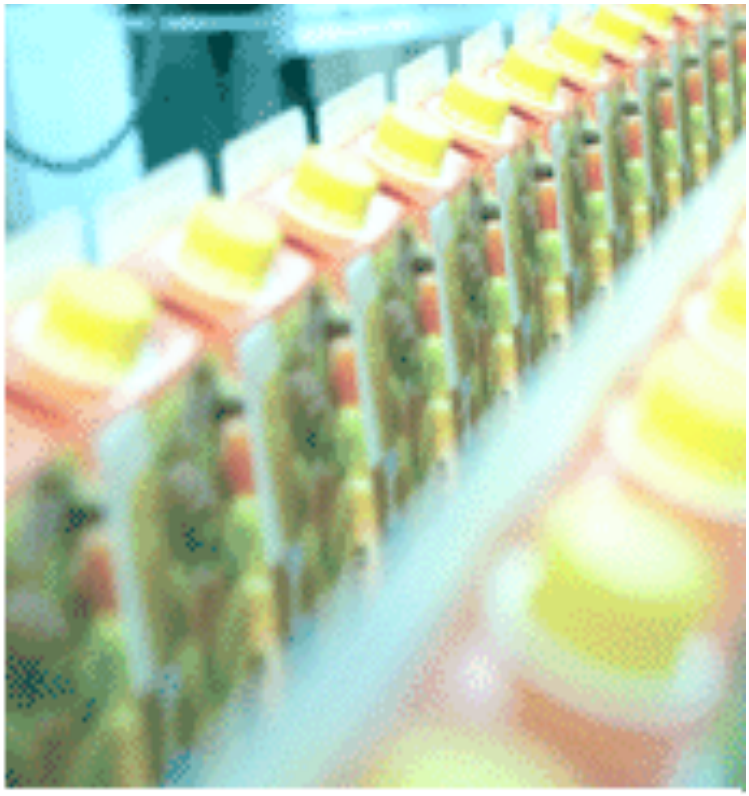

Final thesis for the obtainment of the M.Sc. degree (Master of Science)

Predicting the Consumption of Young Adults concerning Sugared and Sugar-free Beverages

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Management Summary

In the course of an internship at the agency *fischerAppelt Kommunikation GmbH* a quantitative study was developed and accomplished with the aim to obtain information about the choice of non-alcoholic beverages made by young adults. On the basis of these findings, recommendations for an educational initiative were formulated, in order to reduce the uncertainty of the consumer and to provide a supportive help for making a responsible choice.

A written questionnaire, based on an adjusted form of the *Theory of Planned Behaviour* from Ajzen (1991), was carried out by sixth formers and students. To measure the behaviour of young adults a Food Frequency Questionnaire concerning sugared and sugar-free beverages was developed.

342 sixth former and students, comprising both males and females, with the mean age of 20 years, completed the questionnaire during their lessons. On the basis of their results it was determined, which factors of the TBP have the most important impact on the choice of beverages and the intention to drink less sugared beverages.

The main conclusion of the study consists in the finding that the availability of sugared beverages at home proved to be the most important factor to predict the consumption of sugared beverages. The descriptive subjective norm of friends was the only variable out of the TBP which had some predicting power on the consumption of sugared beverages. The other constructs of the TBP turned out to be less influential. In particular, the correlation of the intention towards the consumption and the behaviour is unexpected low. Attitude, the injunctive subjective norm, the descriptive subjective norm of the parents, the self-identity concerning the health awareness and the perceived behavioural control were the components of the theory which account for the most variance of the intention. Moreover, female respondents and students showed a more positive attitude towards sugar-free beverages and consumed less sugared beverages than male respondents and sixth former.

These findings lead to some recommendations for the initiative in order to offer the consumer a supportive help to choose the right beverage. The initiative should focus primarily on the attitude. People's attitudes can be changed due to comprehensible, individually relevant and credible messages, which include new arguments, but conform to the person's existing perceptions and experiences. The initiative should include implementation intentions, which can be realized in everyday life. A successful approach to change old habits consists in presenting new habits which replace the old existing ones. In order to exert influence on the availability of beverages, it is necessary to present possibilities to the respondents how they are able to exercise control on the beverage purchase of the family.

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List of Abbreviations

Abbreviation	Meaning
TPB	**T**heory of **P**lanned **B**ehaviour
KL	**K**now**l**edge
A	**A**ttitude
ISN	**I**njunctive **S**ubjective **N**orm
DSN	**D**escriptive **S**ubjective **N**orm
SI	**S**elf-**I**dentity
PBC	**P**erceived **B**ehavioural **C**ontrol
I	**I**ntention
B	**B**ehaviour

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Foreword

Everyone has become accustomed to the great supply in every supermarket, has adjusted to it and cannot imagine abdicating it. A great supply of food and beverages comes along with being spoilt for choice, and therefore decision making is not always easy. In particular, the beverage market grows enormously. On the market the supply of beverages has become correspondingly diverse and therefore causes often confusion. Besides this, the wide range of information concerning the fluid requirement complicates the customer's choice of beverages. Some sources indicate that the recommendation of the daily intake of sugar-free beverages concerning adults should be at least 2.5 litres. In contrast, other sources present the advice of 1.5 litres fluid daily (Valtin, 2002; Negoianu & Goldfarb, 2008). Many and partly contradictory information about juices, smoothies and soft drinks make the consumer insecure. Soft drinks and juices are often regarded unbalanced with respect to their ingredients, whereby the consumer has a guilty conscience due to the purchase and develops an "all-or-nothing" attitude. This leads to the questions: What kind of beverages and how much of these beverages should be consumed by the costumer?

1. Introduction

The diverse and complex information about beverages and their health benefits or threats confuse the consumer. A lot of consumers consider beverages as "allowed" and "forbidden", "good" and "bad" or "healthy" and "unhealthy". This distinction of beverages cannot be applied so easily. Different studies show that inflexible diet-rules are not suitable for everyday life and that a violation of these strict rules leads to a loss of any control so that the forbidden food or beverage is consumed excessively (Ellrott, 2003).

To shed light on the uncertainty and confusion, which the consumer has to overcome almost every day, the agency of integrated communication, *fischerAppelt Kommunikation GmbH*, pursues the intention to instigate an educational drinking initiative for one of their customers. The planned campaign consists of three main goals: Firstly, it is aim to provide helpful recommendations concerning the drinking behaviour. Secondly, the campaign intends to offer a realistic impression of the current beverage market and to supply information about beverage's ingredients. Thirdly, it is goal to raise the enjoyment in drinking beverages without overstraining the consumer and by presenting a great supply of non-alcoholic beverages to the customer.

To address the target group of the initiative properly more information is needed, for instance of their current drinking behaviour. The study compares the development of young adult's preferences for sugared (e.g., juices, soft drinks) and sugar-free beverages (e.g., water, diet soft drinks). Sixth former (for a definition see § 5) and students allegorize the target group (young adults). It is characteristic for them to be highly educated and successful. Due to the fact, that they have to do intellectual work every day, they need a lot of energy to maintain their concentration. Therefore, the drinking and eating behaviour plays an important part because it provides them with the demanded energy. It is of high significance for the development of the campaign to investigate the group's drinking behaviour in relation to their health awareness, their drinking motives and the needs of the educational advertising concerning beverages. Only by surveying these kinds of information it is feasible to prepare the right advice and drinking information, which appeals to the consumers. The study tends to shed light on the factors, which determine the drinking behaviour. Why do some people consume more water and others more juices or soft drinks? Are there some factors which have an important explanatory power? On the basis of these findings recommendation for a campaign can be formulated, which help to reduce the uncertainty of the consumer and give supportive help for taking a responsible choice.

1.1 The Health and Eating Habits of Adolescents and Young Adults

The industrial countries observe a changing health situation of children and adolescents. The German health care system has to deal with serious health problems, which affect a big part of the young population. For instance, more than 20% of German children and adolescents suffer from chronic diseases like asthma, diabetes or allergies (Warschburger, 2000). Furthermore, the life style of children and adolescents gets more complex due to growing leisure time facilities, an increasing food supply and due to changes in the family structures. Because of these changes and the missing comparable standards of older studies, the health behaviour was scrutinized by means of a new study, "the KIGGS" (Studie zur Gesundheit von Kindern und Jugendlichen in Deutschland) (Kurth, Bergmann, Dippelhofer, Hölling, Kamtsiuris & Thefeld, 2002).

KIGGS was set up by the Federal Ministry of Health and the Ministry of Education and Research and intends to collect a wide range of socio-demographic information and health related facts about the German youth. The goal of the study is to get a realistic picture of the health situation and in consequence of this being able to present advices for prevention programs.

An essential part of the health situation consists in the eating habits of adolescents. In 2007 the results of the KIGGS-study concerning this area were published. The eating behaviour has, among other factors, a great influence on the development of diseases, like diabetes mellitus type 2, hypertension or cardiovascular diseases. Furthermore, the eating and drinking behaviour can predict our physical well-being und willingness to be active (Leitzmann, 2004). The body needs mineral nutrients, vitamins and fluid in order to function properly.

With reference to this awareness water and other non-alcoholic beverages play an important role in a balanced diet. The results of the KIGGS-study and other important studies concerning the health behaviour of young adults are discussed in the next chapter, following, an overview on the theoretical framework and the chosen theory (§3). After this, the methods of the study and a description of the subjects (§4) are represented. On the basis of the theoretical background, the research questions are formulated (§5). In chapter six the results of the study are discussed, which provides a deeper interpretation of the discussion paragraph (§7). In addition to this, weak points of the study and possibilities of further research will be reviewed. Finally, recommendations for the current campaign are presented in the last chapter (§8).

2. Drinking und Eating Situation in Germany

2.1 Drinking Situation

The KIGGS-study indicates that 38.2% of the boys at the age of 14 to 17 years drink mineral water several times a day, whereas 46.7% of the girls drink this kind of beverage several times a day. 16.3% of the male probands drink tap water, respectively 21.2% of the female respondents. Likewise the drinking of mineral water, male adolescents consume soft drinks (36.0%). With the rising age the consumption of soft drinks increases significantly for both, boys and girls. However, male respondents are characterised by a considerable higher consumption of soft drinks in comparison to young females. The soft drink market has changed drastically in the last years and this has an effect on the fluid intake of water. The water intake of children and adolescents decreased between 1991 to 1998, whereas the soft drink intake increased (Sichert-Hellert, Kersting & Manz, 2001). The consumption of juices correlates negatively with the consumer's age. The older the interviewees, the less juice they drink. Additionally, the study reveals that young males drink less tap water with increasing age. Another differentiation that can be made regarding the hydration is between migrants and non-migrants. Boys and girls with migrational background drink more often soft drinks. But this result is only significant for children and adolescents with a Turkish background and for migrants of German origin. Juices are more commonly consumed by non-migrants (Mesink, Kleiser, Richter, 2007).

To sum up, it can be observed that the consumption of soft drinks increases with age, the consumption of juices and milk beverages decreases and water consumption remains the same in the different stages of life.

The national consumption study of the Max Rubner-Institute (NVS), initiated in 2008, examines the eating behaviour and the health state of the German population at the age of 14 to 80 years. Women and men at the age of 19 to 34 years participate to a lesser extent in the survey. Thereby the percentage distribution of the study differs from the percentage distribution of the German population. Nevertheless, the study can be considered as an important foundation for the nutritional situation of young adults in Germany. According to the NVS, the recommended daily amount of 1.5 litres is accomplished by both genders so that hydration is satisfactory. The intake of water constitutes approximately half of the total hydration. Foremost, young men (19-24 years) consume a lot of water. Women at the age of 35 to 50 years consume the highest amount of water. A quarter of the total beverage consumption consists of coffee and green or black tea and 10% to 11% of the total composes of juices and nectars. 10% of the male respondents' total fluid intake consists of soft drinks. This is twice as much as women's amount of soft drinks (4%) referring to their total fluid intake. It turns out that

the socio-demographic status has an effect on the choice of beverages. It is scientifically proven that the lower social stratum of the population consumes sugared beverages, like soft drinks, three to four times more frequently than the upper social stratum (NVS I, 2008; NVS II, 2008). These facts are brought into focus in this master thesis because they are interesting analytical points for the curent study.

2.2 Eating and Health Situation

It is also crucial to scrutinize the eating behaviour of the German population and their assessments towards diets and the current health situation. 76% of all respondents opine that one can judge their health state as "very good" or "good". One third (32.3%) of the consulted young men at the age of 14 to 24 years estimates their state even as "very good". Women at this age share this view to a lesser extent (22.2%). The analysis of the food choice shows however that women eat more healthy products than men do (e.g., 270 gram fruit daily vs. 222 gram). It can be suggested that this may be similar for beverages. Women drink probably more beverages with less sugar and/or with additional health benefits.

More than half (52.6%) of the consulted respondents is not able to calculate their own energy demand. Foremost, women and men aged between 19 and 24 years state a negative calculation of their daily energy demand. Due to the fact, that people do not know how much they have to eat and drink every day, it can be expected that a lot of people eat and drink too much. Assigned to this study it can imply, that the respondents have a high sugar intake by consuming sugared beverages because they are unaware of their total energy demand.

The study shows that it is of high significance that women indicate a higher interest in nutrition than men do and that already young female adolescents aged 14 to 18 years take stock in this topic. Respondents with a higher graduation level (Abitur / Fachhochschule entry qualification) search for nutrition facts more often than people with a lower graduation (elementary school). To sum up, interest in nutrition correlates positively with education. And for this research one can act on the assumption that higher educated people have more interest and therefore more knowledge about healthy eating and drinking.

In spite of the interest for a healthy nutrition only 12.6% of the respondents accomplish the recommended daily vegetable amount of 400 grams. The German Nutrition Society (DGE) gives the advice to consume 250 grams of fruits every day. However, only 59% of the population accomplishes this recommendation. Least fruits are consumed by men and women at the age of 19 to 24 years.

A study of the Federal Centre of Health Education (1992) examined the German population concerning their general food habits, their food consciousness and the appliance of different diets by observing their weight reduction. 52% of the young adults (20-29 years) declare that they pay attention deliberately to a healthy balanced diet. A study of Heseker, Adolf, Eberhardt, Hartmann, Herwig, Kübler, Matiaske, Moch, Nitsche, Schneider and Zipp (1994) reveals that young adults at the age of 18 to 24 years have an increased awareness of a healthy nutrition (cited in Allgöwer, 2000). According to a study, which is dealing with the eating behaviour of German students, 55.2% of the young consulted students attempt to eat healthy and balanced. Particularly, the female students pay a high attention to a balanced diet (Allgöwer, 2000). The health awareness concerning beverages is rarely studied. Because of this, the health awareness is part of the following analysis.

The outcomes show the Janus-faced side concerning the food situation of young adults. Oftentimes, there is a gap between the self-reported eating behaviour and the state of food intake. In the following passages, it will be clarified which determinants correlate with the drinking and eating behaviour and why many young female and male adolescents fail to apply a healthy nutrition in everyday life, although their strong will is existent.

3. Theoretical Framework

What predicts the drinking behaviour of young adults? Which influence has the sugar content on the choice decision of a beverage? To what extent can one relate the drinking behaviour to the general health awareness? The drinking and eating situation of young adults, in particular of students, is hardly studied in Germany (Allgöwer, 2000) and a complete overview cannot be given. Foremost, the drinking of non-alcoholic sugared and sugar-free beverages was not focused in any study. As a consequence, it is difficult to refer to studies concerning the drinking behaviour. Therefore studies examining the eating behaviour are consulted in the course of this work. The results of these studies will be presented as well as the relevance for the target group "young adults". After the description of every determinant, a hypothesis is expressed with relevance to this study. A distinction between sugared and sugar-free beverages is applied in every hypothesis.

3.1 Behavioural Determinants

The development of behavioural patterns is not that simple because a lot of influential factors interact with one another. One of these factors is for instance the social environment (Gedrich, 2003). In addition, behaviour can be developed on the basis of previous experiences, which demanded the same behaviour. One eats and drinks not just as a result of our biological requirements, but due to the influence of psychological, sociocultural and home economical determinants (Gedrich, 2003). In the next subparagraphs different influential factors are discussed, which might have impact on the decision making process.

3.1.1 Biological Factors

The genotype, in particular the *gender*, influences the eating behaviour. Although humans have an inherent preference for the taste "sweet" and an aversion towards "bitter" (Ellrott, 2007), there are differences concerning the preference of taste between women and men. Empirical studies state that women eat more fruit, vegetables, milk products, whole meal-products and less sugared food than men do. These findings conclude that women eat healthier than men (Gerhards & Rössel, 2003). Other studies state that the *age* has an impact on the eating and drinking pattern, too. Older people show a healthier lifestyle pattern than young people (Rappoport, Peters, Downey, McCann & Huff-Corzine, 1993). Grimm, Harnack and Story (2004) affirm that the preference of taste has a big influence on what we drink and eat and is the most important predictor for the choice of a certain beverage.

Hypothesis 1: Female adults drink less sugared beverages than male adults.

Hypothesis 2: Older respondents (students) drink less sugared beverages than younger respondents (sixth former).

3.1.2 Sociocultural Factors

The predilection for a certain taste is not only based upon a genetic preference or a prenatal imprint but also on the determinant *familiarity* (Asp, 1999; Gniech, 2003). If something is frequently offered (mere exposure), the person becomes acquainted with this taste and is going to develop a preference for it (Contento, Williams, Michela & Franklin, 2006; Gniech, 2003). This provides another socioccultural factor which can be defined as the *influence of family and friends*. Their drinking patterns affect the adolescent's choice of beverages (Grimm, Harnack & Story, 2004). People identify themselves with certain groups and dissociate with others. If one decides to join a certain group, he or she is faced with different group norms, learns from other group members and adopts their behaviour patterns.

The sociocultural determinant *education* can be considered as a further aspect which leads to grouping of adolescents. People who have a higher education aim to be part of a special environment. Education is correlated with income and eating behaviour. People who belong to a better educational society often have more income and more money to spend for healthy food. Other explanations for this coherence can either be the knowledge of nutrition, which increases with the level of education (Kußmaul, Döring, Stender, Winkler & Keil, 1995) or the associated symbolic meaning of different foods. The more educated a social class, the more they associate fat and cheap products with a vulgar taste, which they dislike. Summing up, nutrition provides the possibility of choosing a certain *group belonging* (Barlösius, 1999).

The causal coherence between financial resources, education class and the choice of food cannot be indicated clearly. Whether a higher income leads to the purchase of more expensive, healthier and better food or a higher income results in a better education and therefore in more knowledge, is controversial up to now. But apparently one can only eat what one is able to buy. On the one hand, this is predicted by the *income* (Furst, Connors, Bisogni, Sobal & Winter Falk, 1996), and on the other hand by the *availability* of the product. Grimm, Harnack und Story (2004) and Gracey, Stanley, Burke, Corti und Beilin (1996) showed due to their research that accessibility, in particular the availability of soft drinks, water, juices and other food at their homes and at school, provides a significant influence on the beverage and food choice.

