 0.0001	This indicates that there is a significant association between question 30 and race, with 44% of respondents indicating that they agree that advertising and marketing of sugar-sweetened beverages makes them want to buy these products.
Question 31: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%	B27	Pearson's Chi-square	Chi-square: 49.7494	This indicates that there is a significant association between question 31 and race, with 57% of respondents indicating that they agree that they would purchase fewer sugar-sweetened beverages if the price went up by 20%.

			p-value: 0.0002	
Question 32: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%	B28	Pearson's Chi-square	Chi-square: 53.1828 p-value: < 0.0001	This indicates that there is a significant association between question 32 and race, with 39% of respondents indicating that they agree that they would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%.
Question 33: I have developed a habit of drinking these beverages	B29	Pearson's Chi-square	Chi-square: 41.5914 p-value: 0.0031	This indicates that there is a significant association between question 33 and race, with 52% of respondents indicating that they disagree that they have developed a habit of drinking these beverages.
Question 34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages	B30	Pearson's Chi-square	Chi-square: 31.7890 p-value: 0.0456	This indicates that there is a significant association between question 34 and race, with 63% of respondents indicating that they agree that they could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages.
Questions 35 – 37	Addendum D			No statistically significant relationship.
Question 38: The sugary beverages levy will be effective in lowering obesity rates	C8	Pearson's Chi-square	Chi-square: 64.5069 p-value: < 0.0001	This indicates that there is a significant association between question 38 and race, with 42% of respondents indicating that they agree that the sugary beverages levy will be effective in lowering obesity rates.
Question 39: The sugary beverages levy is a practical approach to limiting sugar intake	C9	Pearson's Chi-square	Chi-square: 65.2289 p-value: < 0.0001	This indicates that there is a significant association between question 39 and race, with 47% of respondents indicating that they agree that the sugary beverages levy is a practical approach to limiting sugar intake.
Question 40: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres	C10	Pearson's Chi-square	Chi-square: 47.5447 p-value: 0.0005	This indicates that there is a significant association between question 40 and race, with 66% of respondents indicating that they agree that a tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres.
Question 41: Schools should be prohibited from selling sugar-sweetened beverages on school property	C11	Pearson's Chi-square	Chi-square: 108.8145 p-value:	This indicates that there is a significant association between question 41 and race, with 47% of respondents indicating that they agree that schools should be prohibited from selling sugar-sweetened beverages on school property. Gollust, Barry and Niederdeppe

			< 0.0001	(2014) found that 61.5% of respondents supported restricting the sale of sugar-sweetened beverages on school property. Previous literature (Cradock, McHugh, Mont-Ferguson, Grant, Barrett, Wang & Gortmaker, 2011) has found that limiting access to sugar-sweetened beverages in school is associated with decreased sugar-sweetened beverage consumption. The study by Battram, Piché, Beynon, Kurtz and He (2016) found a similar policy level strategy suggested by children to decrease consumption of sugar-sweetened beverages by limiting or completely banning the accessibility and availability of sugar-sweetened beverages at schools.
Question 42: The tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa	C12	Pearson's Chi-square	Chi-square: 62.9955 p-value: < 0.0001	This indicates that there is a significant association between question 42 and race, with 37% of respondents indicating that they agree that the tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa.
Question 43: The tax on sugar-sweetened beverages will result in a loss of jobs	C13	Pearson's Chi-square	Chi-square: 80.7463 p-value: < 0.0001	This indicates that there is a significant association between question 43 and race, with 41% of respondents indicating that they were undecided about whether the tax on sugar-sweetened beverages will result in a loss of jobs.
Question 44: Prominent calorie labels should be placed on sugar-sweetened beverages	C14	Pearson's Chi-square	Chi-square: 60.1347 p-value: < 0.0001	This indicates that there is a significant association between question 44 and race, with 73% of respondents indicating that they agree that prominent calorie labels should be placed on sugar-sweetened beverages.
Question 45	Addendum D			No statistically significant relationship.
Level of income				
Questions 12 and 13	Addendum D			No statistically significant relationship.
Question 14: Consumption of sugar-sweetened beverages when under stress	A13	Pearson's Chi-square	Chi-square: 15.5131 p-value: 0.0037	This indicates that there is a significant association between question 14 and level of income, with 57% of respondents indicating that their consumption of sugar-sweetened beverages is not affected by stress.
Question 15	Addendum D			No statistically significant relationship.
Question 16: Consumption of water	A14	Pearson's Chi-square	Chi-square: 16.8951	This indicates that there is a significant association between question 16 and level of income, with most respondents (33%) indicating that they consume 3-4 glasses of water daily.

			p-value: 0.0312	
Question 17: Consumption of milk	A15	Pearson's Chi-square	Chi-square: 17.8765 p-value: 0.0013	This indicates that there is a significant association between question 17 and level of income, with most respondents (51%) indicating that they never consume milk.
Questions 18 and 19	Addendum D			No statistically significant relationship.
Question 20: Understanding of the sugary beverages levy	B31	Pearson's Chi-square	Chi-square: 44.7979 p-value: < 0.0001	This indicates that there is a significant association between understanding of the sugary beverages levy and level of income, with the majority of respondents (60%) indicating that they understand the sugary beverages levy.
Question 21: Beneficial health impact of sugary beverages levy	B32	Pearson's Chi-square	Chi-square: 17.9257 p-value: 0.0218	This indicates that there is a significant association between the beneficial nature of the sugary beverages levy and level of income, with a slightly higher number of respondents (35%) indicating that the sugary beverages levy will not have a beneficial impact on health.
Question 28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages	B37	Pearson's Chi-square	Chi-square: 26.9519 p-value: 0.0007	This indicates that there is a significant association between question 28 and level of income, with 45% of respondents indicating that they disagree that clear labelling of sugar content would make them less likely to buy sugar-sweetened beverages.
Question 29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages	B38	Pearson's Chi-square	Chi-square: 22.2302 p-value: 0.0045	This indicates that there is a significant association between question 29 and level of income, with 47% of respondents indicating that they disagree that the reports that they see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages.
Question 30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products	B39	Pearson's Chi-square	Chi-square: 22.1195 p-value: 0.0047	This indicates that there is a significant association between question 30 and level of income, with 44% of respondents indicating that they agree that advertising and marketing of sugar-sweetened beverages makes them want to buy these products.
Question 31: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%	B40	Pearson's Chi-square	Chi-square: 21.8341 p-value: 0.0052	This indicates that there is a significant association between question 31 and level of income, with 57% of respondents indicating that they agree that they would purchase fewer sugar-sweetened beverages if the price went up by 20%.

Question 32: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%	B41	Pearson's Chi-square	Chi-square: 34.1500 p-value: < 0.0001	This indicates that there is a significant association between question 32 and level of income, with 39% of respondents indicating that they agree that they would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%.
Question 33: I have developed a habit of drinking these beverages	B42	Pearson's Chi-square	Chi-square: 28.2966 p-value: 0.0004	This indicates that there is a significant association between question 33 and level of income, with 52% of respondents indicating that they disagree that they have developed a habit of drinking these beverages.
Question 34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages	B43	Pearson's Chi-square	Chi-square: 21.6133 p-value: 0.0057	This indicates that there is a significant association between question 34 and level of income, with 63% of respondents indicating that they agree that they could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages.
Type of residence				
Question 12: Average consumption of sugar-sweetened beverages	A16	ANOVA	P-value: 0.0013	This indicates that there is a significant difference in the weekly average sugar-sweetened beverage consumption based on type of residence.
Questions 13 and 14	Addendum D			No statistically significant relationship.
Question 15: The desire to reduce consumption of sugar-sweetened beverages	A17	Pearson's Chi-square	Chi-square: 10.8360 p-value: 0.0044	The indicates that there is a significant association between question 15 and type of residence, with a slightly higher number of respondents indicating that they had no desire to reduce their consumption of sugar-sweetened beverages, of whom 48% resided at home.
Question 16: Consumption of water	A18	Pearson's Chi-square	Chi-square: 17.5197 p-value: 0.0251	This indicates that there is a significant association between question 16 and type of residence, with most respondents (33%) indicating that they consume 3-4 glasses of water daily, 64% of whom live in campus residence.
Question 17: Consumption of milk	A19	Pearson's Chi-square	Chi-square: 12.4530 p-value: 0.0143	This indicates that there is a significant association between question 17 and type of residence, with most respondents (51%) indicating that they never consume milk, of whom 61% live in campus residence. It is possible that the non-availability of milk as a beverage may explain this relationship.
Questions 18 and 19	Addendum D			No statistically significant relationship.

Source: Own design

4.3.9.6 Other Relevant Statistical Results

Table 8 above presents the relationships between the independent and dependent variables, as well as the proportion of respondents who agree or disagree with certain statements in the questionnaire (the dependent variables). In addition to the relationships between the independent and dependent variables and the percentage of respondents who agree or disagree with these statements described in Table 8 above, the other relevant statistical results reflecting the proportion of respondents who agree or disagree with certain statements are set out in Table 9 below. These results are relevant even where no meaningful relationship can exist between the independent and dependent variables, but the number of respondents who agree or disagree with the statement is relevant, for example, in the following relationships:

- there may be a statistical relationship between "level of income" and the responses to various questions in the questionnaire, but as most of the respondents earn no income, reporting the statistical relationship would be meaningless, whereas the total percentage of respondents who agree or disagree is relevant; and
- in the case of the independent variable "type of residence", the statistical relationship between this independent variable and the responses to certain questions would be meaningless, including for example, "Question 20: Understanding of the sugary beverages levy", or "Question 21: Beneficial health impact of sugary beverages levy", as the type of residence occupied by a respondent can have little bearing of his or her perceptions of the tax, whereas the total percentage of respondents who agree with the statements is relevant.

Table 9: Other relevant statistical results

Question	Independent variable	Addendum	Proportion of respondents who agree or disagree
Question 22: Imposition of a tax on sugar-sweetened beverages	Level of income	B33	41% of respondents indicated that they agree.
Question 23: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system	Level of income	B34	66% of respondents indicated that they agree.
Question 24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease	Level of income	B35	70% of respondents indicated that they agree.
Question 27: Having a tax on sugar-sweetened beverages will improve the health of the population	Level of income	B36	44% of respondents indicated that they agree.
Question 37: The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa	Level of income	C15	72% of respondents indicated that they agree.
Question 38: The sugary beverages levy will be effective in lowering obesity rates	Level of income	C16	42% of respondents indicated that they agree.
Question 39: The sugary beverages levy is a practical approach to limiting sugar intake	Level of income	C17	47% of respondents indicated that they agree.
Question 40: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres	Level of income	C18	66% of respondents indicated that they agree.
Question 43: The tax on sugar-sweetened beverages will result in a loss of jobs	Level of income	C19	41% of respondents indicated that they were undecided.
Question 45: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise	Level of income	C20	72% of respondents indicated that they agree.
Question 20: Understanding of the sugary beverages levy	Type of residence	B44	60% of respondents indicated that they understand the sugary beverages levy, 54% of whom reside at home.
Question 21: Beneficial health impact of sugary beverages levy	Type of residence	B45	35% of respondents indicated that the sugary beverages levy will not have a beneficial impact on health, 61% of whom live in campus residence.
Question 22: Imposition of a tax on sugar-sweetened beverages	Type of residence	B46	40% of respondents indicated that they agree, 57% of whom live in campus residence.
Question 24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease	Type of residence	B47	70% of respondents indicated that they agree. The majority (54%) live in campus residence.

Question 27: Having a tax on sugar-sweetened beverages will improve the health of the population	Type of residence	B48	44% of respondents indicated that they agree. The majority (62%) of these respondents live in campus residence.
Question 28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages	Type of residence	B49	45% of respondents indicated that they disagree. The majority (58%) of these respondents live in campus residence.
Question 29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages	Type of residence	B50	47% of respondents indicated that they disagree. The majority (55%) of these respondents live in campus residence.
Question 30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products	Type of residence	B51	44% of respondents indicated that they agree. The majority (53%) of these respondents live in campus residence.
Question 31: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%	Type of residence	B52	57% of respondents indicated that they agree. The majority (56%) of these respondents live in campus residence.
Question 32: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%	Type of residence	B53	39% of respondents indicated that they agree. The majority (61%) of these respondents live in campus residence.
Question 33: I have developed a habit of drinking these beverages	Type of residence	B54	53% of respondents indicated that they disagree. The majority (57%) of these respondents live in campus residence.
Question 34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages	Type of residence	B55	63% of respondents indicated that they agree. The majority (53%) of these respondents live in campus residence.
Question 39: The sugary beverages levy is a practical approach to limiting sugar intake	Type of residence	C21	47% of respondents indicated that they agree. The majority (65%) of these respondents live in campus residence.
Question 41: Schools should be prohibited from selling sugar-sweetened beverages on school property	Type of residence	C22	47% of respondents indicating that they agree. The majority (53%) of these respondents reside at home.
Question 43: The tax on sugar-sweetened beverages will result in a loss of jobs	Type of residence	C23	41% of respondents indicated that they were undecided on whether the tax on sugar-sweetened beverages will result in a loss of jobs. The majority (57%) of these respondents reside at home.
Question 45: Television and radio stations should provide free airtime for public service announcements on healthy eating and exercise	Type of residence	C24	72% of respondents indicated that they agree. The greatest number (58%) live in campus residence.

Source: Own design

4.4 Qualitative Results

Qualitative data analysis of the responses to the final open-ended question regarding the sugary beverages levy and its implementation, was applied to gain an understanding of the respondents' knowledge and perception of the tax. Responses were collated and summarised under various themes as indicated in Table 10 below, to reveal common responses, statements, perceptions or thoughts of the respondents.

Table 10: Qualitative responses

Positive perceptions – health benefits
I think imposing a sugar-sweetened beverage tax will be beneficial to individuals wishing to live a healthy lifestyle and also the price of healthier beverages should fall to compensate us for living more of a healthy lifestyle!
The implementation of the tax would be beneficial provided there are healthy alternatives that are affordable.
A tax should be levied on sugar-sweetened beverages, provided that healthier beverage prices decrease.
Introduction of a sugar tax is one of the best ways to reduce obesity and sugar consumption in the country.
The implementation of the sugary beverages levy will be very helpful in our country as the level of consumption of sugary beverages will decrease - this will also decrease the number of people with obesity.
I think the sugar tax will assist in curbing obesity as people will now buy less sugar-sweetened beverages because of the high price.
I think the introduction of the tax is good to reduce the consumption by majority of the population, but I do not think it will solve the obesity problem. It is good though to reduce the amount of diseases South Africans are exposed to.
I think the introduction of sugar-sweetened beverage tax is a practical approach to dealing with obesity in our country.
The implementation of the sugary beverage levy will help reduce the number of people being affected by diabetes as the sugary beverages will be much expensive than before.
If the levy will be used for health reasons or medical assistance and awareness programmes, it would be helpful.
Negative perceptions – loss of income
The impact of the sugar tax on the sugary beverages industry is major. I personally know people who have lost jobs at prominent sugar-sweetened beverage manufacturers because of the impact of the sugar tax. A trade-off between healthy eating/having money to eat in the first place?

