UNIVERSITY OF TWENTE

The Development of an Alcohol-Specific Compensatory Health Belief Scale

In Partial Fulfillment of the

Requirement for the Degree of the

Bachelor of Science

by

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Abstract

Objective: The excessive consumption of alcohol is a current and serious problem in our society. Although the majority knows about the negative consequences of alcohol it is still the most popular drug around the world. The knowledge about the negative consequences and simultaneously the ongoing consumption of alcohol can evoke a state of cognitive dissonance, which is a state of discomfort. There are many ways to reduce the dissonance and one possibility is to hold compensatory health beliefs (CHBs). In the case of alcohol, compensatory health beliefs are beliefs that the irreversible negative effects of excessive alcohol consumption can be counterbalanced or neutralized by healthy behavior. The aim of this study was to create a valid and reliable scale that measures alcohol-specific compensatory health beliefs.

Design: For the analysis cross-sectional data were used.

Subjects: The sample consisted of 167 subjects. The mean age was 21.28 years and the majority of participants were students from the University of Twente.

Method: The developed alcohol-specific compensatory health belief scale was tested for its validity, reliability and predictive value. Furthermore a mediator and moderator analysis was conducted.

Results: Evidence was found that the developed alcohol-specific compensatory health belief scale is reliable and valid. A Cronbach's alpha of α=0,88 was found for the developed scale. CHB score was significantly negative related to binge drinking behavior.

Conclusion: The developed alcohol-specific compensatory health belief scale is a valid and reliable instrument to measure the overall tendency of using alcohol-specific compensatory health beliefs.

Abstract

Thema: Overmatig alcoholgebruik is een actueel en serieus probleem in onze maatschappij. Hoewel de meerderheid weet van de negatieve consequenties van overmatig alcoholgebruik, is alcohol nog steeds de populairste drug ter wereld. Het weten van de negatieve consequenties en het tegelijkertijd drinken van alcohol kan leiden tot een cognitieve dissonantie. Een cognitieve dissonantie is een spanning die ontstaat als overtuigingen in tegenstrijd zijn met elkaar. Er zijn veel mogelijkheden om deze spanning op te lossen en één van deze mogelijkheden is om een compensatory health belief te creëren. Compensatory helath beliefs zijn overtuigingen dat de negatieve consequenties van alcohol kunnen worden gecompenseerd of geneutraliseerd door gezond gedrag. Het doel van deze studie was om een vragenlijst te ontwikkelen die op een valide en betrouwbare manier alcoholgerelateerde compensatory health beliefs meet.

Onderzoeksopzet: In deze studie is gebruik gemaakt van cross-sectionele data.

Proefpersonen: 167 profpersonen hebben deelgenomen aan deze studie waarvan 97% studenten zijn.

Methoden: De betrouwbaarheid, validiteit en predictieve validiteit van de alcohol-specifieke compensatory health belief vragenlijst wordt getest. Verder is er een mediator en moderator analyse uitgevoerd.

Resultaten: De resultaten tonen aan dat de ontwikkelde vragenlijst valide en betrouwbaar is. De vragenlijst heeft een Cronbach's alpha van $\alpha=0.88$. De score van de alcohol-specifieke compensatory health belief vragenlijst correleert negatief met de variabele comazuipen.

Conclusie: De ontwikkelde vragenlijst is een valide en betrouwbaar instrument om de algemene neiging om alcohol-specifieke compensatory health beliefs te gebruiken te meten.

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1. Introduction

1.1 Alcohol

Excessive consumption of alcohol is especially for adolescents and young adults a current and serious problem in our society. Europe is worldwide in first place with regard to the consumption alcohol (Anderson & Baumberg, 2006) and in the Netherlands alone, between 2007 and 2010, 1818 adolescents were taken to hospital because of alcohol related problems, whereof approximately 10% had to be medicated at the intensive care unit (van der Lely, van Dalen, van Hoof & Pereira, 2012). Alcohol abuse among students and young people is particularly high (Beenstock, Adams & White, 2011) and binge drinking has become a common and dangerous phenomenon among this target group. The National Health Service (UK) defines binge drinking as consuming six or more units of alcohol in a single session (NHS, 2009). Binge drinking is not just a problem for adolescents or youth with a lower educational level. Research indicates that binge drinking is even more prevalent among university students than their non-student peers (Norman, 2011). Park (2004) stated in his study about the negative consequences of alcohol consumption that the academic performances and the interpersonal relationships among college students suffer from the consumption of alcohol. Beside the negative short-term effects of excessive alcohol consumption, like headache or stomach problems, there are also many negative long-term effects like alcohol liver disease, cancer and high blood pressure. Zantinge, van Laar and Meijer (2012) stated that the consumption of alcohol consumption coheres with about 60 diseases and it has negative effects on almost every organ in the human body.

Although the majority knows about the negative consequences of alcohol consumption, alcohol is the most popular drug around the world. Because of this contradiction, crucial determinates for the consumption of alcohol will be discussed in the following paragraphs.

1.2 Proximal Determinants

The *theory of planned behavior* from Ajzen (1991) is a model that provides an explanation for the decision making process in order to either drink alcohol or to resist. Armitage and Connor (2001) found out that the theory of planned behavior is a good predictor for alcohol abuse. Furthermore Norman (2011) identified in his study about binge drinking that the theory of planned behavior explains almost 75% of the variance in binge drinking behavior. The most important factor in this model, that leads to the actual consumption of alcohol, is first of all the *intention* to do so. The theory of planned behavior assumes that decision about whether to drink alcohol or not is conscious. The model claims that three variables, namely attitude, subjective norm and perceived control, affect intention and therefore behavior (Ajzen, 1991).

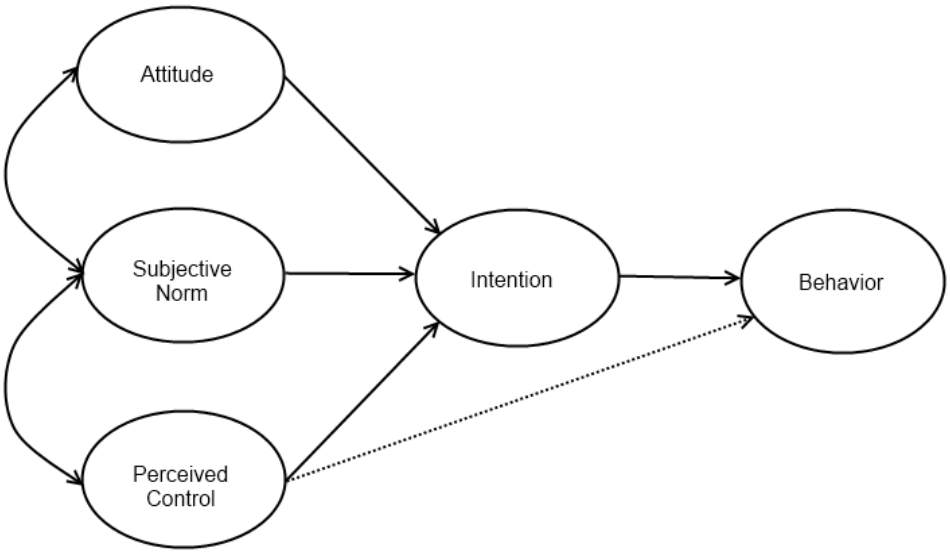

Figure 1. Theory of planned behavior

Attitudes describe the beliefs about the possible positive or negative outcomes of behavior. If people hold positive attitudes towards alcohol use, they expect thus more positive than negative consequences. The expected positive consequences can lead in turn to the consumption of alcohol. Attitudes are affected by two other variables of the model, namely perceived control and subjective norm. The second factor in the theory of planned behavior is *subjective norm*, which describes the belief about norms in the social setting. Especially in the

