

**Hedonism or binging.**  
**Comparing cultural factors influencing binge drinking of young adults in the United Kingdom and the Netherlands: Testing the TMBD model.**

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## Samenvatting

Binge drinken is een fenomeen dat de afgelopen decennia veelvuldig is onderzocht en wordt erkend als een groot probleem voor zowel gezondheid, als maatschappij. Het kan ernstige gevolgen hebben voor de economische, sociale, fysieke en psychische situatie, met name voor jong volwassenen (Fuller-Thompson, Sheridan, Sorichetti & Mehta, 2013; van Wersch & Walker, 2009). Hoewel de alcoholconsumptie in het Verenigd Koninkrijk (UK) gelijk lijkt te zijn aan de Nederlandse consumptie, lijkt er een aanzienlijk verschil te zijn in drinkcultuur. In de UK wordt deze soms beschreven als een 'dry culture' en de Nederlandse als een 'wet culture', mensen in de UK lijken uit te gaan om dronken te worden, terwijl Nederlanders vaker gematigd drinken (Gordon, Heim & MacAskill, 2012). Om binge drinken te voorspellen hebben Pieterse, Boer en van Wersch (2010) het Twente Model of Binge Drinking (TMBD) ontwikkeld. Het model omvat de psychosociale en culturele variabelen die middelengebruik voorspellen. Dit onderzoek had twee doelstellingen: 1) vaststellen welke TMBD factoren samenhangen met binge drinken onder jong volwassenen en 2) cultureel bepaalde verschillen in causale mechanismen die ten grondslag liggen aan binge drinken onder Engelse en Nederlandse jong volwassenen identificeren en vergelijken.

Om deze doelen te bereiken is een cross-nationaal onderzoek uitgevoerd door middel van een vertaalde vragenlijst die is verspreid onder jong volwassenen tussen de 15 en 24 jaar in de UK en Nederland. De vragenlijst bestond uit de vijf hoofdcomponenten van het TMBD: 1) demografische variabelen; 2) substance use risk profile scales (SURPS); 3) culturele context; 4) middelengebruik; 5) cognitieve variabelen.

Resultaten wezen uit dat 28 van de 37 voorspellers significant gecorreleerd waren met de maandelijkse frequentie binge drinken. De multivariate analyse liet zien dat zes van de achttien voorspellers significant samenhangen met binge drinken, namelijk: descriptieve norm, waargenomen gedragscontrole, geslacht, drinkfaciliteit 'thuis', vrijetijdsactiviteit 'sociaal-entertainment' en prototype. Uit de multi-pele regressie analyse per nationaliteit bleek dat er aanzienlijke verschillen waren in voorspellers van binge drinken. De moderatie analyse liet echter zien dat alleen de relatie geslacht en binge drinken en similarity en binge drinken gemodereerd werd door nationaliteit. Uit de mediatie analyse bleek dat subjectieve norm en attitude partiële mediators waren. Sociale druk, descriptieve norm en morele norm bleken volledige mediators.

Vrijwel alle resultaten bevestigden de voorspellingen, zowel met betrekking tot het TMBD als de culturele verschillen tussen de UK en Nederland. De studie had wel enkele limitaties. De populatie in de studie had vele significante verschillen en bestond voornamelijk uit studenten, wat de resultaten mogelijk heeft beïnvloed. Daarnaast is de mediatie analyse uitgevoerd met cross-sectionele data, wat de resultaten mogelijk heeft beïnvloed. Tot slot zijn er verkorte versies van vragenlijsten gebruikt, wat de exacte meting van gedrag kan bemoeilijken. De bevindingen van deze studie kunnen echter wel gebruikt worden als uitgangspunt voor vervolgonderzoek. Ook kan het in beide landen gebruikt worden om interventies aan te passen aan de variabelen die binge drinken sterk voorspellen, met het doel de schadelijke gevolgen en hoge kosten van excessief alcoholgebruik te verminderen.

## Summary

Binge drinking is widely acknowledged as a major issue of concern for public health and society and has serious economical, social, physical and psychological consequences, especially for young adults (Fuller-Thompson, Sheridan, Sorichetti & Mehta, 2013; van Wersch & Walker, 2009). While the quantity of alcohol intake appears to be similar between the United Kingdom (UK) and the Netherlands, there seem to be some significant drinking culture differences. The UK is sometimes labelled as a 'dry culture' whereas the Netherlands is labelled as a 'wet culture', people in the UK seem to go out to get drunk, whereas Dutch people tend to drink moderately, striving to hold their liquor (Gordon, Heim & MacAskill, 2012). To predict binge drinking, the Twente Model of Binge Drinking (TMBD) was developed by Pieterse, Boer and van Wersch (2010). The model entails psychosocial and cultural variables that predict substance use among adolescents. This study had two aims: 1) determine which TMBD factors are associated with binge drinking among young adults. 2) identify and compare culturally determined differences in causal mechanisms underlying binge drinking among young adults in the United Kingdom and the Netherlands.

To achieve the aims, a cross-national survey using a translated questionnaire was disseminated among young adults between 15 and 24 in the UK and the Netherlands. The questionnaire consisted of the five main components of the TMBD: 1) demographic variables; 2) substance use risk profile scales (SURPS); 3) cultural context; 4) substance use; 5) cognitive variables.

Results show that 28 of the 37 included predictors were significantly correlated with monthly binge drinking frequency. The multivariate analysis showed that six out of eighteen predictors were significantly associated with binge drinking, namely: descriptive norm, perceived behavioural control, gender, drinking facility 'at home', leisure activity 'social-entertainment' and prototype. The multiple regression analysis per nationality however showed significant differences in predictors associated with binge drinking. The moderation analysis showed that the relation between gender and binge drinking and similarity and binge drinking were significantly moderated by nationality. Mediation analysis was performed with the emphasis on the cultural variables. It showed a partial mediation of subjective norm and attitude on the relationship between nationality and monthly binge drinking frequency. Social pressure, descriptive norm and moral norm were full mediators.

Most results were in line with the expectations, considering the empirical basis of the TMBD. The results also confirmed the conjecture of cultural differences between the UK and the Netherlands. However, there are some limitations to the study. First, the populations had many significant differences and consisted mainly of students; second, the mediations were tested with cross-sectional data. This might have influenced the results. Furthermore, the shortened versions of the questionnaires, might have distorted the outcomes because it might not measure the exact behaviours. However, the outcomes of this study can be used as a starting point for further research examining the cultural differences between two apparent similar countries with regard to alcohol consumption. It might also be used to adapt interventions to the variables that strongly predict binge drinking in both countries, with the aim to reduce the harmful and costly consequences of binge drinking.

### **Abstract**

Binge drinking is widely acknowledged as a major issue of concern for public health and society. Previous studies have suggested that the United Kingdom (UK) and the Netherlands have a similar alcohol intake, but there seem to be some cultural differences between the two nations. The Twente Model of Binge drinking was developed, entailing the factors that predict substance use among adolescents (Pieterse, Boer and van Wersch, 2010) . This study had two objectives: 1) determine which TMBD factors are associated with binge drinking among young adults and 2) identify and compare culturally determined differences in causal mechanisms underlying binge drinking among young adults in the UK and the Netherlands.

A cross-national survey, using a translated questionnaire was disseminated among young adults between 15 and 24 years old in the UK and the Netherlands.

Results showed that 28 of the 37 predictors were correlated with binge drinking, of which six are associated strongly. The relation between gender and binge drinking and similarity and binge drinking were moderated by nationality. Mediation analysis showed that five out of nine tested predictors mediated the relation between nationality and binge drinking: subjective norm and attitude were partially mediating on the relationship between nationality and monthly binge drinking frequency and social pressure, descriptive norm and moral norm appeared to be full mediators.

The outcomes of this study confirmed the predictable value of the TMBD and the expectation of a cultural difference with regard to binge drinking between the two countries. The study can be used as a startingpoint for future research. Also, future interventions can be adapted to the factors that appear to be strongly associated to binge drinking to optimize the effect so harmful and costly consequences of binge drinking can be reduced.