Hypothesis 3: Young adults have similar drinking patterns concerning sugar-free and sugared beverages as their parents and/or friends.

Hypothesis 4: Young adults from a higher educated family drink less sugared beverages than young adults from a lower educated family.

3.1.3. Home Economical Factors

Furthermore, the *home economical situation* determines the food offering at home. Who is responsible for the food? Which reasons specify the purchases? How are the food and beverages prepared and consumed? The values of eating and drinking are determined by the *culture* but can vary immensely in every family. People in a relationship eat healthier than single-living people (Roos, Lahelma, Virtanen, Prättälä, & Pietinen, 1998). This study also indicates that the presence of children has an impact on the purchase of food and beverages. Households with children younger than 14 years spend more money for healthy food than others households. Up to now, the mother is mostly in charge of purchasing and preparing the food, therefore she is the one who determinates which food is available (Gedrich, 2003). This leads to the hypothesis that children have similar eating patterns as their parents.

A study of Gracey et al. (1996) verifies that an unhealthy eating behaviour is caused by the inability of adolescents to exert an impact on the food choice at home. Apart from that, other studies have shown that healthy eating behaviour is associated with family structures and parents. Whereas the consumption of fast-food correlates with the relationship to friends, independence and fun (Backman, Haddad, Lee, Johnston & Hodgkin, 2002).

Hypothesis 5: The availability of sugared beverages at home and at school has an influence on the consumption of sugared beverages among young adults.

3.1.4 Psychological Factors

Nutrition can be considered as a symbolic value. For instance, fast-food is associated with fun and in contrast, a familial setting leads to a consumption of healthy food among young adolescents. In this case, psychological processes play a significant role. *Emotions, motives, attitudes and cognitive processes*, like perception, thinking and learning, are parts of the psychological component.

Emotions excite a reaction in the individual, which can be either positive or negative. Emotions – as a trigger for reactions – are not inevitably necessary for the food intake because food can cause a reaction without being triggered off by emotions namely due to the drive hunger. Nevertheless, some food products are able to evoke emotions. Sometimes, one wants to eat or drink a special product just because it activates specific

emotions. Hence, it can be called a motif. By the choice of an aliment, people want to experience taste, put themselves in a certain emotional situation, express belonging or the social status.

Besides the factor emotion, the choice of food is determined by values, confidence, outcoming expectations, intentions and involvement (Gedrich, 2003).

The analysis of the influential factors shows that the determination of the eating and drinking behaviour is a complex process. It is impossible to analyse all determinants in one single study. Because of this, paragraph 3.2 gives an overview on two existing theories referring to the behavioural research, which can built a significant foundation for an empirical survey and the most important psychological factors (*attitude, perceived subjective norm and perceived behavioural control*).

3.2 Social Cognition Theories

Different behavioural models try to give theoretical answers. The theory of the *"Health Belief Model"* (Hochbaum, Rosenstock, Leventhal and Kegels, 1956) assumes that a behaviour depends on two variables: the *value* which implies how one credits the goal (e.g., to drink and eat healthy is important) and the *appraisal* which includes whether one can reach the goal by the current behaviour or not (e.g., eat fruit and vegetables). The determinants which influence the behaviour are: the perceived susceptibility to develop a certain disease (diseases can be the result of an unhealthy diet), the perceived severity, perceived benefits or barriers and cues to action (Damoiseaux, van der Molen & Kok, 1993).

Another explanatory model of behaviour is Ajzen's *"Theory of Planned Behaviour"* (1991). The *"Theory of Planned Behaviour"* supposes that behaviour is determined by the current behavioural *intention*. This *intention* is composed of three factors, namely the *attitude* of an individual towards an object, the *subjective norm* and the *perceived behavioural control* to accomplish a certain behaviour.

Attitudes result from certain motives and the positive or negative appraisal to what extent a certain object or behaviour is able to correspond with the individual motives (Backman et al., 2002). People, who have a positive *attitude* towards healthy food, are of the opinion that the consumption of healthy products leads to an improvement of their health, an increase of their energy and a good feeling about themselves. The chance that these people live a healthy lifestyle is considerably higher than for those people who have a negative attitude towards a healthy lifestyle (Gracey et al., 1996). Besides this, the study states that there is a relation between the positive *attitude* towards a healthy

diet and the desire to control one's own weight, to lower cholesterol, to test their own willpower and to improve their appearance.

On the one hand, people know their own preferences and dislikes from *personal experiences*. On the other hand, people do not have to undergo these experiences but can basically develop own drinking and eating behaviour by *observing others* (imitation learning) (Bandura, 2001; Ellrott, 2007). The *subjective norm* refers to the individual perception, in particular, how important others value a certain object and how they behave.

The last factor, the *perceived behavioural control*, describes the own appraisal of the ability to accomplish a certain behaviour, although one has to overcome barriers and obstacles. The stronger the belief that one is able to eat healthy, the bigger is the chance to have a healthy eating behaviour.

In order to form an *attitude*, a *subjective norm* or a *perceived behavioural control*, it is necessary to receive *knowledge* of the topic. The numerous information people have to face every day, have to be selected, organized and interpreted. In this way a subjective perception concerning a healthy eating behaviour, which co-determines people's (purchase) decisions, is developed. Studies show that the *knowledge* of health and a balanced diet has an influence on our eating behaviour. In view of these results, it can be assumed that people who know a lot about food, consequently eat and drink healthier (Backman et al., 2002). The ignorance of food ingredients can lead to a barrier, which hinders a healthy eating behaviour (Gracey et al., 1996).

The main aim of the study is not to built up a preventive intervention trying to persuade the target group to drink less sugared beverages. The study rather tries to get an overview of the factors, which influence the choice of beverages. Consequently, the *TPB* fulfils the requirements of the study to a greater extent than the other theory and is therefore applied.

Nevertheless, additions have to be made in the *"Theory of Planned Behaviour"* to improve its validity. The *perceived behavioural control* can be both, the control over *external* properties (e.g., availability) and the *internal* control over abilities and skills. There are some studies which report that there has to be made a distinction between *internal and external perceived behavioural control* (*IPBC*, respectively *EPBC*), (Armitage & Conner, 1999a; Conner & Armitage, 1998; Terry & O'Leary, 1995; White, Terry & Hogg, 1994).

The second change, which has to be applied, concerns the *subjective norm*. On the one hand, a *subjective norm* can be developed due to the perceived values of other people and on the other hand, it can resolve from the perception of other people's performances. This distinction can be subdivided into two different categories which are

named *injunctive* ("ought meaning of social norm") and *descriptive* ("is meaning of social norm") (Cialdini, Reno & Kallgren, 1990, p.1015).

The third and last addition to the already existent study is the construct *self-identity*. *Self-identity* may be defined as "the salient part of an actor's self which relates to a particular behavior" (Conner & Armitage, 1998, p.1444). Several studies from different health related areas have stated, that the performance of a certain behaviour is consistent with one's own *self-identity* and thereby can be seen as an enrichment of the *Theory of Planned Behaviour* (Pierro, Mannetti & Livi, 2003; Sparks & Guthrie, 1998; Armitage & Conner, 1999b; Sparks & Shepherd, 1992).

By relating the adjusted *TPB* with the complex of problems named above, one obtains the following structure:

The young adult's *knowledge* of sugared and sugar-free beverages and their ingredients, as well as the arisen awareness of these beverages exerts an influence on the *attitude*. It can be assumed that someone, who deals with a healthy diet and consequently knows a lot about ingredients and beverages, has a more positive *attitude* concerning healthy beverages and therefore consumes less sugared drinks (Duffey & Popkin, 2006).

The *attitude,* which is based upon *knowledge*, norms and values, predicts how a beverage is valued. If one emphasises strong flavour, there will be a bigger addiction to consume beverages which are more flavourful than water. If a greater importance is placed on drinking healthy beverages, the tendency will show a higher consumption of water.

The *subjective norm* is based upon the individual perception of the social environment and on the observation of other people. What does the environment consume? And how do they talk about beverages? If all friends drink soft drinks, the chance will increase that a young adult consumes the same beverage in order to belong to the certain group (Contento, Williams, Michela & Franklin, 2006). As named above, a clear distinction between *injunctive and descriptive subjective norms* (*ISN and DSN*) is applied in the study.

To what extent do young adults rate themselves as being able to drink healthy beverages at any time? Which obstacles are hit? And is it possible to control the obstacles? Theses answers can be measured due to the *internal and external perceived behavioural control* (*IPBC and EPBC*). The first question refers to one's own abilities and skills and the other remaining questions advert to the external possibilities.

People create self-perceptions which are characteristics they ascribe to themselves. In this study the self-perception is called *self-identity*. Young adults, who consider their lifestyle as healthy, show a healthier drinking behaviour. They basically drink water or tea in order to comply with their ideals (Sirgy, 1986).

The last construct of the theory is based upon the *intention* to perform a certain behaviour. If someone makes the plan to achieve something, the chance will be significantly higher, that he will actually fulfil the intention, than the chance for someone who does not aim to achieve the self-made plan. In the *"Theory of Planned Behaviour"* the *intention* is the only direct link to behaviour and is determined by all the factors named above.

3.2.1 Previous Behaviour as an Independent Variable

Some studies discovered that previous behaviour belongs to the independent variables and has influence on the *intention*, which can be seen as the dependent variable (Towler & Shepherd, 1991; Godin & Gionet, 1991). If someone always behaves in a certain way, the *intention* will comply with his or her behaviour, so that the person does not perceive dissonance between act and *intention* (Festinger, 1957).

In figure 1 the arrow between the variable behaviour and the variable *intention* reveals this coherence. The arrow has a broken line to clarify that it is not safe to say yet which connection exists. With the help of a regression analysis the relationship between *intention* and behaviour will be examined.

It is important to make the annotation that this study is a cross-sectional one. This indicates that the behaviour is measured only one time and therefore its constancy cannot be reviewed.

Hypothesis 6: The more adults know about the beverages' ingredients the less sugared beverages they drink.

Hypothesis 7: The more positive the attitude towards sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages).

Hypothesis 8: The stronger the perception of the injunctive subjective norm concerning sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages).

Hypothesis 9: The stronger the perception of the descriptive subjective norm concerning sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages).

Hypothesis 10: The worse the perception concerning the internal behavioural control of drinking sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages).

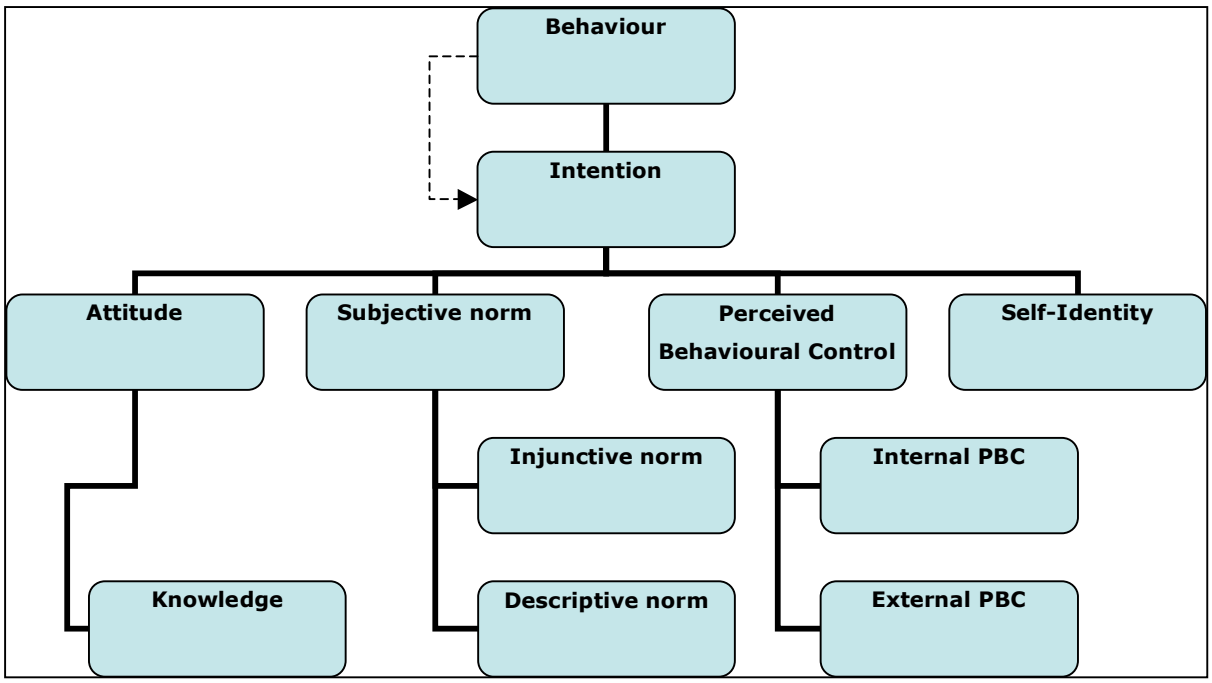
Hypothesis 11: The worse the perception concerning the external behavioural control of drinking sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages).

Hypothesis 12: The less the self-identity considering oneself as healthy, the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages).

Hypothesis 13: The lower the intention to drink sugar-free beverages the higher the consumption of sugared beverages.

Hypothesis 14: The higher the consumption of sugared beverages the lower the intention to drink sugar-free beverages.

Figure 1: Adjusted Theory of Planned Behaviour



With the aid of the following questionnaire, it will be examined to what extent the factors named above exert influence on the drinking behaviour of young adults.

5. Method

5.1 Development of the Questionnaire

The pre-test pursues the aim to test the comprehensibility of the questionnaire. This offers the possibility to exclude or change questions, which are difficult to understand and therefore mistakable questions and statements are avoided in the final survey.

To identify the factors, which affect the choice of beverages, an open questionnaire was sent to 30 German students by email (see attachment 1). Five students returned a completed questionnaire and on the foundation of these findings some additional answer possibilities were applied. Taste, healthfulness, a good value for money and the effect of the beverage (e.g., adipsous and refreshing) were the most important determinants named to choose a special beverage. The other questions are based upon studies from Armitage and Conner (1999a), Povey, Conner, Sparks, James and Shepher (1998) and Sparks and Shepherd (1992). The English questions were translated into German in order to avoid difficulties with the English language.

In addition, two different experts of the topic and people from the target group were asked to comment on the questionnaire with the aim to increase the internal and substantive validity of the constructs. In an open face-to-face questionnaire three staff-members of *fischerAppelt* were requested to check the questionnaire regarding formulations, content and structure. All of the respondents are very familiar with the topic of sugared and sugar-free beverages. With the help of their advices the questionnaire became more explicit and every important topic was considered. The respondents usually commented on the questions concerning the *perceived behavioural control*. Although the translation into German has the aim to avoid understanding problems, comprehension difficulties occurred because some items cannot be translated one-to-one.

Besides that, three people of the target group (two students and one pupil) were asked to comment on the comprehensibility and the content of the questionnaire. Their remarks were integrated in the ongoing questionnaire. Due to this applied pre-tests one can be sure that the questionnaire is coherent for the target group. Furthermore, the three consulted young adults expressed problems with the questions concerning the *perceived behavioural control* in almost the same manner. The given remarks led to following changes: The question "Ich habe viel eigene Kontrolle über das Trinken von zuckerfreien Getränken" was changed into „Es liegt in meinen eigenen Händen, wie viele zuckerfreie Getränke ich trinke", the statement "Ich finde es schwierig, immer zuckerfreie Getränke zu trinken, da ich oft nicht weiß, wie viel Zucker in den Getränken steckt" was modified into „Ich finde es schwierig, immer zuckerfreie Getränke zu trinken, da ich oft nicht weiß, in welchen Getränken Zucker ist", „Die Situation kontrolliert oft das

Trinken von zuckerfreien Getränken" was changed into „Es ist oft von der Situation abhängig, ob ich zuckerfreie Getränke trinke", „Das Trinken von zuckerfreien Getränken ist teuer" was altered into „In Anbetracht des Geldes, das mir zur Verfügung steht, kann ich mir zuckerfreie Getränke nur selten leisten" and „Es gibt Faktoren, die außerhalb meiner Kontrolle liegen, die mich am Trinken von zuckerfreien Getränken hindern" was changed into „Es gibt Faktoren in meinem Umfeld, die ich nicht beeinflussen kann und mich deshalb am Trinken von zuckerfreien Getränken hindern".

To test the substantive validity, two students absorbed in the study communication sciences were asked to read all questions without knowing, which question belongs to which construct. They were asked to assign the questions to the constructs, which fitted the different questions most suitable. Thereby it can be detected to what extent the "measure is judged to be reflective of, or theoretically linked to, a construct under study" (Farrell, Souchon & Durden, n.d., p.4). During this pre-test some questions were not assigned rightly but they were not changed because they were tested in the same way in other studies and there they turned out be questioned properly. This occurred especially within the construct of self-identity. The question "Es liegt in meinen eigenen Händen, wie viele zuckerfreie Getränke ich trinke" or „Ich fühle mich wohl, wenn ich zuckerfreie Getränke trinke" were assigned to the construct self-identity. But these questions do not reflect an individual characteristic. It is rather an estimation of the person's ability and feelings. Because of that, no changes took place.

5.2 Main Questionnaire

A questionnaire (see attachment 10.4), asking respondents about drinking sugar-free and sugared beverages, was constructed. At the beginning of the questionnaire, the topic of the study was explained and it was affirmed that the answers of the respondents are treated confidentially. The respondents obtained a detailed definition of sugared and sugar-free beverages and which beverages are not included in the survey. The questionnaire measured additionally the *self-identity*, *internal* and *external perceived behavioural control*, *injunctive* and *descriptive subjective norms*, as well as the central components of the *"Theory of Planned Behaviour"* (*knowledge, attitude and intention*) and moreover requested demographic information. The questions were presented in a fixed order and were mostly measured on a five-point Likert scale, which stretches from *disagree completely to agree completely*. The variables were reverse-coded, where it seemed appropriate.

Sixth former were asked to answer nine demographical questions and students ten questions concerning their social and demographical background (age, gender, size, weight, class, field of study, family background and educational achievement of the

parents). Two questions were applied to detect which beverages are available at their parent's home and at school.

Knowledge (KL). The questionnaire included four questions about the *knowledge* concerning beverages and their contents (e.g. *"Wie viel Gramm Zucker befinden sich in 100 ml (Angaben beziehen sich auf die gezuckerte Version des Getränks?"*). Different possible answers were offered, including the right answer. To incorporate the difficulty, concerning the estimation of the beverages' sugar amount every answer which deviated –3 points and +3 points from the officially right answer, was considered right. The three point variance was chosen because 3 grams represent one sugar cube and this is the established benchmark to rate the sugar amount of beverages. Finally, the right answers were added up, so that everyone was able to achieve a *knowledge* index between 0 and 15 points.