case of alcohol consumption, the family circumstances and peers play a crucial role. If the social setting accepts or even endorses excessive alcohol consumption, the youth will feel social pressure as a result of people's expectations. Especially peers who engage binge drinking have a strong influence on the decision making process of the youth. The subjective norm is influenced by the two other variables, attitude and perceived control. The *perceived behavioral control* (self-efficacy) represents the third factor in this model. The main concern here is that people weigh the perceived difficulty or ease to carry out a behavior. This factor is, according to Petraitis, Flay and Miller (1995), the most influential factor in the decision making process. If the perceived control is assessed as low, the probability that the planned behavior is actually carried out decreases, even if positive attitudes are hold and the endorsement from others is present. Within the variable self-efficacy, a distinction is made between *use self-efficacy* and *refusal self-efficacy*. Use self-efficacy refers to people's confidence in their ability to perform the behavior, whereas refusal self-efficacy relates to the assessed ability to resist social pressure (Norman, 2011). Both seem to have a great impact in the decision making process (Will, Baker & Botvin, 1989).

Armitage and Connor (2001) found out that 27% to 39% of the variance in intention and behavior can be explained by the theory of planned behavior. Because of the limited predictive value, this study examines whether compensatory health beliefs can add value to the theory of planned behavior. The theory states that individuals make behavioral decisions based on careful consideration of available information (Godin & Kok, 1996). To expand the model, a variable was added that measures compensatory health beliefs. It was hypothesized that the new construct should have better predictive value.

1.3 Compensatory Health Beliefs

People strive towards an optimal level between maximizing pleasure and minimizing harm. This principle is applicable to almost every area of life, also for health related behavior. Unhealthy behavior in this study is associated with excessive alcohol consumption. Harm means in this context, to resist the temptation of the pleasurable but unhealthy behavior in order to achieve a health related goal like drinking less or no alcohol.

When people have to decide whether to behave healthy or to carry out a pleasurable but unhealthy behavior, cognitive dissonance arises (Knäuper, Rabiau, Cohen & Patriciu, 2007). Cognitive dissonance describes a state of discomfort where people have simultaneously two contrary beliefs. In many cases the long-term goals (e.g. drinking no alcohol) contradict with short-term goals (e.g. drinking alcohol at a party) (Rabiau, Knäuper & Miquelon, 2006). With respect to health behavior there are three strategies to deal with this mental conflict (Radtke, Scholz, Keller, Knäuper & Hornung, 2011). The first strategy is to resist the unhealthy but pleasurable behavior in order to choose for the health goal. That means to resist the temptation so that the mental conflict is solved. It is a behavioral strategy where people have to become active to reduce the cognitive dissonance. The second strategy is to adapt the outcome expectation. That is either to change the cognitions about the temptation (e.g. drinking a lot of alcohol isn't that unhealthy) or the goal (e.g. drinking less alcohol isn't that important to me). Another strategy is to create a compensatory health belief. It is the easiest way to deal with the dissonance, but it contains the unhealthy choice and is therefore not an ideal solution.

Compensatory health beliefs (CHBs) are beliefs, that the negative effects of an unhealthy (but pleasurable) behavior can be compensated for or neutralized by carrying out a healthy behavior (Radtke & Scholz, 2012). CHBs are therefore a form of justification. CHBs can be accurate, partially accurate and inaccurate. The distinction between accurate and inaccurate CHBs in the case of alcohol is difficult, because excessive alcohol consumption has multiple negative effects like headache and water loss (Rabiau, Knäuper & Miquelon, 2006). Furthermore, many people actually don't carry out the action that should compensate the unhealthy behavior. The cognitive dissonance decreases over time, so that the initial need to compensate the unhealthy behavior can vanish (Radke & Scholz, 2012). Radtke and Scholz (2012) found out that CHBs are positively associated with health related risk behavior like smoking and drinking alcohol. Risk perception and outcome expectations play a great role in using CHBs. If the risk perception is low and acceptable, the chance that CHBs are used is high (e.g. if I drink a lot of alcohol once a month, the risk to suffer from negative long-term health problems is low). Outcome expectations describe the health goals, people want to achieve. If the purposes are of personal interest and have a high personal value, there is less chance that CHBs are used. Vice versa if the outcome expectations are easy to modify and are from low personal interest, people are inclined to use CHBs in order to reduce the cognitive dissonance. Furthermore people with low self-regulation and self-control are likely to use CHBs because it is the easiest way to reduce the cognitive dissonance. Here a connection can

be made between the compensatory health beliefs and the theory of planned behavior. Radtke and Scholz (2012) stated that if the outcome expectations are of low personal interest and also the perceived self-control is assessed as low, the chance that CHBs were used increases. Therefore this study examines whether CHBs can add value to the theory of planned behavior.

1.4 Distal Factors

Barefoot, Smith, Dahlstrom and Williams (1989) stated in their study that another predicting factor for alcohol abuse is *personality*. Granö, Virtanen, Vahtera, Elovainio and Kivimäki (2004) found out that especially *impulsivity* has a great predicting value for alcohol abuse. Impulsivity is a major personality trait and in many theories this trait forms one of the basic traits of personality. It describes the character trait of acting without due considerations. If people score high on impulsivity they have problems to control their impulses, and in relation to the consumption of alcohol, they have problems to control their drinking behavior. The lack of impulse control can lead to excessive alcohol abuse. Therefore it can be hypothesized that people who are impulsive hold more alcohol-specific CHBs.

The second personality trait which has a great impact on alcohol abuse is *sensation seeking*. Hoyle, Fejfar, & Miller (2000) found out that alcohol abuse correlates positive with risky health behavior and especially with sensation seeking. Sensation seeking describes the permanent demand for new exciting experiences in order to hold excitement in life. To justify health risky excessive alcohol abuse, it was hypothesized that people who score high on sensation seeking hold more alcohol specific CHBs.

The following figure describes the considered model where the personality traits sensation seeking and impulsivity, the theory of planned behavior and compensatory health beliefs are combined.