Sugary beverages are a luxury and thus, deciding on whether the sugar content is high or low wouldn't really make me eliminate purchases if the price increased…eating healthy is expensive.
Negative perceptions – ineffective measure
I think it is all down to the rate at which it is levied - too high and there are economic issues - and too low and it is not effective.
I do believe it may discourage the lower and middle class from drinking too much, however it will not encourage the buying of healthier drinks as these are too pricey in my opinion. It may not have any effect on some groups of people since its part of their diet/routine and can be called an addiction. This would simply just leave a larger hole in their pockets.
Disagree with the sugar tax, will lead to more tax for government to steal.
This will not reduce obesity.
I think this will not make a difference to people drinking these sugary drinks.
This is just another way for the government to extract money from the citizens to cover the losses due to mismanagement of funds and corruption.
More needs to be done to reduce obesity like make healthy options cheaper.
The sugar-sweetened beverage tax is not in my view a factor that could decrease sugar intake. Obesity is a sickness and people are addicted to these drinks. An alternative to dealing with actual obesity should be put in place because people will still purchase sugar-sweetened beverages.
I personally think that the sugary beverages levy is not going to make any difference at all! The government and health department should find more practical ways to discourage intake of sugary beverages and unhealthy food general.
It is unlikely that people with a habit of drinking sugar-sweetened beverages will stop because of this levy as they might consider increasing their spending on these beverages.
As much as this approach is meant to reduce the level of obesity in our society, it won't be successful if the consumers are not willing to co-operate. There could be some consumers who might not be sensitive to the price increases of these sugary beverages.
If the objective of introducing the sugar tax is to reduce rate of obesity, I believe that healthy drinks' prices should be decreased and the sugar cane farmers together with sugar-sweetened drink producers, should look for new markets or ways of keeping the production going out of business as this would contribute to the high unemployment rate due to reduced production of the beverages.
The levy on sugary beverages should be implemented only if it will benefit and improve the health of society.
The levy will surely increase the price of sugary beverages but it will not decrease the number of people who are obese - exercise will.
The implementation of this levy is a step towards the right direction, however, more will need to be done to discourage people from using or consuming these beverages, for example, limits should be set for companies producing these beverages or even pay a fine for producing more than stipulated.
In my opinion, the implementation of the beverage tax will not solve the increasing obesity problem in South Africa. Society loves sugar-sweetened beverages and will go to any lengths to have their fix.

What government can do to reduce this problem is to create awareness around obesity, healthy eating, exercise, etc. and offer free physical training exercises for communities.
The implementation of sugar-sweetened beverage tax will not reduce the level/number of obese people in South Africa, but will have impact on people who are poor.
I do not think sugar beverages levy will reduce the consumption of sugar-sweetened beverages - people will continue to buy these beverages even if their prices go up.
The tax might be a good way to decrease rates of obesity but at an expense of the poor. They will always suffer the changes.
I personally think that the imposing of the sugar- sweetened beverage tax will result in an increase in unemployment as if it is a success, there will be decrease in demand and thus, no jobs for others. On the other hand, people do not stop buying something they love because it is expensive and people will not be healthy simply because they can afford to.
I believe that people mostly drink sugary beverages for taste, more than anything else, such as advertising. Introduction of the sugar tax will increase prices - it is not likely to decrease demand, similarly, sin taxes do not decrease alcohol intake, however, it could be beneficial if it can improve public health.
I do not think this will improve the standard of living of the society or have an effect on how much people consume sugar-sweetened beverages - I think it's another way of taking money from the poor.
I think this sugar-sweetened beverage tax will help reduce the number of sugary drinks that are bought because it will be more expensive than previously - and this is perfect. I think it will raise awareness about the health effects of sugar. But I do not think sugar-sweetened beverages contribute significantly to obesity.
In my opinion I do not think it will achieve its objective, because sugary beverages are very nice - we will adapt to the increased prices and continue buying them.
Introducing a sugar-sweetened beverage tax will not limit people from consuming sugary beverages but companies that produce sugary beverages should reduce sugar included therein, so that people will not have a choice.
The levy will not decrease the level of consumption of the sugary beverages as the healthier products must be sold at a more affordable price/use the money to subsidise healthy producers.
The sugar tax is unnecessary, especially considering the basis upon which it is implemented. It will continue to inflate prices, which will decrease the buying power of poor South Africans.
The issue of the sugar-sweetened beverage tax is a very subjective topic. Those who are sensitive to price changes may change their intake of those beverages; those who are indifferent to whether the sugar tax is imposed or not, will still buy these beverages.
Consuming sugar-sweetened beverages is a problem faced by most children. As soon as one becomes a teenager or an adult, he/she will then start to have control over sugar-sweetened beverages. The primary schools should thus be given a contribution from the tax levies to encourage healthy eating.
Society should be educated on the dangers of consuming excess sugar/Lifestyle is a personal choice and every citizen should choose for themselves.

Negative perceptions – lack of awareness and understanding of the sugar-sweetened beverage tax
Not educated enough on the topic.
Did not even know about this tax. There are too many taxes now. It is hard to keep up.
Not everyone has knowledge of this levy and the reason why it will be implemented. There should be a way in which the government will educate the society as whole, not just a single class of people/ The implementation of the sugary beverages levy should not commence until more awareness is raised on the harmful effects of consuming sugar.

Source: Own design

It was evident that many of the respondents, although in favour of the tax, were concerned about the disparity created between the wealthy and poor as a result of the tax (participants with lower education tended to agree more with this in the French study by Julia, Méjean, Vicari, & Péneau (2015)), the possible maladministration of the funds collected, the fact that demand for sugar-sweetened beverages appeared not to be price-sensitive and that most citizens would benefit more from being educated on the negative effects of sugar.

These findings correlate with those in a qualitative study of adolescent views of sugar-sweetened beverage taxes in Michigan by Krukowski, Conley, Sterling and Rainville (2016). Krukowski *et al.* (2016) found that students identified that the advantage of a sugar-sweetened beverage tax was greater revenue for the government and decreased consumption of these beverages. The students, however, understood that habit could make decreasing consumption of sugar-sweetened beverages particularly difficult.

The study by Krukowski, Conley, Sterling and Rainville (2016) also found that adolescents were of the view that due to the addictive nature of sugar-sweetened beverage consumption, demand was not price sensitive. Respondents also identified various educational strategies that could be implemented at school level to reduce consumption of sugar-sweetened beverages. Additionally, they identified knowledge and awareness campaigns of the detrimental effects of high sugar consumption by the government, could aid in the successful implementation of the tax.

4.5 Discussion of the Findings

This study highlights and profiles perceptions of the sugary beverages levy among post-graduate accountancy university students across two provinces in South Africa. University students experience various social and environmental changes. These changes involve increased independence in daily living and decision-making in all domains, including health (Gillen & Lefkowitz, 2011). Changes range from living in close quarters, similar food choices, student activities, class work, and parties (Hoffman, 2013).

In the French study by Julia, Méjean, Vicari, and Péneau (2015), 50% of the study sample was supportive of the tax and 57.7% perceived it as helpful in improving population health. The present study indicated that there is a significant association between gender and the perception that the sugary beverage levy will be beneficial to health. Female perceptions (64%) of the benefit of the sugary beverage levy were higher than that of males. In contrast to the French study, though, only 34% of all respondents in the present study perceived the sugar-sweetened beverage as being beneficial in terms of health effects.

Generally, the respondents have a positive perception of the sugary beverages levy, understand the sugary beverage levy, as well as the health benefits that will be derived from the levy. In the study by Gollust, Barry and Niederdeppe (2014), however, only 21% of the public supported sugar-sweetened beverage taxes, while 36% support was garnered from a nationally representative survey conducted in 2009-2010 by Rivard, Smith, McCann and Hyland (2012). Rivard *et al*. (2012) found that those with some college or higher education were more likely to support a sugar-sweetened beverage tax than those with less education. This was evident in the present study as well.

Respondents in the French study by Julia, Méjean, Vicari and Péneau (2015) were more likely to support the tax model if the revenue it generated would be used for health-care system improvement (72.7%) and if this tax was associated with a corresponding decrease in the prices of other foodstuffs (71.5%). The present study found that 71.80% of respondents supported the tax on sugar-sweetened beverages if the revenue generated was used to improve the health care system. Rudd (2013) found that question wording proved to be a critically important factor shaping public

support on this issue, with those questions that unequivocally linked tax revenue generated from sugar-sweetened beverage taxes to health improvement programs eliciting more support.

Seventy percent of respondents in the present study supported the imposition of a sugar-sweetened beverage tax if the price of healthy foods decreased. The study by Battram, Piché, Beynon, Kurtz and He (2016) found a similar policy-level strategy suggested by children to limit consumption of sugar-sweetened beverages.

The Battram *et al.* (2016) results were supported in the present study, where the mean of the statement relating to support for the sugar-sweetened beverage tax if the revenue it generated was used for health-care system improvement resulted in a mean of 3.87, while a mean of 3.92 was reflected in relation to the statement dealing with support of the tax if there was a corresponding decrease in the prices of other healthy food and beverage options.

A noteworthy finding emerging from this study is that it did reveal statistically significant different means between male (mean=3.99) and female (mean=2.70) consumption of sugar-sweetened beverages. These results indicated that female respondents drink fewer sugar-sweetened beverages than the male respondents. The study by Hoffman (2013), however, contrasted with the present study's results and previous literature (Edward, 2016), as it did not support gender differences in sugar-sweetened beverage consumption.

The present study found that there is a statistically significant association between gender and the consumption of water, and on average, females were found to have a higher water consumption than males. The number of males and of females, however, who consume the recommended daily water intake of 8 cups daily is more or less similar. In contrast, Hoffman (2013) unexpectedly demonstrated that, compared to females, males consumed more water daily. The present study revealed that females, nearly three times the number of males, reported higher sugar-sweetened beverage consumption during stressful periods. This finding supports the study by Hoffman (2013) where it was found that there was little association between stress and sugar-sweetened beverage intake amongst males.

Efforts to reduce sugar-sweetened beverage consumption are needed for university students. Little research on sugar-sweetened beverage intake has examined consumption patterns of sugar-sweetened beverages by young adults, despite the vulnerabilities of this population to weight gain. It is important to recognise the contribution of sugar-sweetened beverages to excess calories and sugars that may lead to weight gain and resulting health co-morbidities. Reducing sugar-sweetened beverage intake, increasing physical activity, addressing perceptions of body image, and controlling stress may be a targeted means to impact the weight status of university students. Hoffman (2013) found that to promote the health of young adults, nutrition, physical activity, and stress management must be addressed, in addition to sugar-sweetened beverage consumption.

Policies, for example, beverage taxes, regulating food advertising, nutrition labelling and interventions targeting adults may be effective in modifying consumer behaviour within the home, including sugar-sweetened beverage consumption by children. Regulating soft drink advertising, in particular, may play a role.

It is submitted that increasing the cost of the sugar-sweetened beverage levy may limit sugar-sweetened beverage consumption, and the profits generated from taxes on sugar-sweetened beverages can be used to fund other nutrition-based programs. International evidence suggests that when taxes are used in conjunction with investments in nutrition programs, dietary behaviours relating to sugar-sweetened beverage consumption can be successfully modified.

4.6 Limitations of the Study

This study is subject to several limitations. First, the cross-sectional design limits the ability to draw causal conclusions as it is difficult to gauge long-term patterns and implications. Secondly, the population was drawn from a specific setting and the resulting sample for this study was a convenience sample consisting of post-graduate accounting students. Individuals included in the study were young (approximately in the same age group) and with higher educational levels (all tertiary level students). Further, due to the tertiary institutions chosen, the largest race group was Black African. The study thus probably overestimates the level of acceptance of the tax, since

age, education, level of income and race were found to be significant determinants of support for the tax.

All measures were self-reported, which can involve inaccurate reporting. The tax perception questionnaire was administered four to five months after the implementation of the tax in South Africa, which may yield different results, if conducted at a later date.

4.7 Conclusion

The present chapter presents the results of the statistical analyses of the responses to the questionnaire administered to post-graduate accounting students at three South African universities. It discusses the methods (both quantitative and qualitative research techniques) employed to analyse the data, as well as the methods used to ensure the quality and accuracy of the research design.

Respondents seemingly understood the short- and long-term advantages and disadvantages of consuming sugar-sweetened beverages. They understood the personal and economic effects of a tax on sugar-sweetened beverages. Respondents indicated that habit and environment could make reducing sugar-sweetened beverage consumption difficult, but they also indicated that their consumption would decrease as a result of the imposition of the sugar-sweetened beverage tax.

Participants have a high level of awareness of sugar-sweetened beverages and their effects on health. Factors dominant in influencing participants' beverage choice and consumption patterns included habit, awareness and understanding of the tax, cost, availability, childhood consumption patterns, advertising and the perceived impact of the tax.

The results indicate that the perception of the sugar-sweetened beverage tax is favourable, especially with regard to the fact that it has the potential to improve the health of the general population. Similar to the study conducted by Julia, Méjean, Vicari, and Péneau (2015), this study found that public perception of the sugar-sweetened beverage tax depends to a great extent on the objectives of the intended tax. Consistent with international studies, these results found that respondents are

more likely to support the sugar-sweetened beverage tax if the revenue generated is used for the upliftment of society as a whole, in the form of improvements to the health-care system, prevention of obesity and reduction in sugar-related illnesses.

In a study by Donaldson, Cohen, Rutkow, Villanti, Kanarek and Barry (2015), it was found that, overall, 50% of respondents supported a state sugar-sweetened beverage tax. Powell and Chaloupka (2009), however, noted that the policies that rely most heavily on government interventions in the marketplace by increasing prices, a strategy with strong empirical support of effectiveness, are the least popular.

It is submitted that the present study is the first South African study to investigate perceptions of the sugar-sweetened beverage tax, going beyond single measures of acceptance.

The next chapter (Chapter 5) presents the conclusion of the study.

CHAPTER 5: CONCLUSION

5.1 Introduction

This chapter concludes the research thesis. The goal of this exploratory, comparative study was to investigate perceptions of the participants in the study in South Africa regarding the tax on sugar-sweetened beverages and compare these perceptions with perceptions identified in selected foreign jurisdictions that have levied the tax on sugar-sweetened beverages. The current study can possibly provide policy makers with more information regarding acceptance of the sugar-sweetened beverage tax, and shape guidelines for future amendments of the tax imposed. In this concluding chapter, a summary of findings, the conclusions drawn from the research objectives, and future research implications are presented.

5.2 Summary of Findings Addressing the Research Objectives

To achieve the broader research goal, the following sub-goals were undertaken:

- development of a theoretical framework which was used to test perceptions of the tax, based on international experience;
- investigation of the awareness and understanding of the participants in South Africa regarding the sugar-sweetened beverage tax and its scope;
- determination of the perceptions of the participants in the study in South Africa regarding the tax, based on the theoretical framework developed in the first phase of the research; and
- comparison of the perceptions of South African participants in the study with international perceptions.

In chapter two, a comprehensive literature review was performed of past studies, to determine what factors influence perceptions of a sugar-sweetened beverage tax. This was then used to develop a theoretical framework, used to test perceptions of the tax in South Africa, based on international experience. This study identified key factors that influence perceptions of the sugar-sweetened beverage tax. These factors, that formed the basis of a questionnaire, included:

- key demographic questions (gender, race, age etc.);
- beverage consumption (sugar-sweetened beverages, milk and water), serving size, as well as frequency of consumption; and
- knowledge and awareness of the sugar-sweetened beverage tax.

A survey (chapter 3) was used to collect data, using post-graduate Bachelor of Commerce Accounting and Postgraduate Diploma in Accounting students as participants. These students were aged twenty-one years and older, studying at three residential universities in South Africa, during the 2018 academic year. Participation was voluntary. A pilot study was conducted to enhance the questionnaire language, assess the time required to complete the questionnaire and identify any areas that required changes.

The participants were drawn from a specific setting and not randomly selected and as a result, the findings of the research cannot be generalised to the entire South African population.