## Introduction

Binge drinking is a phenomenon that has been studied profoundly within the last decennia. It is widely acknowledged as a major issue of concern for public health and society. It is prevalent all over the world (Fuller-Thompson, Sheridan, Sorichetti & Mehta, 2013), but the population of the European Union (EU) has shown to have the highest alcohol intake (Anderson & Baumberg, 2007). The United Kingdom (UK) and the Netherlands are both on top of the list of EU countries with the highest percentage of binge drinking students. The data of the European School Survey on Alcohol and Other Drugs (ESPAD) show that in 2003 54 percent of the English students was binge drinking. In 2007 that number raised to about 55 percent (Hibell, et. al., 2007; Hibell, et. al., 2009). In particular the northeast of the UK seems to be an area where people drink large amounts of alcohol. Especially in Middlesbrough the alcohol consumption is significantly higher than in the rest of the UK (Local Alcohol Profiles for England, 2011). The ESPAD research shows that the Netherlands has a relatively similar percentage of binge drinkers, namely 58 percent of the students in 2003 (Hibell, et. al., 2004). The results of the study in 2007 weren't available (Hibell, et. al., 2009). In the Netherlands, the east seems to contribute greatly to the countries' total alcohol consumption as well (Mulder, 2010).

The excessive alcohol consumption of the UK and the Dutch population has many concerning consequences for the social, physical and psychological health of people, on the long term, as well as on the short term (van Wersch & Walker, 2009; World Health Organization [WHO], 2011). Possible social consequences are: rows, accidents and violence, earlier initiation of sex, increased sexual activity, increased rate of unprotected sex and unwanted pregnancies. Furthermore, people are more likely to not finish their high school (Fuller-Thompson et. al., 2013) and women have an increased risk of sexual assault (Fuller-Thompson, et. al., 2013; van Wersch & Walker, 2009). Physically, alcohol use is related with over 60 medical conditions and is involved in the onset of 200 other conditions (Trimbos, 2012). These are conditions like epilepsy, several types of cancer, cirrhosis of the liver, cardiovascular diseases, diabetes, sexual transmitted diseases, alcohol poisoning and death. Furthermore, people have an increased chance of brain damage (Trimbos, 2012; van Wersch & Walker, 2009; WHO, 2011). Especially for the developing adolescent brain the latter is a serious risk (Fuller-Thompson et. al., 2013; van Hoof, et. al, 2012). Some psychological consequences of excessive alcohol use are: an increased risk on psychoses, depression and anxiety disorders (Trimbos, 2012; WHO, 2011). Also, people have an increased risk of alcohol dependence and binge drinking with an early onset of alcohol intake. Furthermore, researchers have found a relation between early onset alcohol intake and binge drinking, drug use and smoking at a later age (Fuller-Thompson et. al., 2013; van Hoof, et. al., 2012).

Excessive alcohol use, like binge drinking, contributes greatly to the total disease burden in disability-adjusted life years (DALY) of 4.5 percent. It is on the fourth place of diseases that have the biggest burden. On the average, one loses 0.6 life years when one drinks alcohol excessively (Kuunders, 2010).

Alcohol using adolescents also tend to use general practitioner services more often, which heightens the costs of health care considerably (Fuller-Thompson, et. al., 2013). Not only prevention and treatment of excessive alcohol use cost money, but also matters like police mobilisation, judiciary, damage to public facilities, unemployment and absenteeism increase the costs substantially. In Europe the total costs due to alcohol use goes up to 125 billion euro's a year (STAP, 2010).

While the amount of alcohol use seems comparable between the UK and the Netherlands, there seem to be some significant differences in drinking culture. The UK drinking culture is sometimes described as a 'dry culture', in which people drink little or nothing during the week, but go out to drink several days over the weekend, with the intention of getting drunk. People often drink spirits (Gordon, Heim & MacAskill, 2012). A contributing factor to the excessive alcohol intake of the UK people might be the UK policy. In the UK pubs have limited opening hours which might increase binge drinking (Licensing Act, 2003; Measham & Brain, 2005). Another possible contributing factor are the limited leisure time activities in the UK, which probably increases boredom. Boredom might also lead to alcohol use (McMahon, McAlaney & Edgar, 2007). Alcohol use in the UK is often described as a hedonistic drinking style: people usually drink to have fun, which is seen as the most important aim (Szmigin, Griffin, Mistral, Bengry-Howell, Weale & Hackley, 2008). Going out to drink is usually well prepared in the UK: generally everyone goes out with a group which ensures them of getting home safely, they rarely drive drunk and they don't drink when they have important activities the next day e.g. work (Szmigin, et. al., 2008; van Wersch & Walker, 2009). This calculated hedonistic style seems to be a norm in the UK and contributes to the onset of binge drinking (Szmigin, et. al., 2008). Drinking in large amounts and getting drunk seems to be the aim in the UK, but in countries such as the Netherlands, people highly value the ability to hold their liquor (Gordon, et. al., 2012). The Netherlands is often labelled as a 'wet culture': a culture in which people drink moderately on a daily basis (Pieterse, Boer & van Wersch, 2010). They generally consume alcohol in a social context, for instance a glass of wine at dinner (Gordon, et. al., 2012). The hedonistic drinking style while going out prevails in the UK, but moderate drinking while going out seems to be the Dutch norm, even in young adults (Hughes, et. al., 2011). Today the Dutch legislation states that one can drink beer and wine when they turn eighteen, but at the time of the study this was still sixteen. Also, serving alcohol is allowed when an alcohol serving licence-holding place is open (Drank- en Horecawet, 2013). This might help people to drink more equally distributed over the day and might limit the alcohol intoxication. Also, there are more leisure time activities available for adolescents in the Netherlands. Dutch families with a low social economic status (SES) can apply for financial support so their child can join a sport club or play an instrument (Nibud, 2011). This might decrease boredom and possibly subsequent drinking.

While the amount of alcohol consumption in UK and Dutch adolescents seems to be similar (Hibell, et. al., 2004), the feeling of wellbeing is not. Dutch children rate their wellbeing best out of the 21 richest countries in the world, whereas the children from the UK rate their wellbeing worst (UNICEF, 2007). This difference in wellbeing is remarkable, considering the apparent similar alcohol

use. It is plausible that there is a difference in culture or psychosocial factors that influences alcohol intake in UK and Dutch adolescents which might lessen the sense of wellbeing.

To predict binge drinking, Pieterse, Boer and van Wersch (2010) developed the Twente Model of Binge Drinking (TMBD) (figure 1). The psychosocial and cultural variables are based on the theoretical findings of factors predicting substance use among adolescents. It shows the variables which are expected to relate the strongest to binge drinking. It describes three levels on which the dependent variable 'binge drinking' is influenced: ultimate, distal and proximal.

The ultimate level shows two predictors: personality traits and demographic variables. There are four personality traits which are found to relate to substance use: two externalizing traits namely impulsivity (IMP), sensation seeking (SS) and two inhibiting, hopelessness (H) en anxiety sensitivity (AS). Impulsivity seems to be associated with risky behaviours like alcohol use, because a person with this trait often has a poor motor and cognitive inhibition. Sensation seekers often have an urge for excitement and therefore are more open to excessive alcohol use. Hopeless people often use alcohol as a coping mechanism for negative and in particular depressive, emotions. Someone with the anxiety sensitivity trait usually drinks to reduce panic and the associated negative affect (Conrod, Castellanos-Ryan & Mackie, 2011). Finally the ultimate level shows the demographics: sex, age and educational level. Men seem to binge drink more often, however, women also increasingly tend to binge drink. Recent data even shows that binge drinking occurs almost as much among young women as it does among young men (Gordon, et. al., 2012; Hibell et. al., 2007). The peak of binge drinking seems to be between 15 and 24 years of age. Also in adolescents with a low educational level and a lower social economic status (SES) binge drinking seems more prevalent (Kuntsche, et. al. 2004).

The distal level describes smoking, substance use and 'cultural context' consisting of seven factors that influence alcohol use: nationality, parental/carer respect, alcohol specific quality of communication, alcohol specific rules, parental monitoring, organized leisure activities and drinking facilities. Previous research shows that parental factors and organized leisure time activities can reduce the alcohol intake of adolescents (Kristjansson, James, Allegrante, Sigfusdottir & Helgason, 2010). Also, previous substance use and smoking can provide positive experiences that might in- or decrease the tendency to drink alcohol (Wersch & Walker, 2009).