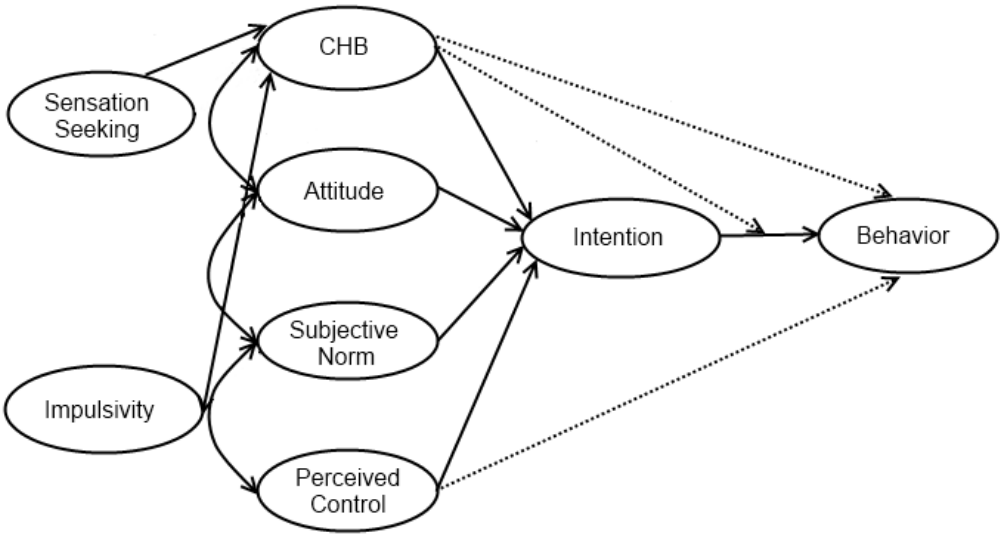

Figure 2. The extended model of the theory of planned behavior

1.5 Aims of this Study

The general CHB scale developed by Knäuper et al. (2004) was used as a role model for the survey. The original scale was too gerneric with regard to alcohol-specific CHBs. The original scale consists of 17 items with four subscales. Six of the 17 developed items belong to the subscale 'substance use'. This subscale has a Cronbach's alpha of α=.74. Three items in the 'substance use' scale measure alcohol-specific CHBs and the other items in this subscale measure CHBs with regard to caffeine intake and cigarette smoking. Because of the limited amount of alcohol-specific items, the original scale had limited ability to examine alcohol-specific CHBs. Therefore the aim of this study was to develop a scale that measures valid and reliable alcohol-specific CHBs.

In order to create an item pool, a preliminary study was performed. People were asked about their general perceptions about compensation behavior with regard to alcohol consumption. The statements from these interviews form the basis for the final eleven items in the developed scale. In addition to the CHB scale other scales and questions were administered to test the validity of the developed scale. These scales were the Health Self-Efficacy Scale, the Substance Use Risk Profile Scale, the Questionnaire Twente Alcohol Consumption Scale and questions based on the theory of planned behavior. The validity of the developed scale was examined by calculating correlations between the results of the alcohol-specific CHB scale with other constructs

The following hypotheses were considered.

Hypothesis 1: Self-efficacy, attitude and intention correlate negatively with holding alcohol-specific CHBs.

Hypothesis 2: Binge drinking correlates positively with holding alcohol-specific CHBs.

Hypothesis 3: Impulsivity and sensation seeking correlate positively with holding alcohol-specific CHBs.

Hypothesis 4: CHBs add value to the theory of planned behavior in predicting excessive alcohol consumption.

Hypothesis 5: CHBs act as mediators in the correlation between sensation seeking and intention to reduce binge drinking.

Hypothesis 6: CHBs act as moderators in the correlation between intention to reduce binge drinking and binge drinking behavior.

2. Method

2.1 Participants

164 participants were recruited through the participant research pool of the University of Twente. Furthermore, the link from the online survey was posted on facebook to gather people who have no access to the participant research pool (n=21). A total number of 185 attendants participated in this study. The cases of 18 participants were excluded from analysis because of incomplete datasets, so that for current analyses 167 subjects were taken into consideration. Of these 167 subjects, 81.4% were female and 18.6 % were male. 96.6% of all attendants were students, whereof 47.9% reported that they were currently follow academic training and 36.6% reported that they were high-school students. The fact that 39.5% participants stated that they are at high school argues against the fact that 146 participants (87.4%) completed the survey via the participant research tool of the University of Twente.

2.2 Procedure

In order to generate an item pool 12 participants were asked about their general perceptions about compensation behavior with regard to alcohol consumption. Semi-structured interviews were performed with these participants. By analyzing the interviews, it turned out that the common CHBs with respect to alcohol use can be divided in 5 subgroups: 'eating healthy', 'drinking water', ‘doing sport’, 'compensation over time' and 'healthy lifestyle'.

The subgroups ‘eating healthy’ and ‘drinking water’ measure if the participants hold the belief that the negative consequences of excessive alcohol consumption can either be compensated via eating healthy food or respectively via drinking water before or after consuming alcohol. The subgroup ‘compensation over time’ measures the beliefs about whether the negative consequences of excessive alcohol decrease over time. The items of the subgroup ‘doing sport’ measure whether participants hold the belief that they can compensate the consumption of alcohol by doing sport. The last subgroup examines if respondents hold the belief that the negative consequences of alcohol consumption can be compensated by an overall healthy lifestyle.

The final items were developed on the basis of these five main categories. For the development of the items the original CHB scale from Knäuper et al. (2004) was used as a guide. The developed items were examined and improved by experts, so that a total number of eleven items were selected for the final alcohol-specific CHB scale. The items were scored on a scale from 1 (strongly agree) to 5 (strongly disagree). A high score on this scale means that participants hold few compensatory health beliefs.

2.3 Instruments

Other scales were included in order to examine how other constructs are related to CHBs and to test the construct validity of the developed scale.

2.3.1 Substance Use Risk Profile Scale (SURPS)

The SURPS assesses variations in the personal risk for substance abuse in terms of hopelessness, anxiety sensitivity, impulsivity, and sensation seeking (Woicik, Stewart, Pihl & Conrod, 2009). There is evidence that personality traits influence the individual risk for alcohol abuse. In this study, the subgroups 'impulsivity' and 'sensation seeking' were used in order to draw inferences about whether these variables are indicators for holding alcohol-specific CHBs. It was assumed that the variables ‘hopelessness’ and ‘anxiety sensitivity’ are not particular relevant for holding alcohol-specific CHBs. Subjects were asked to rate eleven items (six ‘sensation seeking’ items and five ‘impulsivity’ items) on a scale from 1 (strongly disagree) to 5 (strongly agree). A high score on these variables indicates that participants are sensation seeking and impulsive. It was supposed that people who hold alcohol-specific CHBs would score high on the personality traits sensation seeking and impulsivity. A Cronbach’s alpha of α=.753 was found for the ‘sensation seeking’ scale, and a Cronbach’s alpha of α=.653 was found for the ‘impulsivity’ scale.

2.3.2 Alcohol Consumption

Two questions were used from the Questionnaire Twente Alcohol Consumption in order to reconstruct the alcohol consumption at the weekends. For the questions on this scale a definition of a standard glass had to be given, because these questions depend on the amounts of standard alcohol glasses. This was realized via pictures of different standard glasses. One question was about the typical amount of standard glasses at one day of the weekend. The other question was about binge drinking behavior at one day of the weekend. The answer for the first question ranged from 'never' (0) up to '20 glasses or more per day' (10) and the second one from 'never more than 6 standard glasses in the last 4 weeks' (0) up to '9 times or more in the last 4 weeks' (10).