Attitude (A). 19 questions concerning the *attitude* (e.g., *"Zuckerfreie Getränke sind langweilige Getränke"*) were surveyed in the questionnaire. Most questions are based on studies of healthy eating behaviour, which used the *"Theory of Planned Behaviour"* (see § 5.1). Besides, different questions about beverages and their characteristics, which were developed from the pre-test, were applied. Both, direct and indirect measures of *attitude,* were used in the study. A semantic differential scale was used to assess the direct *attitude* of the consulted young adults. The participants were requested to respond to the sentence "Im Allgemeinen finde ich das Trinken von zuckerhaltigen Getränken…" on a five-point bipolar scale (e.g., "lecker" compared to "widerlich"). The indirect measure was composed of different statements, which the respondents had to rate on a five-point Likert scale from "Stimme überhaupt nicht zu" up to "Stimme voll und ganz zu". The construct *attitude* was coded positively and reliable due to usage of the Cronbach's Alpha coefficient .84.

Injunctive subjective norm (ISN). The *injunctive subjective norm* was tested due to four statements (e.g., *"Meine Eltern finden es gut, wenn ich zuckerfreie Getränke trinke"*). Important people, who may influence the participants, are parents, friends and girl- or boyfriends. In this case an indirect measure with the five-point Likert scale was also used. The Cronbach's Alpha coefficient of the summed scale was .75. This construct had a positive coding.

Descriptive subjective norm (DSN). Three statements were used in order to test the influence of the *descriptive subjective norm* on the choice of beverages (e.g., *"Meine Eltern trinken mehr zuckerhaltige Getränke als zuckerfreie"*). A five-point Likert scale was

applied to measure the answers of two questions. One question asked for the number of friends, who drink sugared beverages every day. The responded questions offered three types of social influencers: the parents, the partner and the friends. The construct had a negative coding concerning sugar-free beverages. The Cronbach's Alpha coefficient was .52 which represented a low internal consistency. One can speak of an internal consistency if the alpha value lies above .70 (Spector, 1992). The influencers can have a conflicting drinking behaviour, therefore every person or group was respectively taken apart.

Perceived behavioural control (PBC). The analysis was carried out for the overall construct *perceived behavioural control* because the Cronbach's Alpha coefficients for *internal* and *external perceived behavioural control* were rather low. The eleven items belonging to the two constructs resulted in a Cronbach's Alpha coefficient of .60. After deleting one item („Zuckerfreie Getränke sind Zuhause häufiger verfügbar als Zuckerhaltige") the coefficient was 0.61. The analysis of the factors released no explanation for the low consistency. Since other studies used the same items and proved the reliability of the construct *perceived behavioural control* with the existing ten items, it is used in the further calculations. The construct had a positive coding and the items were measured on a five-point Likert scale.

Self-identiy (SI). The respondents were asked to answer four questions concerning their *self-identity* based on a study of Sparks and Shepherd (1992) (e.g., *"Ich sehe mich selbst als jemanden, der sich mit gesunder Ernährung beschäftigt"*). All items regarding a healthy eating behaviour were measured on a five-point Likert scale ranging from "Stimme überhaupt nicht zu" to "Stimme voll und ganz zu". The answers referring to the self-identity resulted in a Cronbach's Alpha coefficient of .42. The Cronbach's Alpha coefficient was .62, after deleting the last item. This construct was used in several studies and therefore it is utilized further on. To examine this low reliability, an analysis of the different factors was arranged (see attachment 10.5). The first three items concerning the health awareness composed one factor. The other factor consists of the last item "Ich sehe mich selbst als jemanden, der Essen und Trinken genießt". It was clarified that a distinction between the three items, which describe the health awareness, and the one item concerning the hedonism, is necessary. The construct describing the health awareness was coded positively and the single item concerning the hedonism was coded negatively.

Intention (I). Three items relating to the *intention* were presented on a five-point Likert scale by assessing the participants' *intention* to drink more sugar-free beverages (e.g.,

"Ich plane in der Zukunft mehr zuckerfreie Getränke zu trinken"). The three items have a high internal consistency and built up a Cronbach's Alpha coefficient of .83. The *intention* towards sugar-free beverages was coded positively.

Behaviour (B). At the end of the questionnaire all of the respondents were requested to fill in a "Food Frequency Questionnaire" concerning their drinking behaviour, which included the choice of 18 different sugared and sugar-free beverages. The total sugar consumption was calculated by multiplying the number of glasses with the sugar content of the different beverages. In this passage the sugar intake from beverages is expressed in gram per day. Due to the fact, that a sugar index was calculated, the construct was coded negatively concerning sugar-free beverages.

Diaries. As named above some of the young adults additionally took part in a diary survey for three days. Diary records are generally considered more accurate than recalling the dietary intake because the respondents write the fluid intake immediately down after drinking, which decreases the number of errors associated with recalls (Bandini, Must, Cyr, Anderson, Spadano & Dietz, 2003). They were asked to keep a diary for three days because some studies showed that respondents find it invasive and burdensome to record their food intake over a longer period (Macdiarmid & Blundell, 1998). The compliance of keeping a diary declines from reporting day to reporting day, so that the risk of underreporting grows enormously and the validity decreases (Green, Allen & O'Connor, 1998; Moreno, Kersting, de Henauw, González-Gross, Sichert-Hellert, Matthys, Mesana & Ross, 2005; Gersovitz, Madden & Smiciklas-Wright, 1978). To make the respondents stay with the diary, the reporting of the drinking behaviour was limited to two weekdays and one day of the weekend.

5.3 Procedure

The main research method consisted of a quantitative survey among German students with different majors and sixth former in Germany. Sixth former can be defined as pupils at the age of 16 to 19 years visiting a secondary school in Germany. Sixth former have the highest educational level of all pupils living in Germany.

The questionnaires were distributed at the beginning or end of a school lesson or lecture and collected again after a quarter of an hour. Before the questionnaires were handed out, the investigator presented information on the background and content of the study and offered the possibility to ask questions during the completion of the questionnaires. Some respondents attended voluntarily a diary survey of their beverage consumption for three days (two weekdays and one day of the weekend).

The data was entered in SPSS 15.0 for Windows and different types of analyses were carried out.

5.4 Subjects

348 respondents took part in the study. Six questionnaires had to be excluded from the analysis because important parts of the questionnaire were not filled in or because the age of the respondents fell below 16 years.

54 respondents (15.8%) wanted to fill in a diary survey about their beverage consumption. After two weeks eight diaries were handed back. The response rate was about 14.8%. Due to these few returns, the diaries were excluded from the analysis.

Table 1 shows the demographical characteristics of the studied population. The mean age was about 20 years within the range of 16 to 29 years. 145 men (42.4%) and 197 women (57.6%) filled in the questionnaire. 219 sixth formers from a secondary school (64%) and 123 students (36%) with different majors (e.g., Business Administration, Media management, Dentistry) answered the questions.

Table 1: Frequency Table of the Socio-Demographic Facts

		N	%
Gender	**Female**	197	57.6
	Male	145	42.4
BMI	**Underweight**	32	9.4
	Normal weight	254	74.3
	Overweight	29	8.5
	Obese	11	3.2
Education status	**Sixth former**	219	64.0
	Student	123	36.0
Origin mother	**German**	318	93.0
	Other	24	7.0
Origin father	**German**	308	90.1
	Other	34	9.8
Education level mother	**Low education**	171	50.0
	Medium education	70	20.5
	High education	87	25.4
	Unknown	14	4.1
Education level father	**Low education**	142	41.5
	Medium education	43	12.6
	High education	135	39.5
	Unknown	21	6.1
	Missing	1	0.3

6. Results

6.1 Socio Demographical Factors

Most respondents featured a mother with German origin (N=318). The answers of the remaining consulted young adults showed that, 7% of the respondents had a mother with a foreign origin (e.g., Turkey, Poland, Greece, China etc.). 90.1% of the consulted students' and pupils' male parents featured a German origin. 34 respondents had a father from foreign countries like Turkey, Italy, Spain, Poland etc.

The educational levels are divided into low, medium and high. Parents with no graduation or who visited a school only for ten years (secondary general school, intermediate secondary school and grammar school, classes 5 to 10) fall in the designation low. People with a vocational diploma and a graduation at a grammar school qualifying for university admission are considered as having a medium education. Highly educated people are those who accomplished their university degree.

Half of the respondent's mothers presented a low education. Followed by nearly one third of high educated mothers. The average education level of mothers proved to be the graduation of a vocational diploma, hence a medium education. The questionnaire exhibit just as many low educated fathers as high educated fathers. Similar to the mothers' education, the average education level represented a vocational diploma graduation.

6.2 Consumption of Sugared and Sugar-free Beverages

Table 2 gives an overview on the beverage consumption of the respondents. There is only one beverage which was consumed daily 4 to 6 times, namely water. Another study features approximately equivalent results. According to the NVS (2008), the German population consumes 1115 gram water a day. The category of sparkling apple juice showed a consumption two to three times a week. Orange juice, skimmed milk, whole milk, multivitamin juice and soft drinks belong to the group of beverages which were consumed once a week. The respondents declared that they rarely drink yoghurt drinks, chocolate milk, apple juice, diet soft drinks and ice tea. Hardly never buttermilk, soya milk, grape juice, vegetable juice, bio soft drink and smoothies were consumed by the respondents. The total sugar intake resulted in about 6.9 gram every day.

Table 2: Frequency Table of the Averaged Beverage Consumption per Month Ranked by Mean Frequency

(N varies between 338 and 342, depending on the different items)

	never	1-2 times a month	1 time a week	2-3 times a week	4-6 times a week	1 time a day	2-3 times a day	4-6 times a day	7 times or more often a day	Mean
Water	3	8	11	6	13	18	53	81	149	7.63
Sparkling apple juice	50	56	50	63	40	24	42	11	5	3.91
Orange juice	62	89	56	50	28	28	17	8	4	3.32
Skimmed milk	116	50	40	31	31	46	15	5	8	3.27
Soft drink	58	107	72	46	22	11	15	8	3	3.05
Whole milk	143	56	29	30	19	41	17	4	3	2.87
Multivitamin juice	118	93	50	33	25	12	6	3	1	2.52
Apple juice	114	112	45	23	21	13	7	2	3	2.47
Chocolate milk	149	72	46	31	16	17	8	1	1	2.38
Diet soft drink	168	74	35	29	11	11	8	4	2	2.23
Ice tea	172	91	30	17	11	2	13	3	2	2.09
yoghurt drinks	170	113	30	12	6	4	1	1	0	1.79
Bio soft drink	237	79	12	4	5	2	1	1	0	1.46
Grape juice	240	82	6	6	5	9	2	0	1	1.44
Smoothie	247	70	17	4	2	1	1	0	0	1.39
Buttermilk	227	54	5	10	2	2	1	1	0	1.38
Vegetable juice	305	22	4	4	1	2	2	1	0	1.22
Soya milk	332	10	1	1	1	3	1	0	1	1.15

6.3 Respondents' Knowledge of Beverages' Sugar Content and the Daily Fluid Demand

The respondents were asked to estimate the sugar content of the different beverages. The beverage, which was rated mostly as containing the highest sugar amount, was ice tea. The respondents estimated that ice tea has twice as much sugar as the real content.

Furthermore, they overestimated the sugar content of soft drinks and bio soft drink. An understatement was existent concerning the sugar content of grape juice. By contrast, the consulted people estimated the sugar content concerning chocolate milk, apple juice, sparkling apple juice and smoothies really close to the exact amount.

19.3% (N=66) estimated the right fluid demand of 1.5 litres daily. Nearly half of the respondents were of the opinion that 2.5 litres is the right fluid intake by beverages every day (N=161, 47.1%). A third of the consulted people assessed a fluid demand of 3 litres (M=111, 32.5%).

Table 3: Descriptive Table of Real and Estimated Sugar Content (100 ml/gram)

	Real sugar content	**Estimated sugar content**	**Std.D.**
Chocolate milk	12.00	12.53	3.34
Apple juice	11.00	11.00	3.32
Grape juice	17.00	11.27	3.48
Sparkling apple juice	8.00	9.77	2.99
Soft drinks	11.00	15.73	2.12
Bio soft drinks	6.00	8.89	3.46
Ice tea	6.00	13.41	3.32
Smoothie	12.00	10.99	3.68

Std.D. = Standard Deviation

6.4 Relations between the Variables of the Adjusted Theory of Planned Behaviour

First of all a correlation matrix was computed to examine the relationship between the different constructs. Due to this approach the positive or negative correlations can be detected.

The mean of the construct *knowledge* averaged 6.96 (N=275). This result is a little bit lower than half of the 15 questions concerning *knowledge*. It is also interesting to have a look at the number of completed questions of *knowledge*. Nearly 20% of all respondents did not fill questions of *knowledge* (N=67) in. The *attitude* construct reached an average of 0.42 (N=326), which appeared between the statements "So-so" and "I agree". The attitude towards sugar-free beverages was rated by the respondents in a positive direction. The *injunctive subjective norm* scored an average of -0.12 (N=313) whereas it is located between "So-so" and "I do not agree". That means, that the respondents did not agree with the statement that their surrounding drink more sugare beverages than sugar-free beverages. The first part of the *descriptive subjective norm* asking for the parents' behaviour, reached an average of -0.75 (N=342). The second part referring to the perceived behaviour of the partner scored an average of -0.26 (N=308). This means, that most parents and partners drink more sugar-free beverages than sugared ones. On the contrary, an average of 3.58 (N=339) was set up by the third and last part of the *descriptive subjective norm*. That leads to the conclusion, that most of the respondent's friends drink sugared beverages every day. The *perceived behavioural*

control was rated with an averaged amount of 0.83 (N=327). This value tends to the statement "I agree" and means that the respondents thought of themselves to be able to control the consumption of beverages. The *self-identity* construct, which refers to the health awareness, had an average value of 0.37 (N=338). This is only a weak positive rating of being a health aware consumer. The part consisting of the hedonistic view scored an average of 1.23 (N=341). With this part of the construct, the respondents agreed or agreed squarely and thought of themselves to be a hedonistic customer. The *intention* to drink less sugared beverages showed an average of -0.16. Most of the respondents did not have the *intention* to drink less sugared beverages. The total sugar intake resulted in about 6.9 gram every day.

Almost every construct had some significant correlations with other constructs (see table 4). Remarkable is the construct *knowledge* and the one item concerning the consumption view, which tries to reflect a part of the construct *self-Identity* (SI consumption). These constructs had no linear relationship with any other construct. Due to this fact, they were excluded in the regression analysis.

The availability of beverages at home and at school or university was included in the correlation analysis. The availability at home correlated strongly with the constructs *attitude,* the *descriptive subjective norm* of the parents and partner and with the consumption of sugared beverages. If sugared beverages were often available at home, respondents had a more negative *attitude* towards sugar-free beverages. Respondents who observed their parents and partners drinking more sugared beverages stated that there were more sugared beverages available at home. The availability at school or university had no significant effect at all.

The *attitude* towards sugar-free beverages featured a positive correlation with the *injunctive subjective norm*, the *perceived behavioural control*, the *self-identity* (health) and the *intention* to drink less sugared beverages. It correlated negatively with the *descriptive subjective norm* in observing the parents and friends, who drink sugared beverages. Furthermore, the positive *attitude* towards sugar-free beverages had a negative correlation with the consumption of sugared beverages. The negative correlations were already expected because a correlation analysis between positively and negatively coded constructs was applied. The *injunctive subjective norm* showed a negative correlation with three constructs: the *descriptive subjective norm* of parents, friends and behaviour. If the surrounding of the respondents had a positive meaning towards sugar-free beverages, the *self-identity* was judged more positively just as the *intention*. There was a positive correlation between parents drinking a lot of sugared beverages with partners and friends and their consumption of sugared beverages. The *perceived behavioural control* and the *self-identity* were lower, if parents consumed more sugared beverages. The *descriptive subjective norm* showed a positive correlation with

the behaviour. Just like the *DSN* of parents, the *descriptive subjective norm* of the partner had a positive correlation with the *DSN* of the friends. Respondents, who had a lot of friends drinking sugared beverages everyday scored badly on the construct *self-identity*. Besides this, these consulted people appeared to drink more sugared beverages. If participants thought of themselves as having a lot of *behavioural control*, they presented a more positive picture of their *self-identity* referring to their health awareness. On the other hand, the *self-identity* as a healthy person appeared in a positive correlation with the *intention* to drink more sugar-free beverages and in a negative way with the consumption of sugared beverages. The *intention* to drink more sugar-free beverages had a negative correlation with the behaviour concerning the consumption of sugared beverages. Even though the correlation showed the expected direction, the correlation between the *intention* and the consumption of sugared beverages appeared to be low. Other studies proved correlations between .20 till .57 (e.g., Armitage & Conner, 1999b; Povey et al., 2000). The strongest correlations of the consumption concerning sugared beverages were presented with the availability of sugared beverages at home and the *attitude* about sugar-free beverages.

Table 4: Correlations of the Constructs

	Availability home-	**Availability school / uni.-**	**KL+**	**A+**	**ISN+**	**DSN parent -**	**DSN partner-**	**DSN friends -**	**PBC+**	**SI health +**	**SI consumption -**	**I-**
Availability home												
Availability school /uni.	.15**											
KL	-.07	-.00										
A	-.29**	.08	-.01									
ISN	-.18**	.08	-.00	.50**								
DSN parents	.23**	-.03	-.03	-.32**	-.24**							
DSN partner	.09	.04	-.06	-.11	.00	.39**						
DSN friends	.22**	-.08	-.01	-.29**	-.19**	.26**	.14*					
PBC	-.14*	-.01	.02	.17**	.02	-.14*	-.06	.04				
SI health	-.16**	-.06	-.01	.44**	.29**	-.24**	-.05	-.22**	.18**			
SI consumption	-.11	.00	-.03	-.08	.04	-.11	.01	-.00	.05	.06		
I	-.03	.07	-.05	.44**	.41**	.00	-.02	-.08	-.06	.25**	-.09	
B	.25**	-.03	.01	-.26**	-.17**	.18**	.02	.13*	-.07	-.16**	-.05	-.

*p<0.05, ** p<0.01

KL=Knowledge, A=Attitude, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity, I=Intention, B=Behaviour

+=positive coded, -=negative coded

6.5 Multiple Regression Analysis of the Beverage Consumption and the Intention to Drink Less Sugared Beverages

A regression analysis was carried out in a stepwise method using *behaviour* as a dependent variable (see table 5). The independent variables consisted of the demographical data, the availability of sugared beverages at home and at school / university and the constructs from of the *Theory of Planned Behaviour* which correlate significantly with the dependent variable.

From the sample as a whole, it was possible to account for approximately 10% of the variance in behaviour using availability of sugared beverages at home only. The most important determinants of the first and third block are the education level of the father and the *descriptive subjective norm* of the friends. The other factors do not contribute significantly to prediction the consumption of sugared beverages.