All necessary ethical approvals were granted by the universities concerned.

In chapter 4, the quantitative and qualitative data analysis was presented. The two main constructs (construct 1: perception of the sugar-sweetened beverage tax and the price of sugar-sweetened beverages and construct 2: the social impact of the sugar-sweetened beverage tax) tested in the questionnaire were then analysed using descriptive statistics. Noteworthy results included the following:

- there is a significant association between gender and the perception that the sugary beverage levy will be beneficial to health, with female perceptions of the benefit of the sugary beverage levy being greater than that of males;
- respondents appear to have a positive perception of the sugary beverages levy, understand the sugary beverage levy, as well as the health benefits that will be derived from the levy;
- approximately 72% of respondents supported the tax on sugar-sweetened beverages if the revenue generated was used to improve the health care system;
- seventy percent of respondents supported the imposition of a sugar-sweetened beverage tax if the price of healthy foods decreased;

- genders differed in their sugar-sweetened beverage consumption, with female respondents drinking fewer sugar-sweetened beverages than male respondents;
- there is a statistically significant association between gender and the consumption of water with females having a higher water consumption than males, on average; and
- females reported higher sugar-sweetened beverage consumption during stressful periods.

5.3 Implications of this Study

This study examines perceptions of the Sugar-Sweetened Beverage Tax in South Africa. The findings suggest that socio-demographic factors modulate perceptions of the tax. The findings of this research can therefore be used to help inform future public health policy and interventions that aim to reduce sugar-sweetened beverage consumption among young people.

A considerable portion of young adults consume sugar-sweetened beverages, one or more times daily. Males and certain race groups, particularly those with low socio-economic status (two out of the three universities selected were historically disadvantaged institutions, i.e. rural universities), are the largest consumers of sugar-sweetened beverages, especially in the absence of daily physical activity. The public must be provided with information regarding the negative effects of sugar-sweetened beverage consumption in order for them to make informed consumption choices.

5.4 Future Research

Other researchers may expand the findings of this research by testing these findings in other areas, among other population groups and using varying statistical analyses. The findings about sugar-sweetened beverage consumption trends across gender, ethnicities and physical activity groups can help guide targeted strategies to reduce sugar-sweetened beverage consumption.

Han and Powell (2013) suggest that studies should examine the link between variable determinants of sugar-sweetened beverage consumption to provide evidence on the potential effectiveness of policy interventions aimed at improving public health.

5.5 Final Conclusion

This study provides insight into sugar-sweetened beverage consumption trends in two provinces in South Africa, among young adults. South Africa is a country of diverse cultures and backgrounds. The study found that perception of the sugar-sweetened beverage tax may depend on several factors, closely linked to individual beliefs and cultures, and thus different populations may have different perceptions of the tax. Gender, certain racial minorities and the lack of physical activity can potentially be related to greater sugar-sweetened beverage consumption.

Krukowski, Conley, Sterling and Rainville (2016) suggest that taxes on sugar-sweetened beverages could be used, along with other strategies, to reduce consumption. This combination may improve population health in general, in South Africa. Bollard, Maubach, Walker and Mhurchu (2016) concluded that additional approaches could involve plain packaging and warning labels, which could significantly reduce young adults' preferences for and the probability of purchasing sugar-sweetened beverages and may therefore reduce consumption.

Based on the study performed, it is submitted that information regarding the potential effectiveness of sugar-sweetened beverage taxes in reducing consumption and generating revenue for childhood obesity programmes, can be disseminated to the public. The relationship between obesity and sugar-sweetened beverages must be explained to enhance the public's understanding of the effect of sugar-sweetened beverages on health outcomes. Fiscal interventions such as subsidies on healthy beverage choices may also be beneficial.

Another issue to consider is that reducing the price of a healthy food effectively gives consumers more money to spend, and they may choose to purchase both healthier and unhealthier foods. Research by Epstein, Dearing, Roba, and Finkelstein (2010) has shown that this is a real possibility. It is not sufficient to demonstrate that lowering the price of healthy foods increases consumption of those healthy foods. Food policy analysts need to consider food choices in order to understand what effect taxes and subsidies will have on diet.

Hoffman (2013) submits that by educating college students to limit sugar-sweetened beverage intake and to practice other behaviours such as healthy nutrition, physical activity and stress management, could significantly impact their physical and mental health. Huffman and West (2007) conclude that rapidly increasing obesity rates are a problem for both adults and youth, and college students represent an important population that may not receive sufficient attention in obesity prevention efforts. However, it is these young adults that are at a developmental stage in which they are establishing healthy habits, that are likely to endure and represent a very promising target audience for focused behavioural interventions directed at reducing sugar-sweetened beverage consumption.

Edward (2016) concludes that ideally, multiple measures, including limiting availability, reducing targeted marketing, increasing the cost of sugar-sweetened beverages, simultaneous reduction in costs of healthier alternatives, educative and informational measures through mass media, school-based policies and interventions targeted at young adults, children and parents will together prove most effective in reducing sugar-sweetened beverage consumption.

To determine the success or failure of the sugar-sweetened beverage tax, monitoring of the subsequent effects on public health will be required. Further, it will be important to note how industry reacts, as companies may absorb the tax rather than pass it down to consumers, which could potentially result in very little to no change in consumer behaviour.

In recent times, several countries have deliberated introducing sugar-sweetened beverage taxes but have vetoed the idea following public debate. Urbach (2016) explains that the Republic of South Africa National Treasury refers to the Mexican sugar-sweetened beverage tax, levied in 2014, as the model for a similar tax implemented in South Africa. The Treasury emphasises that the introduction of the tax in Mexico was followed by a decline in purchases of the taxed products. Overall, the Mexican sugar-sweetened beverage tax raised additional tax revenue without considerably reducing consumption, or having any quantifiable influence on obesity at all, indicating that demand for sugar-sweetened beverages may often be very inelastic.

Urbach (2016) states that the Danish government scrapped their sugar-sweetened beverage tax citing the following reasons; expensive and counterproductive, high administrative costs and regressive in nature. Urbach (2016) further concludes that South Africa, similarly, should not risk an additional tax which disproportionately affects lower income households. Additionally, even if consumers decide against buying higher-priced sugar-sweetened beverages, they can always resort to purchasing untaxed sugary products, which means their sugar consumption will not decrease and obesity will not be reduced (Urbach, 2016). However, similar to the “sin taxes” directed at tobacco and alcohol, a sugar-sweetened beverage tax remains a solution that is worth considering as, even if it does not reduce consumption as much as anticipated, it will generate more tax revenues which could be spent on healthcare (as a result of overweight related illnesses) or subsidising healthy foods, and such pricing strategies may actually be an effective stimulant of healthier food choices.

REFERENCES

Ambrosini, G.L. 2009. “Adolescent dietary patterns are associated with lifestyle and family psycho-social factors”, **Public Health Nutrition**, Volume 12, Issue 10, October 2009, Pages 1807–15. [Online]. Available: https://doi.org/10.1017/S1368980008004618 (accessed 12 May 2018)

Armstrong, P., Fourie, H. and Rich, E. 2016. “The impact of a sugar tax on SSBs on the prevalence of obesity”, **Econex competition and applied economics**, Research Note 41:1. [Online]. Available: https://econex.co.za/wpcontent/uploads/2017/01/ECONEX_researchnote_41.pdf (accessed: 28 December 2017)

Barry, C.L., Niederdeppe, J., Gollust, S.E., 2013, “Taxes on Sugar-Sweetened Beverages”, **American Journal of Preventive Medicine**, Volume 44, Issue 2, 158 – 163. [Online]. Available: https://doi.org/10.1016/j.amepre.2012.09.065 (accessed: 20 January 2018).

Battram, D.S., Piché, L., Beynon, C., Kurtz, J., He, M. 2016, “Sugar-Sweetened Beverages: Children's Perceptions, Factors of Influence, and Suggestions for Reducing Intake”, **Journal of Nutrition Education and Behavior**, Volume 48, Issue 1, Pages 27-34.e1. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S1499404615006582 (accessed: 1 April 2018).

Bleich, S.N., Cutler, D., Murray, C. and Adams, A. 2008. “Why is the developed world obese?”, **Annual Review of Public Health**, Volume 29, Issue 1, April 2008, 273-295. [Online]. Available: https://www.annualreviews.org/doi/10.1146/annurev.publhealth.29.020907.090954 (accessed: 2 May 2018)

Bleich, S.N. and Wang, Y.C. 2011. “Consumption of Sugar-Sweetened Beverages Among Adults with Type 2 Diabetes”, **Diabetes Care**, Volume 34, Issue 3, March 2011, Pages 551–555. [Online]. Available: http://doi.org/10.2337/dc10-1687 (accessed 28 April 2018)

Bollard, T., Maubach, N., Walker and Mhurchu, C.N. 2016. “Effects of plain packaging, warning labels, and taxes on young people’s predicted sugar-sweetened beverage

preferences: an experimental study". **International Journal of Behavioral Nutrition and Physical Activity,** 13:95. [Online]. Available: https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-016-0421-7 (accessed: 18 June 2018)

Brownbill, A.L. November 2015. **"The marketing of sugar-sweetened beverages to young people on social media"**. [Online]. Available: http://docplayer.net/59768952-The-marketing-of-sugar-sweetened-beverages-to-young-people-on-social-media.html (accessed 10 April 2018)

Buscher, L.A. and Martin, K.A. 2001. "Point-of-purchase messages framed in terms of cost, convenience, taste, and energy improve healthful snack selection in a college foodservice setting". **J Am Diet Assoc**, Volume 101, Issue 8, August 2001, Pages 909 –913. [Online]. Available: https://doi.org/10.1016/S0002-8223(01)00223-1 (accessed 10 May 2018)

Butland, B., Jebb, S., Kopelman, P., McPherson, K., Thomas, S., Mardell, J. and Parry, V. 2007. "**Tackling obesities: Future choices – Project report, 2nd edition**". Government office for science. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/287937/07-1184x-tackling-obesities-future-choices-report.pdf (accessed: 17 June 2018)

Caraher, M. and Cowburn, G. 2005. "Taxing food: implications for public health nutrition", **Public Health Nutrition**, Volume 8, Issue 8, Pages 1242-9, December 2005. [Online]. Available: https://www.ncbi.nlm.nih.gov/pubmed/16372919 (accessed: 14 June 2018)

Colchero, M.A., Guerrero-Lóapez, C.M., Molina, M. and Rivera J.A 2016. "Beverages Sales in Mexico before and after Implementation of a Sugar-sweetened Beverage Tax", **PLoS ONE**, Volume 11, Issue 9, 26 September 2016, e0163463. [Online]. Available: 10.1371/journal.pone.0163463 (accessed: 5 June 2018)

Colchero, M.A., Molina, M. and Guerrero-López, C.M. 2017. "After Mexico Implemented a Tax, Purchases of Sugar-Sweetened Beverages Decreased and Water Increased: Difference by Place of Residence, Household Composition, and Income

Level", **The Journal of Nutrition**, Volume 147, Issue 8, 1 August 2017, Pages 1552–1557. [Online]. Available: https://doi.org/10.3945/jn.117.251892 (accessed: 1 March 2018)

Cradock, A. L., McHugh, A., Mont-Ferguson, H., Grant, L., Barrett, J.L., Wang, Y. C. and Gortmaker, S.L. 2011. "Effect of school district policy change on consumption of sugar-sweetened beverages among high school students, Boston, Massachusetts, 2004–2006". **Preventing Chronic Disease**, Volume 8, Number 4, July 2011. [Online]. Available: https://www.cdc.gov/pcd/issues/2011/jul/10_0149.htm (accessed: 5 April 2018)

Cruz, S.Y., Fabián, C., Pagán, I., Ríos, J.L., González, A.M., Betancourt, J., González, M.J., Rivera-Soto, W.T., Palacios, C. 2013. "Physical activity and its associations with sociodemographic characteristics, dietary patterns, and perceived academic stress in students attending college in Puerto Rico". **Puerto Rico Health Science Journal**, Volume 32, Issue 1, March 2013, Pages 44-50. [Online]. Available: http://prhsj.rcm.upr.edu/index.php/prhsj/article/view/810/619 (accessed 18 May 2018)

Davis, L.E. 2016. **An investigation of sugar-sweetened beverage consumption among Canadian youth.** Queen's university. [Online]. Available: https://qspace.library.queensu.ca/handle/1974/14706 (accessed: 10 April 2018)

Demory-Luce, D., Morales, M., Nicklas, T., Baranowski, T., Zakeri. I and Berenson, G. 2004. "Changes in food group consumption patterns from childhood to young adulthood: The Bogalusa Heart Study." **Journal of the Academy of Nutrition and Dietetics**, Volume:104, Issue 11, November 2004, Pages 1684-1691. [Online]. Available: https://jandonline.org/article/S0002-8223(04)01249-0/fulltext (accessed: 18 May 2018)

De Waal, M. 2016. "**When governments crack down on sugar**", FinWeek. [Online]. Available: https://www.pressreader.com/south-africa/finweekenglishedition/20160526/281865822700992 (accessed: 28 February 2018)

Donaldson, E.A., Cohen, J.E., Rutkow, L., Villanti, A.C., Kanarek, N.F. and Barry, C.L. 2015. "Public support for a sugar-sweetened beverage tax and pro-tax messages in a

Mid-Atlantic US state", **Public Health Nutr**. 18(12): 2263–2273. [Online]. Available: https://doi.org/10.1017/S1368980014002699 (accessed: 31 December 2017)

Downs, A. and Ashton, J. 2011. "Vigorous Physical Activity, Sports Participation, and Athletic Identity: Implications for Mental and Physical Health in College Students". **Journal of Sport Behavior**. Mobile Vol. 34, Issue. 3. September 2011. Pages: 228-249. [Online]. Available: https://search.proquest.com/openview/ecf8409fb3c7cf04ad322b8d1d39c7ee/1?pq-origsite=gscholar&cbl=30153 (accessed: 18 April 2018)

Edward, B. 2016. "**Association between sugar-sweetened beverage consumption and overweight /obesity by physical activity status and socio-demographic factors in U.S. adolescents: analysis of the 2015 youth risk behavior survey**". [Online]. Available: https://scholarworks.gsu.edu/cgi/viewcontent.cgi?article=1538&context=iph_theses (accessed: 18 May 2018)

Epstein, L.H., Dearing, K.K., Roba, L.G. and Finkelstein, E., 2010, "The influence of taxes and subsidies on energy purchased in an experimental purchasing study", **Psychological Science**, Issue 21, Pages 406–14. [Online]. Available: https://doi.org/10.1177/095679761036144 (accessed: 11 November 2018)

Gillen, M.M. and Lefkowitz, E.S. 2011. "Gender and racial/ethnic differences in body image development among college students". **Body Image**, Volume 9, Issue 1, January 2012, Pages 126-130. [Online]. Available: https://doi.org/10.1016/j.bodyim.2011.09.004 (accessed: 14 May 2018)

Gollust S.E., Barry, C.L. and Niederdeppe J., 2014, "Americans' opinions about policies to reduce consumption of sugar-sweetened beverages", **American Journal of Preventive Medicine**, Volume 63, 52 – 57. [Online]. Available: https://doi.org/10.1016/j.ypmed.2014.03.002 (accessed: 20 January 2018).