2.3.4 Health-Specific Self-Efficacy Scale

The Health-Specific Self-Efficacy Scale (Schwarzer & Renner, 2009) was used to measure the self-efficacy in relation to the resistance of alcohol. People who don't trust in their own ability to resist the temptation of drinking alcohol are more likely to actually drink alcohol. Three statements about the self-assessed capability to resist unhealthy alcohol-specific temptations were asked to rate on a scale from 'unsure' (4) to 'sure' (1). High scores on this scale mean that people are not self-efficient with regard to the resistance of alcohol. It was hypothesized that people who hold alcohol-specific CHBs would have low self-efficacy with regard to the resistance of alcohol. A Cronbach's alpha of α=.766 was found for this scale.

2.3.5 Theory of Planned Behavior

Questions depending on the theory of planned behavior (Ajzen, 1991) were used in order to test attitude, perceived control and social influence with regard to alcohol consumption. The construct social influence consists of the variables 'subjective norm' and 'descriptive norm'. The theory of planned behavior provides an explanation for the decision

making process to either drink alcohol or to resist. This model claims that the three variables affect behavioral intentions and therefore behavior.

To measure the attitude towards binge-drinking the statement "Drinking six or more standard glasses at a party at least once a week is..." had to be rated on a scale from 'bad' (1) to 'good' (5) and from 'unsociable' (1) to 'sociable'(5). A high score indicates that the attitude towards binge drinking is positive.

The second variable social influence was measured by two items, whereof one measures 'subjective norm' ('My friends think that I should limit my consumption of alcohol to maximal 5 standard glasses per opportunity') and the other one measures 'descriptive norm' ('How many of your friends sometimes drink more than 5 standard glasses?'). Participants had to rate two statements on a 5-point-likert-scale from 'sure not' (1) tot 'sure' (5) (subjective norm) and from 'almost nobody' (1) tot 'almost everybody' (5) (descriptive norm). Intention to reduce binge drinking was measured by this statement: 'I want to limit my consumption of alcohol to maximal 5 standard glasses per opportunity in the following 12 month'. Participants had to rate this statements on a 5-point-likert-scale from 'sure not' (1) tot 'sure' (5).

2.4 Data Analysis

First of all reliability was examined of the developed CHB scale, the two SURPS subscales and the health self-efficacy scale. Reliability measures the overall consistency of a dataset. For this research, it was important that a reliability coefficient of at least 0.6 was attained for further analysis.

Furthermore a Pearson correlation analysis was conducted in order to detect correlations between the different constructs and the CHB scale to examine the external validity of the CHB scale.

Three analyses of regression were carried out. The first one was conducted to find out whether CHBs add value to the theory of planned behavior with the dependent variable 'intention to reduce binge drinking'. The second one was accomplished to find out if the variable 'CHBs' and the variable 'intention to reduce binge drinking' add value to the theory of planned behavior. The third analysis of regression was conducted to find out whether CHBs add valued to the variable sensation seeking. The dependent variable of the last two analyses of regression was 'binge drinking behavior'.

A moderation analysis was conducted to find out whether the correlation between the independent variable ‘intention to reduce binge drinking’ and the dependent variable ‘binge drinking behavior’ is affected by the possible moderator CHB. Furthermore a mediator analysis was carried out to examine whether CHBs act as a mediator in the correlation between ‘sensation seeking’ and ‘binge drinking behavior’.

3. Results

3.1. Descriptive Statistics

In Table 2 the descriptive statistics of the different test are shown. The mean of the variable ‘binge drinking behavior’ is 2.46 and the mean of the standard glasses on a normal weekend day is 7.79. A mean of 41.64 with a standard deviation of 7.57 and overall maximum score of 55 was found for the CHB scale. A great variation is found between the participants in the intention to reduce binge (m=2.84, SD=4.44). A mean of 4.81 with an overall maximum value of 12 was found on the Health Self Efficacy Scale.

Table 2. *Descriptive statistics (minimum, maximum, mean and standard deviation) of the different variables*

	Minimum	Maximum	Mean	Standard Deviation
CHB Scores	22	55	41.64	7.57
Amount of standard glasses	0	11	7.79	2.47
Binge Drinking Behavior	1	10	2.46	1.93
Health Self efficacy	3	10	4.81	2.05
Impulsivity	5	16	11.52	2.47
Sensation Seeking	6	24	15.04	4.02
Attitude	0	10	4.52	1.96
Intention	1	5	2.84	4.44
Subjective Norm	0	5	4.37	1.01
Descriptive Norm	1	5	3.26	1.08

3.2 Factor Analysis

A factor analysis is a method that detects a fundamental structure in a data matrix (Tinsley & Tinsley, 1987). In order to examine whether each subgroup also forms distinct factor, such an analysis was conducted. The results indicate that two factors can be found. The subgroup ‘compensation over time’, item 1 (Als ik doordeweek veel sport, dan kan ik in het weekend met een gerust hart stevig alcohol drinken) of the ‘doing sport’ subgroup, item 2 (Het is oké om veel alcohol te drinken als ik de volgende dagen extra gezond eet) of the ‘eating healthy’ subgroup and item 1 and 3 (Een gezonde leefstijl kan de negatieve effecten van alcohol compenseren; Als ik goed op mijn gezondheid let is het oké dat ik in het weekend veel alcohol drink) of the ‘healthy lifestyle’ subgroup form one factor. The subgroup ‘drinking water’ and item 1 of the ‘eating healthy’ subgroup belong to the second factor. Item 2 of the ‘doing sport’ subgroup and item 2 of the ‘healthy lifestyle’ subgroup don’t show a real affinity to both factors. Because of these results, it was concluded that the whole survey measures an overall tendency of using alcohol-specific CHBs. However it is striking that the

subgroup ‘drinking water’ had a high factor loading. Furthermore the Cronbach’s alpha for this subgroup was α=.61. These results indicate that this subgroup forms a distinct construct. A Cronbach’s alpha of α=.86 was found for the first factor which indicates that this factor is internal consistent. A Cronbach’s alpha of α=.63 was found for the second factor.