Table 5: Stepwise Regression Analysis of Predicting the Consumption of Sugared Beverages Regarding the Total Population (N=249)

	Block 1		**Block 2**		**Block 3**	
	Beta	**P**	**Beta**	**P**	**Beta**	**p**
Age	-.10	.122	-.03	.699	-.01	.870
Education level mother	.01	.980	-.03	.652	-.06	.422
Education level father	.05	.493	.10	.150	.13	.065
BMI	.02	.792	.01	.833	-.00	.950
Availability at home			.33	.000	.32	.000
Availability at school/university			-.05	.405	-.05	.496
Attitude					-.06	.450
ISN					-.07	.372
DSN parents					.08	.270
DSN partner					-.06	.378
DSN friends					-.12	.066
PBC					.04	.580
SI (health)					-.04	.568
Intention					-.03	.649
R	.11		.34		.38	
R^2	.01		.11		.15	
F	(df=4)=0.78	.542	(df=6)=5.11	.000	(df=14)=2.91	.000
ΔR^2			.10		.04	
ΔF			13.62	.000	1.22	.286

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity

In terms of the factor *intention*, the determinants of the *Theory of Planned Behaviour* can be accounted for 29% of the variance. *Attitude*, the *descriptive subjective norm* of the parents and the partner, the *perceived behavioural control* and the *self-identity* concerning health awareness were identified as the strongest predictors. In addition, a

significant proportion of the variance concerning the factor *intention* (5%) was explained due to the demographical data.

Intention as a dependent variable can be explained by 59% of the theory. Only 38% of the variance referring to behaviour can be predicted by the theory and therefore the *Theory of Planned Behaviour* had more explanatory power within the regression analysis of the *intention.* Figure 2 shows the predictive power of every single variable on the *intention* to drink less sugared beverages.

Table 6: Stepwise Regression Analysis of Predicting the Intention to Drink Less Sugared Beverages Regarding the Total Population (N=249)

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	.10	.127	.08	.244	.03	.671
Education level mother	-.09	.208	-.10	.177	-.06	.346
Education level father	.21	.004	.21	.004	.16	.009
BMI	.10	.124	.10	.142	.11	.058
Availability at home			-.00	.991	.09	.134
Availability at school/university			.07	.261	.03	.573
Attitude					.41	.000
ISN					.20	.002
DSN parents					.19	.003
DSN partner					-.07	.233
DSN friends					.04	.467
PBC					-.11	.041
SI (health)					.11	.083
Behaviour					-.03	.649
R	.23		.24		.59	
R^2	.05		.06		.35	
F	(df=4)=3.44	.009	(df=6)=2.51	.023	(df=14)=8.95	.000
ΔR^2			.01		.29	
ΔF			.653	.521	13.04	.000

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity

6.6 Group Differences Concerning the Predicting Power of the Constructs

Two group differences were made within the hypotheses formulated in chapter 3: it is distinguished between genders and age (sixth former vs. students). The results are described in the following paragraphs.

Answering hypothesis 1: "Female adults drink less sugared beverages than male adults."
There are some important differences between the genders concerning their drinking behaviour, which can be ascertained with the help of an *Independent-Samples T Test*. The most important difference which can be made is between female's and male's

attitude towards sugar-free beverages. Young female adults showed a better *attitude* towards sugar-free beverages than boys. Furthermore, they perceived a higher *injunctive subjective norm* of their surrounding and a higher *descriptive subjective norm* of their parents and friends than the male respondents. Female adults considered themselves to have a higher health-consciousness. On the other hand, boys rated the pleasure of consuming more significantly than the female counterpart did. With an average of 5.37 gram sugar every day the female adults consumed 3.52 gram less sugar than the male respondents.

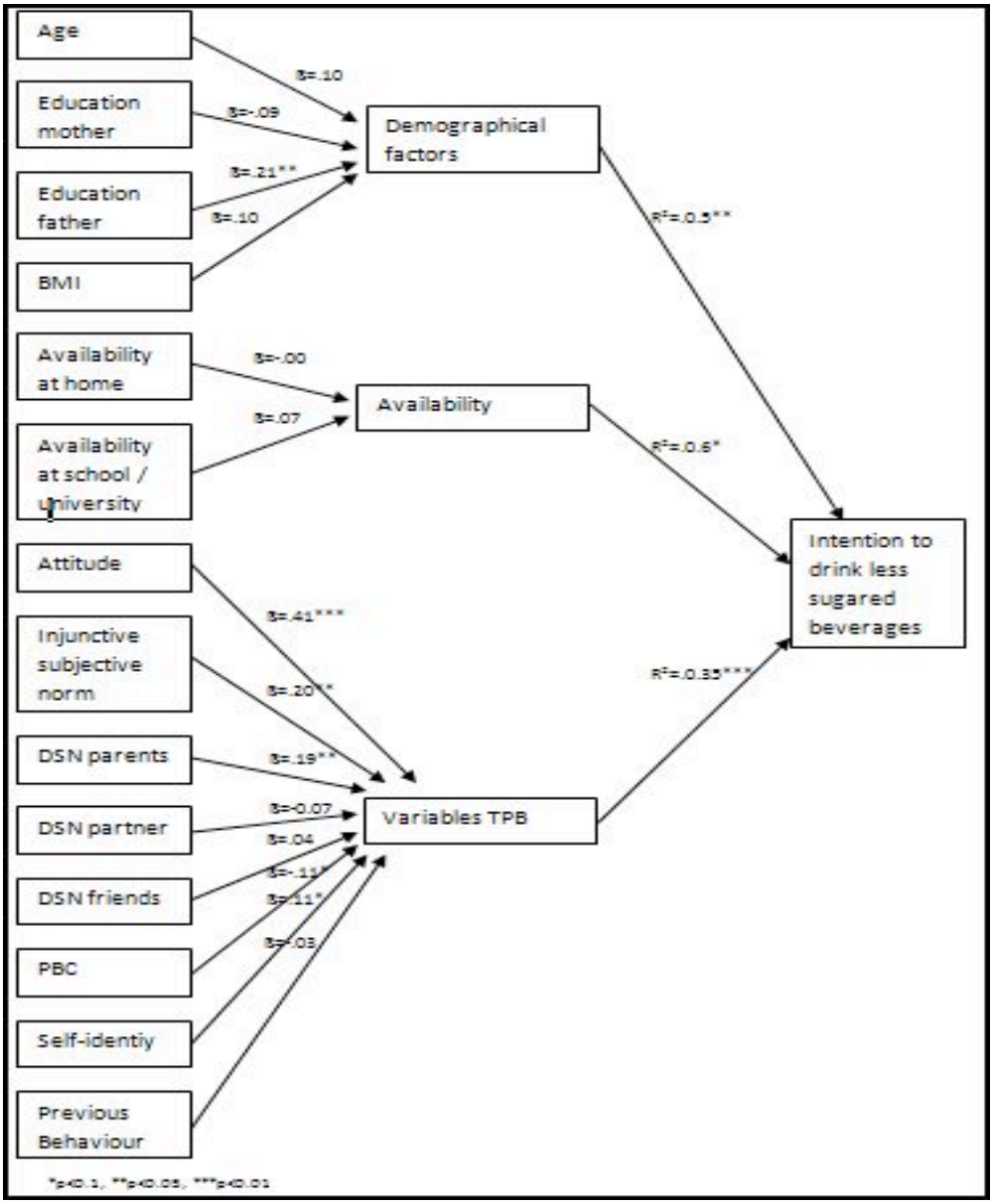


Figure 2: Stepwise Regression of Predicting the Intention to Drink Less Sugared Beverages Regarding the Total Population (N=249)

The regression analysis (tables 8 till 10) showed that the behaviour and the *intention* of female and male respondents were influenced by different constructs. Due to the fact,

that regression analysis concerning male's consumption of sugared beverages had a low significance (p>0.1), the remarks are only devised shortly and the table is not contained in the article (see attachment 10.5).

Within both groups, the availability of sugared beverages at home was the most important predictor of the consumption concerning sugared beverages. Within the male group the availability at home, the *descriptive subjective norm* of the friends and the education level of the father accounted for 18% of the variance in behaviour. The second and third most important predictors within the female group turned out to be the *attitude* towards sugar-free beverages and the BMI. All in all, they accounted for 26% of the variance.

Table 7: Independent-Samples T Test of the Gender Differences

	Gender	**N**	**Mean**	**Std. D.**	**t**
Knowledge	Female	158	6.94	1.84	-.243
	Male	117	6.99	1.86	
Attitude	Female	188	.58	.52	6.09**
	Male	138	.21	.57	
ISN	Female	183	.03	.73	3.79**
	Male	130	-.33	.89	
DSN parents	Female	197	-.86	1.13	-2.27*
	Male	145	-.59	1.10	
DSN partner	Female	184	-.18	1.23	1.33
	Male	124	-.36	1.06	
DSN friends	Female	196	3.42	.92	-3.61**
	Male	143	3.78	.95	
PBC	Female	189	.80	.44	-1.34
	Male	138	.87	.53	
SI health	Female	195	.49	.74	3.39**
	Male	143	.21	.76	
SI consumption	Female	197	1.15	.87	-2.01*
	Male	144	1.35	.90	
Intention	Female	196	.02	.97	3.86**
	Male	145	-.40	1.03	
Behaviour	Female	197	5.37	6.26	-3.55**
	Male	145	8.89	10.64	

*p<0.05, **p<0.01

KL=Knowledge, A=Attitude, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity, I=Intention, B=Behaviour

The *attitude* and the *descriptive subjective norm* concerning the parents and the partner were significant predictors of the *intention* in both groups. In addition, predictive value was presented by the *injunctive subjective norm* and the BMI within the male group. The fourth most important predictor of female's *intention* was the education level of the father. Summing up, the four constructs accounted for 41% and 36% respectively, of the variance concerning intention.

Table 8: Stepwise Regression Analysis for Predicting the Consumption of Sugared Beverages Regarding Female Respondents (N=144)

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	-.09	.300	.03	.733	.03	.703
Education level mother	-.06	.536	.03	.760	.02	.824
Education level father	-.05	.587	-.01	.932	-.03	.764
BMI	-.11	.214	-.11	.180	-.13	.101
Availability at home			.43	.000	.36	.000
Availability at school/university			-.09	.281	-.04	.643
Attitude					-.26	.012
ISN					-.13	.164
DSN parents					.01	.943
DSN partner					-.06	.455
DSN friends					-.06	.513
PBC					.08	.387
SI (health)					.04	.634
Intention					.12	.199
R	.17		.44		.51	
R^2	.03		.20		.26	
F	(df=4)=1.01	.404	(df=6)=5.58	.000	(df=14)=3.19	.000
ΔR^2			.17		.06	
ΔF			14.35	.000	1.31	.243

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity

Table 9: Stepwise Regression Analysis for Predicting the Intention to Drink Less Sugared Beverages of Male Respondents (N=104)

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	-.03	.774	-.04	.712	-.07	.459
Education level mother	-.08	.478	-.10	.409	-.04	.715
Education level father	.08	.482	.09	.414	.01	.960
BMI	.31	.002	.31	.002	.22	.018
Availability at home			.03	.804	.04	.709
Availability at school/university			.09	.399	.12	.193
Attitude					.26	.024
ISN					.28	.007
DSN parents					.27	.007
DSN partner					-.22	.022
DSN friends					.19	.036
PBC					-.10	.241
SI (health)					.13	.179
Behaviour					-.03	.704
R	.31		.32		.64	
R^2	.10		.10		.41	
F	(df=4)=2.62	.040	(df=6)=1.88	.092	(df=14)=4.41	.000
ΔR^2			.01		.30	
ΔF			.461	.632	5.76	.000

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity

Table 10: Stepwise Regression Analysis for Predicting the Intention to Drink Less Sugared Beverages of Female Respondents (N=144)

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	.15	.078	.15	.106	.09	.247
Education level mother	-.08	.411	-.08	.388	-.06	.456
Education level father	.27	.004	.28	.003	.26	.002
BMI	.02	.773	.02	.805	.05	.485
Availability at home			.03	.333	.10	.287
Availability at school/university			.02	.836	-.06	.475
Attitude					.47	.000
ISN					.19	.029
DSN parents					.18	.043
DSN partner					-.00	.976
DSN friends					-.05	.565
PBC					-.13	.116
SI (health)					.08	.357
Behaviour					.10	.199
R	.29		.29		.60	
R^2	.09		.09		.36	
F	(df=4)=3.26	.014	(df=6)=2.18	.049	(df=14)=5.16	.000
ΔR^2			.01	.00	.27	
ΔF			.09	.910	6.85	.000

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity

Answering hypothesis 2: Older respondents (students) drink less sugared beverages than younger respondents (sixth former).

Another aspect of the differences within the groups can be considered the age. Students are older (M=23.4 years) than sixth formers (M=17.6 years) and therefore have other perceptions of their surroundings. During this period, a change in their living situation takes place. Most students move out of their parent's home and live on their own or with friends. Due to this reason, some variations may appear in the judgments of the different constructs.

Students showed a more positive *attitude* towards sugar-free beverages than sixth former. Furthermore, they observed their parents drinking less sugared beverages and have less friends drinking sugared beverages daily. Students scored their health awareness and the consumption view on the scale of *self-identity* significantly higher than sixth former. The last difference, which can be made, refers to the *intentions* of drinking less sugared beverages. Sixth former showed a lower *intention* of drinking less sugared beverages than students.

Table 11: Independent-Samples T Test of Age Differences

	Education level	N	Mean	Std. D.	t
Knowledge	Sixth formers	191	7.01	1.70	.562
	Students	84	6.86	2.14	
Attitude	Sixth formers	211	.33	.58	-4.16**
	Students	84	.59	.52	
ISN	Sixth formers	208	-.17	.81	-1.52
	Students	105	-.02	.83	
DSN parents	Sixth formers	219	-.64	1.18	2.35*
	Students	123	-.93	1.11	
DSN partner	Sixth formers	203	-.25	1.14	.200
	Students	105	-.28	1.30	
DSN friends	Sixth formers	219	3.68	.94	2.91**
	Students	120	3.38	.93	
PBC	Sixth formers	210	.83	.47	.138
	Students	117	.83	.50	
SI health	Sixth formers	217	.31	.79	-2.06*
	Students	121	.48	.68	
SI consumption	Sixth formers	219	1.16	.92	-2.20*
	Students	122	1.37	-80	
Intention	Sixth formers	218	-.26	1.01	-2.41*
	Students	123	.02	1.00	
Behaviour	Sixth formers	219	7.51	8.26	1.70
	Students	122	5.81	9.20	

*p<0.05, **p<0.01

A=Attitude, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived behavioural control; SI=Self-identity, I=Intention

The predicting of the *intention* to drink less sugared beverages and the consumption of sugared beverages (behaviour) was compared between the two groups. In both groups, the availability at home accounted for significant proportions of the variance in behaviour. However, other factors were also important predictors of the student group. The *descriptive subjective norm* of the friends and the *self-identity* concerning the health awareness had influence on the consumption of sugared beverages. All in all, the three constructs accounted for 29% of the variance. The educational level of the father was an influential determinant of the sixth former's consumption of sugared beverages. 15% can be explained due to the two constructs.

The *attitude* and the education level of the father predicted a big part of the *intention* in terms of the sixth former and student group. These two constructs in addition with the *injunctive subjective norm*, the BMI, the *descriptive subjective norm* of the partner and the parents, accounted for 42% of the variance in the sixth former's *intention*. 40% of the student's *intention* was predicted by the *attitude*, the education level of the father, the *descriptive subjective norm* of the friends and the *self-identity* with respect to the health awareness.

The analysis of the respondent's educational level pointed out that some differences certainly exist between the age groups.

Table 12: Stepwise Regression Analysis for Predicting the Consumption of Sugared Beverages Regarding Sixth former (N=172)

	Block 1		**Block 2**		**Block 3**	
	Beta	**P**	**Beta**	**p**	**Beta**	**p**
Age	-.06	.415	-.01	.888	-.00	.988
Education level mother	-.08	.372	-.11	.215	-.13	.135
Education level father	.07	.439	.11	.190	.14	.100
BMI	.01	.915	.01	.874	.02	.842
Availability at home			.33	.000	.32	.000
Availability at school/university			-.03	.654	-.01	.884
Attitude					-.08	.475
ISN					-.03	.735
DSN parents					.05	.636
DSN partner					-.07	.422
DSN friends					-.04	.605
PBC					.07	.385
SI (health)					.00	.981
Intention					-.11	.266
R	.09		.33		.38	
R^2	.01		.11		.15	
F	(df=4)=.37	.829	(df=6)=3.43	.003	(df=14)=1.92	.028
ΔR^2			.10		.04	
ΔF			9.47	.000	.82	.589

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity,

Table 13: Stepwise Regression Analysis for Predicting the Consumption of Sugared Beverages Regarding Students (N=76)

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	-.05	.663	-.03	.794	.05	.407
Education level mother	.19	.153	.14	.291	.10	.774
Education level father	.03	.835	.09	.521	.05	.358
BMI	.06	.625	.03	.770	.02	.181
Availability at home			.31	.010	.27	.049
Availability at school/university			-.05	.701	-.16	.269
Attitude					.07	.597
ISN					-.14	.280
DSN parents					.10	.449
DSN partner					-.09	.461
DSN friends					-.39	.005
PBC					.03	.812
SI (health)					-.23	.098
Intention					.18	.203
R	.21		.36		.54	
R^2	.05		.13		.29	
F	(df=4)=.85	.496	(df=6)=1.78	.116	(df=14)=1.78	.062
ΔR^2			.09		.16	
ΔF			3.51	.035	1.68	.120

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity,

Table 14: Stepwise Regression Analysis for Predicting the Intention to Drink Less Sugared Beverages of Sixth former (N=172)

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	-.03	.727	-.05	.558	-.01	.825
Education level mother	-.10	.261	-.12	.194	-.11	.145
Education level father	.14	.105	.14	.110	.07	.345
BMI	.14	.072	.14	.079	.13	.037
Availability at home			-.05	.498	.10	.142
Availability at school/university			.11	.163	.07	.263
Attitude					.41	.000
ISN					.30	.000
DSN parents					.25	.001
DSN partner					-.21	.003
DSN friends					-.01	.868
PBC					-.04	.527
SI (health)					.07	.360
Behaviour					-.07	.266
R	.19		.21		.65	
R^2	.03		.05		.42	
F	(df=4)=1.50	.204	(df=6)=1.35	.232	(df=14)=5.21	.000
ΔR^2			.01		.38	
ΔF			1.09	.340	12.84	.000

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity,

Table 15: Stepwise Regression Analysis for Predicting the Intention to Drink Less Sugared Beverages of Students (N=76)

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	-.07	.555	-.11	.391	-.15	.213
Education level mother	-.11	.409	-.13	.334	-.06	.599
Education level father	.33	.014	.36	.08	.32	.012
BMI	.05	.667	.03	.826	.05	.651
Availability at home			.15	.193	.15	.258
Availability at school/university			.10	.449	.09	.458
Attitude					.22	.088
ISN					.18	.135
DSN parents					.17	.172
DSN partner					.08	.469
DSN friends					.30	.021
PBC					-.17	.172
SI (health)					.27	.030
Behaviour					.15	.203
R	.31		.36		.63	
R^2	.10		.13		.40	
F	(df=4)=1.90	.119	(df=6)=1.73	.125	(df=14)=2.97	.002
ΔR^2			.03		.27	
ΔF			1.36	.263	3.52	.002

BMI=Body Mass Index, ISN=Injunctive subjective norm, DSN=Descriptive subjective norm, PBC=Perceived Behavioural Control, SI=Self-identity,

6.7 The Influence of Sociocultural Factors

Answering hypothesis 3: Young adults have similar drinking patterns concerning sugar-free and sugared beverages as their parents and/or friends.