The proximal level shows two information processing pathways: the conscious and the unconscious. The conscious, reflective pathway incorporates the variables of the Theory of Planned Behaviour (TPB) (Ajzen, 1991). The unconscious, impulsive pathway incorporates the variables of the Prototype Willingness Model (PWM). The Theory of Planned Behaviour states that there are three motivational factors that influence the intention to perform certain behaviours, namely attitudes, subjective norms and perceived behavioural control. Attitudes refer to the evaluation people make of their own behaviours. Research has shown that there are two main positive attitudes towards alcohol: pleasure and relaxation (Kuntsche, et. al. 2004). The attitudes can be used to predict future drinking quantity and frequency (Collins & Carey, 2007). Subjective norm implies the persons perception of others' evaluation of the persons behaviour. Perceived behavioural control implies the perceived level

of difficulty for a specific person to execute a certain behaviour. The perceived behavioural control of refusing alcoholic drinks has been found to be a strong predictor of quantity and frequency of alcohol use and problems related to drinking (Collins & Carey, 2007). Descriptive norm, moral norm and social pressure are also added as predictors of binge drinking. Descriptive norm describes how people perceive how others drink (Collins & Carey, 2007), moral norm describes the moral obligation people feel to do the right thing and social pressure refers to the perceived social pressure one feels to perform a certain behaviour (Ajzen, 1991). The Prototype Willingness Model assumes that most adolescent behaviour is, although volitional, not intended or planned. It describes three factors: prototype favourability, similarity and behavioural willingness. Prototype favourability describes the images of the type of person that executes certain types of behaviours; similarity describes the extent to which the person perceives himself to be similar to the prototype; behavioural willingness describes the willingness to carry out certain behaviours, thus measuring intention unobtrusively (Gerrard, Gibbon, Stock, Vande Lune, Cleveland, 2005).

The ultimate and distal levels influence the proximal, which in its turn influences binge drinking.

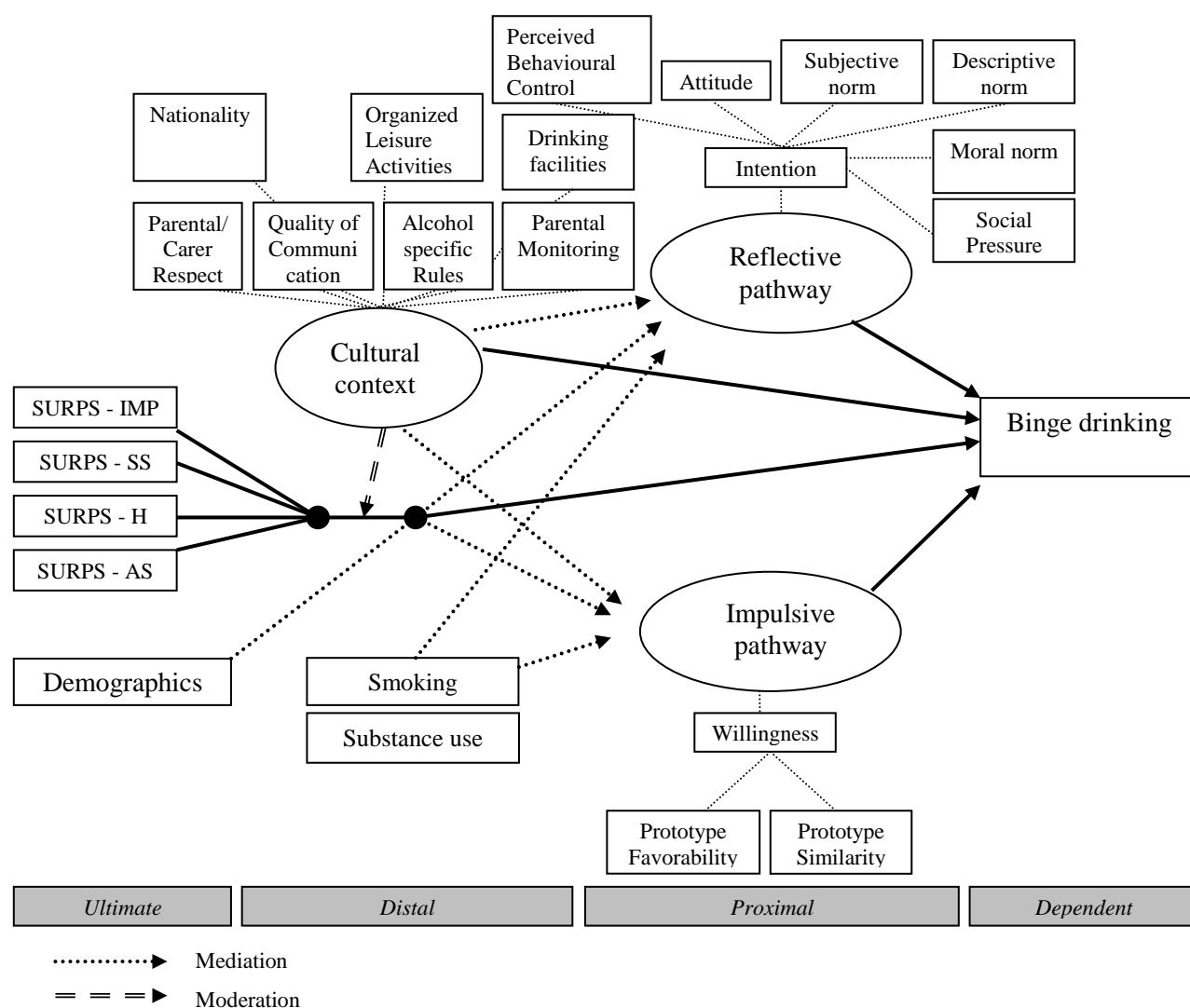


Figure 1. Twente Model of Binge Drinking (TMBD) (Pieterse, Boer & van Wersch, 2010).



In this study we will try to compare the binge drinking behaviours of UK and Dutch young adults by means of the Twente Model of Binge Drinking (TMBD). The aims of the study are to: 1) determine which TMBD factors are associated with binge drinking among young adults. 2) identify and compare culturally determined differences in causal mechanisms underlying binge drinking among young adults in the United Kingdom and the Netherlands.

No previous research was found that had similar aims and compared these two countries. By determining the risk factors for binge drinking for both countries individually, a binge drinking risk profile can be formed, which might simplify locating binge drinking risk groups. Furthermore, it might help the development of interventions for specific risk groups, which probably raises the effectiveness (Hamberg van Reenen & Meijer, 2012). Based on the found literature it is expected that the findings of this study will show that most predictors of the TMBD have an association with binge drinking and that there are significant differences in the relationship between the given TMBD factors and binge drinking behaviour of UK and Dutch young adults.

## **Method**

### **Participants**

The total population of this study consisted of 390 young adults. 33% was male, 54.3% female and 12.7% was unknown. Only participants that completed the survey and those who were 15 to 25 year, were included in the study. 301 participants were included, 35.2% male and 64.8% female. The total age range was from 15 to 25 and the total mean age was 18.87 ( $SD = 2.11$ ). The population consisted of two groups, a group of young adults from the UK ( $N = 100$ , age range = 18 to 25, mean age = 20.74,  $SD = 2.09$ ) and a group of Dutch young adults ( $N = 201$ , age range = 15 to 21, mean age = 17.99,  $SD = 1.44$ ). In the UK population 41% was male and 59% was female. In the Dutch population 32.4% was male and 67.6% was female.

### **Procedure**

The participants were recruited in various ways to create a heterogeneous population as much as possible. The UK participants were approached in the university library, addressed during lectures or approached on the street and asked to cooperate in the online study. Everyone received flyers with links to the online survey to remind them of the study. Also, a link was posted on social media. Bachelor psychology students were able to receive credits after finishing the survey, but a vast majority of 98% of the participants did not receive a compensation of any sort.

Dutch participants were recruited by spreading flyers stating the name of the study, the raffling of a gift certificate of €10 for people who finished the survey and the link to the online survey. The flyers were disseminated near the exits of high schools, MBO schools and sport clubs asking them to participate in the study. Also, personal contacts of the researchers were asked to participate.

### **Measurement**

A cross-national survey using a translated questionnaire was used. The questionnaire consisted of the five components of the Twente Model of Binge Drinking and the subsequent variables of which

was expected to have the strongest correlation with binge drinking: 1) demographic variables; 2) substance use risk profile scales (SURPS); 3) cultural context; 4) substance use; 5) cognitive variables.

#### *Demographic variables*

In this component of the questionnaire participants were asked about their gender, age, current living situation, current primary occupation and highest current or completed educational level. For an overview of the results see table 1.