Table 1. *Results of the factor analysis*

Subgroups and items	Percentage of variance factor 1	Percentage of variance factor 2
Subgroup I: eating healthy (**α=0.669**)		
1. Door gezond te eten kan ik de negatieve gevolgen van veel alcohol drinken compenseren.	.35	**.56**
2. Het is oké om veel alcohol te drinken als ik de volgende dagen extra gezond eet.	**.65**	.36
Subgroup II: drinking water (**α=0.611**)		
1. Het drinken van veel water compenseert alcoholgebruik.	.19	**.73**
2. De gevolgen van overmatig alcoholgebruik kan ik opheffen door veel water te drinken.	.09	**.79**
Subgroup III: sport (**α=0.764**)		
1. Als ik doordeweek veel sport, dan kan ik in het weekend met een gerust hart stevig alcohol drinken.	**.76**	.35
2. De gevolgen van overmatig alcoholgebruik kan ik door sporten compenseren.	.54	.55
Subgroup IV: compensation over time (**α=0.722**)		
1. Het is oké om dit weekend veel alcohol te drinken als ik volgend weekend geen alcohol drink.	**.75**	.03
2. Het is oké om in een weekend veel alcohol te drinken als ik het niet door-de-week doe.	**.81**	.15
Subgroup V: healthy lifestyle (**α=0.747**)		
1. Een gezonde leefstijl kan de negatieve effecten van alcohol compenseren.	**.52**	.38
2. Als je maar gezond leeft, is veel alcohol drinken niet erg.	.5	.32
3. Als ik goed op mijn gezondheid let is het oké dat ik in het weekend veel alcohol drink.	**.8**	.32

Note. Factor loadings above 0.5 are bold; Cronbach's alpha above 0.6 are bold

3.3 Internal Consistency

The overall Cronbach's alpha for the CHB scale was α=.88, which is defined as good. Cronbach's alpha for the 5 considered subgroups were as follows: 'eating healthy' α=.67, 'drinking water' α=0.61, 'doing sport' α=.76, 'compensation over time' α=.72 and 'healthy lifestyle' α=.75.

3.4 Correlations

A correlation analysis was conducted between the diverse tests, in order to examine the validity of the developed alcohol-specific CHB scale. As can be seen in Table 2, a significant negative correlation was found between the score on the CHB scale and the score on the variable 'binge drinking behavior' (r=-.32), which indicates that people who are inclined to binge drinking also hold more alcohol-specific CHBs. As expected a significant negative correlation was found (r=-.18) between the Health Self Efficacy Scale and holding CHBs which confirms the hypothesis that people who hold CHBs have low self-efficacy. In terms of personality, holding more CHBs is related to the higher impulsivity (r=.20) and sensation seeking (r=.2). Furthermore a significant negative correlation was found between the attitude towards binge drinking and holding CHBs (r=-.33), which means that people who don't want to reduce their alcohol consumption to maximal 5 standard glasses are inclined to hold CHBs. It was hypothesized that people who hold CHBs don't have the intention to reduce their alcohol consumption to maximal 5 standard glasses. A significant negative correlation was found between these two variables (r=-.33) which indicates that the hypothesis is confirmed. No correlation was found between subjective norm and holding CHBs (r=-.04).

Table 3. *Correlation coefficients of the different variables*

	1.	2.	3.	4.	5.	6.	7.	8.
1. CHB score	-	-.322**	-.183**	.204**	.196**	-.329**	-.333**	-.044
2. Binge Drinking Behavior		-	.340**	-.218**	-.187**	.363**	.453**	.093
3. Health Self efficacy			-	-.163*	.161*	.263**	.335**	-.084
4. Impulsivity				-	.219**	-.019	-.049	-.122
5. Sensation Seeking					-	-.229**	-.128*	-.178*
6. Attitude						-	.661**	.211**
7. Intention							-	.216**
8. Subjective Norm								-

****.** Correlation is significant at the 0.01 level (1-tailed)

***.** Correlation is significant at the 0.05 level (1-tailed)

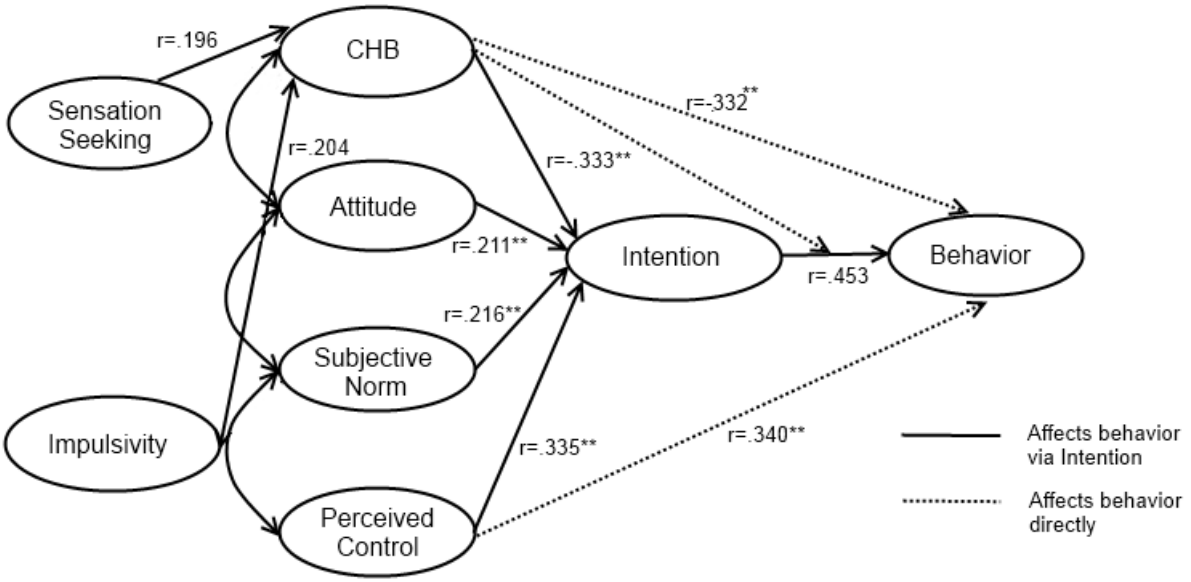

Figure 3. Univariat correlation coefficients between the different variables in the extended model of the theory of planned behavior

3.5 Analysis of Regression

Three analyses of regression were carried out. The first one was accomplished to find out whether CHBs add value to the theory of planned behavior. The dependent variable here was ‘intention to reduce binge drinking’. The first model consistes of the variables ‘subjective norm’, ‘descriptive norm’, ‘attitude’ and ‘self-efficacy’. 48.3% of the variance of the dependent variable ‘intention’ can be explained by this model with F(4.17)=37.82 and p=.000. For the second model the variable ‘CHBs’ was added in order to find out whether this variable adds value to the theory of planned behavior. The second model explains 49.2% of the variance in intention to binge drinking with F(5.17)=31.21 and p=.000. That means there is just a slight increase of 1% in the explained variance with F(1.12)=2.94 and p=.09. Results indicate that the CHBs do predict some unique variance but primarily due to the overlap with attitude and self-efficacy. Furthermore intention was expected to mediate.

Table 4. *Results of the regression analysis with the dependent variable ‘intention to reduce binge drinking’*

	Model 1 β	Model 1 t	Model1 P	Model 2 β	Model 2 t	Model 2 p
Subjective Norm	.01	.10	.92	.02	.29	.77
Descriptive Norm	.14	2.34	.02	.13	2.20	.03
Attitude	.59	9.70	.01	.56	8.85	.01
Self-Efficacy	.18	2.92	.00	.17	2.79	.00
CHB				-.10	-1.72	.09
R^2	.48			.49		
df	4.17			5.17		
F	37.82			31.21		
P	.000			.000		
				R Square Change	F Change	Significant F Change
	.			.009	2.94	0.09

The dependent variable of the second analysis of regression was ‘binge drinking behavior’. The variables ‘subjective norm’, ‘descriptive norm’, ‘attitude’ and ‘self efficacy’ (Theory of planned behavior) formed model 1. In model 2 the variable ‘CHBs’, and in model 3 the variable ‘intention to reduce binge drinking’ was added.