Haftoglou, S. 2015. **Relationship Between Sugar Sweetened Beverage Consumption and Academic Performance Among Elementary and Middle School Children**. University of California. [Online]. Available: https://cloudfront.escholarship.org/dist/prd/content/qt9n93f72k/qt9n93f72k.pdf
(accessed: 10 April 2018)

Han, E. and Powell, L.M. 2013. “Consumption patterns of sugar-sweetened beverages in the United States”. **Journal of the Academy of Nutrition and Dietetics**, Volume 113, Issue: 1, January 2013, Pages 43–53. [Online]. Available: https://doi.org/10.1016/j.jand.2012.09.016 (accessed: 19 May 2018)

Härkänen, T., Kotakorpi, K., Pietinen, P., Pirttilä, J., Reinivuo, H. and Suoniemi, I. 2014. “The welfare effects of health-based food tax policy”, **Elsevier**, Volume 49, Part 1, Pages 196 – 206, December 2014. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0306919214001080 (accessed: 14 June 2018)

Harrington, S. 2008. “The Role of Sugar-Sweetened Beverage Consumption in Adolescent Obesity: A Review of the Literature”. **Journal of School Nursing**, Volume: 24 Issue: 1, February 2008, Page(s): 3-12. [Online]. Available: https://doi.org/10.1622/1059-8405(2008)024[0003:TROSBC]2.0.CO;2 (accessed: 2 May 2018)

Harris, J.L., Schwartz, M.B., Brownell, K.D. “Evaluating sugary drink nutrition and marketing to youth”. **Yale Rudd Center for Food Policy and Obesity**, 2011. Sugary drink F.A.C.T.S. food advertising to children and teens score. [Online]. Available: http://www.kickthecan.info/sites/default/files/documents/sugarydrinkfacts_report.pdf (accessed: 18 June 2018)

Hattersley, L., Irwin, M., King, L. and Allman-Farinelli, M. 2009. “Determinants and patterns of soft drink consumption in young adults: a qualitative analysis.” **Public Health Nutr**, Volume 12, Issue: 10, October 2009, Pages 1816-22. [Online]. Available: https://doi: 10.1017/S136898000800462X. (accessed: 20 May 2018)

Heller, K.E., Burt, B.A. and Eklund, S.A. 2001. “Sugared soda consumption and dental caries in the United States”, **Journal of Dental Research**, 2001; 80:1949–53. [Online]. Available:http://www.kickthecan.info/sites/default/files/documents/J%20DENT%20RES-2001-Heller-1949-53.pdf (accessed: 13 January 2018)

Hoffman, E. 2013. Sugar-Sweetened Beverage Intake among College Students*:* A Socio-Ecological Model*.* **The Ohio State University**. [Online]. Available:

https://pdfs.semanticscholar.org/9caf/318426090f985f5b31e59745e11ac8305b39.pdf (accessed: 10 April 2018)

Huffman, L. and West D.S. 2007. “Readiness to change sugar sweetened beverage intake among college students”. **Eating Behaviors**. 2007, Volume 8, Issue 1, January 2007, Pages 10-14. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S1471015306000328?via%3Dihub (accessed: 28 April 2018)

Jones, N. R. V., Conklin, A. I., Suhrcke, M. and Monsivais, P. 2014. “The Growing Price Gap between More and Less Healthy Foods: Analysis of a Novel Longitudinal UK Dataset”. **PloS ONE**, Volume 9, Issue 10, 8 October 2014, e109343. [Online]. Available: https://doi.org/10.1371/journal.pone.0109343 (accessed: 7 June 2018)

Julia, C., Méjean, C., Vicari, F. and Péneau, S. 2015. “Public perception and characteristics related to acceptance of the sugar-sweetened beverage taxation launched in France in 2012”, **Public Health Nutrition,** Volume 18, Issue 14 , pp. 2679-2688. [Online]. Available: https://doi.org/10.1017/S1368980014003231 (accessed: 1 March 2018)

Kengne, A.P. 2017. “Trends in obesity and diabetes across Africa from 1980 to 2014: an analysis of pooled population-based studies”, **International Journal of Epidemiology**, Volume 46, Issue 5, Pages 1421–1432. [Online]. Available: https://doi.org/10.1093/ije/dyx078 (accessed: 5 February 2018)

Khan, S.N. 2014. “Qualitative research method – Phenomenology”, **Asian Social Science**, Volume 10, Number 21, November 2014, Pages 298–310. [Online]. Available: http://www.ccsenet.org/journal/index.php/ass/article/viewFile/41811/22946 (accessed 8 May 2018)

Koordeman, R., Anschutz, D.J., van Baaren, R.B. and Engels, R.C.M.E. 2010. “Exposure to soda commercials affects sugar-sweetened soda consumption in young women. An observational experimental study”. **Appetite**, Volume 54, Issue 3, June 2010, Pages 619-622. [Online]. Available: https://doi.org/10.1016/j.appet.2010.03.008 (accessed: 29 May 2018)

Kothari, C.R. 2004. **Research Methodology (Methods and Techniques)**. Second revised edition. India: New Age International India. [Online]. Available: http://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf (accessed: 12 April 2018)

Krukowski, C.N., Conley, K.M., Sterling, M. and Rainville, A.J. "A Qualitative Study of Adolescent Views of Sugar-Sweetened Beverage Taxes, Michigan, 2014". **Preventing Chronic Disease**, Volume 13, May 2016. [Online]. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4858450/ (accessed: 10 April 2018)

Lavin, R and Timpson, H. 2013. "**Exploring the Acceptability of a Tax on Sugar-Sweetened Beverages - Brief Evidence Review**." [Online]. Available: http://www.cph.org.uk/wp-content/uploads/2013/11/SSB-Evidence-Review_Apr-2013-2.pdf (accessed: 16 February 2018)

Lenoir, M., Serre, F., Cantin, L. and Ahmed, S.H. 2007. "Intense sweetness surpasses cocaine reward". **PLoS One**, Volume 2, Issue: 8, 1 August 2007, e698. [Online]. Available: https://doi.org/10.1371/journal.pone.0000698 (accessed: 3 June 2018)

Levy, D.T., Friend, K.B. "Simulation modeling of policies directed at youth sugar-sweetened beverage consumption". **American Journal of Community Psychology**, Volume 51, Issue 1-2, Pages 299-313, March 2013. [Online]. Available: https://doi:10.1007/s10464-012-9535-5 (accessed: 5 April 2018)

Lin, B. and Smith, T.A. 2010. "The Effects of a Sugar-Sweetened Beverage Tax: Consumption, Calorie Intake, Obesity, and Tax Burden by Income", **Economists. Economic Research Service**, USDA. [Online]. Available: https://www.researchgate.net/publication/254384022_The_Effects_of_a_Sugar-Sweetened_Beverage_Tax_Consumption_Calorie_Intake_Obesity_and_Tax_Burden_by_Income (accessed: 31 December 2017)

Lopez, R.A. and Fantuzzi, K.L. 2012. "Demand for carbonated soft drinks: implications for obesity policy", **Applied Economics**, Volume 44, Issue: 22, pp. 2859-2865. [Online]. Available: https://doi.org/10.1080/00036846.2011.568397 (accessed: 17 June 2018)

Lowman, S. 2016. Biznews. [Online] Available: https://www.biznews.com/sa-investing/2016/10/11/countries-that-taxed-calories-why-it-was-abolished-in-some-increased-revenue-in-others/ (accessed: 10 January 2018)

Lytle, L.A., Seifert, S., Greenstein, J. and McGovern, P. 2000. "How do children's eating patterns and food choices change over time? Results from a cohort study". **American Journal of Health Promotion**, Volume 14, Issue 4, 1 March 2000, Pages 222-228. [Online]. Available: http://journals.sagepub.com/doi/10.4278/0890-1171-14.4.222 (accessed: 29 May 2018)

Malik, V.S., Schulze, M.B., and Hu, F.B. 2006. "Intake of sugar-sweetened beverages and weight gain: a systematic review", **The American Journal of Clinical Nutrition**, 84(2), 274–288. [Online]. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3210834/pdf/nihms332953.pdf (accessed: 10 January 2018)

Manyema, M., Veerman, L.J., Chola, L., Tugendhaft, A., Sartorius, B., Labadoarios, D. and Hofman, K.J. 2014. "The potential impact of a 20% tax on sugar-sweetened beverages on obesity in South African adults: A mathematical model." **PLoS one**, Vol. 9, No. 8. (p. e105287). [Online]. Available: https://doi.org/10.1371/journal.pone.0105287 (accessed: 28 December 2017)

McGranahan, L. and Schanzenbach, D.W. 2011. "Who would be affected by soda taxes?", **Chicago Fed Letter**, The Federal Reserve Bank of Chicago, Issue March 2011, Number 284. [Online]. Available: https://www.chicagofed.org/publications/chicago-fed-letter/2011/march-284 (accessed: 18 March 2018)

McKinsey Global Institute. Overcoming obesity: An initial economic analysis. November 2014. [Online]. Available: https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Economic%20Studies%20TEMP/Our%20Insights/How%20the%20world%20could%20better%20fight%20obesity/MGI_Overcoming_obesity_Full_report.ashx (accessed 14 January 2018)

Miller, K. 2007. **Communication theories: perspectives, processes, and contexts**. (2nd ed.). Beijing: Peking University Press

Mytton, O. T., Eyles. H. and Ogilvie, D. 2014. “Evaluating the health impacts of food and beverage taxes”, **Current Obesity Reports**, December 2014, Volume 3, Issue 4, pp 432-439. [Online]. Available: http://dx.doi.org/10.1007/s13679-014-0123-x (accessed: 16 June 2018)

Neuman, W.L. 2011. **Social Research Methods: Qualitative and Quantitative Approaches**. USA: Allyn and Bacon.

Neumark-Sztainer, D., Hannan, P.J., Story, M., Croll, J. and Perry, C. 2003. “Family meal patterns: Associations with sociodemographic characteristics and improved dietary intake among adolescents”. **Journal of the Academy of Nutrition and Dietetics**, Volume 103, Issue: 3, March 2003, Pages 317–22. [Online]. Available: https://doi.org/10.1053/jada.2003.50048 (accessed: 13 May 2018)

Ng, S.W., Mhurchu, C.N., Jebb, S.A., and Popkin, B.M. 2012. “Patterns and trends of beverage consumption among children and adults in Great Britain, 1986–2009”, **The British Journal of Nutrition**, 108(3), 536–551. [Online]. Available: http://doi.org/10.1017/S0007114511006465 (accessed: 13 February 2018)

Olsen, C. and George, D.M.M. 2004. “Cross sectional study design and data analysis”, **The Young Epidemiology Scholars Program**, 3-53. [Online]. Available: http://www.collegeboard.com/prod_downloads/yes/4297_MODULE_05.pdf (accessed: 12 March 2018)

Osei-Assibey, G., Dick, S., Macdiarmid, J., Semple, S., Reilly, J. J., Ellaway, A., Cowie, H. and McNeill. G. 2013. “The influence of the food environment on overweight and obesity in young children: a systematic review.”, **BMJ Open**, Volume 2, Issue 6, 1 January 2013. [Online]. Available:10.1136/bmjopen-2012- 001538. (accessed: 17 June 2018)

Powell, L.M. and Chaloupka, F.J. 2009. **Food prices and obesity: evidence and policy implications for taxes and subsidies.** Milbank Q 87, 229–257. [Online]. Available: https://doi: 10.1111/j.1468-0009.2009.00554.x (accessed: 1 March 2018)

Powell, L.M. and Chriqui, J.F. 2012. “Food Taxes and Subsidies: Evidence and Policies for Obesity Prevention”, **The Oxford Handbook of the Social Science of Obesity**. September 2012. [Online]. Available: 10.1093/oxfordhb/9780199736362.013.0038 (accessed: 17 June 2018)

Powell, L.M., Han, E. and Chaloupka, J.F. 2010. “Economic Contextual Factors, Food Consumption, and Obesity among U.S. Adolescents”. **The Journal of Nutrition**, June 2010. Volume 140, Issue 6, Pages 1175–1180 [Online]. Available: https://doi.org/10.3945/jn.109.111526 (accessed: 17 April 2018)

Rehm, C.D., Matte, T.D., Van Wye, G., Young, C. and Frieden, T.R. 2008. “Demographic and Behavioral Factors Associated with Daily Sugar-sweetened Soda Consumption in New York City Adults". **Journal of Urban Health: Bulletin of the** Republic of South Africa National Treasury. 8 July 2016. Policy Paper. **Taxation of Sugar Sweetened Beverages**. [Online]. Available: http://www.treasury.gov.za/public%20comments/Sugar%20sweetened%20beverages/POLICY%20PAPER%20AND%20PROPOSALS%20ON%20THE%20TAXATION%20OF%20SUGAR%20SWEETENED%20BEVERAGES-8%20JULY%202016.pdf (accessed: 28 December 2017)

Republic of South Africa National Treasury, 2017. **Treasury.** [Online]. Available: http://www.treasury.gov.za/publications/RevenueLaws/2017%20%20Final%20Response%20Document-2017%20Rates%20Bill-%20Health%20Promotion%20Levy-15%20December%202017.pdf (accessed 4 February 2018)

Republic of South Africa National Treasury. 8 July 2016. Policy Paper. **Taxation of Sugar Sweetened Beverages**. [Online]. Available: http://www.treasury.gov.za/public%20comments/Sugar%20sweetened%20beverages/POLICY%20PAPER%20AND%20PROPOSALS%20ON%20THE%20TAXATION%20OF%20SUGAR%20SWEETENED%20BEVERAGES-8%20JULY%202016.pdf (accessed: 28 December 2017)

Riemann, G.M. n.d. “Sweet Dreams: The Introduction of a 'Sugar Tax' in the United Kingdom”. **University of York**. [Online]. Available: http://www.academia.edu/25025534/Sweet_Dreams_the_Introduction_of_a_Sugar_Tax_in_the_United_Kingdom (accessed: 4 June 2018)

Rivard, C., Smith, D., McCann, S.E. and Hyland, A. 2012. “Taxing sugar-sweetened beverages: A survey of knowledge, attitudes and behaviours”. **Public Health Nutr**. Volume 15, Issue 8, Pages 1355–1361. [Online]. Available: https://doi.org/10.1017/S1368980011002898 (accessed: 16 March 2018).

Rivera, J. 2016. Business Day. [Online]. Available: https://www.businesslive.co.za/bd/opinion/2016-11-18-mexicos-sugary-drinks-tax-a-sweet-success--now-sa-should-follow-suit/# (accessed: 4 June 2018)

Rudd Center for Food Policy & Obesity, 2013. Public Opinion Data. [Online]. Available: http://yaleruddcenter.org/what_we_do.aspx?id=273). (accessed: 16 March 2018).

Sa´nchez-Romero, L.M., Penko, J., Coxson, P.G., Ferna´ndez, A., Mason, A., Moran, A.E., Ávila-Burgos, L., Odden, M., Barquera, S. and Bibbins-Domingo, K. 2016. “Projected Impact of Mexico’s Sugar-Sweetened Beverage Tax Policy on Diabetes and Cardiovascular Disease: A Modeling Study”. **PLoS Med** 13(11): e1002158. [Online]. Available: http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002158 (accessed 20 January 2018)

Schernhammer, E.S., Hu, F.B., Giovannucci, E., Michaud, D.S., Colditz, G.A., Stampfer, M.J., and Fuchs, C.S. 2005. “Sugar-sweetened soft drink consumption and risk of pancreatic cancer in two prospective cohorts”, Cancer Epidemiol Biomarkers Prevention, Vol 14:2098–105. [Online]. Available: http://cebp.aacrjournals.org/content/14/9/2098 (accessed: 11 January 2018)

Scully, M., Morley. B., Niven, P., Crawford, D., Pratt, I.S. and Wakefield M. 2017. “Factors associated with high consumption of soft drinks among Australian secondary-school students”. **Public Health Nutrition**, Volume 20, Issue 13, Pages 2340–2348. [Online]. Available: https://doi.org/10.1017/S1368980017000118 (accessed: 5 April 2018).