The correlation analysis showed a significant negative correlation between the *injunctive subjective norm* and the *consumption* of sugared beverages. Besides, two significant positive correlations between the *descriptive subjective norm* with respect to their parents and friends and the *injunctive subjective norm* were detected. If the respondents had the feeling that their parents, partner and friends support the drinking of sugar-free beverages, the consumption of sugared beverages was lower (-.17, $p<0.01$). If parents and a lot of friends consumed more sugared beverages than sugar-free drinks, the consumption of sugared beverages increased (.18, $p<0.01$, .13, $p<0.05$, respectively).

Moreover, the influence of the friends' drinking behaviour was more significant for all the respondents ($p<0.1$) to consume sugared beverages than the drinking behaviour of the parents ($p>0.1$). In contrast, the parent's *descriptive subjective norm* had more influence ($p<0.05$) on the *intention* to drink less sugared beverages than the friends DSN ($p>0.1$). It is interesting to examine is the difference between students and sixth former. The *intention* of sixth formers can be predicted by the *descriptive subjective norm* of

their parents and their partner (see table 14). However, the *intention* of students was only influenced by the *descriptive subjective norm* of their friends.

The analysis showed clearly that the social environment had an important impact on the drinking behaviour of the respondents but the importance varies in the different groups.

Answering hypothesis 4: Young adults from a higher educated family drink less sugared beverages than young adults from a lower educated family.

A *one-way ANOVA analysis* with a *post-hoc comparison (Bonferroni*) was carried out to check the relationship between education and drinking pattern. Three education levels were distinguished: low, medium and high education level (see table 1).

Looking at the education level of the father, the analysis showed one significant difference between the education levels. The *descriptive subjective norm* concerning parents' consumption of sugared beverages appeared differently between respondents, who have a father with a low education and respondents, who have a father with high education. Respondents observed their high educated fathers consuming less sugared beverages. Differences within the other constructs and between the education levels of the mothers were not significant and therefore were not mentioned.

The regression analysis showed that the educational level of the father had an impact ($p<0.1$) on sixth former's consumption of sugared beverages (see table 12). The *intention* of students and women was predicted among other things by the educational level of the father ($p<0.1$).

Table 16: One-way ANOVA for the Educational Level of the Father

	Education level	**N**	**Mean**	**Std. D.**	**F**
DSN parents	Low education	142	-.59	1.17	2.92*
	High education	135	-.96	1.03	

*p<0.5

6.8 The Influence of Home Economical Factors

Answering hypothesis 5: "The availability of sugared beverages at home and at school has an influence on the consumption of sugared beverages by young adults."

In the theoretical framework speculations on the influence of the availability and the consumption of beverages were assumed. The next analysis shows the correlation between the availability of different beverages at home or at school / university and the consumption of these beverages. Table 17 shows clearly that beverages' availability at home correlates significantly with the consumption. The consumption of ice tea and smoothies showed simply no correlation to the availability of beverages at home. The availability at school or at the university influenced only the consumption of smoothies.

The regression analyses (table 5, 8, 12 and 13) detected the factor availability of sugared beverages at home to be the most important predictor concerning the consumption of sugared beverages. No other variable had such big influence on the actual behaviour.

Therefore the hypothesis, that the availability of sugared beverages at home has a big influence on the consumption of sugared beverages, can be totally supported. The influence of the availability at school and at the university cannot be supported.

Table 17: Correlation Analysis between the Beverage Consumption and the Availability at Home and at School / University

	Availability home	**Availability school / university**
Soft drinks consumption	.51**	.03
Ice tea consumption	-.02	-.00
Bio soft drinks consumption	.31**	.03
Sparkling apple juice consumption	.55**	.03
Apple juice consumption	.40**	.11
Milk consumption	.08	-.01
Chocolate milk consumption	.44**	.02
Smoothies consumption	.07	.46**
Orange juice consumption	.46**	-.03
Water consumption	.25**	-.01

**p<0.01

6.9 The Influence of the Variables from the Theory of Planned Behaviour

Answering hypothesis 6: "The more adults know about the beverages' ingredients the healthier they drink."

The correlation analysis in table 4 presented no significant coherence between *knowledge* of beverages' ingredients and a healthful drinking pattern (.01). It cannot be expected that higher *knowledge* leads to healthy drinking patterns in collaboration with more awareness. Due to this conclusion, the hypothesis had to be discarded.

Answering hypothesis 7: "The more positive the attitude towards sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages)."

As shown in the correlation analysis (table 4), there was a significant negative coherence between the *attitude* towards sugar-free beverages and the *consumption* of sugared

beverages (-.26, $p<0.01$). The regression analyses cannot support a strong predictive power of this construct. Only the *intention* to drink less sugared beverages was strongly influenced by the construct *attitude*. The *attitude* of sixth formers had more effect on the *intention* to drink sugar-free beverages than the *attitude* of students. Both, female and male adult's *intention* was mainly predicted by the *attitude* but the significance was somewhat higher for the female respondents. The results clarified that the hypothesis cannot be supported for the determination of the behaviour but well for the prediction of the intention.

Answering hypothesis 8: "The stronger the perception of the injunctive subjective norm concerning sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages)."
The *injunctive subjective norm* concerning sugar-free beverages had a significant negative correlation with the consumption of sugared beverages. That means, that a high *injunctive subjective norm* concerning sugared beverages resulted in a higher consumption of sugared beverages. However, the *ISN* had no significant influence on the proportion of variance in behaviour. Comparable to the determinant *attitude*, the *injunctive subjective norm* accounted for the variance in *intention*. Simply for students the *injunctive subjective norm* could not be considered as an important predictor of *intention*.

Answering hypothesis 9: "The stronger the perception of the descriptive subjective norm concerning sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages)."
In advance, a distinction between the *descriptive subjective norm* of parents, partners and friends was made. Every group can exert a different power of influence on the target group. The correlation analysis showed that parents and friends had a greater impact on the *behaviour* of the respondents (.18, $p<0.01$, .15, $p<0.05$, respectively) than the partner (.02). Parents, who consumed a lot of sugared beverages, influenced the choice of their child concerning sugared beverages positively. The regression analysis showed that the *descriptive subjective norm* of the parents had influence on the *intention* of the whole sample, the *intention* of both genders and of the sixth formers. The other subjective influencer is the circle of friends. The more friends, who drank sugared beverages daily, the more sugared beverages were consumed by the target group. This determinant accounted for important variance in the behaviour. It is applicable for all respondents, but especially for the consumption of sugared beverages concerning male respondents and students. Friends showed predictive power on student's and male's *intention*. Although there was no significant correlation between the *descriptive*

subjective norm concerning the partner and the behaviour or *intention*, the regression analysis detected an influence on the *intention* of male respondents and sixth formers.

Answering hypothesis 10: "The worse the perception concerning the perceived behavioural control of drinking sugared beverages the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages)."
The *perceived behavioural control* showed no significant correlation with the *behaviour*, nor with the *intention* to drink less sugared beverages. The only significant influence of the determinant, was exerted on the prediction of the *intention* for the whole sample. A low significance was detected within the prediction of the female respondent's *intention*.

Answering hypothesis 11: "The less self-identity considering oneself as healthy the higher the consumption of sugared beverages (the worse the intention to drink less sugar-free beverages)."
The *self-identity* as being very health-orientated correlated with the *intention* to drink less sugared beverages and the consumption of sugared beverages significantly. The *self-identity* did not account for a proportion of the variance in behaviour but well for a part of the *intention's* variance. In particular, the determinant was able to predict the *intention* of the student group significantly.

Answering hypothesis 12: "The lower the intention to drink sugar-free beverages the higher the consumption of sugared beverages."
Indeed, the correlation analysis showed a significant coherence between the *intention* and the consumption of beverages but only in a low modality (-.11). The regression analysis also approved that the two constructs only allegorized a low relationship. The determinant *intention* had no influence on the prediction of the consumption. Therefore the hypothesis has to be revised.

Answering Hypothesis 13: "The higher the consumption of sugared beverages the lower the intention to drink sugar-free beverages."
As named above the relationship between the two determinants appeared to be low. No influential power of the previous behaviour can be detected in order to predict the *intention* towards sugared beverages. Again, the hypothesis cannot be supported.

7. Discussion

The aim of the study consisted in obtaining information about the choice of non-alcoholic beverages made by young adults. These results are necessary in order to give advices for an educational initiative which intends to reduce the uncertainty of the consumer and provide a supportive help for making a responsible choice. This chapter deals with a more interpretative view on the results and an explanatory approach.

7.1 General discussion

Not more than 10% of a normal grownup's energy intake should consist out of sugar (DGE, 2003). This corresponds to 45 - 55 gram sugar daily. The current study showed that young adults received approximately 7 gram sugar out of beverages every day. This represents 12% to 15% of the daily sugar amount. In comparison to another study, these consulted young adults presented a comparably low sugar intake from beverages. A study from Briefel, Wilson and Gleason (2009) points out that the energy intake from sugared beverages averaged about 159 kcal. This represents approximately 40 gram sugar and therefore the consumption of sugar turns out to be four times as much as in this study. Within the female and student group, sugar intake from sugared beverages was lower, although the difference between students and sixth former was not significant. The NVS study (2008) provides similar information. The study reports that male adults drink more sugar-containing beverages, like juices and soft drinks. Furthermore, the fluid intake of water and juices complied with the data of the NVS. Approximately 1250 gram water and 260 gram juices (apple juice, orange juice, grape juice and multivitamin juice) were consumed by the consulted people. According to the NVS, the fluid intake of water was composed of 1100 gram for men and 1119 gram for women. Men drink 270 gram juices every day and women 232 gram. The respondents indicated that they consumed an average of 72 ml soft drinks daily (men's intake=103 ml and women's intake=49 ml). On the contrary, the study of NVS presents, that the consulted male adults consumed 224 gram soft drinks and the women 88 gram of soft drinks. This is clearly a higher consumption of soft drinks in comparison to the current study. Different explanations for the aberration can be expressed. It might be possible, that the probands modified their answers in order to conform to the social requirements or that they experienced difficulties in recalling the beverage consumption. This is a problem that frequently appears in researches. On the other hand, the discrepancy can be explained by the selection of the population. In this study the respondents belong to a high educated population. Other studies (Roos, Lahelma, Virtanen, Prättälä, & Pietinen, 1998; NVS I, 2008; NVS II, 2008) detect that high educated people tend to eat and drink

healthier, which also implies a consumption of soft drinks to a lesser extent. The NVS (2008) states that the lower stratum of the population consumes soft drinks three to four times more frequently than the upper social stratum. The age of the respondents can be associated with a high consumption of sugared beverages, according to other researches (Mesink, Kleiser, Richter, 2007; NVS I, 2008; NVS II, 2008). The explanation for the divergent consumption of soft drink can barely be substantiated due to the factor age.

This study presented less overweight and obese respondents than the KIGGS study (2003-2006). Approximately 17% of young adults in Germany have overweight and 8.5% are obese. This initiated study detected 8.5% being overweight and 3.2% suffering from obesity. If the reported amount of sugar intake from beverages is valid, then this can be considered as a possible explanation for the lower percentages concerning overweight and obesity. Hence, this implies that respondents, who drank less soft drinks featured less weight problems. The relationship between a high education and less weight problems is supported by different studies (Danielzik & Müller, 2006; Kurth & Schaffrath Rosario, 2007). If the selection of a high educated population is an intermediate effect between the consumption of soft drinks and the weight cannot be maintained surely. In addition, the possibility has to be considered, that the consulted people did not fill their right weight in because they were ashamed of it.

7.2 Discussion of the used model

The strongest predictor of the consumption amount concerning sugared beverages was the availability of sugared beverages at home. This assumption is also backed up by other studies (Kassem, Lee, Modeste & Johnston, 2003; Grimm, Harnack, Story, 2004). A direct relationship between the availability of sugared beverages and the consumption of soft drinks can be detected for all subgroups. Although most determinants of the *Theory of Planned Behaviour* correlated with the factor behaviour and with each other, they did not always show the expected effects on the prediction of the behaviour. The only determinant, which had a predicting power on the consumption of sugared beverages, was the *descriptive subjective norm* of the friends. In particular, it is noticeable that the *intention* and the behaviour had a low relationship. This implies that no matter how strong the *intention* is to drink less sugared beverages or how positive the *attitude* towards sugar-free beverages is, in the end the consumption is mostly predicted by the availability of the beverages at home. This allows the assumption that the consumption and choice of beverages is often an impulsive action without far-reaching cognitions.

The determinants seemed to be more useful to predict the *intention* to drink less sugared beverages. In this connection the *attitude*, the *injunctive subjective norm*, the

descriptive subjective norm of the parents, the *self-identity* with regard to the health awareness and the *perceived behavioural control* predicted a big proportion concerning the variance in *intention*. All the regression analysis (of the whole sample and the subgroups) showed that the *intention* to drink less sugared beverages was influenced by more predictors than just the actual behaviour. This leads to the conclusion that in this case, the *Theory of Planned Behaviour* was a better model to predict the *intention* regarding the performance of a certain behaviour.

The *Theory of Planned Behaviour* had a different impact on different groups. The group differences of every single determinant are discussed in detail in the following description.

7.2.1 Influence of Knowledge

In this study *knowledge* was unrelated to the consumption of sugared beverages and to any of the other behavioural determinants. Due to these findings, it can be assumed that *knowledge* of beverages (i.e., sugar content, types of sweeteners, recommended daily amount of fluid) had no measurable influence on the actual drinking behaviour of the whole sample. This assumption can be supported by the outcome, that knowledge was not associated with gender or education level. Female respondents reported drinking less sugared beverages, but did not show a higher level of *knowledge.* Similarly, the student population, which is considered older and a little bit more educated, did not show a higher level of *knowledge* in comparison to the younger population. Other health related studies also detected the weak predictable power of *knowledge*. Although *knowledge* of a topic is a pre-condition, the effect on the behaviour is, however, low (Van der Velde & Van der Pligt, 1990; Joseph, Montgomery, Emmons, Kessler, Ostrow, et al., 1987; Reinher, Kersting, Chahda Andler, 2003).

Another possible explanation of the result might be that the respondents possibly experienced problems with the completion of the questions because they were asked for information too detailed. Thereby a lot of respondents might have filled something in without knowing which answer is correct. This could have led to the average knowledge index of 6.96 (highest possible points were 15). In turn, this indicates that there is a lot of information, which the consumer has to face every day and that these information are not presented comprehensible enough. Most of the people still have a wrong conception of the ingredients concerning different beverages. It seems as if the young adults followed rules of thumb, which segmented beverages in different categories. Juices were often regarded as healthful because they are obtained from crushing fruits. In contrast, soft drinks were perceived as beverages with a high amount of sugar. Both kinds of beverages include sugar and are energy-dense beverages, so that it is not simply said, which beverage is healthier concerning the sugar content. The beverage with the highest

sugar amount is definitely grape juice (17 grams sugar on 100 ml), which was rated with an average of 11.27 by the participants. The respondents estimated that soft drinks have the highest amount of sugar (M=15.73), although these beverages contain approximately 11 grams sugar.

Even though, the impact of *knowledge* on the *intention* and the consumption of sugared beverages is limited, it is important to provide a clear, honest and unbiased overview on the different beverages and their ingredients. Thereby the consumer receives the possibility to take responsible decisions without being unaware of certain beverages and their influence on health.

7.2.2 Influence of Attitude

In general, most respondents reported a positive *attitude* towards sugar-free beverages. They agreed that sugar-free beverages are healthier, tasty and have other advantages over sugared beverages.

Both, the bivariate correlations and the regression analyses, confirmed that *attitude* is an important determinant of the *intention* to drink sugar-free beverages. Moreover the determinant *attitude* affected the consumption of sugared beverages of some groups.

An important distinction can be applied between gender and age. Young females have a more positive *attitude* towards sugar-free beverages (see table 7). This can be related to the greater interest they possess for food, beverages and their ingredients (NVS I, 2008; NVS II, 2008). Although no differences concerning the *knowledge* of beverages were detected in this study, other studies, however, show that females pay more attention to a healthy and balanced diet and therefore know more about this topic in general (Allgöwer, 2000). In addition, students also showed a more positive *attitude* towards sugar-free beverages (see table 13). Perhaps, younger people, in this case sixth former, have no big health problems yet and therefore do not spend time in gathering information about a healthy eating and drinking behaviour. The Independent-Samples T Test showed that the students' BMI is significantly higher than the BMI of the sixth former ($t=-3.36$, $p<0.001$). This can imply, that sixth former have less problems concerning their weight and thereby do not have to look on their energy intake as much as students. Sixth former have not reached their final body height yet and therefore cannot be compared to students without approaching this explanation really cautiously.

7.2.3 Influence of Injunctive and Descriptive Subjective Norm

A negative correlation between the *injunctive subjective norm* and the consumption of sugared beverages was exhibited ($-.17$, $p<0.01$). This fact maintains the conclusion, that the perceived *attitude* of the social environment influences the personal behaviour. Although the regression analysis showed no effect of the *injunctive subjective norm* on the behaviour, there does exist an effect concerning the *intention* to drink less sugared

beverages. In combination with other determinants of the *Theory of Planned Behaviour*, the *injunctive subjective norm* accounted for 35% of the variance concerning their *intention*. In particular, the *injunctive subjective norm* had a predictive value for the male and female respondent's and the sixth former's *intention*.

The *injunctive subjective norm* differs within the gender. Female adults perceived a higher *injunctive subjective norm* than male adults (see table 7). Possibly, it is more important for females, which impression the social environment has of them. Females put more emphasis on their good looks and ideal body shape because they have a more negative body-image than men (Muth & Cash, 1997; Feingold & Mazzella, 1997; Hayes & Ross, 1987). Therefore they have the wish to appeal to their friends, their partner and their family. The only distinction between students and sixth former, which can be made, is that the *intention* of sixth former was among other things influenced by the *injunctive subjective norm*. Apparently, students were less motivated to comply with the norms of their social environment, although it can be assumed that students knew which norms the social environment exhibits. This does not mean that the social environment had no influence at all, but that the influence, which can be seen, is observable due to the *descriptive subjective norm*.