The results show that the 24% of the variance in behavior can be explained by model 1. This model was significant with p=.000. The second model, where the variable ‘CHBs’ was added explains 26% of the variance in behavior. A minimal rise of 2.7% from model one to model two is detected with F(1.16)=5.89 and p=.16. Model three, with the added variable ‘intention to reduce binge drinking’ explains 30% of the variance in binge drinking behavior. A rise of 3.5% is detected with F(1.16)=7.95 and p=.05. These results indicate that CHBs and the intention are unique predictors in binge drinking behavior.

Table 5. *Results of the regression analysis with the dependent variable 'binge drinking behavior'*

	Model 1 β	Model 1 t	Model1 p	Model 2 β	Model 2 T	Model 2 p	Model 3 β	Model 3 t	Model 3 p
Subjective Norm	-.12	-1.72	. 088	-.11	-1.47	.144	-.11	-1.56	.120
Descriptive Norm	.19	2.67	.008	.17	2.50	.014	.14	2.03	.044
Attitude	.27	3.70	.000	.22	2.90	.004	.07	.81	.42
Self-Efficacy	.24	3.28	.001	.22	3.11	.002	.18	2.50	.013
CHB				-.18	-2.43	.016	-.15	-2.08	.039
Intention							.26	2.82	.005
R^2	.24			.26			.30		
df	4.17			5.17			6.17		
F	12.84			11.76			11.55		
P	.000			.000			.000		
				R Square Change	F Change	Significant F Change	R Square Change	F Change	Significant F Change
	.			.027	5.89	.16	.35	7.95	.005

Because sensation seeking was a good and stable predictor for alcohol use, the third analysis of regression was conducted in order to find out whether CHBs add valued to this variable. Therefore the independent variables were 'sensation seeking' and 'CHBs' and the dependent variable was 'binge drinking behavior'. In the first model, the variable 'sensation seeking' was significant with p=.015 and β=-.19.This model explains 4% of the variance in binge drinking behavior. The variable CHB was added in the second model and the variable sensation seeking no longer significant with β=-.13 and p=0.86, whereas the variable CHB was significant with β=-.3 and p=.000. Furthermore, the second model explains 11% of the variance in binge drinking behavior. A rise of 9% is detected with F(1.16)=15.81 and p=.000. These results indicate that the variable 'CHBs' acts as a partial mediator in the correlation between sensation seeking and binge drinking behavior.

Table 6. *Results of the regression analysis with the dependent variable 'binge drinking behavior'*

	Model 1 β	Model 1 t	Model1 p	Model 2 β	Model 2 t	Model 2 p
Sensation Seeking	-.19	-2.45	.015	-.13	-1.73	.086
CHB				-.3	-3.98	.000
R^2	.04			.11		
df	1.16			2.16		
F	6			11.17		
P	.01			.000		

R Square Change	F Change	Significant F Change
.09	15.81	.000

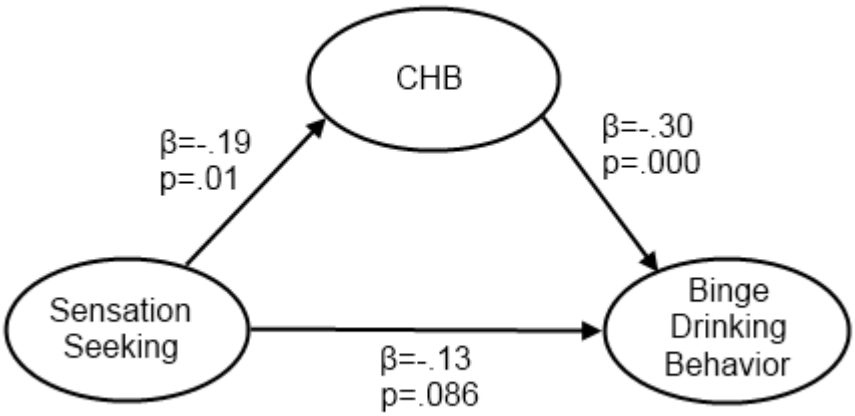

Figure 4. Results of the mediator analysis with the variable 'CHB' as a mediator in the correlation between the independent variable 'sensation seeking' and the dependent variable 'binge drinking behavior'

3.6 Moderation Analysis

The moderator analysis examined whether the correlation between the independent variable ‘intention to reduce binge drinking’ and the dependent variable ‘binge drinking behavior’ is affected by the possible moderator ‘CHBs’. First of all the variables ‘intention to reduce binge drinking’ and ‘CHBs’ were centralized. Then a new variable was created, by multiplying the centralized scores of the variables ‘intention to reduce binge drinking’ and ‘CHBs’. An analysis of regression was conducted in order to determine whether the variable ‘CHBs’ act a moderator in the correlation between the independent variable ‘intention to reduce binge drinking’ and the dependent variable ‘binge drinking behavior’.

A significant positive regression was found for the variable ‘intention to reduce binge drinking’. The regression was significant wit p=.000 and β=-.39. For the variable ‘CHBs’ a negative regression was found, which indicates that holding CHBs can lead to binge drinking behavior. The regression was significant wit p=.009 and β=-.19.

For the interaction variable no significant regression coefficient was found (β=-.05, p=.515). These results indicate that there is no moderation effect of the CHB score for the correlation between the independent variable ‘intention to reduce binge drinking’ and the dependent variable ‘binge drinking behavior’.

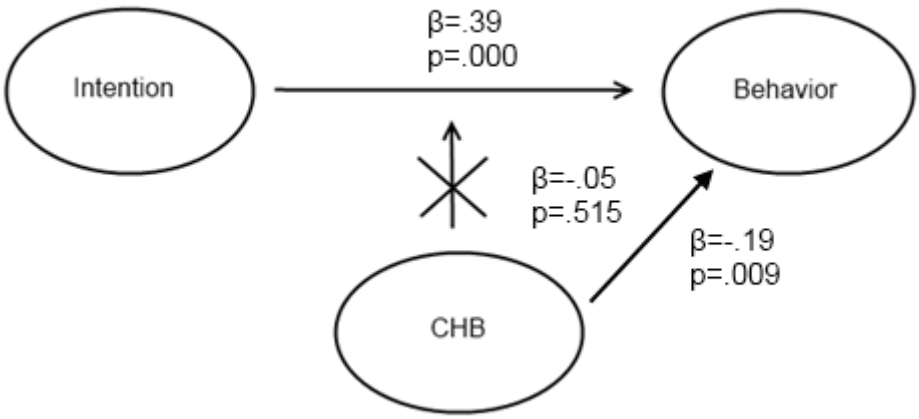

Figure 5. Results of the moderator analysis with the variable ‘CHB’ as a moderator in the correlation between the independent variable ‘intention to reduce binge drinking’ and the dependent variable ‘binge drinking behavior’

4. Discussion

The main purpose of this study was to develop a scale that measures reliable and valid alcohol-specific CHBs. The items were developed on the basis of interviews with psychology students of the University of Twente. These interviews showed five popular topics with regard to alcohol-specific CHBs, namely compensation via healthy food, drinking water, doing sport, time and via an overall healthy lifestyle. A factor analysis was conducted to find out whether these factors actually can be found in the scale. Results showed that only two factors can be found in the developed scale, which means that the scale actually measures a more general tendency of using alcohol-specific. However, the subgroup 'drinking water' water showed significant results in the factor analysis, which indicates that the scale is capable to measures this construct.