Sharkey, J.R., Johnson, C.M. and Dean, W.R. 2011. “Less-healthy eating behaviors have a greater association with a high level of sugar-sweetened beverage consumption among rural adults than among urban adults”. **Food and Nutrition**

Research, Volume 55. [Online]. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3153312/ (accessed: 30 April 2018)

Smed, S., Jensen, J.D. and Denver, S. 2007. "Socio-economic Characteristics and the Effect of Taxation as a Health Policy Instrument". **Food Policy**, Issue 32, Issue 5, pp.624–639, 1 October 2007. [Online]. Available: 10.1016/j.foodpol.2007.03.002 (accessed: 17 June 2018)

Temple, N.J. and Steyn, N.P. 2011. "The cost of a healthy diet: A South African perspective", **Nutrition**, Volume 27, Issue 5, May 2011, Pages 505-508. [Online]. Available: https://doi.org/10.1016/j.nut.2010.09.005 (accessed: 7 June 2018)

Teterycz, S. 2017. "**Cross-sectional study exploring sugar- sweetened beverages (SSB) consumption among students".** Cardiff Metropolitan University. [Online]. Available: n/a (accessed: 7 May 2018)

Tewksbury, R. 2009. "Qualitative versus quantitative methods: Understanding why qualitative methods are superior for criminology and criminal justice", **Journal of Theoretical and Philosophical Criminology**, Volume 1, Issue 1, January 2009, Pages 38–58. [Online]. Available: http://scholars.indstate.edu/handle/10484/5214 (accessed 8 May 2018)

The Beverage Association of South Africa (BevSA). 2016. [Online] Available: http://www.bevsa.co.za/wp-content/uploads/2016/08/22082016-BEVSA-SSB-Tax-Comments-FINAL.pdf (accessed: 14 January 2018)

The Centers for Disease Control and Prevention. 2010. **The CDC Guide to Strategies for Reducing the Consumption of Sugar-Sweetened Beverages**. March 2010. [Online]. Available: http://dhhs.ne.gov/publichealth/documents/guidance_doc_sugar_sweetened_bev.pd (accessed 13 May 2018)

Theron, M., Amissah A., Kleynhans, I.C., Albertse, E. and MacIntyre, U.E. 2007. "Inadequate dietary intake is not the cause of stunting amongst young children living in an informal settlement in Gauteng and rural Limpopo Province in South Africa: The

NutriGro study", **Public Health Nutr**, Volume 10, Issue 4, April 2007, Pages 379–389. [Online]. Available: 10.1017/S1368980007246579 (accessed: 4 June 2018)

Theron, N., Rossouw, R. and Fourie, H. 2016. "Economy-wide implications of the proposed tax on sugar sweetened beverages (SSBs)", **Econex competition and applied economics**, Research Note 42:4. [Online]. Available: https://econex.co.za/wp-content/uploads/2017/01/ECONEX_researchnote_42.pdf
(accessed: 28 December 2017)

Tiffin, R. and Arnoult, M. 2011. "The public health impacts of a fat tax", **European Journal of Clinical Nutrition**, Volume 65, Pages 427 – 433, 19 January 2011. [Online]. Available: http://www.nature.com/articles/ejcn2010281 (accessed: 14 June 2018)

Timpson, H., Lavin, R and Hughes, L. 2015. "Exploring the Acceptability of a Tax on Sugar-Sweetened Beverages Insight Work Summary of Findings. [Online]. Available: http://www.foodactive.org.uk/wp-content/uploads/2015/02/SSB-Insight_Summary-of-Findings.pdf (accessed: 16 February 2018)

Trujillo, A. 2015. **An excise tax on sugar-sweetened drinks as health policy: can taxation influence weight?** Sacramento: California State University. [Online]. Available: http://www.csus.edu/ppa/thesis-project/bank/2015/trujillo.pdf (accessed: 31 December 2017)

Tugendhaft, A., Manyema, M., Veerman, L.J., Chola, L., Labadoarios, D. and Hofman, K.J., 2016. "Cost of inaction on sugar-sweetened beverage consumption: implications for obesity in South Africa", **Public Health Nutrition**, Vol. 19, Issue 13, Pages 2296 – 2304, September 2016. [Online]. Available: https://www.ncbi.nlm.nih.gov/pubmed/26494269 (accessed: 1 March 2018)

Urbach, J. 2016. Biznews. [Online] Available: https://www.biznews.com/sa-investing/2016/10/11/countries-that-taxed-calories-why-it-was-abolished-in-some-increased-revenue-in-others/ (accessed: 10 January 2018)

van der Horst, K., Kremers, S., Ferreira, I., Singh, A., Oenema, A. and Brug, J. 2007. "Perceived parenting style and practices and the consumption of sugar-sweetened beverages by adolescents." **Health Educ Research**. Volume 22, Issue 2, April 2007, Pages 295–304. [Online]. Available: https://doi.org/10.1093/her/cyl080 (accessed: 16 May 2018)

Vanderlee L., Manske S., Murnaghan D., Hanning R. and Hammond D. 2014. "Sugar-sweetened beverage consumption among a subset of Canadian youth". **Journal of School Health**, Volume 1, Issue: 84(3), March 2014, Pages 168–176. [Online]. Available: https://cshr.discoveryspace.ca/sites/default/files/josh12139_Vanderlee.pdf (accessed: 16 May 2018)

Veerman, J.L., Sacks, G., Antonopoulos, N. and Martin, J. 2016. "The Impact of a Tax on Sugar-Sweetened Beverages on Health and Health Care Costs: A Modelling Study", **PLoS One**, Volume 11, Issue 4, e0151460, 13 April 2016. [Online]. Available: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0151460 (accessed: 24 March 2018)

Wang, Y.C. 2010. **The Potential Impact of Sugar-Sweetened Beverage Taxes in New York State**. A Report to the NYC Department of Health and Mental Hygiene. [Online]. Available: http://www.columbia.edu/~ycw2102/SSB%20tax%20brief%20Wang%202010%2006%2021%20_Final_.pdf (accessed: 16 June 2018).

Wang, Y., and Beydoun, M. 2007. "The Obesity Epidemic in the United States- Gender, Age, Socioeconomic, Racial/Ethnic, and Geographic Characteristics: A Systematic Review and Meta-Regression Analysis", **Epidemiologic Reviews**, Vol 29:8. [Online]. Available: https://doi.org/10.1093/epirev/mxm007 (accessed: 5 January 2018)

Waterlander, W.E., de Mul, A., Schuit, A.J., Seidell, J.C. and Steenhuis, I.H.M. 2010. **"**Perceptions on the use of pricing strategies to stimulate healthy eating among residents of deprived neighbourhoods: a focus group study". **International Journal of Behavioural Nutrition and Physical Activity**, Volume 7, Issue 44, 19 May 2010. [Online]. Available: https://doi.org/10.1186/1479-5868-7-44 (accessed: 7 June 2018)

Welle, P.D. and Graf, H.M. 2011. “Effective Lifestyle Habits and Coping Strategies for Stress Tolerance among College Students”. **American Journal of Health Education**, Volume 42, Issue 2, 23 January 2013, Pages 96-105. [Online]. Available: https://doi.org/10.1080/19325037.2011.10599177 (accessed: 16 May 2018)

West D.S., Bursac, Z., Quimby, D., Prewitt, T.E., Spatz, T., Nash, C., Mays, G. and Eddings K. “Self-reported sugar-sweetened beverage intake among college students”. **Obesity**. 2006, Volume 14, Issue 10, Pages 1825–1831. [Online]. Available: https://www.ncbi.nlm.nih.gov/pubmed/17062813 (accessed: 28 April 2018)

Wiecha, J.L., Finkelstein, D., Troped, P.J., Fragala, M., and Peterson, K.E. 2006. “School Vending Machine Use and Fast-Food Restaurant Use Are Associated with Sugar-Sweetened Beverage Intake in Youth”. **Journal of the American Dietetic Association**, Volume 106, Issue 10, October 2006, Pages 1624 – 1630. [Online]. Available: https://www.ncbi.nlm.nih.gov/pubmed/17000195 (accessed: 16 May 2018)

World Health Organisation. 2015. **WHO calls on countries to reduce sugars intake among adults and children.** 4 March 2015. [Online]. Available: http://www.who.int/mediacentre/news/releases/2015/sugar-guideline/en/ (accessed: 30 December 2017)

Yang C.C. and Chiou W.B. 2010. “Substitution of healthy for unhealthy beverages among college students. A health-concerns and behavioral-economics perspective”. **Appetite**, Volume 54, Issue 3, June 2010, Pages 512-516. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0195666310000462 (accessed: 23 May 2018)

ADDENDUM A:

The significant results of statistical tests for each of the six independent variables tested in respect of questions numbered 12 to 19 (Habits)

1. Gender

Table A 1: Average consumption of sugar-sweetened beverages, by gender

Q12: Average consumption of sugar-sweetened beverages per week						
Gender	**Mean**	**95% CL**	**Mean**	**Std Dev**	**95% CL**	**Std Dev**
Male	3.2692	2.5530	3.9855	4.1274	3.6793	4.7007
Female	2.3488	1.9950	2.7027	2.3509	2.1260	2.6295
Diff (1-2)	0.9204	0.1802	1.6606	3.2366	2.9970	3.5181
Method	**Variances**	**DF**	**T Value**	**Pr> [t]**		
Satterthwaite	Unequal	191.34	2.28	0.0238		

Source: Own design

Table A 2: Non-consumption of sugar-sweetened beverages due to a medical condition, by gender

Q13: Non-consumption of sugar-sweetened beverages due to a medical condition				
		Male	Female	Total
Yes	Frequency	2	2	4
No	Frequency	10	24	34
Total	Frequency	12	26	38

Frequency missing = 265

Source: Own design

Table A 3: Consumption of sugar-sweetened beverages when under stress, by gender

Q14: Consumption of sugar-sweetened beverages when under stress				
		Male	Female	Total
Yes	Frequency	17	51	68
No	Frequency	87	63	150
Occasionally	Frequency	14	32	46
Total	Frequency	118	146	264

Frequency missing = 39			
Statistic	**DF**	**Value**	**Probability**
Chi-square	2	25.1972	<.0001

Source: Own design

Table A 4: The desire to reduce consumption of sugar-sweetened beverages, by gender

Q15: The desire to reduce consumption of sugar-sweetened beverages				
		Male	Female	Total
Yes	Frequency	47	83	130
No	Frequency	71	63	134
Total	Frequency	118	146	264

Frequency missing = 38			
Statistic	**DF**	**Value**	**Probability**
Chi-square	1	7.5622	0.0060

Source: Own design

Table A 5: Consumption of water, by gender

Q16: Average consumption of water				
		Male	Female	Total
Never	Frequency	3	1	4
1-2 glasses a day	Frequency	24	29	53
3-4 glasses a day	Frequency	48	53	101
5-6 glasses a day	Frequency	22	55	77
7 or more glasses a day	Frequency	33	34	67
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	10.2339	0.0367

Source: Own design

Table A 6: Consumption of milk, by gender

Q17: Average consumption of milk				
		Male	Female	Total
Never	Frequency	64	88	152
1-2 glasses a day	Frequency	52	78	130
3 or more glasses a day	Frequency	14	6	20
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	2	6.4736	0.0393

Source: Own design

2. Race:

Table A 7: Average consumption of sugar-sweetened beverages, by race

Q12: Average consumption of sugar-sweetened beverages per week					
Source	DF	Sum of squares	Mean square	F Value	Pr>F
Model	5	159.400242	31.880048	3.11	0.0095
Error	297	3046.520550	10.257645		
Corrected Total	302	3205.920792			

Source: Own design

Table A 8: Consumption of sugar-sweetened beverages when under stress, by race

Q14: Consumption of sugar-sweetened beverages when under stress					
		Yes	No	Occasionally	Total
Black African	Frequency	44	87	38	169
Coloured	Frequency	1	0	0	1
Indian	Frequency	22	51	8	81
White	Frequency	0	8	0	8
Other	Frequency	0	2	0	2
Prefer not to answer	Frequency	1	3	0	4
Total	Frequency	68	151	46	265

Frequency missing = 38			
Statistic	**DF**	**Value**	**Probability**
Chi-square	10	18.0275	0.0545

Source: Own design

Table A 9: The desire to reduce consumption of sugar-sweetened beverages, by race

Q15: The desire to reduce consumption of sugar-sweetened beverages				
		Yes	No	Total
Black African	Frequency	97	72	169
Coloured	Frequency	1	0	1
Indian	Frequency	31	50	81
White	Frequency	0	8	8
Other	Frequency	2	0	2
Prefer not to answer	Frequency	0	4	4
Total	Frequency	131	134	265

Frequency missing = 38			
Statistic	**DF**	**Value**	**Probability**
Chi-square	5	23.1240	0.0003

Source: Own design

Table A 10: Consumption of water, by race

Q16: Average consumption of water							
		Never	1-2 glasses a day	3-4 glasses a day	5-6 glasses a day	7 or more glasses a day	Total
Black African	Frequency	1	35	74	44	41	195
Coloured	Frequency	0	0	0	1	0	1
Indian	Frequency	0	15	22	31	24	92
White	Frequency	0	2	5	0	2	9
Other	Frequency	0	1	0	1	0	2
Prefer not to answer	Frequency	3	1	0	0	0	4
Total	Frequency	4	54	101	77	67	303

Statistic	DF	Value	Probability
Chi-square	20	187.2467	<.0001

Source: Own design

Table A 11: Consumption of milk, by race

Q17: Average consumption of milk					
		Never	1-2 glasses a day	3 or more glasses a day	Total
Black African	Frequency	106	84	5	195
Coloured	Frequency	1	0	0	1
Indian	Frequency	38	39	15	92
White	Frequency	7	2	0	9
Other	Frequency	1	1	0	2
Prefer not to answer	Frequency	0	4	0	4
Total	Frequency	153	130	20	303

Statistic	DF	Value	Probability
Chi-square	10	29.3375	0.0011

Source: Own design

Table A 12: Consumption of sugar-sweetened beverages during childhood, by race

Q18: Childhood consumption of sugar-sweetened beverages						
		Never	Daily	Weekly	On special occasions	Total
Black African	Frequency	9	59	39	88	195
Coloured	Frequency	0	0	1	0	1
Indian	Frequency	6	22	49	15	92
White	Frequency	1	6	1	1	9
Other	Frequency	0	1	1	0	2
Prefer not to answer	Frequency	0	3	0	1	4
Total	Frequency	16	91	91	105	303

Statistic	**DF**	**Value**	**Probability**
Chi-square	15	54.7444	<.0001

Source: Own design

3. Level of income:

Table A 13: Consumption of sugar-sweetened beverages when under stress, by level of income

Q14: Consumption of sugar-sweetened beverages when under stress					
		Yes	No	Occasionally	Total
No	Frequency	52	94	34	180
Part time/Casual work	Frequency	10	53	12	75
Full time	Frequency	6	4	0	10
Total	Frequency	68	151	46	265

Frequency missing = 38			
Statistic	**DF**	**Value**	**Probability**
Chi-square	4	15.5131	0.0037

Source: Own design

Table A 14: Consumption of water, by level of income

Q16: Average consumption of water							
		Never	1-2 glasses a day	3-4 glasses a day	5-6 glasses a day	7 or more glasses a day	Total
No	Frequency	3	38	68	57	44	210
Part time/Casual work	Frequency	1	10	30	19	23	83
Full time	Frequency	0	6	3	1	0	10
Total	Frequency	4	54	101	77	67	303