#### *Substance Use Risk Profile Scales (SURPS)*

In this section participants were asked to complete the SURPS, a scale most often used to measure personality traits associated with substance use. It was proven to be helpful in assessing the onset of substance use and the processes underlying vulnerability of substance (mis-)use (Malmberg, et. al. 2012; Woicik, Stewart, Pihl & Conrod, 2009). By means of this scale the traits impulsivity (IMP) ( $\alpha = .57$ ), sensation seeking (SS) ( $\alpha = .68$ ), hopelessness (H) ( $\alpha = .84$ ) and anxiety sensitivity (AS) ( $\alpha = .65$ ) were measured. In this section the participants were presented 23 statements such as 'I usually act without stopping to think' (IMP), 'I would like to skydive.' (SS), 'I am very enthusiastic about my future.' (H) and 'It frightens me when I feel my heart beat change.' (AS). The participants were asked to tick a box on a 4-point Likert scale ranging from: 'Strongly disagree', 'Disagree', 'Agree' and 'Strongly agree'.

#### *Cultural context*

This section consisted of six constructs: nationality, organized leisure activities, drinking facilities, parental/carer respect and three parenting practices related to alcohol, namely: alcohol specific quality of communication, alcohol specific rules and parental monitoring.

Organized leisure activities were measured by a shortened version of the Leisure scale (Beatty, Jeon, Albaum & Murphy, 1993) and consisted of four items. Participants were asked how often they performed aesthetic-intellectual activities (e.g. reading, museums, playing an instrument, play chess, tinker etc.), sports-action activities (e.g. walking, bicycle, football, hockey, etc.), social-entertainment activities (e.g. going out, cinema, join a club etc.) and home activities (e.g. watch television, be at the computer, play videogames etc.) within the past year. The 6-point Likert scale ranged from 'Daily' (1), 'A few times a week' (2), 'Weekly' (3), 'Monthly' (4), 'A few times a year' (5) to 'Annually' (6).

Drinking facilities were measured by seven items. Participants were asked how many times they used alcohol in certain places. Some stated places were 'Openly on the street', 'Hidden place outside my home' and 'At a restaurant or pub'. Participants were asked to choose from six possible answers: 'Daily' (1), 'A couple times a week' (2), 'Weekly' (3), 'Monthly' (4), 'Once or a couple times a year' (5) and 'Never' (6).

The parental respect scale (Chao, 2001) ( $\alpha = .80$ ) consisted of six statements such as 'It is important that my parents approve of what I do.' and 'Even if I completely disagree with them, I have to respect my parents' beliefs.'. Participants were asked to tick the box of the five-point Likert scale, best representing their situation, ranging from 'Strongly disagree', 'Disagree', 'Neutral', 'Agree' to 'Strongly agree'.

Quality of communication was measured by measuring the alcohol specific quality of communication, indicating the quality of the relationship by assessing the level of trust, shared identity and reciprocity. The questionnaire consisted of six questions ( $\alpha = .84$ ). Some questions asked were: 'My parents and I are interested in each others' opinion about drinking alcohol' and 'When my parents and I talk about drinking alcohol, I think my parents are unfair or unreasonable'. Participants were asked to tick the box on the 5-point Likert scale best representing their situation ranging from 'Strongly disagree', to 'Disagree', 'Neutral', 'Agree' and 'Strongly agree'.

Alcohol specific rules (van der Vorst, Engels, Dekovic, Meeus & Vermulst, 2005) ( $\alpha = .94$ ) consisted of ten statements such as 'I am allowed to drink multiple glasses of alcohol when my mother or father is at home.' and 'I am allowed to come home tipsy.'. The answering options on the 5-point Likert scale were 'Strongly disagree', 'Disagree', 'Neutral', 'Agree' and 'Strongly agree'. A high score indicated less strict alcohol specific rules.

Parental monitoring (Kerr & Stattin, 2000) ( $\alpha = .71$ ) consisted of five statements such as 'Before you go out on a Saturday night, do your parents want to know with whom and where you'll be drinking?' and 'Do your parents try to find out if your friends drink alcohol?'. Participants were asked to tick the box on a 5-point Likert scale, best representing their situation ranging from 'Never' (1), to 'Once in a while' (2), 'Sometimes' (3), 'Often' (4) and 'Always' (5).

#### *Substance use*

This section started with a definition of a unit of alcohol. The amount of glasses alcohol is often used to define binge drinking (Farke ed. 2008). In some cases binge drinking is defined when a woman drinks at least four units of alcohol and a man five units in one occasion with the intention of getting drunk (Stolle, Sack & Thomasius, 2009). Others define it as 'at least six units of alcohol during one sitting' (e.g. Garretsen, et. al., 2008). In this research the latter definition was used. Subsequently, a visualisation of different types of drinks with corresponding units were displayed in a table, adapted to respectively the UK and Dutch drinking culture. Participants were asked about their objective alcohol consumption, binge drinking, tobacco use and drug use.

Following Korte, Pieterse, Postel, & van Hoof (2012) a composite measure was made by adding up scores of the five objective alcohol questions, which resulted in a weekly total alcohol consumption. Some questions were 'Have you ever had an alcoholic drink?', and 'On how many days of the four weekdays (Monday, Tuesday, Wednesday, Thursday) do you usually drink alcohol?'. Answers varied from '4 days', to '3 days', '2 days', '1 day', 'less than one day' and 'I never drink on a weekday'. Another question was: 'How many units of alcohol do you usually drink on a weekend day on which you drink?'. Answers varied from '20 units or more per day' to '15-19 units per day', '11-14 units per day', '7-10 units per day', '6 units per day', '5 units per day', '4 units per day', '3 units per day', '2 units per day', '1 units per day' and '0 units per day'.

Binge drinking was measured by the following question: 'How many times in the past 4 weeks did you have 6 or more units of alcohol on one occasion (e.g. at a party or on a regular evening)?'. Possible answers were 'I never drank more than 6 units in the past 4 weeks', '1 times in the past 4

weeks', '2 times in the past 4 weeks', '3 times in the past 4 weeks', '4 times in the past 4 weeks', '5 times in the past 4 weeks', '6 times in the past 4 weeks', '7 times in the past 4 weeks', '8 times in the past 4 weeks' and '9 times or more in the past 4 weeks'.

Tobacco use was measured by the question: 'Have you smoked cigarettes in the past four weeks?'. Participants were asked to choose from three options: 'Yes, I smoke on a daily basis', 'Yes, I do smoke, but only once in a while' and 'No, not even a puff'.

Drug use was measured by four items. Participants were asked how many times they used certain types of drugs. One question was: 'How many times in your life have you used marijuana?' Answering options ranged from 'Never' to '1-2 times', '3-9 times', '10-19 times', '20-39 times', '40-99 times' and '100 times or more'. Another question was: 'How many times in the last year have you used the following drugs?' 'XTC', 'Cocaine', 'Magic mushrooms' and 'Amphetamine/speed'. The 6-point Likert scale ranged from 'Never' to '1-2 times', '3-4 times', '5-6 times', '7-8 times' and '9 times or more'.

#### *Cognitive variables*

This section incorporated the reflective pathway Theory of Planned Behaviour factors including; intention, attitude, perceived behavioural control, subjective norm and descriptive norm. Also, moral norm and social pressure were added. This section also incorporate the impulsive pathway variables or the Prototype Willingness Model factors, being: prototype favourability, similarity and behavioural willingness.

The Theory of Planned Behaviour was measured by seventeen items. Intention was measured by three items ( $\alpha = .84$ ). One statement was: 'I intend to drink less than 6 units of alcohol per occasion'. Participants could answer by means of a 5-point scale ranging from 'Definitely won't', to 'Probably won't', 'Maybe I will, maybe I won't', 'Probably will' and 'Definitely will'.

Attitude was measured by three items ( $\alpha = .89$ ). All statements started with the following sentence: 'In my opinion, me drinking once a week 6 or more units of alcohol at one night or a party is...'. One of the 5-point Likert scales ranged from 'Bad' to 'Good'.

Perceived behavioural control was measured by 5 items ( $\alpha = .82$ ) in which participants were asked to tick the box on a 5-point Likert scale ranging from 'Easy', to 'Relatively easy', 'Not easy, not hard', 'Relatively hard' and 'Hard'. One of the questions was: 'To me, drinking less than 6 units of alcohol on one night, when my friends drink more is...'.

Descriptive norm was measured by one item: 'How many of your best friends drink once a week 6 or more units of alcohol per occasion?'. The 5-point Likert scale items ranged from '(Almost) none', to 'Less than half', 'About half', 'More than half' and '(Almost) everybody'.