The descriptive statistics showed that most participants hold few alcohol-specific CHBs. A high score on this scale indicates less alcohol-specific CHBs. A possible explanation for this positive score is that the majority of the participants were psychology students from the University of Twente. In this bachelor course the topic alcohol is discussed in many courses, so most of the participants should have knowledge about the irreversible negative consequences of excessive alcohol consumption. Furthermore it was noticeable that that the majority of participants were female (81.4%), which is not surprising because it reflects the overall gender ratio of the course psychology at the University of Twente.

To measure the internal consistency of the scale, Cronbach's alpha was calculated. A Cronbach's alpha of α=0,88 was found which is defined as good. By assembling the results of the different analyses, it can be concluded that the scale measure reliable and valid alcohol-specific compensatory health beliefs. In the following paragraph the different hypotheses will be discussed.

CHBs add value to the theory of planned behavior, in predicting excessive alcohol consumption.

The theory of planned behavior is a model that provides an explanation for the decision making process in either drinking alcohol or not. In order to examine this hypothesis an analysis of regression was carried out. This analysis showed that the theory of planned behavior describes 48% of the variance in behavior. When the variable CHB was added it described 49% of the behavior. Because of these unremarkable results the hypothesis was

rejected and another analysis of regression was carried out with 3 models. The first model consisted of the four variables of the theory of planned behavior, namely attitude, subjective norm, descriptive norm and self-efficacy. In model 2 alcohol-specific compensatory health beliefs were added and in model 3 the intention to reduce binge drinking. These results indicate that CHBs and the intention to reduce binge drinking behavior are unique predictors in binge drinking behavior.

Self-efficacy, attitude and intention correlate negatively with holding alcohol-specific CHBs.

One goal of this study was to examine the construct validity of the developed scale. It was hypothesized that holding CHBs correlates negatively with health self-efficacy, attitude and intention. For all three variables the hypothesis was confirmed which suggests that the developed scale has a good construct validity. The results showed that attitude towards binge drinking and intention to binge drinking is related to alcohol-specific CHBs. People who have positive outcome experience (attitude) towards binge drinking and who don't have the intention to reduce binge drinking are inclined to hold alcohol-specific CHBs. Furthermore a low self-efficacy is related to holding more alcohol-specific CHBs. With regard to health self-efficacy, the results in this study are similar to those of Knäuper, Rabiau, Cohen and Patriciu (2004).

Binge drinking correlates positively with holding alcohol-specific CHBs.

Another hypothesis was that people who do binge drinking are inclined to hold more alcohol-specific CHBs. Because of the fact that the majority of participants were psychology students from the University of Twente, it was assumed that they are clearly informed about the irreversible negative consequences of excessive alcohol consumption. Because of this fact the probability that a cognitive dissonance arises, while binge drinking, is high. The hypothesis was confirmed. People who do binge drinking are more inclined to hold alcohol-specific compensatory health beliefs.

Impulsivity and sensation seeking correlate positively with holding alcohol-specific CHBs.

Another hypothesis was that people who score high on the personality traits impulsivity and sensation seeking are more inclined to hold alcohol-specific compensatory health beliefs. Impulsivity describes the character trait of acting without due considerations. If people score high on impulsivity they have problems to control their impulses. In relation to the consumption of alcohol they have problems to control their drink behavior. The lack of impulse control can lead to health risky excessive alcohol abuse. Therefore it was hypothesized that people who are impulsive hold more alcohol-specific CHBs. This hypothesis was confirmed.

Sensation seeking describes the permanent demand for new exciting experiences in order to hold excitement in life. Hoyle, Fejfar & Miller (2000) found out that alcohol abuse correlates positive with risky health behavior and especially with the personality trait sensation seeking. In order to justify excessive alcohol consumption, it was hypothesized that people who score high on sensation seeking hold more alcohol specific CHBs. Also this hypothesis was confirmed.

CHBs act as moderators in the correlation between intention to reduce binge drinking and binge drinking behavior.

A moderation analysis was conducted in order to find whether holding CHBs may impede the intention-behavior association. Results show that CHB do not have a moderation effect in this correlation. A possible explanation for this result is that this study isn't a longitudinal study, which means that that the intention to stop binge drinking and binge drinking behavior are measured at the same time.

CHBs act as mediators in the correlation between sensation seeking and intention to reduce binge drinking.

Because sensation seeking was a good and stable predictor for alcohol abuse, an analysis of regression was carried out in order to find out whether alcohol-specific compensatory health beliefs add value to this model. The hypothesis was that the variable CHB acts as a mediator in the correlation between the independent variable sensation seeking and the dependent variable binge drinking behavior. The results of the mediator analysis showed that CHBs partially mediate in the interaction between sensation seeking binge drinking. The hypothesis is confirmed.

Limitations and further research

The majority of participants who filled in the final scale were psychology students of the University of Twente who had access to the participant research tool. This is inconsistent with the high number of students who states that they are at high school. A possible explanation for this phenomenon is that the questioning about the education was confusing for the participants. The question should be about what the current educational level is and not what the highest reached education level is until now.

The participants in this study where mainly psychology students. This can influence the results in a particular way. As already mentioned, it was assumed that most participants in this group know about the irreversible consequences of alcohol consumption. To proceed on the assumption that a cognitive dissonance arises when people know about the negative consequences of excessive alcohol consumption and they do binge drinking regardless, the probability that participants in this study experience a cognitive dissonance while binge drinking is very high. For follow up studies it would be interesting to see if and how the outcomes change when participants were chosen who are not as informed as the participants in this study. Because binge drinking is especially a problem under adolescents this target group would be preferable for follow up studies. Because this study doesn't distinguish between correct, partial correct and incorrect CHB items, it would be interesting if the results distinguish between the correct and incorrect compensatory health beliefs.

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6. Appendix

Online survey

Demografische Gegevens

Wat is je geslacht?

- man
- vrouw

Wat is je leeftijd?

____

Wat is op dit moment je belangrijkste bezigheid?