In advance, a distinction between the *descriptive subjective norm* of the parents, partners and friends was made. Every group can exert a different influence on the target group. The figures show that parents and friends had a greater impact on the *behaviour* of the respondents (.18, $p<0.01$, .15, $p<0.05$, respectively) than the partner (.02). The regression analysis showed that the *descriptive subjective norm* of the parents had an influence on the *intention* of the whole sample, specifically on the *intention* of both genders and of the sixth former. The lack of influence within the student group can be explained by the living situation of the students. Most students live on their own or in flat-sharing communities. Therefore parents cannot exert such big influence on their observable behaviour anymore. The influence of friends even predicted a part of the variance in the consumption of sugared beverages and was therefore the only predictive variable out of the TPB concerning the behaviour among this group. Particularly, the *descriptive subjective norm* of friends loomed obviously in the consumption of sugared beverages of male respondents and students. Friends, furthermore, had a predictive power on student's and male's *intention*. Although there was no significant correlation between the *descriptive subjective norm* concerning the partner with the behaviour or *intention*, the regression analysis detected influence on the *intention* of male respondents and sixth former.

A lot of studies exist, which refer to the social pressure and the affinity of conformity. People try to behave in the same way as other people in order to reach conformity (Solomon, 1955). If family and friends mostly drank sugared beverages, the respondents

most likely tended to drink more sugared beverages, too. This expresses the group belonging and avoids that other group members comment on or disapprove of the respondent's deviant behaviour. Particularly friends have a great impact on the behaviour of the target group (Hundleby & Mercer, 1987). Young adults spend a lot of time with people of the same age because they are similar to them and they have same interests. They influence each other and they adopt behavioural patterns of one other (Berndt, 2008). Female participants possessed fewer friends, who drank sugared beverages daily. It can be expected that females have more female friends and that most of the males' respondents have friends of the same gender. Due to the fact, that girls generally drank less sugared beverages, the difference concerning the *descriptive subjective norm* can be explained. Similar to women, students stated that they have fewer friends, who drink sugared beverages. But these few friends drinking sugared beverages had a nameable influence on the behaviour of the students. The regression analysis demonstrates that a part of the student's consumption of sugared beverages can be explained by this kind of *descriptive subjective norm*.

The influence of the partners had no worth mentioning effect on the behaviour of the respondents. The correlation tended to zero. Only the intention of male and sixth former was influenced by this determinant. They frequently observed their partners drinking more or less sugared beverages. For the rest of the population this had no noteworthy effect. The study showed that students drank less sugared beverages. Hence, this can explain the fact, that the students observed their partner drinking less sugared beverages. But female respondents consumed less sugared beverages as well. Actually, it has to be expected that females observed their boyfriends drinking more sugared beverages and not the other way around.

Another explanation is the development of preferences by imitation learning (Bandura, 2001; Ellrot, 2007). Respondents, who observed their parents and friends drinking sugar-free beverages tended to drink the same beverages. Besides that, it can be hypothesized, that the beverages, which the parents consume, are more often available at home and the target group is therefore confronted with these kinds of beverages more frequently. Table 17 supports this hypothesis of availability and consumption. Beverages were consumed more often, if they were available at home.

Having a look at the differences between the groups, it becomes apparent that male respondents observed their parents more often drinking sugared beverages than females (see table 7). The reason may be related to the availability of beverages at home which had a significant correlation with the *DSN* of the respondent's parents (.23, $p<0.01$). It was significant that soft drinks ($t=2.66$, $p<0.01$), ice-tea ($t=2.10$, $p<0.05$) and chocolate milk ($t=2.98$, $p<0.01$) were more often available at the males respondent's home. Merely the availability of smoothies was mentioned more often by female respondents

(t=-2.86, p<0.01). The other beverages did not differ with regard to their availability. These results lead to the assumption, that households, in this case especially households of the male respondents, consumed more sugared beverages because they were more available. It cannot be indicated clearly, whether the male's demand for sugared beverages led to the supply at home or the parents determined the availability at home. A research of de Bruijn, Kremers, de Vries, van Mechelen and Brug (2007) showed that more restrictive parenting practices are associated with a lower consumption of sugared beverages. Girls reported an authoritative parenting style more often than boys, so that it can be expected that this is a reason for a supply of less sugared beverages at girl's home (Kremers, Brug, de Vries, Engels, 2003). A less authoritative male's home might be intercessional for a bigger supply of sugared beverages. Nevertheless, the *intention* of both genders can be predicted by the *descriptive subjective norm* of their parents (see table 10 and 11).

Students stated that their parents drink more sugar-free beverages than sixth former's parents. This can be explained by the availability of beverages too. Soft drinks (t=2.30, p<0.01), ice tea (t=3.18, p<0.01), chocolate milk (t=4.01, p<0.001) and milk (t=3.06, p<0.01) were more available at the home of sixth former so that these kinds of beverages could be consumed more often. It is quite possibly, that the availability was a result of sixth former's requirement for sugared beverages at home. In the majority of the cases, students do not stay at their parents anymore and do not decide about the beverage purchase anymore. Student's parents might change their drinking behaviour after the move out of their children. This relationship between availability of sugared beverages at home and student's consumption of beverages has to be determined in a follow-up study. Besides the aspect of availability, the aspect of friend's influence is interesting to examine.

7.2.4 Influence of Perceived Behavioural Control

The respondents rated their *perceived behavioural control* as good and considered themselves as being in control of drinking sugared or sugar-free beverages and being independent of their surrounding or the situation. It can be seen positively that they see themselves as being able to decide what they want to drink in whichever situation. But it is rather doubtful that the answers mirror the reality because there are some situations in which they cannot exert influence on the availability of beverages (e.g., they have no influence on the beverage supply at their friend's home or in a bar). The analyses showed that the availability at home was strongly related to the behaviour of consumption and this can be seen as an external factor, which cannot be controlled by the respondents totally. The correlation analysis showed that the more sugared beverages were available at home the lower was the perceived behavioural control to

drink sugar-free beverages (-0.14, $p<0.05$). The consulted people possibly had difficulties to project themselves in the actual position or situation or the statements were perceived as being too abstract. It can be deduced from the figures that the estimation of the *perceived behavioural control* had no influence on the consumption of more sugared or more sugar-free beverages. Some people, who drink sugared beverages, decided voluntarily to consume them and therefore it was redundant to ask the question if they are able to drink less because they wouldn't want to consume less sugared beverages anyway.

The determinant accounted for some variance in the *intention* to drink sugar-free beverages for the whole sample and to a less pronounced degree for female respondents. Other differences cannot be detected. Maybe some respondents intended to drink less sugared beverages but their impulsiveness and the temptation concerning the availability of sugared beverages thwarted their plans.

7.2.5 Influence of Self-identity

The *self-identity* can be divided into two independent elements: on the one hand identity concerning the health awareness and on the other hand identity concerning the hedonism. This division can be supported by the low inter-correlation of the two constructs. The first part correlated negatively with the consumption of sugared beverages (-.16, $p<0.01$). People, who see themselves as being healthy, want to act in a consistent way. It is important for them that their behaviour reflects the characteristics, which they ascribe to themselves. Female respondents described themselves having a higher health awareness than male adults (table 7). This fact complies with other studies examining the health beliefs of men and women (Hayes & Ross, 1987; Rappoport, Peters, Downey, McCann & Huff-Corzine, 1993) and it is consistent with the construct *attitude*, which girls rated more positively than boys. The quantity of students was also higher at the construct *self-identity* with reference to health awareness (table 13). The *self-identity* did not account for a proportion of the variance in behaviour but it did account for a part of *intention's* variance. In particular, the determinant *self-identity* predicted the *intention* within the student group significantly.

The second part of *self-identity* had no significant correlation with behaviour. But there is a difference between females and males as well as between students and sixth former. To a greater degree, men and students thought of themselves as being a hedonistic consumer. It has to be asked which products are perceived as being hedonistic. Rappoport et al. (1993) state that younger and older adults give different ratings to food. Older adults give higher pleasure ratings towards healthy food, like rice and fish, whereas younger adults favour snacks. With age, the consumption of products might develop a different meaning. Students get a more positive attitude towards

healthy food (in this case towards sugar-free beverages) and the context of eating gets another meaning. They have dinner with their friends more often than sixth former who mostly eat at home with their family. Different settings, different kinds of food and different people give food and beverages different meanings. Perhaps this leads to a higher valuation of consumption. Females might have problems in fulfilling their personal pleasure without feeling remorseful. Fagerli and Wandel (1999) argue that women more often choose food that seems to be healthy and complies with dietary guidelines. Povlsen (1985) calls this phenomenon "women's greater rationality" (cited in Fagerli & Wandel, 1999, p.187). They look more carefully at the ingredients of different food and beverages and try to eat very conscientiously (Rappoport, Peters, Downey, McCann & Huff-Corzine, 1993). This control and rationality can lead to less pleasure during the consumption of food and beverages. But hedonistic consumers may also see themselves as healthy persons (see students). This does not have to be a contradiction in term because healthy products can be very delicious, too.

7.2.6 Influence of Intention

The *intention* showed a significant negative correlation with the *behaviour* (-.11, $p<0.01$). The respondents with a positive *intention* towards the reducing of consuming sugared beverages showed a lower consumption of sugared beverages. However, the correlation is not that strong. Other studies (e.g., Armitage & Conner, 1999b; Povey et al., 2000) show a greater coherence between the two variables. The regression analysis awarded that the *intention* had no influence on the prediction of the beverage consumption. This can be explained due to the fact, that some people already drank less sugared beverages and therefore they did not intend to drink even less of these beverages. Furthermore the *intention* of the whole population towards the consumption of more sugar-free beverages was very low (.11). The application of the Independent-Samples T Test allows to draw the conclusion that neither a high *intention* nor a low *intention* to drink less sugared beverages induced a different drinking behaviour ($t=-1.32$, $p>0.1$).

Although there did not exist a high *intention* to drink less sugared beverages in any group, females and students were more motivated to decrease their consumption of sugared beverages (see table 7 and 11). This was consistent to the other findings, which showed that females and students think more positively of sugar-free beverages. According to the *Theory of Planned Behaviour,* all determinants have direct influence on the *intention*. The analysis (table 4) showed that the constructs *attitude, injunctive subjective norm* and *self-identity* concerning the health awareness correlated positively and significantly with the *intention*.

7.2.7 Influence of Previous Behaviour

In paragraph 3.2.1 it was mentioned that not the behaviour has to be the dependent variable but the *intention,* which can be influenced by previous behaviour, or in other words by habits. The regression analysis did not show any influence of the behaviour on the *intention*, hence it cannot be proven which causal relationship exists. But all the regression analyses detected, that the *intention* to drink less sugared beverages was influenced by more predictors than just the actual behaviour. This leads to the conclusion that, in this case, the *Theory of Planned Behaviour* is a better model for predicting the *intention* to perform a certain behaviour. Changes within the variables of the *Theory of Planned Behaviour* can only have an impact on the *intention* and not on the behaviour. The educational drinking initiative has to bring the influence on the *intention* into focus and cannot expect that changes of the consumption behaviour take place.

7.3 Limitations of the Study

Some hypotheses cannot be verified because limitations of the study occured.

The first limitation one has to make concerns the reliability of the constructs. Although most questions and statements are based upon studies using similar topics, the reliability of the construct *self-identity* and *perceived behavioural control* cannot be considered high. The questions were translated into German to avoid understanding problems. Sometimes it was difficult to translate one-to-one so that the meaning of the items changed slightly. In future studies, the questionnaire has to be checked more precisely and a standardized questionnaire for the German language has to be developed. Because the two constructs did not have such big influence on the behaviour and the intention, the lack of reliability is not that crucial.

The theoretical background showed that there is a difference between educational classes concerning the food and beverage choice (Kußmaul, Döring, Stender, Winkler & Keil, 1995). Less educated people drink more sugared beverages like soft drinks, than more educated people (NVS I, 2008; NVS II, 2008). The comparison of parents' education level in this study did not support this fact. These groups represented the higher educated classes and as a result families of a higher socio-economic status are overrepresented in this sample. If the study had compared pupils of secondary general schools with pupils of grammar schools, there could have been some differences. But because only respondents above 16 years were studied and pupils of secondary general schools are younger, this difference was not examined.

It is always difficult to get results which are free from bias. There are a lot of sources, which emerged from bias, and therefore it can lead to inexact completion of the questionnaire. One source of bias concerned the shortcoming of privacy. The respondents

completed the questionnaire in the presence of their classmates or fellow students. They had the possibility to talk during the completion and to compare their answers. Furthermore, the threat of social desirable answers existed (Hoogstraten, 2004). Perhaps some consulted people wanted to deny socially undesirable traits because they want to be seen in a favourable light by their friends and by the researcher (Nederhof, 1985). Besides that, a lack of concentration was observed (Hoogstraten, 2004). In some classes were more than 20 students and sometimes the teacher was not present during the completion of the questionnaire. That induced to a noisy surrounding which distracted the respondents from conscious answering. If they did not read the questions and answer possibilities properly, they might have made mistakes easily. The survey gets more valid if every respondent is able to fill the questionnaire in on their own. But because of temporal, financial and areal limitations this could not be realized.

The study used a self-reported questionnaire which means that every respondent had to answer questions concerning their own life. Some questions might have been displeasing because they asked for private information, like the questions concerning the weight or the educational level of their parents. Perhaps these questions invoked dishonest answers because the respondents felt ashamed, although the questionnaires were taken anonymously.

Moreover it is difficult to estimate the own beverage intake correctly. Drinking often happens unconsciously and therefore the respondents did not know exactly how often they drink which beverage and how much of it. Next to this, the human memory has limits and cannot keep everything in mind so that the recall of consumed beverages gets difficult (Smith, Jobe & Mingay, 1991). The study tried to avoid this bias with the help of a Food diary. Unfortunately, only a few Food diaries returned so that they were excluded from the study.

A final limitation of the study is the cross-sectional character, which means that the data was only taken at one specified moment. The interpretations have to be handled with caution because the data cannot detect clear causal relationships (Dooley, 2001). In fact these are only assumptions and they have to be proven further on by other studies.

8. Recommendations

On the basis of the study's findings recommendations for the educational campaign can be devised. The initiative tries to give helpful suggestions concerning the drinking behaviour. The beverage market grows enormously and hence a great supply of food and beverages comes along with being spoilt for choice, and therefore decision making is not always easy. To avoid confusion and to inform the target group adequately, recommendations can be given on the foundation of the detected figures. In general, it is more significant to focus on the *intention* of the behaviour. No matter if it is the aim to convince somebody to drink more sugared beverages or more sugar-free beverages, the analyses demonstrated that there exists a greater impact of influence on the *intention*.

8.1 Methods to Increase Knowledge and Change Attitudes

The *knowledge* index showed that young adults know little about beverages and their ingredients. For a conscious decision it is important to have information about the beverages. The educational campaign should imply an objective view on the general beverage supply. Juices and soft drinks could be compared with regard to their sugar content. The misconceptions concerning the fluid intake and the double-tracked division into good and bad beverages have to be disproved. With the reattribution of beverages a new view on the beverage supply can be created and the double-tracked division can be avoided. Therefore, information about the beverages and their characteristics are needed.

The information has to be prepared in a compressible, individually relevant and credible way. This means that the information is clearly expressed and includes only the most important facts for the target group. Too much inconsiderable information cannot be kept in mind. It is also fundamental that the messages are not too discrepant to the target group's experiences. People who drink very healthy cannot be persuaded that soft drinks are not so unhealthy. In fact, they have to be convinced that the consumption of a soft drink is also allowed from time to time in a balanced diet. Furthermore, credible sources, containing studies or utterances from experts, have to be named. The experts have to be accepted by and identifiable for the target group.

The initiative should provide new arguments in order to present the importance of consuming diverse beverages. If the advantages are presented in a suitable way for the target group, the young adults will feel more addressed and give more attention to the information. This means, that the initiative should use the language of the young adults and should not evoke an impression that is too cautionary. In this context, specified

consequences have to be mentioned, which result from the new behaviour. Possible rewards of the behaviour might be a stimulus to act in this new way.

8.2 Methods to Change Perceived Environmental Influence

The social environment is a complex formation, which cannot be influenced easily. Therefore the young adult's perception of the environment has to be changed. Bartholmew, Parcel, Kok and Gottlieb (2006) give advices how to modify the perception through observation of models (vicarious learning). One possibility of an observational modelling is it to make peer expectations visible. Peer expectation is a successful intervention method because the process of social comparison is used. People prefer to act right and tend to turn to others in order to decide about the right course of action. The initiative can mention in which way parents and friends value the consumption of diverse beverages. Thereby the addressed person is able to compare him- or herself to others and is able to comply with other's behaviours.

The availability of beverages at home exerted a nameable influence on consumption of beverages. Oftentimes, parents are responsible for the availability and therefore they codetermine the modality of beverages consumed by the young adults. The initiative can provide alternatives by showing the target group how to exert influence on the purchase. For instance, the respondents could accompany their parents on the purchase in order to have more control.

However, it is difficult for an educational initiative to concentrate on this aspect of influence. It is more promising to focus on the *attitude* of the respondents because individual factors are easier to influence.

8.3 Methods to Change Intentions and Habits

The influence of a written initiative exhibits limitations. Surely, information influence *attitudes* and *intentions* but it cannot be expected that the target group changes its behaviour completely only through information. But if beneficial recommendations are provided, which can be easily implemented into everyday life, the chance for a change grows.

However, these recommendations have to be clear implementation *intentions*, which means that it has to be stipulated when, where and how the new *intention* can be implemented. It is important that these implementation *intentions* are linked to specific environmental cues (Bartholmew, Parcel, Kok & Gottlieb, 2006). It is necessary to make the decision, in which situation and in which period of time one intends to achieve the defined goal. It is the challenge of the initiative to show specific possibilities which can be realized by the young adults. These possibilities have to be applicatory and situational so

that cue-response links can be formed. A possible implementation *intention* could be the advice to drink a glass of orange juice during breakfast every morning in order to get already enough vitamins at the beginning of the day.

The best method to change old habits is to form new habits. This implies that the initiative should give advices how to behave in a different way. For instance, it is of high significance to explain the diversity of the beverage supply and to underline which beverage can constitute a conscious substitute for another.

8.4 Differences between the Groups

Due to the fact, that females and males have a different view concerning sugar-free beverages, they have to be addressed differently. The aspect of the sugar content plays a major role for female adults. They are more afraid of gaining weight so that they lose the pleasure of eating and drinking more easily. The campaign may have to include this aspect and should demonstrate possibilities how to drink diversely without gaining weight. In this case implementation *intentions* can be a successful way of changing the behaviour as well.