Subjective norm was measured by two items ( $\alpha = .60$ ). One of the statements was: 'My best friends think I should not drink 6 or more units of alcohol per occasion'. The 5-point Likert scale ranged from: 'Strongly disagree', to 'Disagree', 'Neutral', 'Agree', and 'Strongly agree'.

Moral norm was measured by three items ( $\alpha = .88$ ). One of the statements was: 'I think it would be wrong if I drink at least 6 units of alcohol per occasion', with a 5-point Likert scale ranging from 'Entirely disagree' to 'Disagree', 'Neutral', 'Agree' and 'Entirely agree'.

Social pressure was measured by the item 'How many times have you had the feeling that your best friends want you to drink at least 6 units of alcohol on an evening or party?'. The 5-point Likert scale ranged from 'Never' to 'Hardly ever', 'Now and then', 'Quite often' and 'All the time'.

The Prototype Willingness Model was measured by twelve items. Prototype favourability was measured by eight items ( $\alpha = .95$ ). Participants were asked what their thoughts were about a person of their age drinking six or more units of alcohol at least once a week. Some statements were 'Is cool', 'Has a lot of friends' and 'Is often in a relationship'. The 5-point Likert scale ranged from 'Strongly disagree', to 'Disagree', 'Neutral', 'Agree' and 'Strongly agree'.

Similarity was measured by the item 'Do you think you're similar to the person of the previous question?'. The 5-point Likert scale ranged from 'Not at all' to 'Hardly', 'A little bit', 'Quite a lot' and 'Very much'.

Behavioural willingness was measured by three items ( $\alpha = .66$ ). Participants were asked to imagine themselves at a party with a couple of friends. They were asked what they would do if they have had sex or more units of alcohol and a friend offers them another drink. One of the statements was 'Say 'no thanks' and refuse the drink?'. The 5-point Likert scale ranged from 'Definitely not' to 'Probably not', 'Perhaps', 'Probably so' and 'Definitely so'.

### **Analysis**

SPSS 21 was used to analyse the data of a sample of 301 cases. First, the demographic characteristics of the sample were calculated. By means of an Analysis of Variance (ANOVA) or Chi square test possible differences between groups with regard to age, gender, current living situation, primary occupation and educational level were tested. Secondly bivariate associations between all predictors and monthly binge drinking frequency were tested by using Pearson Correlation and ANOVA. Then, a multivariate analysis was executed. A multiple regression analysis per level of proximity with the significant predictors of the bivariate analysis was used. The predictors that were still significant were used in another multiple regression analysis to find out which predictor still had significant effect on binge drinking after stepwise including more proximate levels of predictors. To see if nationality was a covariate of binge drinking, an ANCOVA between all predictors and nationality was performed, uncorrected and corrected for gender, age and educational level. Then, a multivariate linear regression per nationality was performed to see if there was a moderation effect of nationality. A moderation analysis was executed based on visual comparison of significance levels of the variables of the regression analysis of the two nationalities. The variables that showed great difference in significance level were included in the moderation analysis. Finally, the significant predictors of the ANCOVA that were most likely to be mediators were analysed by means of a multiple linear regression analysis. Subsequently a Sobel test was executed to find possible mediations of the predictors, nationality and binge drinking.

### **Results**

Table 1 shows the demographic characteristics of the total sample (N=301) and per nationality (UK = 100; NL = 201). The results of the chi-square and ANOVA tests were also described. The mean age of

the UK-sample is 20.74 years old whereas the mean age of Dutch sample is 17.99 years old. This is a significant difference between the groups. There were also significantly more women than men, more students than pupils and more students than working respondents in the sample. Also, the UK sample binge drank significantly more than the Dutch sample:  $F(1,308) = 14.84, p = .000$ . The total weekly alcohol consumption was significantly higher in the Dutch sample:  $M = 20.82, SD = 14.62$  against  $M = 15.13, SD = 14.43, F(1,308) = 10.38, p = .001$ . There was no significant difference in living situation: with parents or independently, nor was there a difference between level of education: non-university or university.

Table 1. *Demographic Characteristics for the total sample, UK and the Netherlands (NL) separately and differences were tested with an ANOVA or Chi-square.*

	UK	NL	Total	<i>F</i>		<i>X</i> <sup>2</sup>	
	(N = 100)	(N = 201)	(N = 301)	<i>F</i>	<i>p</i>	<i>X</i> <sup>2</sup>	<i>p</i>
Age in years	20.74	17.99	18.87	183.15	.000		
<i>M</i> ( <i>SD</i> )	(2.09)	(1.44)	(2.11)				
Sex N (%)							
A. Male	41 (41)	68 (32.4)	109 (35.2)			27.3	.000 <sup>a</sup>
B. Female	59 (59)	142 (67.6)	201 (64.8)				
Current living situation N (%)							
A. With parents	24 (24)	140 (66.7)	164 (52.9)			1.1	.307 <sup>b</sup>
B. Independently	75 (75)	68 (32.4)	143 (46.1)				
C. Assisted living or in an institution	-	-	-				
D. Other	1 (1)	2 (1)	3 (1.0)				
Current primary occupation N (%)							
A. Pupil	1 (1)	95 (45.2)	96(31)			30.4	.000 <sup>a</sup>
B. Student	80 (80)	108 (51.4)	188 (60.6)				
C. Special needs pupil	1 (1)	-	-			225.3	.000 <sup>c</sup>
D. Paid work	17 (17)	5 (2.4)	22 (7.1)				
E. In search of employment	1 (1)	-	1 (0.3)				
F. Other	-	2 (1)	2 (0.6)				
Highest current or completed educational level N (%)							
A. Primary school / Basisonderwijs	-	3 (1.0)	3			0.859	.354 <sup>d</sup>

B. GCSE/VMBO	1 (0.3)	2 (0.6)	3
C. NVQ / MBO/ROC	1 (0.3)	5 (1.6)	6
D. As Levels / Havo	1(0.3)	20 (6.5)	21
E. A Levels / VWO	38 (12.3)	86 (27.7)	124
F. University BSc/BA	43 (13.9)	6 ( 1.9)	49
G. University MSc/MA	4 (1.3)	88 (28.4)	92
H. University PhD	-	-	-
I. Other	12 (3.9)	-	12

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Note. <sup>a</sup>. A versus B; <sup>b</sup>. A versus B and D; <sup>c</sup>. A - C versus D; <sup>d</sup>. A - E versus F - G.

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Bivariate associations between the predictors and the monthly binge drinking frequency are shown in table 2. The majority of the predictors was highly correlated with binge drinking.

On ultimate level, the demographics were positively correlated, except for educational level. Gender appeared to be highly associated with binge drinking. Men reported a higher binge drinking frequency than women, as anticipated ( $p = .000$ ). Only two of the personality traits were associated, yet highly associated: impulsivity and sensation seeking. The fact that the two traits are highly correlated was anticipated, however the fact that the two others are not, was unforeseen.

On distal level, eleven out of sixteen predictors were associated with binge drinking. Nationality was significantly associated, but only one of four parental influence predictors were positively correlated with binge drinking, namely alcohol specific rules. This was unexpected. Notable is that all drinking facilities are strongly correlated with binge drinking. The negative association indicates that one has a higher binge drinking frequency if one goes to the stated facilities more often, as to be expected. Also two leisure activities, namely: 'aesthetic-intellectual' and 'social-entertainment' were correlated. As foreseen, social-entertainment was highly associated with binge drinking. The negative correlation indicates that if one performs social-entertainment activities, one binge drinks more often. Smoking and drug use were also both strongly correlated with binge drinking. However, smoking unexpectedly emerged negatively correlated, what indicates that if one smokes, one does not binge drink necessarily more often.

The cognitions of the reflective pathway were all strongly correlated, all in the expected direction. Moral norm and social pressure were also strongly correlated with binge drinking. With regard to the impulsive pathway, prototype and similarity were correlated, but willingness was not.