- Scholier
- Student
- Beroeps Begeleidende Leerweg
- Betaald werk
- Werkzoekend
- Anders, namelijk
- _____

Developed alcohol-specific-compensatory health belief scale

Mensen hebben verschillende opvattingen over bepaalde gedragingen en de effecten daarvan op de gezondheid. In de volgende vraaglijst staan uitspraken over het drinken van alcohol. Lees elke stelling goed door en kruis aan in hoeverre je het een of oneens bent met de uitspraak. Onthoudt dat er geen goede of foute antwoorden zijn omdat iedereen andere ideeën heeft.

Gezond eten

- Door gezond te eten kan ik de negatieve gevolgen van veel alcohol compenseren.
- Het is oké om veel alcohol te drinken als ik de volgende dagen extra gezond eet.

Water drinken

- Het drinken van veel water compenseert alcoholgebruik.
- De gevolgen van overmatig alcoholgebruik kan ik opheffen door veel water te drinken.

Sport

- Als ik doordeweek veel sport, dan kan ik in het weekend met een gerust hart stevig alcohol drinken.
- De gevolgen van overmatig alcoholgebruik kan ik door sporten compenseren.

Volgende weken/dagen geen alcohol drinken

- Het is oké om dit weekend veel alcohol te drinken als ik volgend weekend geen alcohol drink.
- Het is oké om in een weekend veel alcohol te drinken als ik het niet doordeweek doe.

Gezonde Leefstijl

- Een gezonde leefstijl kan de negatieven effecten van alcohol compenseren.
- Als je maar gezond leeft, is veel alcohol drinken niet erg.
- Als ik goed op mijn gezondheid let is het oké dat ik in het weekend veel alcohol drink.

Answers:

- Helemaal mee eens
- Beetje mee eens
- Neutraal
- Beetje mee oneens
- Helemaal mee oneens

SURPS (Impulsivity and Sensation Seeking)

Geef bij de onderstaande uitspraken aan of ze bij jou passen

- Ik denk vaak niet goed na, voordat ik iets zeg. *IMP*
- Ik zou graag parachutespringen. *SS*
- Ik begeef mij vaak in situaties waar ik later spijt van heb. *IMP*
- Ik geniet van nieuwe en spannende ervaringen, zelfs als deze ongewoon zijn. *SS*
- Ik houd ervan dingen te doen die me een beetje beangstigen. *SS*
- Normaal gesproken doe ik iets zonder eerst na te denken. *IMP*
- Ik wil graag leren hoe ik motor moet rijden. *SS*
- Over het algemeen ben ik een impulsief persoon. *IMP*
- Ik ben geïnteresseerd in ervaringen, puur om de ervaring zelf, ook als het illegaal is. *SS*
- Het lijkt me leuk lange afstanden te wandelen op ruig en onbewoond terrein. *SS*
- Ik heb het gevoel dat ik anderen moet manipuleren (bespelen) om te krijgen wat ik wil. *IMP*

Answers:

- Helemaal mee oneens/Klopt helemaal niet
- Beetje mee oneens/ Klopt niet
- Beetje mee eens/Klopt wel
- Helemaal mee eens/Klopt helemaal

Questionnaire Twente Alcohol Consumptie

Voor de volgende vragen is het belangrijk dat je weet wat een standaardglas is.

Elk drankje heeft zijn eigen glas. Wijn in een wijnglas, bier in een bierglas en sterke drank in een borrelglaasje. Dit noemen we een

standaardglas. Als het drankje in het juiste (standaard)glas wordt geschonken dan bevat ieder glas evenveel alcohol.

We vragen je telkens te antwoorden in standaardglazen. In onderstaand schema staan voorbeelden genoemd.

Zoals je in de tabel kunt zien bevat bijvoorbeeld één wijnglas 1 standaardglas alcohol. Als je er 3 glazen van hebt gedronken, dan is je antwoord 3 standaardglazen, omdat 3 x 1 = 3.

Er bestaan geen goede of foute antwoorden. In dit onderzoek gaat het om jouw mening.

Probeer altijd een antwoord in te vullen. Als je twijfelt, vul dan het antwoord in dat het beste bij jou past.

Soort drank	Aantal standaardglazen	
Glas bier (fluitje)	1	
Blikje of flesje bier (pijpje)	1,5	(1 ½)
Halve liter bier (beugel)	2	
Glas wijn (wijnglas)	1	
Fles wijn (0,75l)	7,5	(7 ½)
Limonadeglas mix van sterke drank met fris of sap	1	
Breezer, mixdrank in flesje (275ml)	1,25	(1 ½)
Shooter (bijv. Feigling)	0,35	(1/3)
Borrelglas sterke drank (bijv. whisky, jenever, likeur)	1	
Fles sterke drank	22	

1. Hoeveel standaardglazen alcohol drink je meestal op zo'n weekenddag?

- 20 glazen of meer per dag
- 19 glazen per dag
- 14 glazen per dag
- 10 glazen per dag
- 6 glazen per dag
- 5 glazen per dag
- 4 glazen per dag
- 3 glazen per dag
- 2 glazen per dag
- 1 glas per dag
- 0 glazen per dag

1. Hoe vaak heb je de afgelopen 4 weken ZES OF MEER standaardglazen alcohol gedronken bij één gelegenheid (bijvoorbeeld op een feestje of op een avond)?

- Nooit meer dan 6 standaardglazen in de afgelopen 4 weken
- 1 keer in de afgelopen 4 weken
- 2 keer in de afgelopen 4 weken
- 3 keer in de afgelopen 4 weken
- 4 keer in de afgelopen 4 weken
- 5 keer in de afgelopen 4 weken
- 6 keer in de afgelopen 4 weken
- 7 keer in de afgelopen 4 weken
- 8 keer in de afgelopen 4 weken
- 9 keer of vaker in de afgelopen 4 weken

Health-Specific Self-Efficacy Scales

Geef bij de onderstaande uitspraken in hoeverre je eens bent.(Kan ik het zo schrijfen)

1. De weerstand tegen alcohol zelf effectiviteit schaal.

Ik ben er zeker van dat ik mezelf in de hand kan houden om…

1. …mijn alcohol gebruik te verminderen.
2. …überhaupt geen alcohol te drinken.
3. …alleen te drinken bij speciale gelegenheden.

Answers:

- Helemaal zeker
- Beetje zeker
- Beetje onzeker
- Helemaal onzeker

Theory of planned behavior

1. Ik ben van plan de komende 12 maanden mijn alcoholgebruik te beperken tot hoogstens 5 standaardglazen per gelegenheid (of minder)
2. Mijn vrienden/vriendinnen vinden dat ik mijn alcoholgebruik moet beperken tot hoogstens 5 standaardglazen per gelegenheid (of minder)

   Answers: from'zeker niet' tot 'zeker'

3. Hoeveel van je vrienden/vriendinnen drinken weleens meer dan 5 standaardglazen per gelegenheid?

   Answers:

   - (Bijna) geen
   - Sommige
   - De helft
   - De meeste
   - (Bijna) allen

4. Zelf mijn alcoholgebruik te beperken tot hoogstens 5 standaardglazen per gelegenheid (of minder) vind ik …

   Answers: from 'goed' tot 'slecht'
   from 'gezellig' tot 'ongezellig'