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	16.8951	0.0312

Source: Own design

Table A 15: Consumption of milk, by level of income

Q17: Average consumption of milk					
		Never	1-2 glasses a day	3 or more glasses a day	Total
No	Frequency	115	86	9	210
Part time/Casual work	Frequency	37	35	11	83
Full time	Frequency	1	9	0	10
Total	Frequency	153	130	20	303

Statistic	DF	Value	Probability
Chi-square	4	17.8765	0.0013

Source: Own design

4. Type of residence:

Table A 16: Average consumption of sugar-sweetened beverages, by type of residence

Q12: Average consumption of sugar-sweetened beverages per week					
Source	DF	Sum of squares	Mean square	F Value	Pr>F
Model	2	139.530899	69.765449	6.80	0.0013
Error	299	3065.836651	10.253634		
Corrected Total	301	3205.367550			

Source: Own design

Table A 17: The desire to reduce consumption of sugar-sweetened beverages, by type of residence

Q15: The desire to reduce consumption of sugar-sweetened beverages					
		Home	Campus Residence	Digs	Total
Yes	Frequency	42	86	2	130
No	Frequency	64	63	7	134
Total	Frequency	106	149	9	264

Frequency missing = 38

Statistic	DF	Value	Probability
Chi-square	2	10.8360	0.0044

Source: Own design

Table A 18: Consumption of water, by type of residence

Q16: Average consumption of water					
		Home	Campus Residence	Digs	Total
Never	Frequency	3	1	0	4
1-2 glasses a day	Frequency	18	35	1	54
3-4 glasses a day	Frequency	28	64	8	100
5-6 glasses a day	Frequency	36	39	2	77
7 or more glasses a day	Frequency	33	33	1	67
Total	Frequency	118	172	12	302

Frequency missing = 1			
Statistic	**DF**	**Value**	**Probability**
Chi-square	8	17.5197	0.0251

Source: Own design

Table A 19: Consumption of milk, by type of residence

Q17: Average consumption of milk					
		Home	Campus Residence	Digs	Total
Never	Frequency	53	94	6	153
1-2 glasses a day	Frequency	50	73	6	129
3 or more glasses a day	Frequency	15	5	0	20
Total	Frequency	118	172	12	302

Frequency missing = 1			
Statistic	**DF**	**Value**	**Probability**
Chi-square	4	12.4530	0.0143

Source: Own design

ADDENDUM B:

The significant results of statistical tests for each of the six independent variables tested in respect of the Likert Scale questions numbered 20 to 34 (Perception of the Sugar-sweetened Beverage Tax and the Price of sugar-sweetened beverages)

1. Gender

Table B 1: Beneficial health impact of sugary beverages levy, by gender

Q21: The sugary beverages levy will be beneficial to my health				
		Male	Female	Total
Strongly disagree	Frequency	15	42	57
Disagree	Frequency	26	24	50
Undecided	Frequency	52	39	91
Agree	Frequency	26	44	70
Strongly agree	Frequency	11	23	34
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	18.0995	0.0012

Source: Own design

Table B 2: Imposition of a tax on sugar-sweetened beverages, by gender

Q22: A tax should be levied on sugar-sweetened beverages				
		Male	Female	Total
Strongly disagree	Frequency	32	21	53
Disagree	Frequency	21	23	44
Undecided	Frequency	32	51	83
Agree	Frequency	26	49	75
Strongly agree	Frequency	19	28	47
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	9.8495	0.0430

Source: Own design

Table B 3: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich, by gender

Q26: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich				
		Male	Female	Total
Strongly disagree	Frequency	6	6	12
Disagree	Frequency	17	16	33
Undecided	Frequency	32	41	73
Agree	Frequency	42	34	76
Strongly agree	Frequency	33	75	108
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	12.7203	0.0127

Source: Own design

Table B 4: Having a tax on sugar-sweetened beverages will improve the health of the population, by gender

Q27: Having a tax on sugar-sweetened beverages will improve the health of the population				
		Male	Female	Total
Strongly disagree	Frequency	7	21	28
Disagree	Frequency	18	41	59
Undecided	Frequency	31	52	83
Agree	Frequency	41	33	74
Strongly agree	Frequency	33	25	58
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	17.7499	0.0014

Source: Own design

Table B 5: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages, by gender

Q28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages				
		Male	Female	Total
Strongly disagree	Frequency	19	36	55
Disagree	Frequency	46	36	82
Undecided	Frequency	26	32	58
Agree	Frequency	14	44	58
Strongly agree	Frequency	25	24	49
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	17.1225	0.0018

Source: Own design

Table B 6: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products, by gender

Q30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products				
		Male	Female	Total
Strongly disagree	Frequency	9	31	40
Disagree	Frequency	33	42	75
Undecided	Frequency	24	30	54
Agree	Frequency	54	47	101
Strongly agree	Frequency	10	22	32
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	13.2470	0.0101

Source: Own design

Table B 7: I have developed a habit of drinking these beverages, by gender

Q33: I have developed a habit of drinking these beverages				
		Male	Female	Total
Strongly disagree	Frequency	20	38	58
Disagree	Frequency	46	55	101
Undecided	Frequency	23	25	48
Agree	Frequency	25	49	74
Strongly agree	Frequency	16	5	21
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	14.4557	0.0060

Source: Own design

Table B 8: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages, by gender

Q34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages				
		Male	Female	Total
Strongly disagree	Frequency	7	24	31
Disagree	Frequency	13	17	30
Undecided	Frequency	31	19	50
Agree	Frequency	36	55	91
Strongly agree	Frequency	43	57	100
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	13.0748	0.0109

Source: Own design

2. Age

Table B 9: Understanding of the sugary beverages levy, by age

Q20: I understand the sugary beverages levy					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	20	5	1	26
Disagree	Frequency	24	1	0	25
Undecided	Frequency	62	7	1	70
Agree	Frequency	130	7	1	138
Strongly agree	Frequency	44	0	0	44
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	15.3606	0.0525

Source: Own design

Table B 10: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system, by age

Q23: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	20	0	0	20
Disagree	Frequency	18	1	2	21
Undecided	Frequency	59	2	1	62
Agree	Frequency	72	3	0	75
Strongly agree	Frequency	111	14	0	125
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	25.6974	0.0012

Source: Own design

Table B 11: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease, by age

Q24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	18	1	0	19
Disagree	Frequency	14	1	1	16
Undecided	Frequency	54	1	1	56
Agree	Frequency	87	2	0	89
Strongly agree	Frequency	107	15	1	123
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	17.1627	0.0285

Source: Own design

Table B 12: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich, by age

Q26: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	11	0	1	12
Disagree	Frequency	30	2	1	33
Undecided	Frequency	71	1	1	73
Agree	Frequency	72	4	0	76
Strongly agree	Frequency	96	13	0	109
Total	Frequency	280	20	3	303

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	19.0446	0.0146

Source: Own design

Table B 13: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages, by age

Q28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	51	4	0	55
Disagree	Frequency	81	0	1	82
Undecided	Frequency	53	5	0	58
Agree	Frequency	53	4	2	59
Strongly agree	Frequency	42	7	0	49
Total	Frequency	280	20	3	303

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	15.9227	0.0435

Source: Own design

Table B 14: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages, by age

Q29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	38	2	1	41
Disagree	Frequency	100	1	1	102
Undecided	Frequency	62	3	1	66
Agree	Frequency	57	9	0	66
Strongly agree	Frequency	23	5	0	28
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	18.7437	0.0163

Source: Own design

Table B 15: I have developed a habit of drinking these beverages, by age

Q33: I have developed a habit of drinking these beverages					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	49	8	1	58
Disagree	Frequency	97	4	0	101
Undecided	Frequency	47	0	1	48
Agree	Frequency	67	7	0	74
Strongly agree	Frequency	20	1	1	22
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	16.0034	0.0423

Source: Own design

Table B 16: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages, by age

Q34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	28	2	1	31
Disagree	Frequency	30	0	0	30
Undecided	Frequency	48	0	2	50
Agree	Frequency	86	5	0	91
Strongly agree	Frequency	88	13	0	101
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	20.4245	0.0088

Source: Own design

3. Race

Table B 17: Understanding of the sugary beverages levy, by race

Q20: I understand the sugary beverages levy							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	23	22	59	67	24	195
Coloured	Frequency	0	1	0	0	0	1
Indian	Frequency	3	2	11	62	14	92
White	Frequency	0	0	0	7	2	9
Other	Frequency	0	0	0	1	1	2
Prefer not to answer	Frequency	0	0	0	1	3	4
Total	Frequency	26	25	70	138	44	303

Statistic	DF	Value	Probability
Chi-square	20	68.3441	<.0001

Source: Own design

Table B 18: Beneficial health impact of sugary beverages levy, by race

Q21: The sugary beverages levy will be beneficial to my health							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	35	33	50	48	29	195
Coloured	Frequency	0	1	0	0	0	1
Indian	Frequency	13	16	37	21	5	92
White	Frequency	9	0	0	0	0	9
Other	Frequency	0	0	1	1	0	2
Prefer not to answer	Frequency	0	0	4	0	0	4
Total	Frequency	57	50	92	70	34	303

Statistic	DF	Value	Probability
Chi-square	20	65.7330	<.0001

Source: Own design

Table B 19: Imposition of a tax on sugar-sweetened beverages, by race

Q22: A tax should be levied on sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	37	32	45	43	38	195
Coloured	Frequency	0	0	0	1	0	1
Indian	Frequency	11	12	31	30	8	92
White	Frequency	2	0	7	0	0	9
Other	Frequency	0	0	0	1	1	2
Prefer not to answer	Frequency	3	0	0	1	0	4
Total	Frequency	53	44	83	76	47	303

Statistic	DF	Value	Probability
Chi-square	20	42.1484	0.0026

Source: Own design

Table B 20: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system, by race

Q23: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	17	18	30	48	82	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	2	1	31	24	34	92
White	Frequency	1	2	0	0	6	9
Other	Frequency	0	0	0	0	2	2
Prefer not to answer	Frequency	0	0	1	3	0	4
Total	Frequency	20	21	62	75	125	303

Statistic	DF	Value	Probability
Chi-square	20	40.2934	0.0046

Source: Own design

Table B 21: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease, by race

Q24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	18	13	31	56	77	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	0	2	25	27	38	92
White	Frequency	1	0	0	6	2	9
Other	Frequency	0	0	0	0	2	2
Prefer not to answer	Frequency	0	1	0	0	3	4
Total	Frequency	19	16	56	89	123	303

Statistic	DF	Value	Probability
Chi-square	20	33.6013	0.0290

Source: Own design

Table B 22: Table B22: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich, by race

Q26: A tax on sugar-sweetened beverages would be unfair because poor people would still pay the same amount as the rich							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	10	21	40	40	84	195
Coloured	Frequency	0	0	1	0	0	1
Indian	Frequency	2	7	25	35	23	92
White	Frequency	0	5	3	0	1	9
Other	Frequency	0	0	0	1	1	2
Prefer not to answer	Frequency	0	0	4	0	0	4
Total	Frequency	12	33	73	76	109	303

Statistic	DF	Value	Probability
Chi-square	20	55.4265	<.0001

Source: Own design

Table B 23: Having a tax on sugar-sweetened beverages will improve the health of the population, by race

Q27: Having a tax on sugar-sweetened beverages will improve the health of the population							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	27	38	40	45	45	195
Coloured	Frequency	0	0	0	1	0	1
Indian	Frequency	0	15	38	26	13	92
White	Frequency	1	3	5	0	0	9
Other	Frequency	1	0	0	1	0	2
Prefer not to answer	Frequency	0	3	0	1	0	4
Total	Frequency	29	59	83	74	58	303

Statistic	DF	Value	Probability
Chi-square	20	50.7385	0.0002

Source: Own design

Table B 24: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages, by race

Q28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	46	44	44	32	29	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	2	35	14	24	17	92
White	Frequency	6	0	0	2	1	9
Other	Frequency	0	0	0	1	1	2
Prefer not to answer	Frequency	1	3	0	0	0	4
Total	Frequency	55	82	58	59	49	303

Statistic	DF	Value	Probability
Chi-square	20	57.6596	<.0001

Source: Own design

Table B 25: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages, by race

Q29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	36	49	46	42	22	195
Coloured	Frequency	0	1	0	0	0	1
Indian	Frequency	0	45	19	23	5	92
White	Frequency	1	7	0	0	1	9
Other	Frequency	1	0	1	0	0	2
Prefer not to answer	Frequency	3	0	0	1	0	4
Total	Frequency	41	102	66	66	28	303

Statistic	DF	Value	Probability
Chi-square	20	58.5712	<.0001

Source: Own design

Table B 26: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products, by race

Q30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	32	41	44	51	27	195
Coloured	Frequency	0	0	0	1	0	1
Indian	Frequency	6	33	6	43	4	92
White	Frequency	2	0	1	5	1	9
Other	Frequency	0	1	0	0	1	2
Prefer not to answer	Frequency	0	0	3	1	0	4
Total	Frequency	40	75	54	101	33	303

Statistic	DF	Value	Probability
Chi-square	20	52.8558	<.0001

Source: Own design

Table B 27: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%, by race

Q31: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	27	23	36	50	59	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	6	3	27	38	18	92
White	Frequency	1	5	0	1	2	9
Other	Frequency	0	0	1	0	1	2
Prefer not to answer	Frequency	0	0	1	3	0	4
Total	Frequency	34	31	65	92	81	303

Statistic	**DF**	**Value**	**Probability**
Chi-square	20	49.7494	0.0002

Source: Own design

Table B 28: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%, by race

Q32: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	26	35	57	43	34	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	0	14	41	25	12	92
White	Frequency	1	6	0	1	1	9
Other	Frequency	1	0	0	1	0	2
Prefer not to answer	Frequency	0	3	0	1	0	4
Total	Frequency	28	58	98	71	48	303

Statistic	**DF**	**Value**	**Probability**
Chi-square	20	53.1828	<.0001

Source: Own design

Table B 29: I have developed a habit of drinking these beverages, by race

Q33: I have developed a habit of drinking these beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	49	57	28	52	9	195
Coloured	Frequency	0	0	1	0	0	1
Indian	Frequency	7	34	18	21	12	92
White	Frequency	2	5	1	1	0	9
Other	Frequency	0	1	0	0	1	2
Prefer not to answer	Frequency	0	4	0	0	0	4
Total	Frequency	58	101	48	74	22	303

Statistic	DF	Value	Probability
Chi-square	20	41.5914	0.0031

Source: Own design

Table B 30: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages, by race

Q34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	23	26	28	59	59	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	7	3	21	23	38	92
White	Frequency	1	0	1	6	1	9
Other	Frequency	0	0	0	0	2	2
Prefer not to answer	Frequency	0	1	0	3	0	4
Total	Frequency	31	30	50	91	101	303

Statistic	DF	Value	Probability
Chi-square	20	31.7890	0.0456

Source: Own design

4. Level of income

Table B 31: Understanding of the sugary beverages levy, by level of income

Q20: I understand the sugary beverages levy							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	21	18	50	93	28	210
Part time/Casual work	Frequency	5	1	20	43	14	83
Full time	Frequency	0	6	0	2	2	10
Total	Frequency	26	25	70	138	44	303

Statistic	DF	Value	Probability
Chi-square	8	44.7979	<.0001

Source: Own design

Table B 32: Beneficial health impact of sugary beverages levy, by level of income