Table 2. *Bivariate Associations Between all Predictors and Monthly Binge Drinking Frequency By means of Pearson Correlation and ANOVA.*

	<i>r</i>	<i>p</i>	(N = 310)	
Age	.15	.008		
Current Living Situation	.14	.011		
Primary Occupation	.17	.002		
Educational Level	-.07	.213		
Impulsivity	.34	.000		
Sensation Seeking	.30	.000		
Hopelessness	-.04	.523		
Anxiety Sensitivity	-.10	.081		
Parental/carer respect	-.06	.338		
Alcohol specific quality of communication	-.01	.819		
Alcohol specific rules	.25	.000		
Parental monitoring	.06	.332		
Drinking facilities				
Openly on the street	-.45	.000		
Hidden place outside my home	-.20	.001		
At home	-.55	.000		
At a friends' house	-.56	.000		
At a public house	-.55	.000		
At a restaurant or pub	-.52	.000		
At school	-.29	.000		
Leisure activities				
Aesthetic-intellectual	.13	.027		
Sports-action	-.00	.956		
Social-entertainment	-.35	.000		
Home activities	.01	.829		
Smoking	-.30	.000		
Drug use	.34	.000		
Intention	-.57	.000		
Moral norm	-.59	.000		
Perceived Behavioural Control	.54	.000		
Attitude	.58	.000		
Subjective Norm	-.35	.000		
Descriptive Norm	.59	.000		
Social Pressure	.38	.000		
Prototype	.19	.001		
Similarity	.43	.000		
Willingness	-.07	.229		
	<i>M (SD)</i>	<i>M (SD)</i>	<i>F</i>	<i>p</i>
	UK	NL		
Nationality	3.96 (2.82)	2.80 (2.40)	14.08	.000
	Male	Female		
Gender	4.37 (2.93)	2.53 (2.14)	39.92	.000



The significant predictors of the bivariate analysis were analysed per level of proximity by means of a multiple regression analysis. This was done to find which predictor had at least a 0.10 significance level on binge drinking to further reduce the number of predictors in a final model combining all proximity levels. On the ultimate level, gender ( $\beta = -.32, p = .000$ ), impulsivity ( $\beta = .30, p = .000$ ), primary occupation ( $\beta = .17, p = .014$ ) and sensation seeking ( $\beta = .14, p = .009$ ) were significant. On the distal level seven predictors were significant: drinking facilities 'at home' ( $\beta = -.23, p = .000$ ), 'at a public house' ( $\beta = -.20, p = .002$ ) and 'openly on the street' ( $\beta = -.19, p = .002$ ); leisure activities 'aesthetic-intellectual' ( $\beta = .16, p = .000$ ) and 'social-entertainment' ( $\beta = -.16, p = .001$ ); nationality ( $\beta = .11, p = .038$ ) and drug use ( $\beta = .10, p = .075$ ). On proximal level six predictors were significant: descriptive norm ( $\beta = .33, p = .001$ ); perceived behavioural control ( $\beta = .24, p = .000$ ); moral norm ( $\beta = -.20, p = .002$ ); attitude ( $\beta = .13, p = .041$ ); similarity ( $\beta = .10, p = .035$ ) and prototype ( $\beta = -.09, p = .052$ ). Intention was considered a fourth proximity level, tested singly and was found significant ( $\beta = -.57, p = .000$ ).

With these results, a multiple regression analysis was executed, stepwise adding levels of proximity to find which predictors were related to binge drinking on at least a .05 level. Table 3 shows the results of this multivariate analysis. The ultimate level of proximity explains 28.8% of the variance in binge drinking. Gender, primary occupation and personality traits impulsivity and sensation seeking all had a significant effect on binge drinking. Both gender and impulsivity quite expressly: gender ( $\beta = -.32, p = .000$ ) and impulsivity ( $\beta = .29, p = .000$ ).

Adding the distal level of proximity to the ultimate level added 23% of explained variance in binge drinking. Both proximity levels thus explained 51.8% of the explained variance. Of the ultimate level gender and impulsivity were still significant, but partially mediated by the cultural variables. The distal level predictors that had a significant effect were: drinking facilities 'at a public house', 'at home' and 'openly on the street'; nationality and leisure activities 'aesthetic-intellectual' and 'social-entertainment'. Drinking facilities 'at a public house' and 'at home' appeared to be the highest associated with binge drinking with respectively  $\beta = -.23, p = .000$  and  $\beta = -.21, p = .000$ .

Adding the variables of the proximal level to the ultimate and distal levels added 10.2% of the explained variance in binge drinking. Thus three proximity levels explained 62% of the variance. The significant variable of the ultimate level was gender, the ones of the distal level drinking facilities 'at home' and 'at a public house' and leisure activity 'social-entertainment' and the ones of the proximal level were perceived behavioural control, moral norm, descriptive norm and prototype. Notable are 'nationality' and all drinking facilities that appeared to be strongly mediated by adding the cognitions. The cultural predictors are thus largely mediated by cognitions, but not fully. Descriptive norm, followed by perceived behavioural control was found highly significant, respectively  $\beta = .25, p = .000$  and  $\beta = .17, p = .000$ .

Finally, adding 'intention' on a fourth level adds 0.4% explained variance in binge drinking. All four levels explain 62.4% of the variance. The predictors descriptive norm, perceived behavioural control, gender, drinking facility 'at home', leisure activity 'social-entertainment' and prototype are of

significant influence on binge drinking. Especially descriptive norm seems to be highly associated:  $\beta = .26, p = .000$ . Noticeable is that none of the predictors were highly influenced by adding intention. Especially in the cognitions influence was expected.

Table 3. *Multivariate Analysis Multiple Regression of Ultimate, Distal and Proximal Predictors on Monthly Binge Drinking Frequency (N = 310).*

	1		2		3		4	
	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>
Gender	-.32	.000	-.18	.000	-.13	.001	-.14	.001
Primary occupation	.23	.000	.04	.373	.08	.087	.08	.069
Impulsivity	.29	.000	.13	.006	.07	.083	.07	.102
Sensation seeking	.15	.004	.04	.397	.04	.340	.04	.335
Nationality			.12	.016	.03	.586	.02	.700
Openly on the street			-.13	.018	-.07	.206	-.06	.230
At home			-.21	.000	-.13	.010	-.12	.012
At a public house			-.23	.000	-.11	.042	-.10	.066
Aesthetic-intellectual			.12	.005	.07	.074	.07	.092
Social-entertainment			-.12	.009	-.08	.047	-.09	.039
Drug use			.06	.192	.02	.584	.02	.622
Moral norm					-.12	.040	-.09	.135
Perceived behavioural control					.17	.000	.15	.002
Attitude					.03	.641	.00	.959
Descriptive Norm					.25	.000	.26	.000
Prototype Similarity					-.09	.025	-.09	.040
Intention					.02	.678	.01	.768
							-.10	.074
	$R^2 = .29$		$R^2 = .52$		$R^2 = .62$		$R^2 = .62$	
	$F = 30.7$		$F = 29.0$		$F = 27.9$		$F = 26.7$	
	$p = .000$		$p = .000$		$p = .000$		$p = .000$	
			$F$ Change = 20.3		$F$ Change = 12.8		$F$ Change = 3.2	
			$F$ Change $p = .000$		$F$ Change $p = .000$		$F$ Change $p = .074$	
			$R^2$ change = .23		$R^2$ change = .10		$R^2$ change = .00	

To see whether the significant determinants of binge drinking differed per nationality, ANCOVA's were executed. Possible differences might indicate moderating or mediating effects. The significantly correlated variables of binge drinking were used and the test was performed both with and without correcting differences in gender, age and educational level between the two samples. Results are shown in table 4. The descriptive statistics show that the two nationalities differ in some variables on every proximity level. On ultimate level two personality traits differed from each other namely: hopelessness and anxiety sensitivity, in which the UK seems to have a slightly higher mean score, indicating that young adults in the UK are slightly more anxious and hopeless. On distal level

both countries differ in parental/carer respect and alcohol specific rules; drinking facilities 'openly on the street', 'at home', 'at a friends' house' and 'at a restaurant or pub' and leisure activity 'social-entertainment' and monthly binge drinking frequency. The UK had the highest mean score in drinking facility 'openly on the street' and monthly binge drinking frequency. The higher score in drinking facility 'openly on the street' indicates that the UK population drank less than a few times a year openly on the street whereas the Dutch population tended to drink more often than a few times a year openly on the street. The Dutch population had the highest mean score on drinking 'at home', 'at a friends' house', 'at a restaurant or pub', what indicated they drank at these specific places less than the UK population. They also had a higher mean score regarding the leisure activity 'social-entertainment', also indicating that they perform the behaviour less. On proximal level they differed in nine out of ten cognitions in which behavioural willingness is nearly significant ( $F(1, 305) = 3.73; p = .054$ ). The UK population had the highest mean score in nearly all cognitions which indicates that they have consistently more risky cognitions.