The importance of conscious eating and drinking is not present in the group of the sixth former. The initiative has to present them hip reasons for drinking diversely without appearing too cautionary. Sixth former tend to boycott recommendations easily, if they have the feeling to be lectured. An alternative to this, would be to direct the attention towards the advantages of different taste experiences.

8.5 Overview on the Most Important Advices

Finally an overview on the most important recommendations is provided. The mentioned methods in order to accomplish the main aim are approved intervention methods, which are applied by many health promotion programs.

- The messages have to be comprehensible, individually relevant and credible.
- The initiative has to present new arguments to the target group, which need to conform to the already existing perceptions and experiences.
- Possibilities have to be mentioned how the respondents can exert influence on the family's purchase of beverages.
- The initiative has to mention clear implementation *intentions,* which can be easily realized in everyday life.
- New habits have to be presented in order to change the old habits successfully.

8.6 Scientific Recommendations

Apart from the recommendations with regard to the content, scientific recommendations can be outlined for follow-up studies. This study only focused on sugared and sugar-free beverages. But there are more factors which influence the choice of beverages and are worth considering in a new study: preservatives, artificial flavours, nutrient content and preference or aversion for carbonated beverages.

Due to the fact, that environmental influences, especially the availability at home, are important predictors for the consumption of beverages, it is necessary to examine this variable more precisely. The *Theory of Planned Behaviour* postulates that these variables are mediated by the *perceived behavioural control*. But in course of this study it seems as if the theory is not adequate to account completely for such influences.

Furthermore, the *Theory of Planned Behaviour* is not capable of predicting the behaviour, but has only the ability to predict the *intention* to drink sugar-free beverages. A follow-up study should think about other models which attempt to predict the consumption of beverages.

The cross-sectional type of the study leads to problems with causal explanations. By means of a longitudinal study and interviews with the target group, the causal relationships could be examined. Interviews with the target groups are a good starting point for a follow-up study because it supports the development of a valid questionnaire.

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10. Attachment

10.1 Pre-test and Answer possibilities

1.) Welche Eigenschaften muss ein alkoholfreies Getränk haben, um von dir gekauft zu werden?
   - Taste (naturally, not to sweet, something special)
   - Design

2.) Welche Motive spielen bei deiner Wahl von alkoholfreien Getränken eine Rolle?
   - Value for money
   - Psychological value (Coke vs. Pepsi, hip)
   - Previous experiences
   - Health
   - Effect of beverage (adipsous, stay/get alert, refreshing)

3.) Wählst du bestimmte alkoholfreie Getränke für bestimmte Anlässe/Tageszeiten aus? Wenn ja, welche wofür? Und wieso?
   - Fit to food
   - Situation

4.) Anmerkungen

10.2 First version questionnaire

Umfrage zum Trinkverhalten von alkoholfreien Getränken

Sehr geehrte/r Teilnehmer/in,

meistens machen wir es unterbewusst und nebenbei. Dabei ist es ein lebenswichtiges Verhalten: das Trinken.

In Studien hat das Trinkverhalten bislang wenig Aufmerksamkeit bekommen und wurde unter verhaltenswissenschaftlichen Aspekten kaum betrachtet. Das soll sich mit dieser Studie nun ändern.

Die Umfrage wird im Rahmen einer Abschlussarbeit an der Universität Twente (Niederlande) durchgeführt und ausgewertet. Kernstück der Umfrage ist ein sechsseitiger Fragebogen, den Sie in der Anlage finden. Sie benötigen für das Ausfüllen ungefähr 15 Minuten. Ihre Angaben werden natürlich vertraulich behandelt und anonym verwendet. Die Auswertung wird keinen Rückschluss auf Ihre Person zulassen.
Desweiteren gibt es die Möglichkeit, freiwillig an einer Zusatzstudie teilzunehmen. Bei dieser müssen Sie eine Woche lang Ihren Konsum von alkoholfreien Getränken notieren. Als kleinen Anreiz können Sie ein persönlich ausgewertetes Trinkfazit erhalten. Sollten Sie Interesse haben, füllen Sie die letzte Angabe des Fragebogens aus und melden Sie sich bei der Studienleiterin.
Alle gestellten Fragen beziehen sich auf kalte, alkoholfreie Getränke, die sowohl mit als auch ohne Kohlensäure sein können und als „light" oder normale Variante im Supermarkt zu kaufen sind. Alkoholische Getränke, sowie Kaffee und Tee sind nicht Bestandteil des Fragebogens.
Lassen Sie sich beim Ausfüllen von Ihrer ersten spontanen Idee leiten. Es geht um Ihre Meinung und da gibt es weder falsch noch richtig.

Ich bedanke mich für Ihre Unterstützung und freue mich auf Ihre Meinung!

Mit freundlichen Grüßen

Karen Dinkhoff

Demografische Fragen

1. Alter:……

2. Geschlecht:
   - Weiblich
   - Männlich

3. Größe:……..cm

4. Gewicht:……..kg

5. Ich besuche die:
   - 11. Klasse
   - 12. Klasse
   - 13. Klasse

(Ich studiere seit:…….)

6. Herkunftsland der Mutter:…….

7. Herkunftsland des Vaters:……..

8. Der höchste Bildungsabschluss meiner Mutter:
   - Kein Abschluss
   - Hauptschulabschluss
   - Realschulabschluss
   - 10. Klasse Gymnasium
   - Fachhochschulreife
   - Allgemeine Hochschulreife
   - Abgeschlossenes Studium an der Fachhochschule
   - Abgeschlossenes Studium an der Universität
   - Weiß ich nicht

9. Der höchste Bildungsabschluss meines Vaters:
   - Kein Abschluss
   - Hauptschulabschluss
   - Realschulabschluss
   - 10. Klasse Gymnasium
   - Fachhochschulreife
   - Allgemeine Hochschulreife
   - Abgeschlossenes Studium an der Fachhochschule
   - Abgeschlossenes Studium an der Universität
   - Weiß ich nicht

10. Folgende Getränke sind Zuhause verfügbar *(Mehrfachnennungen möglich)*:

	Nie	Selten	Ab und zu	Fast immer	Immer
○ Biolimonade	○	○	○	○	○
○ Eistee	○	○	○	○	○
○ Apfelschorle	○	○	○	○	○
○ Soft Drinks (Cola, Fanta)	○	○	○	○	○
○ Apfelsaft	○	○	○	○	○
○ Milch	○	○	○	○	○
○ Schokomilch	○	○	○	○	○
○ Smoothies	○	○	○	○	○
○ Traubensaft	○	○	○	○	○

○	Wasser	0	0	0	0	0

11. Folgende Getränke sind an der Schule verfügbar *(Mehrfachnennungen möglich)*:

		Nie	Selten	Ab und zu	Fast immer	Immer
○	Biolimonade	0	0	0	0	0
○	Eistee	0	0	0	0	0
○	Apfelschorle	0	0	0	0	0
○	Soft Drinks (Cola, Fanta)	0	0	0	0	0
○	Apfelsaft	0	0	0	0	0
○	Milch	0	0	0	0	0
○	Schokomilch	0	0	0	0	0
○	Smoothies	0	0	0	0	0
○	Traubensaft	0	0	0	0	0
○	Wasser	0	0	0	0	0

12. Wie viel Gramm Zucker befindet sich in 100 ml

		4	5	6	7	8	9	10	11	12	13	14	15	16	17
-	Biolimonade:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	Eistee:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	Apfelschorle:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	Cola:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	Apfelsaft:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	Schokomilch:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	Smoothie:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-	Traubensaft:	0	0	0	0	0	0	0	0	0	0	0	0	0	0

13. Wie viel Flüssigkeit sollte eine erwachsene Person, laut der Deutschen Gesellschaft für Ernährung (DGE) täglich durch Getränke zu sich nehmen?
    - ○ 0.5 Liter
    - ○ 1 Liter
    - ○ 1.5 Liter
    - ○ 2.5 Liter
    - ○ 3 Liter
    - ○ 5 Liter

14. Was sind von den untengenannten Begriffen Süßstoffe? *(Mehrfachnennungen möglich)*
    - ○ Saccharin
    - ○ Aspartam
    - ○ Sorbit
    - ○ Cyclamat
    - ○ Isomalt

Meinungsumfrage

	Stimme überhaupt nicht zu	Teils, nicht zu	Stimme zu Stimme teils		Stimme voll und ganz zu
15. Die neuen Biolimonaden sind, bezüglich ihres Zuckeranteils, die gesunde Alternative zu gewöhnlichen Limonaden.	0	0	0	0	0

Im Allgemeinen finde ich das Trinken von zuckerhaltigen Getränken

16. Lecker	0	0	0	0	0	Widerlich
17. Gut	0	0	0	0	0	Schlecht
18. Klug	0	0	0	0	0	Unklug
19. Empfehlenswert	0	0	0	0	0	Nicht empfehlenswert
20. Wohltuend	0	0	0	0	0	Ekel erregend
21. Gesund	0	0	0	0	0	Ungesund

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
21. Ich fühle mich wohl, wenn ich zuckerfreie Getränke trinke.	0	0	0	0	0
22. Ich fühle mich gesünder, wenn ich zuckerfreie Getränke trinke.	0	0	0	0	0
23. Ich habe ein gutes Gewissen, wenn ich zuckerfreien Getränke trinken würde.	0	0	0	0	0
24. Zuckerfreie Getränke helfen mir, mein Gewicht zu halten.	0	0	0	0	0
25. Zuckerfreie Getränke sind durstlöschender als zuckerhaltige.	0	0	0	0	0
26. Zuckerfreie Getränke sind erfrischender als zuckerhaltige.	0	0	0	0	0
27. Zuckerfreie Getränke sind hipper als zuckerhaltige.	0	0	0	0	0
28. Zuckerfreie Getränke sind langweilige Getränke.	0	0	0	0	0
29. Der Spaß am Trinken vergeht mir durch zuckerfreie Getränke.	0	0	0	0	0
30. Zuckerfreie Getränke sind teurer als					

zuckerfreie.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
31. Zuckerfreie Getränke schmecken nicht gut.	0	0	0	0	0
32. Zuckerfreie Getränke helfen mir nicht meine Konzentration zu steigern.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
33. Meine Eltern finden es gut, wenn ich zuckerfreie Getränke trinke.	0	0	0	0	0
34. Meine Freunde finden es gut, wenn ich zuckerfreie Getränke trinke.	0	0	0	0	0
35. Mein/e Partner/in findet es gut, wenn ich zuckerfreie Getränke trinke.	0	0	0	0	0
36. Ich bekomme oft von meinen Freunden zuckerfreie Getränke angeboten.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
37. Meine Eltern trinken mehr zuckerhaltige Getränke als zuckerfreie.	0	0	0	0	0
38. Mein/e Partner/in trinkt mehr zuckerhaltige Getränke als zuckerfreie.	0	0	0	0	0

39. Wie viele deiner Freunde trinken täglich zuckerhaltige Getränke?
    - Keiner
    - Wenige
    - Manche
    - Die meisten
    - Alle

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
40. Wenn ich es möchte, bin ich der Lage, jederzeit zuckerfreien Getränken zu trinken.	0	0	0	0	0
41. Ich habe viel eigene Kontrolle über das Trinken von zuckerfreien Getränken.	0	0	0	0	0
42. Ich finde es schwierig, immer zuckerfreie Getränke zu trinken, da ich oft nicht weiß, wie viel Zucker in den Getränken steckt.	0	0	0	0	0
43. Ich finde es schwierig, zuckerhaltigen Getränken zu widerstehen.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
44. Ich empfinde es als schwierig, in jeder Situation auf zuckerfreien Getränke zurück zu greifen.	0	0	0	0	0
45. Die Situation kontrolliert oft das Trinken von zuckerfreien Getränken.	0	0	0	0	0
46. Das Trinken von zuckerfreien Getränken ist teuer.	0	0	0	0	0
47. Zuckerfreie Getränke sind weniger verfügbar an der Schule / der Universität als zuckerhaltige.	0	0	0	0	0
48. Zuckerfreie Getränke sind häufiger verfügbar Zuhause als zuckerhaltige.	0	0	0	0	0
49. Es gibt Faktoren, die außerhalb meiner Kontrolle liegen, die mich am Trinken von zuckerfreien Getränken hindern	0	0	0	0	0
50. Die Auswahl von zuckerfreien Getränken ist begrenzter als die Auswahl von zuckerhaltigen.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
51. Ich sehe mich selbst als einen gesunden Esser und Trinker.	0	0	0	0	0
52. Ich sehe mich selbst als jemanden, der sich mit gesunder Ernährung beschäftigt.	0	0	0	0	0
53. Ich sehe mich selbst als jemanden, der sich über die Folgen der Ernährung bewusst ist.	0	0	0	0	0
54. Ich sehe mich selbst als jemanden, der Essen und Trinken genießt.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
55. Ich plane in der Zukunft mehr zuckerfreie Getränke zu trinken.	0	0	0	0	0
56. Ich beabsichtige in der Zukunft nicht weniger zuckerhaltige Getränke zu trinken.	0	0	0	0	0
57. Ich möchte gerne mehr zuckerfreie Getränke zu mir nehmen.	0	0	0	0	0

Mit Hilfe von folgender Liste möchten wir überprüfen wie oft Sie durchschnittlich welche Getränke konsumieren. Bitte füllen Sie die Liste aus und machen Sie bei jedem Getränk

nur ein Kreuz. Bei jedem Getränk geht es um die Größe eines Standardglases von 250 ml.

Getränk	Nie	1 – 2 mal im Monat	1-mal die Woche	2 – 3 mal die Woche	4 – 6 mal die Woche	1-mal am Tag	2 – 3 mal am Tag	4 – 6 mal am Tag	7 mal oder öfter am Tag
Vollmilch (3.5% Fett)									
Fettarme Milch (1.5% Fett)									
Magermilch (max. 0.3% Fett)									
Sojamilch									
Schokomilch									
Purer Apfelsaft									
Purer Traubensaft									
Purer Orangensaft									
Apfelsaftschorle									
Brauselimonade (z.B. Cola, Fanta)									
Light Brauselimonade (z.B. Cola light, zero)									
Biolimonade									
Eistee									
Leitungs- oder Mineralwasser									
Smoothies									

Möchten Sie an der Zusatzstudie teilnehmen? Dann füllen Sie in untenstehendes Feld als erstes ihr Geburtsjahr, dann die letzten beiden Buchstaben ihres Vor- und Nachnamens ein:

_ _ _ _ _ _ _ _ (JJJJ,VV,NN)

10.3 Substantive Validity Analysis

Answers first expert

The attitude which is built on basic of knowledge, norms and values predicts how we esteem beverages. If one emphasises taste there will be a bigger addiction to consume beverages with taste instead of water. If it's important to someone that the beverage is healthy the tendency will go to drinking water.

- Zuckerfreie Getränke sind erfrischender als zuckerhaltige.
- Zuckerfreie Getränke sind durstlöschender als zuckerhaltige.
- Zuckerfreie Getränke sind langweilige Getränke.
- Zuckerfreie Getränke schmecken nicht gut.
- Zuckerfreie Getränke helfen mir nicht meine Konzentration zu steigern.
- Zuckerfreie Getränke sind hipper als zuckerhaltige.
- Der Spaß am Trinken vergeht mir durch zuckerfreie Getränke.
- Ich finde es schwierig, zuckerhaltigen Getränken zu widerstehen.

The subjective norm based on the individual perception of the social environment and on the observation of other people. What does the environment consume? And how do they speak about beverages? If al friends drink a soft drink the chance will be bigger that one takes the same so that one belongs to the group (Contento, Williams, Michela & Franklin, 2006). As named above there will be made a clear distinction between injunctive and descriptive norms in the study. On the one hand a subjective norm can be the perceived values of important others but on the other the perception of the performance of others. This can be two different things which can be named injunctive (ought meaning of social norm) and descriptive (is meaning of social norm).

- Mein/e Partner/in findet es gut, wenn ich zuckerfreie Getränke trinke.
- Meine Eltern trinken mehr zuckerhaltige Getränke als zuckerfreie.
- Meine Freunde finden es gut, wenn ich zuckerfreie Getränke trinke.
- Meine Eltern finden es gut, wenn ich zuckerfreie Getränke trinke.
- Mein/e Partner/in trinkt mehr zuckerhaltige Getränke als zuckerfreie.
- Es ist oft von der Situation abhängig, ob ich zuckerfreie Getränken trinke.
- Ich bekomme oft von meinen Freunden zuckerfreie Getränke angeboten.

To what extent asses young adults themselves as being able to drink always healthy beverages at any time. Which barriers are perceived? And is it possible to control the barriers? This can be measured by the internal and external perceived behavioural control. The first refers to one´s own abilities and skills and the other to the external

possibilities. One can estimate that if one has the skills or facilities (e.g, the knowledge or the money) to eat and drink healthy but the healthy foods aren´t available at a certain place that one will fail to achieve the conducted behaviour.

- Es gibt Faktoren in meinem Umfeld, die außerhalb meiner Kontrolle liegen, die mich am Trinken von zuckerfreien Getränken hindern
- In Anbetracht des Geldes, das mir zur Verfügung steht, kann ich mir zuckerfreie Getränke nur selten leisten.
- Zuckerfreie Getränke sind Zuhause häufiger verfügbar als zuckerhaltige.
- Die Auswahl von zuckerfreien Getränken ist begrenzter als die Auswahl von zuckerhaltigen.
- Zuckerfreie Getränke sind teurer als zuckerhaltige.
- Zuckerfreie Getränke sind weniger verfügbar an der Schule / der Universität als zuckerhaltige.
- Wenn ich es möchte, bin ich der Lage, jederzeit zuckerfreie Getränke zu trinken.
- Ich finde es schwierig, immer zuckerfreie Getränke zu trinken, da ich oft nicht weiß, in welchen Getränken Zucker ist.
- Ich empfinde es als schwierig, in jeder Situation auf zuckerfreie Getränke zurück zu greifen.

People hold self-concepts or self-perceptions which are characteristics that people ascribe to themselves. In this study it will be called self-identity. Persons who think that they have a healthy lifestyle will show a healthier drinking behaviour and mostly drink water or tea because they want to comply with their ideals (Sirgy, 1986). The questions of this construct based on the study of Sparks and Shepherd (1992).

- Ich fühle mich gesünder, wenn ich zuckerfreie Getränke trinke.
- Ich sehe mich selbst als jemanden, der sich über die Folgen der Ernährung bewusst ist.
- Zuckerfreie Getränke helfen mir, mein Gewicht zu halten.
- Ich sehe mich selbst als einen gesunden Esser und Trinker.
- Ich sehe mich selbst als jemanden, der sich mit gesunder Ernährung beschäftigt.
- Ich fühle mich wohl, wenn ich zuckerfreie Getränke trinke.
- Es liegt in meinen eigenen Händen, wie viele zuckerfreie Getränken ich trinke.
- Ich sehe mich selbst als jemanden, der Essen und Trinken genießt.
- Ich habe ein gutes Gewissen, wenn ich zuckerfreie Getränke trinke.