Q21: The sugary beverages levy will be beneficial to my health							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	40	27	70	50	23	210
Part time/Casual work	Frequency	16	17	21	19	10	83
Full time	Frequency	1	6	1	1	1	10
Total	Frequency	57	50	92	70	34	303

Statistic	DF	Value	Probability
Chi-square	8	17.9257	0.0218

Source: Own design

Table B 33: Imposition of a tax on sugar-sweetened beverages, by level of income

Q22: A tax should be levied on sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	38	26	68	45	33	210
Part time/Casual work	Frequency	15	11	15	30	12	83
Full time	Frequency	0	7	0	1	2	10
Total	Frequency	53	44	83	76	47	303

Statistic	DF	Value	Probability
Chi-square	8	37.3067	<.0001

Source: Own design

Table B 34: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system, by level of income

Q23: A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	17	10	43	43	97	210
Part time/Casual work	Frequency	2	11	13	31	26	83
Full time	Frequency	1	0	6	1	2	10
Total	Frequency	20	21	62	75	125	303

Statistic	DF	Value	Probability
Chi-square	8	30.6441	0.0002

Source: Own design

Table B 35: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease, by level of income

Q24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	13	10	48	57	82	210
Part time/Casual work	Frequency	6	5	8	23	41	83
Full time	Frequency	0	1	0	9	0	10
Total	Frequency	19	16	56	89	123	303

Statistic	DF	Value	Probability
Chi-square	8	27.6169	0.0006

Source: Own design

Table B 36: Having a tax on sugar-sweetened beverages will improve the health of the population, by level of income

Q27: Having a tax on sugar-sweetened beverages will improve the health of the population							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	12	30	68	62	38	210
Part time/Casual work	Frequency	16	22	15	11	19	83
Full time	Frequency	1	7	0	1	1	10
Total	Frequency	29	59	83	74	58	303

Statistic	DF	Value	Probability
Chi-square	8	45.3315	<.0001

Source: Own design

Table B 37: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages, by level of income

Q28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	31	62	37	48	32	210
Part time/Casual work	Frequency	17	19	20	10	17	83
Full time	Frequency	7	1	1	1	0	10
Total	Frequency	55	82	58	59	49	303

Statistic	DF	Value	Probability
Chi-square	8	26.9519	0.0007

Source: Own design

Table B 38: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages, by level of income

Q29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	23	80	43	40	24	210
Part time/Casual work	Frequency	15	17	23	25	3	83
Full time	Frequency	3	5	0	1	1	10
Total	Frequency	41	102	66	66	28	303

Statistic	DF	Value	Probability
Chi-square	8	22.2302	0.0045

Source: Own design

Table B 39: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products, by level of income

Q30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	32	52	35	68	23	210
Part time/Casual work	Frequency	8	15	19	32	9	83
Full time	Frequency	0	8	0	1	1	10
Total	Frequency	40	75	54	101	33	303

Statistic	DF	Value	Probability
Chi-square	8	22.1195	0.0047

Source: Own design

Table B 40: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%, by level of income

Q31: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	29	23	43	68	47	210
Part time/Casual work	Frequency	5	8	20	17	33	83
Full time	Frequency	0	0	2	7	1	10
Total	Frequency	34	31	65	92	81	303

Statistic	DF	Value	Probability
Chi-square	8	21.8341	0.0052

Source: Own design

Table B 41: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%, by level of income

Q32: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	18	41	66	56	29	210
Part time/Casual work	Frequency	10	9	32	14	18	83
Full time	Frequency	0	8	0	1	1	10
Total	Frequency	28	58	98	71	48	303

Statistic	DF	Value	Probability
Chi-square	8	34.1500	<.0001

Source: Own design

Table B 42: I have developed a habit of drinking these beverages, by level of income

Q33: I have developed a habit of drinking these beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	37	80	37	47	9	210
Part time/Casual work	Frequency	21	19	11	20	12	83
Full time	Frequency	0	2	0	7	1	10
Total	Frequency	58	101	48	74	22	303

Statistic	DF	Value	Probability
Chi-square	8	28.2966	0.0004

Source: Own design

Table B 43: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages, by level of income

Q34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	23	13	35	68	71	210
Part time/Casual work	Frequency	8	14	15	17	29	83
Full time	Frequency	0	3	0	6	1	10
Total	Frequency	31	30	50	91	101	303

Statistic	DF	Value	Probability
Chi-square	8	21.6133	0.0057

Source: Own design

5. Type of Residence

Table B 44: : Understanding of the sugary beverages levy, by type of residence

Q20: I understand the sugary beverages levy					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	4	22	0	26
Disagree	Frequency	2	21	2	25
Undecided	Frequency	14	51	5	70
Agree	Frequency	73	59	5	137
Strongly agree	Frequency	25	19	0	44
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	48.5813	<.0001

Source: Own design

Table B 45: Beneficial health impact of sugary beverages levy, by type of residence

Q21: The sugary beverages levy will be beneficial to my health					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	26	31	0	57
Disagree	Frequency	16	34	0	50
Undecided	Frequency	43	42	6	91
Agree	Frequency	26	41	3	70
Strongly agree	Frequency	7	24	3	34
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	17.8589	0.0223

Source: Own design

Table B 46: Imposition of a tax on sugar-sweetened beverages, by type of residence

Q22: A tax should be levied on sugar-sweetened beverages					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	16	37	0	53
Disagree	Frequency	14	26	4	44
Undecided	Frequency	38	40	5	83
Agree	Frequency	38	36	1	75
Strongly agree	Frequency	12	33	2	47
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	19.8135	0.0111

Source: Own design

Table B 47: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease, by type of residence

Q24: A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	1	18	0	19
Disagree	Frequency	2	13	1	16
Undecided	Frequency	26	28	2	56
Agree	Frequency	36	47	5	88
Strongly agree	Frequency	53	66	4	123
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	18.9280	0.0152

Source: Own design

Table B 48: Having a tax on sugar-sweetened beverages will improve the health of the population, by type of residence

Q27: Having a tax on sugar-sweetened beverages will improve the health of the population					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	6	22	1	29
Disagree	Frequency	20	36	2	58
Undecided	Frequency	48	32	3	83
Agree	Frequency	30	42	2	74
Strongly agree	Frequency	14	40	4	58
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	23.7732	0.0025

Source: Own design

Table B 49: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages, by type of residence

Q28: Clear labelling of sugar content makes people less likely to buy sugar-sweetened beverages					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	8	46	1	55
Disagree	Frequency	43	33	5	81
Undecided	Frequency	18	37	3	58
Agree	Frequency	28	29	2	59
Strongly agree	Frequency	21	27	1	49
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	28.8398	0.0003

Source: Own design

Table B 50: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages, by type of residence

Q29: The reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	5	35	1	41
Disagree	Frequency	54	43	4	101
Undecided	Frequency	25	38	3	66
Agree	Frequency	26	36	4	66
Strongly agree	Frequency	8	20	0	28
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	26.4643	0.0009

Source: Own design

Table B 51: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products, by type of residence

Q30: Advertising and marketing of sugar-sweetened beverages makes people want to buy these products					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	12	28	0	40
Disagree	Frequency	34	37	4	75
Undecided	Frequency	16	36	2	54
Agree	Frequency	50	46	4	100
Strongly agree	Frequency	6	25	2	33
Total	Frequency	118	172	12	302

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	18.8896	0.0155

Source: Own design

Table B 52: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%, by type of residence

Q31: Fewer sugar-sweetened beverages would be purchased if the price went up by 20%					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	9	23	2	34
Disagree	Frequency	8	22	1	31
Undecided	Frequency	31	30	4	65
Agree	Frequency	47	42	3	92
Strongly agree	Frequency	23	55	2	80
Total	Frequency	118	172	12	302

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	18.3830	0.0185

Source: Own design

Table B 53: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%, by type of residence

Q32: I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	4	23	1	28
Disagree	Frequency	22	33	3	58
Undecided	Frequency	50	43	4	97
Agree	Frequency	27	42	2	71
Strongly agree	Frequency	15	31	2	48
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	15.9112	0.0437

Source: Own design

Table B 54: I have developed a habit of drinking these beverages, by type of residence

Q33: I have developed a habit of drinking these beverages					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	13	41	4	58
Disagree	Frequency	48	50	3	101
Undecided	Frequency	22	23	2	47
Agree	Frequency	21	51	2	74
Strongly agree	Frequency	14	7	1	22
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	21.8170	0.0053

Source: Own design

Table B 55: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages, by type of residence

Q34: I could develop a habit of drinking healthier beverages if they are cheaper than sugar-sweetened beverages					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	8	20	3	31
Disagree	Frequency	4	25	1	30
Undecided	Frequency	23	25	2	50
Agree	Frequency	35	54	2	91
Strongly agree	Frequency	48	48	4	100
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	18.3371	0.0188

Source: Own design

ADDENDUM C:

The significant results of statistical tests for each of the six independent variables tested in respect of the Likert Scale questions numbered 35 to 45 (Social Impact)

1. Gender

Table C 1: Childhood obesity is a problem for society, by gender

Q35: Childhood obesity is a problem for society				
		Male	Female	Total
Strongly disagree	Frequency	0	6	6
Disagree	Frequency	7	6	13
Undecided	Frequency	16	8	24
Agree	Frequency	34	79	113
Strongly agree	Frequency	73	73	146
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	21.2336	0.0003

Source: Own design

Table C 2: Childhood obesity is a serious problem, by gender

Q36: Childhood obesity is a serious problem				
		Male	Female	Total
Disagree	Frequency	8	8	16
Undecided	Frequency	20	14	34
Agree	Frequency	24	73	97
Strongly agree	Frequency	78	77	155
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	3	20.3708	0.0001

Source: Own design

Table C 3: Prominent calorie labels should be placed on sugar-sweetened beverages, by gender

Q44: Prominent calorie labels should be placed on sugar-sweetened beverages				
		Male	Female	Total
Strongly disagree	Frequency	0	1	1
Disagree	Frequency	12	4	16
Undecided	Frequency	30	34	64
Agree	Frequency	49	85	134
Strongly agree	Frequency	39	48	87
Total	Frequency	130	172	302

Statistic	DF	Value	Probability
Chi-square	4	10.2091	0.0370

Source: Own design

Table C 4: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise, by gender

Q45: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise				
		Male	Female	Total
Strongly disagree	Frequency	3	5	8
Disagree	Frequency	5	18	23
Undecided	Frequency	30	24	54
Agree	Frequency	55	62	117
Strongly agree	Frequency	37	62	99
Total	Frequency	130	171	301

Frequency missing = 1			
Statistic	**DF**	**Value**	**Probability**
Chi-square	4	9.8444	0.0431

Source: Own design

2. Age

Table C 5: The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa, by age

Q37: The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	3	0	1	4
Disagree	Frequency	20	1	0	21
Undecided	Frequency	59	2	0	61
Agree	Frequency	100	5	1	106
Strongly agree	Frequency	98	12	1	111
Total	Frequency	280	20	3	303

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	29.5736	0.0003

Source: Own design

Table C 6: The sugary beverages levy is a practical approach to limiting sugar intake, by age

Q39: The sugary beverages levy is a practical approach to limiting sugar intake					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	23	4	1	28
Disagree	Frequency	64	1	1	66
Undecided	Frequency	64	4	0	68
Agree	Frequency	100	3	1	104
Strongly agree	Frequency	29	8	0	37
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	24.5119	0.0019

Source: Own design

Table C 7: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres, by age

Q40: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres					
		21-25 years	26-30 years	31-35 years	Total
Strongly disagree	Frequency	8	1	0	9
Disagree	Frequency	16	0	2	18
Undecided	Frequency	76	0	0	76
Agree	Frequency	115	7	0	122
Strongly agree	Frequency	65	12	1	78
Total	Frequency	280	20	3	303

Statistic	DF	Value	Probability
Chi-square	8	37.7274	<.0001

Source: Own design

3. Race

Table C 8: The sugary beverages levy will be effective in lowering obesity rates, by race

Q38: The sugary beverages levy will be effective in lowering obesity rates							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	20	37	55	51	32	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	0	14	36	36	6	92
White	Frequency	1	6	2	0	0	9
Other	Frequency	1	0	0	1	0	2
Prefer not to answer	Frequency	0	4	0	0	0	4
Total	Frequency	22	61	93	88	39	303

Statistic	DF	Value	Probability
Chi-square	20	64.5069	<.0001

Source: Own design

Table C 9: The sugary beverages levy is a practical approach to limiting sugar intake, by race

Q39: The sugary beverages levy is a practical approach to limiting sugar intake							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	25	32	38	66	34	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	0	27	27	36	2	92
White	Frequency	2	6	0	1	0	9
Other	Frequency	1	0	0	1	0	2
Prefer not to answer	Frequency	0	1	3	0	0	4
Total	Frequency	28	66	68	104	37	303

Statistic	DF	Value	Probability
Chi-square	20	65.2289	<.0001

Source: Own design

Table C 10: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres, by race

Q40: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	5	11	41	77	61	195
Coloured	Frequency	0	0	0	1	0	1
Indian	Frequency	2	6	34	42	8	92
White	Frequency	2	1	0	1	5	9
Other	Frequency	0	0	0	1	1	2
Prefer not to answer	Frequency	0	0	1	0	3	4
Total	Frequency	9	18	76	122	78	303

Statistic	DF	Value	Probability
Chi-square	20	47.5447	0.0005

Source: Own design

Table C 11: Schools should be prohibited from selling sugar-sweetened beverages on school property, by race

Q41: Schools should be prohibited from selling sugar-sweetened beverages on school property							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	26	40	58	30	41	195
Coloured	Frequency	0	0	0	1	0	1
Indian	Frequency	0	4	24	59	5	92
White	Frequency	1	1	1	6	0	9
Other	Frequency	0	2	0	0	0	2
Prefer not to answer	Frequency	0	3	1	0	0	4
Total	Frequency	27	50	84	96	46	303

Statistic	DF	Value	Probability
Chi-square	20	108.8145	<.0001

Source: Own design

Table C 12: The tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa, by race

Q42: The tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	14	55	48	54	24	195
Coloured	Frequency	0	0	1	0	0	1
Indian	Frequency	1	25	38	27	1	92
White	Frequency	1	1	2	0	5	9
Other	Frequency	1	1	0	0	0	2
Prefer not to answer	Frequency	0	4	0	0	0	4
Total	Frequency	17	86	89	81	30	303

Statistic	DF	Value	Probability
Chi-square	20	62.9955	<.0001

Source: Own design

Table C 13: The tax on sugar-sweetened beverages will result in a loss of jobs, by race

Q43: The tax on sugar-sweetened beverages will result in a loss of jobs							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	8	38	57	57	35	195
Coloured	Frequency	0	0	1	0	0	1
Indian	Frequency	3	10	64	14	1	92
White	Frequency	1	0	2	1	5	9
Other	Frequency	1	0	1	0	0	2
Prefer not to answer	Frequency	0	1	0	3	0	4
Total	Frequency	13	49	125	75	41	303

Statistic	DF	Value	Probability
Chi-square	20	80.7463	<.0001

Source: Own design

Table C 14: Prominent calorie labels should be placed on sugar-sweetened beverages, by race

Q44: Prominent calorie labels should be placed on sugar-sweetened beverages							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
Black African	Frequency	1	11	42	84	57	195
Coloured	Frequency	0	0	0	0	1	1
Indian	Frequency	0	0	21	44	27	92
White	Frequency	0	5	1	1	2	9
Other	Frequency	0	0	0	1	1	2
Prefer not to answer	Frequency	0	0	0	4	0	4
Total	Frequency	1	16	64	134	88	303