Considering the difference between the uncorrected and corrected ANCOVA it is notable that several predictors were found significant covariates in the uncorrected, but were insignificant after correction for gender age and educational level. This effect indicates that some differences between the UK and the Netherlands are not necessarily a consequence of culture, but of sampling differences. Parental/carer respect is an example of this effect, but also drinking facilities 'at a friends' house', 'at a public house' and 'at school', leisure activity 'social-entertainment', binge drinking and similarity appear insignificant after correction. Especially leisure activity 'social-entertainment' shows this effect strongly: uncorrected:  $F(1, 308) = 7.04; p = .008$ ; corrected:  $F(1, 305) = .02; p = .900$ . This is also the case the other way around: before correction it is insignificant and after correction significant. This indicates that the difference in demographical factors in both samples confound possible cultural differences. By correcting for the demographical differences, cultural differences become apparent. Drinking facilities 'hidden place outside my home' and 'at a restaurant or pub' and leisure activities 'aesthetic-intellectual' and 'sports-action' are examples of this effect.

The results of the ANCOVA in which predictors were corrected, showed several variables of which nationality seems to be a covariate. On ultimate level the variables were: current living situation; primary occupation; anxiety sensitivity and hopelessness. On distal level they were: alcohol specific rules; leisure activities 'aesthetic-intellectual' and 'sports-action'. Nationality also had significant influence on drinking facilities: 'in a restaurant or pub', 'openly on the street' and 'hidden place outside my home'. On proximate level: social pressure, moral norm, prototype, attitude, subjective norm, intention, descriptive norm and perceived behavioural control. These significant relations point to a possible mechanism through which nationality ultimately determines binge drinking. In particular social pressure ( $F(1, 305) = 80.55, p = .000$ ) was highly expected to hold such a mechanism.

Table 4. ANCOVA between all Significant Correlation Variables and Nationality, Uncorrected and Corrected for Gender, Age and Educational Level (UK:  $N = 100$ ; NL:  $N = 201$ ).

	Uncorrected				Corrected			
	UK	NL	$F$	$p$	UK	NL	$F$	$p$
	$M (SD)$	$M (SD)$			$M (SD)$	$M (SD)$		
Current Living Situation	1.74 (0.46)	1.32 (0.49)	53.6	.000	1.74 (0.45)	1.31 (0.49)	12.1	.001
Primary Occupation	2.37 (0.81)	1.58 (0.64)	87.3	.000	2.37 (0.81)	1.58 (0.64)	5.0	.026
Impulsivity	2.18 (.51)	2.22 (0.45)	0.3	.559	2.18 (0.51)	2.22 (0.45)	1.2	.277
Sensation Seeking	2.63 (0.57)	2.53 (0.55)	2.1	.151	2.63 (0.57)	2.53 (0.55)	0.6	.453
Hopelessness	1.89 (0.55)	1.73 (0.46)	7.0	.009	1.89 (0.55)	1.73 (0.46)	3.9	.048
Anxiety Sensitivity	2.49 (0.50)	2.28 (0.49)	11.4	.001	2.49 (0.50)	2.28 (0.49)	4.9	.028
Parental/carer respect	2.61 (0.69)	3.44 (0.62)	4.7	.032	3.61 (0.69)	3.44 (0.62)	0.3	.576
Alcohol specific quality of communication	4.53 (0.77)	3.56 (0.77)	0.6	.433	3.63 (0.77)	3.56 (0.77)	0.3	.604
Alcohol specific rules	4.53 (0.67)	3.81 (1.00)	42.0	.000	4.53 (0.67)	3.81 (1.00)	10.5	.001
Parental monitoring	2.15 (0.82)	2.17 (0.84)	0.0	.851	2.15 (0.82)	2.17 (0.84)	0.6	.427
Drinking facilities								
Openly on the street	5.16 (0.96)	4.90 (0.93)	5.2	.024	5.16 (0.96)	4.90 (0.93)	13.7	.000
Hidden place outside my home	5.66 (0.62)	5.52 (0.92)	1.8	.181	5.66 (0.62)	5.52 (0.92)	6.6	.011
At home	3.60 (1.18)	4.10 (1.20)	11.8	.181	3.60 (1.18)	4.10 (1.20)	1.1	.286
At a friends' house	3.67 (1.08)	3.97 (1.10)	5.0	.001	3.67 (1.08)	3.97 (1.10)	0.2	.656
At a public house	3.77 (1.42)	3.80 (1.21)	0.0	.026	3.77 (1.42)	3.80 (1.21)	0.2	.688
At a restaurant or pub	3.49 (1.10)	4.59 (1.08)	69.2	.847	3.49 (1.10)	4.59 (1.08)	17.5	.000
At school	5.25 (1.11)	5.17 (0.85)	0.5	.000	5.25 (1.11)	5.17 (0.85)	0.8	.378
Leisure activities								
Aesthetic-intellectual	2.87 (1.64)	2.60 (1.54)	2.0	.159	2.87 (1.64)	2.60 (1.54)	7.7	.006
Sports-action	2.29 (1.31)	2.13 (1.07)	1.3	.265	2.29 (1.31)	2.13 (1.07)	7.3	.007
Social-entertainment	2.60 (0.96)	2.93 (1.04)	7.0	.008	2.60 (0.96)	2.93 (1.04)	0.0	.900

Home activities	1.44 (0.89)	1.44 (0.82)	0.0	.985	1.44 (0.89)	1.44 (0.82)	0.8	.373
Binge drinking	3.96 (2.82)	2.80 (2.40)	14.1	.000	3.96 (2.82)	2.80 (2.40)	3.7	.056
Smoking	2.55 (0.73)	2.60 (0.69)	0.4	.523	2.55 (0.73)	2.60 (0.69)	0.1	.715
Drug use	1.42 (0.72)	1.29 (0.59)	2.9	.089	1.42 (0.71)	1.29 (0.59)	0.6	.425
Intention	2.83 (1.09)	3.27 (1.21)	9.8	.002	2.83 (1.09)	3.27 (1.21)	10.5	.001
Moral norm	2.55 (1.03)	3.13 (1.33)	14.6	.000	2.55 (1.03)	3.13 (1.33)	19.3	.000
Perceived Behavioural Control Attitude	2.42 (0.96)	2.12 (0.82)	8.4	.004	2.42 (0.96)	2.12 (0.82)	6.2	.013
Attitude	3.09 (1.00)	2.64 (1.08)	12.1	.001	3.09 (1.00)	2.64 (1.08)	13.1	.000
Subjective Norm	2.82 (0.89)	3.31 (1.05)	16.6	.000	2.82 (0.89)	3.31 (1.05)	11.8	.001
Descriptive Norm	3.59 (1.22)	2.78 (1.36)	25.5	.000	3.59 (1.22)	2.78 (1.36)	9.0	.003
Social Pressure	3.38 (1.23)	1.88 (1.07)	121.5	.000	3.38 (1.23)	1.88 (1.07)	80.6	.000
Prototype	2.62 (0.83)	1.99 (0.92)	34.1	.000	2.62 (0.83)	1.99 (0.92)	17.2	.000
Similarity	2.03 (1.01)	1.74 (0.92)	6.2	.013	2.03 (1.01)	1.74 (0.92)	1.4	.241
Willingness	2.90 (0.89)	2.81 (0.38)	3.7	.054	2.90 (0.40)	2.81 (0.38)	1.1	.287

To find possible moderation by nationality on the effect of the predictors on binge drinking, a regression analysis per nationality was performed, using the variables that were found significant in the first multiple regression analysis to further reduce the number of predictors. Results can be found in table 5.

In the UK sample the variables of the ultimate level explained 27.6% of the variance in binge drinking. Impulsivity and primary occupation appeared to be significant. Adding the variables of the distal level to the ultimate level added 22.1% of explained variance, explaining 49.7% of the variance in total. All ultimate predictors were mediated by the cultural, distal factors. In particular primary occupation appeared highly mediated. Drinking facilities 'at a public house' and 'openly on the street', leisure activity 'aesthetic-intellectual' and impulsivity were significant. Adding the proximal variables to the ultimate and distal level added 12.3% to the explained variance in binge drinking. The explained variance in binge drinking of the three levels is 61.9%. Noticeable is that the cognitions had limited influence on the ultimate and distal level, in which only drinking facilities 'at home' and 'at a public house' were mediated. Also 'impulsivity' shows a significant decrease of beta coefficient. Perceived behavioural control, similarity and leisure activity 'aesthetic-intellectual' are significant. Adding

intention to the ultimate, distal and proximal level added 1.4% explained variance in binge drinking. The total explained variance in binge drinking was 63.3%. Intention was not significantly related to binge drinking, but similarity, leisure activity 'aesthetic-intellectual', perceived behavioural control were.