The last construct is the intention to perform a certain behaviour. If someone takes the plan to do something the chance that he will actually do this will be bigger than for someone who doesn't plan it. In the TPB the intention is the only direct link to behaviour and is determined by all factors named above.

- Ich plane in der Zukunft mehr zuckerfreie Getränke zu trinken.
- Ich beabsichtige in der Zukunft weniger zuckerhaltige Getränke zu trinken.
- Ich möchte gerne mehr zuckerfreie Getränke zu mir nehmen.

Answers second expert

The attitude which is built on basic of knowledge, norms and values predicts how we esteem beverages. If one emphasises taste there will be a bigger addiction to consume beverages with taste instead of water. If it's important to someone that the beverage is healthy the tendency will go to drinking water.

- Zuckerfreie Getränke sind erfrischender als zuckerhaltige.
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- Meine Eltern finden es gut, wenn ich zuckerfreie Getränke trinke.
- Mein/e Partner/in trinkt mehr zuckerhaltige Getränke als zuckerfreie.
- Ich bekomme oft von meinen Freunden zuckerfreie Getränke angeboten.

- Zuckerfreie Getränke sind weniger verfügbar an der Schule / der Universität als zuckerhaltige.
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To what extent asses young adults themselves as being able to drink always healthy beverages at any time. Which barriers are perceived? And is it possible to control the barriers? This can be measured by the internal and external perceived behavioural control. The first refers to one´s own abilities and skills and the other to the external possibilities. One can estimate that if one has the skills or facilities (e.g, the knowledge or the money) to eat and drink healthy but the healthy foods aren´t available at a certain place that one will fail to achieve the conducted behaviour.

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- In Anbetracht des Geldes, das mir zur Verfügung steht, kann ich mir zuckerfreie Getränke nur selten leisten.
- Wenn ich es möchte, bin ich der Lage, jederzeit zuckerfreie Getränke zu trinken.
- Ich finde es schwierig, immer zuckerfreie Getränke zu trinken, da ich oft nicht weiß, in welchen Getränken Zucker ist.
- Ich empfinde es als schwierig, in jeder Situation auf zuckerfreie Getränke zurück zu greifen.
- Ich finde es schwierig, zuckerhaltigen Getränken zu widerstehen.
- Es liegt in meinen eigenen Händen, wie viele zuckerfreie Getränke ich trinke.
- Es ist oft von der Situation abhängig, ob ich zuckerfreie Getränke trinke.

People hold self-concepts or self-perceptions which are characteristics that people ascribe to themselves. In this study it will be called self-identity. Persons who think that they have a healthy lifestyle will show a healthier drinking behaviour and mostly drink water or tea because they want to comply with their ideals (Sirgy, 1986). The questions of this construct based on the study of Sparks and Shepherd (1992).

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- Ich sehe mich selbst als einen gesunden Esser und Trinker.
- Ich sehe mich selbst als jemanden, der sich mit gesunder Ernährung beschäftigt.

- Ich fühle mich wohl, wenn ich zuckerfreie Getränke trinke.
- Ich sehe mich selbst als jemanden, der Essen und Trinken genießt.
- Ich habe ein gutes Gewissen, wenn ich zuckerfreie Getränke trinke.
-

The last construct is the intention to perform a certain behaviour. If someone takes the plan to do something the chance that he will actually do this will be bigger than for someone who doesn't plan it. In the TPB the intention is the only direct link to behaviour and is determined by all factors named above.

- Ich plane in der Zukunft mehr zuckerfreie Getränke zu trinken.
- Ich beabsichtige in der Zukunft weniger zuckerhaltige Getränke zu trinken.
- Ich möchte gerne mehr zuckerfreie Getränke zu mir nehmen.
- Zuckerfreie Getränke helfen mir, mein Gewicht zu halten.
- Zuckerfreie Getränke helfen mir nicht meine Konzentration zu steigern.

10.4 Final Version Questionnaire

Umfrage zum Trinkverhalten von alkoholfreien Getränken

Sehr geehrte/r Teilnehmer/in,

meistens machen wir es unbewusst und nebenbei. Dabei ist es ein lebenswichtiges Verhalten: das Trinken.

In Studien hat das Trinkverhalten bislang wenig Aufmerksamkeit bekommen und wurde unter verhaltenswissenschaftlichen Aspekten kaum betrachtet. Das soll sich mit dieser Studie nun ändern.

Die Umfrage wird im Rahmen einer Abschlussarbeit an der Universität Twente (Niederlande) durchgeführt und ausgewertet. Sie benötigen für das Ausfüllen des Fragebogens ungefähr 10 Minuten. Ihre Angaben werden natürlich vertraulich behandelt und anonym verwendet.

Des Weiteren gibt es die Möglichkeit, freiwillig an einer Zusatzstudie teilzunehmen. Bei dieser bitten wir Sie, drei Tage lang Ihren Konsum von alkoholfreien Getränken zu notieren. Als kleinen Anreiz können Sie ein persönlich ausgewertetes Trinkfazit erhalten. Sollten Sie Interesse haben, füllen Sie die letzte Angabe des Fragebogens aus und melden Sie sich bei der Studienleiterin.

Alle gestellten Fragen beziehen sich auf **kalte, alkoholfreie Getränke**, die **sowohl mit als auch ohne Kohlensäure** sein können und als **zuckerfreie** oder **zuckerhaltige** Variante im Supermarkt zu kaufen sind. Unter zuckerfreie Getränke fallen Wasser und Lightlimonaden. Zuckerhaltige Getränke sind Säfte, Limonaden, Schorlen und Milchgetränke. Alkoholische Getränke sowie Kaffee und Tee sind nicht Bestandteil des Fragebogens.

Lassen Sie sich beim Ausfüllen von Ihrer ersten spontanen Idee leiten und erschrecken Sie nicht bei den Wissensfragen.

Ich bedanke mich für Ihre Unterstützung und freue mich auf Ihre Meinung!

Mit freundlichen Grüßen

Karen Dinkhoff

Demografische Fragen

1. Alter:……

2. Geschlecht:
   - Weiblich
   - Männlich

3. Größe:……cm

4. Gewicht:……kg

5. Ich besuche die:
   - 11. Klasse
   - 12. Klasse
   - 13. Klasse

   (Ich studiere seit:……..
   Studiengang:…….)

6. Herkunftsland der Mutter:……

7. Herkunftsland des Vaters:……

8. Der höchste Bildungsabschluss meiner Mutter:
   - Kein Abschluss
   - Hauptschulabschluss
   - Realschulabschluss
   - 10. Klasse Gymnasium
   - Fachhochschulreife
   - Allgemeine Hochschulreife
   - Abgeschlossenes Studium an der Fachhochschule
   - Abgeschlossenes Studium an der Universität
   - Weiß ich nicht

9. Der höchste Bildungsabschluss meines Vaters:
   - Kein Abschluss
   - Hauptschulabschluss
   - Realschulabschluss
   - 10. Klasse Gymnasium
   - Fachhochschulreife
   - Allgemeine Hochschulreife
   - Abgeschlossenes Studium an der Fachhochschule
   - Abgeschlossenes Studium an der Universität
   - Weiß ich nicht

10. Folgende Getränke sind Zuhause bei meinen Eltern verfügbar:

	Nie	Selten	Ab und zu	Fast immer	Immer
○ Biolimonade	0	0	0	0	0
○ Eistee	0	0	0	0	0
○ Apfelschorle	0	0	0	0	0
○ Softdrinks (z.B. Cola, Fanta)	0	0	0	0	0
○ Apfelsaft	0	0	0	0	0
○ Milch	0	0	0	0	0
○ Schokomilch	0	0	0	0	0
○ Smoothies	0	0	0	0	0
○ Orangensaft	0	0	0	0	0
○ Mineralwasser	0	0	0	0	0

11. Folgende Getränke sind an der Schule verfügbar:

	Nie	Selten	Ab und zu	Fast immer	Immer
○ Biolimonade	0	0	0	0	0
○ Eistee	0	0	0	0	0
○ Apfelschorle	0	0	0	0	0
○ Softdrinks (z.B. Cola, Fanta)	0	0	0	0	0
○ Apfelsaft	0	0	0	0	0
○ Milch	0	0	0	0	0
○ Schokomilch	0	0	0	0	0
○ Smoothies	0	0	0	0	0
○ Orangensaft	0	0	0	0	0
○ Mineralwasser	0	0	0	0	0

12. Wie viel Gramm Zucker befinden sich in 100 ml (Angaben beziehen sich auf die gezuckerte Version des Getränks)

	4g	5g	6g	7g	8g	9g	10g	11g	12g	13g	14g	15g	16g	17g
- Biolimonade:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Eistee:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Apfelschorle:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Cola:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Apfelsaft:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Schokomilch:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Smoothie:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Traubensaft:	0	0	0	0	0	0	0	0	0	0	0	0	0	0

13. Wie viel Flüssigkeit sollte eine erwachsene Person, laut der Deutschen Gesellschaft für Ernährung (DGE), täglich **durch Getränke** zu sich nehmen?
    - ○ 0.5 Liter
    - ○ 1 Liter
    - ○ 1.5 Liter
    - ○ 2.5 Liter
    - ○ 3 Liter
    - ○ 5 Liter

14. Was sind von den untengenannten Begriffen Süßstoffe? *(Mehrfachnennungen möglich)*
    - ○ Saccharin
    - ○ Aspartam
    - ○ Sorbit
    - ○ Cyclamat
    - ○ Isomalt

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
15. Die neuen Biolimonaden sind, bezüglich ihres Zuckeranteils, die gesunde Alternative zu gewöhnlichen Limonaden.	0	0	0	0	0

Im Allgemeinen finde ich das Trinken von **zuckerhaltigen** Getränken

16. Lecker	0	0	0	0	0	Widerlich
17. Gut	0	0	0	0	0	Schlecht
18. Klug	0	0	0	0	0	Unklug
19. Empfehlenswert	0	0	0	0	0	Nicht empfehlenswert
20. Wohltuend	0	0	0	0	0	Schädlich
21. Gesund	0	0	0	0	0	Ungesund

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
22. Ich fühle mich wohl, wenn ich **zuckerfreie** Getränke trinke.	0	0	0	0	0
23. Ich fühle mich gesünder, wenn ich **zuckerfreie** Getränke trinke.	0	0	0	0	0
24. Ich habe ein gutes Gewissen, wenn ich **zuckerfreie** Getränke trinke.	0	0	0	0	0
25. **Zuckerfreie** Getränke helfen mir, mein Gewicht zu halten.	0	0	0	0	0
26. **Zuckerfreie** Getränke sind durstlöschender als zuckerhaltige.	0	0	0	0	0
27. **Zuckerfreie** Getränke sind erfrischender als zuckerhaltige.	0	0	0	0	0
28. **Zuckerfreie** Getränke sind hipper als zuckerhaltige.	0	0	0	0	0
29. Bei **zuckerfreie** Getränken ist es mir wichtiger, dass ich ein Markengetränk wähle als bei zuckerhaltigen	0	0	0	0	0
30. **Zuckerfreie** Getränke sind langweilige Getränke.	0	0	0	0	0
31. Der Spaß am Trinken vergeht mir durch **zuckerfreie** Getränke.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
32. **Zuckerfreie** Getränke sind teurer als zuckerhaltige.	0	0	0	0	0
33. **Zuckerfreie** Getränke schmecken nicht gut.	0	0	0	0	0
34. **Zuckerfreie** Getränke helfen mir nicht meine Konzentration zu steigern.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
35. Meine Eltern finden es gut, wenn ich **zuckerfreie** Getränke trinke.	0	0	0	0	0
36. Meine Freunde finden es gut, wenn ich **zuckerfreie** Getränke trinke.	0	0	0	0	0
37. Mein/e Partner/in findet es gut, wenn ich **zuckerfreie** Getränke trinke.	0	0	0	0	0
38. Ich bekomme oft von meinen Freunden **zuckerfreie** Getränke angeboten.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
39. Meine Eltern trinken mehr **zuckerhaltige** Getränke als zuckerfreie.	0	0	0	0	0
40. Mein/e Partner/in trinkt mehr **zuckerhaltige** Getränke als zuckerfreie.	0	0	0	0	0

41. Wie viele deiner Freunde trinken täglich **zuckerhaltige** Getränke?
    - Keiner
    - Wenige
    - Die Hälfte
    - Die meisten
    - Alle

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
42. Wenn ich es möchte, bin ich der Lage, jederzeit **zuckerfreie** Getränke zu trinken.	0	0	0	0	0
43. Es liegt in meinen eigenen Händen, wie viele **zuckerfreie** Getränken ich trinke.	0	0	0	0	0
44. Ich finde es schwierig, immer **zuckerfreie** Getränke zu trinken, da ich oft nicht weiß, in welchen Getränken Zucker ist.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
45. Ich finde es schwierig, **zuckerhaltigen** Getränken zu widerstehen.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
46. Ich empfinde es als schwierig, in jeder Situation auf **zuckerfreie** Getränke zurück zu greifen.	0	0	0	0	0
47. Es ist oft von der Situation abhängig, ob ich **zuckerfreie** Getränke trinke.	0	0	0	0	0
48. In Anbetracht des Geldes, das mir zur Verfügung steht, kann ich mir **zuckerfreie** Getränke nur selten leisten.	0	0	0	0	0
49. **Zuckerfreie** Getränke sind weniger verfügbar an der Schule als zuckerhaltige.	0	0	0	0	0
50**. Zuckerfreie** Getränke sind Zuhause häufiger verfügbar als zuckerhaltige.	0	0	0	0	0
51. Es gibt Faktoren in meinem Umfeld, die ich nicht beeinflussen kann und mich deshalb am Trinken von **zuckerfreien** Getränken hindern.	0	0	0	0	0
52. Die Auswahl von **zuckerfreien** Getränken ist begrenzter als die Auswahl von zuckerhaltigen.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
53. Ich sehe mich selbst als einen gesunden Esser und Trinker.	0	0	0	0	0
54. Ich sehe mich selbst als jemanden, der sich mit gesunder Ernährung beschäftigt.	0	0	0	0	0
55. Ich sehe mich selbst als jemanden, der sich über die Folgen der Ernährung bewusst ist.	0	0	0	0	0
56. Ich sehe mich selbst als jemanden, der Essen und Trinken genießt.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
57. Ich plane in der Zukunft mehr **zuckerfreie** Getränke zu trinken.	0	0	0	0	0

	Stimme überhaupt nicht zu	Stimme nicht zu	Teils, teils	Stimme zu	Stimme voll und ganz zu
58. Ich beabsichtige in der Zukunft weniger **zuckerhaltige** Getränke zu trinken.	0	0	0	0	0
59. Ich möchte gerne mehr **zuckerfreie** Getränke zu mir nehmen.	0	0	0	0	0

Mit Hilfe von folgender Liste möchten wir überprüfen, wie oft Sie durchschnittlich welche Getränke konsumieren. Bitte füllen Sie die Liste aus und machen Sie bei jedem Getränk nur ein Kreuz. Bei jedem Getränk geht es um die **Größe eines Standardglases von 250 ml.**

Getränk	Nie	1 – 2 mal im Monat	1-mal die Woche	2 – 3 mal die Woche	4 – 6 mal die Woche	1-mal am Tag	2 – 3 mal am Tag	4 – 6 mal am Tag	7 mal oder öfter am Tag
Vollmilch (3.5% Fett)									
Fettarme Milch (1.5% Fett)									
Magermilch/ Buttermilch (max. 0.3% Fett)									
Joghurtdrinks									
Sojamilch									
Schokomilch									
Purer Apfelsaft									
Purer Traubensaft									
Purer Orangensaft									
Multivitaminsaft									
Gemüsesaft									
Apfelsaftschorle									
Brauselimonade (z.B. Cola, Fanta)									
Light Brauselimonade (z.B. Cola light, zero)									
Biolimonade									
Eistee									
Leitungs- oder Mineralwasser									
Smoothies									

Möchten Sie an der Zusatzstudie teilnehmen? Dann füllen Sie in untenstehendes Feld als erstes Ihr Geburtsjahr, dann die letzten beiden Buchstaben Ihres Vor- und Nachnamens ein. Dies ist Ihr persönlicher Code, der es ermöglicht, Ihre Anonymität zu erhalten und die Zusatzstudie an diesen Fragebogen koppeln zu können.

_ _ _ _ _ _ _ _ (JJJJ,VV,NN)

10.5 Additional analysis

Factor analysis SI

Variable SI	Initial Eigenvalues		Extraction Sum of Squared Loadings	
	Total	% of Variance	Total	% of Variance
1	1.73	43.24	1.73	43.24
2	1.04	25.87	1.04	25.87
3	0.77	19.12		
4	0.47	11.77		

Component matrix SI

Item	Comp 1	Comp 2
1	.792	
2	.810	
3	.655	
4		.964

Factor analysis PBC

Variable PBC	Initial Eigenvalues		Extraction Sum of Squared Loadings	
	Total	% of Variance	Total	% of Variance
1	2.35	22,52	2.25	22.52
2	1.49	14.93	1.49	37.46
3	1.09	10.93	1.09	48.38
4	1.00	10.04	1.00	58.42
5	.88	8.83		
6	.81	8.10		
7	.70	7.02		
8	.66	6.59		
9	.56	5.63		
10	.54	5.39		

Component matrix PBC

Item	Comp 1	Comp 2	Comp 3	Comp 4
1	.562			
2	.485		-.506	
3	.451			
4	.412	-.503		
5			.435	
6		.598		
7	.662			
8		.496		.513
9	.590			
10	.426	.472		

Excluded Table (low p): Stepwise Regression Analysis for Predicting the Consumption of Sugared Beverages of Male Respondents

	Block 1		**Block 2**		**Block 3**	
	Beta	**p**	**Beta**	**p**	**Beta**	**p**
Age	-.05	.615	-.02	.867	-.04	.701
Education level mother	-.09	.415	-.14	.222	-.18	.133
Education level father	.22	.062	.28	.017	.33	.007
BMI	.03	.770	.04	.676	.07	.543
Availability at home			.26	.011	.33	.004
Availability at school/university			.01	.902	-.02	.848
Attitude					.14	.306
ISN					-.14	.278
DSN parents					.06	.617
DSN partner					-.01	.939
DSN friends					-.25	.020
PBC					-.01	.895
SI (health)					-.06	.617
Intention					-.05	.704
R	.20		.32		.43	
R^2	.04		.11		.18	
F	(df=4)=1.01	.405	(df=6)=1.92	.086	(df=14)=1.41	.161
ΔR^2			.07		.08	
ΔF			3.62	.031	1.04	.412

Independent-Samples T Test: Low intenders vs. high intenders (no significant difference)

	Education level	**N**	**Mean**	**Std. D.**	**t**
Consumption of sugared beverages	High intenders	102	6.11	6.45	-1.32
	Low intenders	238	72.76	9.41	