Statistic	DF	Value	Probability
Chi-square	20	60.1347	<.0001

Source: Own design

4. Level of income

Table C 15: The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa, by level of income

Q37: The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	3	17	40	64	86	210
Part time/Casual work	Frequency	1	4	19	41	18	83
Full time	Frequency	0	0	2	1	7	10
Total	Frequency	4	21	61	106	111	303

Statistic	DF	Value	Probability
Chi-square	8	19.3367	0.0132

Source: Own design

Table C 16: The sugary beverages levy will be effective in lowering obesity rates, by level of income

Q38: The sugary beverages levy will be effective in lowering obesity rates							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	8	36	71	63	32	210
Part time/Casual work	Frequency	8	23	21	25	6	83
Full time	Frequency	6	2	1	0	1	10
Total	Frequency	22	61	93	88	39	303

Statistic	DF	Value	Probability
Chi-square	8	54.5798	<.0001

Source: Own design

Table C 17: The sugary beverages levy is a practical approach to limiting sugar intake, by level of income

Q39: The sugary beverages levy is a practical approach to limiting sugar intake							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	12	44	54	69	31	210
Part time/Casual work	Frequency	15	15	13	35	5	83
Full time	Frequency	1	7	1	0	1	10
Total	Frequency	28	66	68	104	37	303

Statistic	DF	Value	Probability
Chi-square	8	33.3068	<.0001

Source: Own design

Table C 18: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres, by level of income

Q40: A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	6	11	52	78	63	210
Part time/Casual work	Frequency	3	5	24	36	15	83
Full time	Frequency	0	2	0	8	0	10
Total	Frequency	9	18	76	122	78	303

Statistic	DF	Value	Probability
Chi-square	8	17.5066	0.0252

Source: Own design

Table C 19: The tax on sugar-sweetened beverages will result in a loss of jobs, by level of income

Q43: The tax on sugar-sweetened beverages will result in a loss of jobs							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	9	33	94	43	31	210
Part time/Casual work	Frequency	3	15	24	31	10	83
Full time	Frequency	1	1	7	1	0	10
Total	Frequency	13	49	125	75	41	303

Statistic	DF	Value	Probability
Chi-square	8	16.4633	0.0362

Source: Own design

Table C 20: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise, by level of income

Q45: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise							
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
No	Frequency	8	18	45	71	67	209
Part time/Casual work	Frequency	0	4	9	44	26	83
Full time	Frequency	0	1	0	2	7	10
Total	Frequency	8	23	54	117	100	302

Frequency missing = 1			
Statistic	**DF**	**Value**	**Probability**
Chi-square	8	21.1605	0.0067

Source: Own design

5. Type of Residence

Table C 21: The sugary beverages levy is a practical approach to limiting sugar intake, by type of residence

Q39: The sugary beverages levy is a practical approach to limiting sugar intake					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	7	21	0	28
Disagree	Frequency	35	29	2	66
Undecided	Frequency	33	30	4	67
Agree	Frequency	41	57	6	104
Strongly agree	Frequency	2	35	0	37
Total	Frequency	118	172	12	302

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	36.0678	<.0001

Source: Own design

Table C 22: Schools should be prohibited from selling sugar-sweetened beverages on school property, by type of residence

Q41: Schools should be prohibited from selling sugar-sweetened beverages on school property					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	1	23	3	27
Disagree	Frequency	13	36	1	50
Undecided	Frequency	29	50	4	83
Agree	Frequency	66	29	1	96
Strongly agree	Frequency	9	34	3	46
Total	Frequency	118	172	12	302

Statistic	DF	Value	Probability
Chi-square	8	64.5469	<.0001

Source: Own design

Table C 23: The tax on sugar-sweetened beverages will result in a loss of jobs, by type of residence

Q43: The tax on sugar-sweetened beverages will result in a loss of jobs					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	5	8	0	13
Disagree	Frequency	11	35	3	49
Undecided	Frequency	71	50	3	124
Agree	Frequency	23	49	3	75
Strongly agree	Frequency	8	30	3	41
Total	Frequency	118	172	12	302

Statistic	**DF**	**Value**	**Probability**
Chi-square	8	33.0172	<.0001

Source: Own design

Table C 24: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise, by type of residence

Q45: Television and radio stations should provide free air time for public service announcements on healthy eating and exercise					
		Home	Campus Residence	Digs	Total
Strongly disagree	Frequency	0	5	3	8
Disagree	Frequency	9	14	0	23
Undecided	Frequency	24	27	3	54
Agree	Frequency	54	60	3	117
Strongly agree	Frequency	30	66	3	99
Total	Frequency	117	172	12	301

Frequency missing = 1			
Statistic	**DF**	**Value**	**Probability**
Chi-square	8	34.4699	<.0001

Source: Own design

ADDENDUM D:

Reason for certain results of statistical tests for each of the six independent variables tested being omitted

Variable	Question Number	Question	Reason for statistical test result being omitted
Gender	18	Consumption of sugar-sweetened beverages during childhood.	p-value of 0.18, which indicates that there is no statistically significant association between gender and childhood consumption of sugar-sweetened beverages. That is, both male and female respondents consumed sugar-sweetened beverages equally as children.
	19	Availability of healthy beverage options on campus.	To test a relationship between gender and the availability of healthy beverage options on campus would be meaningless.
	20	Understanding of the sugary beverages levy.	p-value of 0.1812, which indicates that there is no statistically significant association between gender and understanding of the sugary beverages levy. In other words, the responses about the understanding of the sugary beverages levy are not associated with their gender.
	23	A tax should be levied on sugar-sweetened beverages only if the money is used to improve the health-care system.	p-value of 0.2382, which indicates no significant association between gender (male and female perception) and whether a tax should be levied on sugar-sweetened beverages, provided the money is used to improve the health-care system.
	24	A tax should be levied on sugar-sweetened beverages only if the prices of other healthy foods and beverages decrease.	p-value of 0.2332, which indicates that there is no significant association between gender (male and female perception) and whether a tax should be levied on sugar-sweetened beverages, provided the prices of other healthy foods and beverages decrease.
	25	Imposing a tax on sugar-sweetened beverages will increase prices.	p-value of 0.7296, which indicates that there is no significant association between gender (male and female perception) and whether imposing a tax on sugar-sweetened beverages will increase their prices.
	29	The reports that people see and read in the	p-value of 0.9248, which indicates that there is no significant association

		media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages.	between the perception that the reports that people see and read in the media about sugar and sugar-sweetened beverages discourage them from drinking sugar-sweetened beverages and gender.
	31	Fewer sugar-sweetened beverages would be purchased if the price went up by 20%.	p-value of 0.1124, which indicates that there is no significant association between the perception that fewer sugar-sweetened beverages would be purchased if the price went up by 20% and gender.
	32	I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%.	p-value of 0.1500, which indicates that there is no significant association between the perception that healthier beverages would be purchased if the price of sugar-sweetened beverages went up by 20% and gender.
	37	The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa.	p-value of 0.1616, which indicates that there is no significant association between gender and the perception that the consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa.
	38	The sugary beverages levy will be effective in lowering obesity rates.	p-value of 0.0842, which indicates that there is no significant association between gender and the perception that the sugary beverages levy will be effective in lowering obesity rates
	39	The sugary beverages levy is a practical approach to limiting sugar intake.	p-value of 0.6195, which indicates that there is no significant association between gender and the perception that the sugary beverages levy is a practical approach to limiting sugar intake.
	40	A tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres.	p-value of 0.4186, which indicates that there is no significant association between gender and the perception that a tax should be levied on sugar-sweetened beverages only if the money is used to improve pre-school programs or build parks, libraries or recreation centres.
	41	Schools should be prohibited from selling sugar-sweetened beverages on school property.	p-value of 0.2538, which indicates that males and females do not differ in their responses about the social impact item regarding the fact that schools should prohibit selling of sugar-sweetened beverages on their property.
	42	The tax on sugar-sweetened beverages will result in producers of sugar-sweetened	p-value of 0.3155, which indicates that there is no significant association between gender and responses on the social impact factor that the tax on sugar-

		beverages leaving South Africa.	sweetened beverages will result in producers of these products leaving South Africa.
	43	The tax on sugar-sweetened beverages will result in a loss of jobs.	p-value of 0.5987, there is no significant association between gender and responses on the social impact item regarding the fact that the tax on sugar-sweetened beverages will result in loss of jobs. That is, the responses on this matter did not show any connection with gender.
Age	12	Average consumption of sugar-sweetened beverages.	ANOVA test of the difference in the average number of sugar-sweetened beverages consumed during the week by age resulted in a p-value of 0.2260, which indicates that there is no significant difference in the weekly average sugar-sweetened beverage consumption by age.
	13	Non-consumption of sugar-sweetened beverages due to a medical condition.	p-value of 0.8832 which indicates that there is no significant association between question 13 and age.
	14	Consumption of sugar-sweetened beverages when under stress.	p-value of 0.1550, which indicates that there is no significant association between question 14 and age, with most respondents (57%) (151/265) indicating that stress does not affect their consumption of sugar-sweetened beverages.
	15	The desire to reduce consumption of sugar-sweetened beverages.	p-value of 0.1800, which indicates that there is no significant association between question 15 and age.
	16	Average consumption of water.	p-value of 0.9816, which indicates that there is no significant association between question 16 and age, with most respondents (33%) (101/303) indicating that they consume 3-4 glasses of water daily.
	17	Average consumption of milk.	p-value of 0.3162, which indicates that there is no significant association between question 17 and age, with most respondents (51%) (153/303) indicating that they never consume milk.
	18	Consumption of sugar-sweetened beverages during childhood.	p-value of 0.8549, indicates that there is no significant association between question 18 and age.
	19	Availability of healthy beverage options on campus.	To test a relationship between age and the availability of healthy beverage

			options on campus would be meaningless.
	21	Beneficial health impact of sugary beverages levy.	p-value of 0.5582, which indicates that there is no significant association between question 21 and age, with a slightly higher number of students (35%) indicating that the sugary beverages levy will not have a beneficial impact on health.
	22	Imposition of a tax on sugar-sweetened beverages.	p-value of 0.8384, which indicates that there is no significant association between question 22 and age, with a slightly higher number of students (41%) indicating that they agree with the fact that a tax should be levied on sugar-sweetened beverages.
	25	Imposing a tax on sugar-sweetened beverages will increase their prices.	p-value of 0.1770, which indicates that there is no significant association between question 25 and age, with the majority (91%) of students indicating that they agree with the fact that imposing a tax on sugar-sweetened beverages will increase prices.
	27	Having a tax on sugar-sweetened beverages will improve the health of the population.	p-value of 0.3354, which indicates that there is no significant association between question 27 and age, with 44% of students indicating that they agree with the fact that having a tax on sugar-sweetened beverages will improve the health of the population. The majority of these students fell into the 21-25-year range.
	30	Advertising and marketing of sugar-sweetened beverages makes people want to buy these products.	p-value of 0.5439, which indicates that there is no significant association between question 30 and age. This finding correlates with the study by Teterycz (2017) which also found that there was no statistically significant difference between age group and perception of influence of advertising and marketing to purchase more soft drinks.
	31	Fewer sugar-sweetened beverages would be purchased if the price went up by 20%.	p-value of 0.3875, which indicates that there is no significant association between question 31 and age, with 57% of students indicating that they agree with the fact that they would purchase fewer sugar-sweetened beverages if the price went up by 20%. The majority of these students fell into the 21-25-year range.

	32	I would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%.	p-value of 0.0848, which indicates that there is no significant association between question 32 and age, with 39% of students indicating that they agree with the fact that they would purchase healthier beverages if the price of sugar-sweetened beverages went up by 20%. The majority of these students fell into the 21-25-year range.
	35	Childhood obesity is a problem for society.	p-value of 0.1895, which indicates that there is no significant association between question 35 and age.
	36	Childhood obesity is a serious problem.	p-value of 0.1066, which indicates that there is no significant association between question 36 and age.
	38	The sugary beverages levy will be effective in lowering obesity rates	p-value of 0.2055, which indicates that there is no significant association between question 38 and age.
	41	Schools should be prohibited from selling sugar-sweetened beverages on school property.	p-value of 0.0969, which indicates that there is no significant association between question 41 and age.
	42	The tax on sugar-sweetened beverages will result in producers of sugar-sweetened beverages leaving South Africa.	p-value of 0.1545, which indicates that there is no significant association between question 42 and age.
	43	The tax on sugar-sweetened beverages will result in a loss of jobs.	p-value of 0.2480, which indicates that there is no significant association between question 43 and age.
	44	Prominent calorie labels should be placed on sugar-sweetened beverages.	p-value of 0.6606, which indicates that there is no significant association between question 44 and age.
	45	Television and radio stations should provide free air time for public service announcements on healthy eating and exercise.	p-value of 0.6092, which indicates that there is no significant association between question 45 and age.
Race	13	Non-consumption of sugar-sweetened beverages due to a medical condition.	p-value of 0.3564, which indicates that there is no significant association between question 13 and race.
	19	Availability of healthy beverage options on campus.	To test a relationship between race and the availability of healthy beverage options on campus would be meaningless.

	25	Imposing a tax on sugar-sweetened beverages will increase their prices.	p-value equivalent to 0.1320, which indicates that there is no significant association between question 25 and race, with the majority (91%) of students indicating that they agree with the fact that imposing a tax on sugar-sweetened beverages will increase prices, majority of whom were Black Africans.
	35	Childhood obesity is a problem for society.	p-value equivalent to 0.4798, which indicates that there is no significant association between question 35 and race.
	36	Childhood obesity is a serious problem.	p-value equivalent to 0.5213, which indicates that there is no significant association between question 36 and race.
	37	The consumption of sugar-sweetened beverages contributes to the obesity rate in South Africa.	p-value equivalent to 0.1461, which indicates that there is no significant association between question 37 and race.
	45	Television and radio stations should provide free air time for public service announcements on healthy eating and exercise.	p-value equivalent to 0.4719, which indicates that there is no significant association between question 45 and race.
Level of income	12	Average consumption of sugar-sweetened beverages.	The ANOVA test of the difference in the average number of sugar-sweetened beverages consumed during the week by level of income resulted in a p-value of 0.3234, which indicates that there is no significant association between question 12 and level of income.
	13	Non-consumption of sugar-sweetened beverages due to a medical condition.	p-value of 0.2749, which indicates that there is no significant association between question 13 and level of income.
	15	The desire to reduce consumption of sugar-sweetened beverages.	p-value of 0.3800, which indicates that there is no significant association between question 15 and level of income, with a slightly higher number of respondents indicating that they had no desire to reduce their consumption of sugar-sweetened beverages, of whom 70% did not receive any form of income.
	18	Consumption of sugar-sweetened beverages during childhood.	To test a relationship between level of income and consumption of sugar-sweetened beverages during childhood (question 18) would be meaningless, as

			present income has no relationship with childhood consumption.
	19	Availability of healthy beverage options on campus.	To test a relationship between level of income and the availability of healthy beverage options on campus (question 19) would be meaningless.
Type of residence	13	Non-consumption of sugar-sweetened beverages due to a medical condition.	Little relationship is possible between question 13 and type of residence.
	14	Consumption of sugar-sweetened beverages when under stress.	Little relationship is possible between question 14 and type of residence.
	18	Consumption of sugar-sweetened beverages during childhood.	There is no possible relationship between type of residence and childhood habits.
	19	Availability of healthy beverage options on campus.	There is no possible relationship between type of residence and the availability of healthy beverage options on campus.

ADDENDUM E: Questionnaire and Informed Consent

Final Questionnaire
to be administered.pc