In the Dutch sample the variables of the ultimate level explained 26.8% of the variance in binge drinking. All variables of the ultimate level were found significant. Gender and impulsivity being highly significant. Adding the variables of the distal level, the second level of the multiple regression analysis, added 23.8% to the explained variance in binge drinking, explaining 49.6% of the variance in total. Gender was significant on ultimate level, but evidently influenced by the cultural predictors. Furthermore, drinking facilities 'at a public house' and 'at home' and leisure activity 'social-entertainment' were significantly related to binge drinking. Adding the proximal variables added 13.5% to the explained variance. Thus, the three proximity levels explain 62.7% of the variance in binge drinking. Descriptive norm, moral norm, gender, drinking facility 'at home' and prototype were significantly related to binge drinking on this regression level. Adding intention added 0.5% to the explained variance. All predictors explained 63.0% of the variance in binge drinking for the Dutch population. Descriptive norm, moral norm, gender and drinking facility 'at home' were significantly related to binge drinking on this regression level. Notably is 'descriptive norm' which had the most significant association with binge drinking of the last regression level:  $\beta = .27, p = .000$ .

Conspicuous was that on the fourth multiple regression level, none of the predictors for monthly binge drinking frequency in the UK sample were similar to the predictors in the Dutch sample.

Table 5. *Multiple Regression Analysis on Binge Drinking using Predictors of the Levels of Proximity per Nationality, to Find Possible Moderators.*

	UK (N = 100)								NL (N = 201)							
	1		2		3		4		1		2		3		4	
	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>
Gender	-.15	.084	-.08	.340	-.11	.153	-.12	.136	-.41	.000	-.25	.000	-.16	.002	-.16	.002
Primary occupation	.19	.030	.01	.868	-.02	.806	-.01	.883	.15	.016	.04	.473	.09	.069	.09	.066
Impulsivity	.40	.000	.18	.050	.02	.827	.02	.808	.24	.000	.09	.116	.05	.327	.04	.446
Sensation seeking	.13	.159	.09	.274	.10	.205	.12	.139	.15	.024	.03	.677	.04	.477	.03	.505
Openly on the street			-.23	.031	-.18	.060	-.18	.063			-.10	.120	-.05	.381	-.05	.420
At home			-.17	.100	-.04	.647	-.04	.691			-.22	.001	-.14	.013	-.14	.016
At a public house			-.24	.020	-.11	.273	-.10	.337			-.23	.001	-.11	.112	-.09	.168
Aesthetic-intellectual			.19	.038	.20	.025	.20	.023			.09	.089	.05	.248	.05	.278
Social-entertainment			-.13	.127	-.14	.092	-.15	.059			-.14	.013	-.08	.123	-.08	.121
Drug use			.02	.825	-.02	.828	-.02	.868			.06	.288	.03	.539	.02	.658
Moral norm					-.06	.496	-.03	.701					-.22	.003	-.19	.020
Perceived behavioural control					.25	.012	.20	.049					.09	.116	.07	.227
Attitude					-.05	.619	-.08	.389					.07	.364	.04	.614
Descriptive Norm					.17	.059	.15	.090					.26	.000	.27	.000
Prototype Similarity					-.01	.933	.00	.996					-.10	.029	-.09	.057
Intention					.22	.011	.23	.007					-.09	.105	-.10	.064
							-.16	.082							-.12	.097
	$R^2 = .28$		$R^2 = .50$		$R^2 = .62$		$R^2 = .63$		$R^2 = .27$		$R^2 = .50$		$R^2 = .63$		$R^2 = .63$	
	$F = 9.0$		$F = 8.8$		$F = 8.4$		$F = 8.3$		$F = 20.0$		$F = 21.5$		$F = 22.9$		$F = 21.9$	
	$p = .000$		$p = .000$		$p = .000$		$p = .000$		$p = .000$		$p = .000$		$p = .000$		$p = .000$	
			$F$ Change = 6.5		$F$ Change = 4.5		$F$ Change = 3.1		$F$ Change = 16.4		$F$ Change = 12.6		$F$ Change = 12.6		$F$ Change = 2.8	
			$p = .000$		$p = .001$		$p = .082$		$p = .000$		$p = .000$		$p = .000$		$p = .097$	
			$R^2$ change = .221		$R^2$ change = .123		$R^2$ change = .014		$R^2$ change = .238		$R^2$ change = .135		$R^2$ change = .005			

Some apparent differences between the two nationalities can be found in table 5. There seemed to be differences in gender; drinking facilities 'openly on the street' and 'at home'; leisure activities 'aesthetic-intellectual' and 'social-entertainment'; perceived behavioural control; moral norm; descriptive norm and similarity. To see whether nationality moderated the effect that the variables had on monthly binge drinking frequency, a moderation analysis was performed. The results in table 6 indicate limited moderating effect of nationality on the relationship between the predictors and binge drinking. Gender and similarity were found significant on a .05 significance level. Perceived behavioural control was significant on .10 significance level.

Table 6. *Moderation analysis using Differential Variables of Regression analysis per Nationality (N = 301).*

	$\beta$	$p$
Gender**	-.34	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	.10	.049 <sup>c</sup>
Openly on the street	-.45	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	-.04	.431 <sup>c</sup>
At home	-.55	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	-.05	.342 <sup>c</sup>
Aesthetic-intellectual	.13	.027 <sup>a</sup>
	.21	.000 <sup>b</sup>
	-.06	.328 <sup>c</sup>
Social-entertainment	-.35	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	.01	.898 <sup>c</sup>
Perceived behavioural control*	.54	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	.09	.054 <sup>c</sup>
Moral norm	-.59	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	.04	.357 <sup>c</sup>
Descriptive norm	.59	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	-.00	.972 <sup>c</sup>
Similarity **	.43	.000 <sup>a</sup>
	.21	.000 <sup>b</sup>
	.12	.020 <sup>c</sup>

Note. <sup>a</sup> Binge drinking is regressed on the predictor; <sup>b</sup> Binge drinking is regressed on nationality; <sup>c</sup> Binge drinking is regressed on predictor-nationality corrected for predictor and nationality.

\*\*  $p < .05$ ; \*  $p < .10$  level.

A mediation analysis was executed using predictors of the ANCOVA analysis that were most likely to mediate between nationality and binge drinking. Considering the second research aim, emphasis was placed on the cultural predictors. Alcohol specific rules, drinking facility 'openly on the street', leisure time activity 'aesthetic-intellectual', moral norm, attitude, subjective norm, descriptive norm, social pressure and prototype were analysed. The results in figures 2 to 10 showed that five out of nine tested predictors were significant mediators of the relation between nationality and the monthly binge drinking frequency respectively: descriptive norm, moral norm, attitude, social pressure and subjective norm. Results showed that there was partial mediation of subjective norm and attitude on the relationship between nationality and monthly binge drinking frequency. Social pressure, descriptive norm and moral norm were full mediators. In particular the association between nationality and binge drinking ( $\beta = .21, p = .000$ ) became non significant after adding social pressure ( $\beta = .01, p =$



.909). However descriptive norm also appeared strongly mediating the relationship:  $\beta = .21, p = .000$ ;  $\beta = .05, p = .309$ .

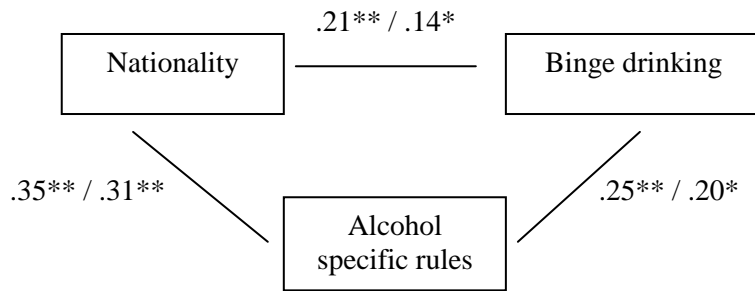


Figure 2. Regression analysis with significant predictor 'alcohol specific rules' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable.  $** p < .001$ ;  $* p < .05$ . Mediation analysis by means of the Sobel test showed  $t = 1.68 p = .094$ .

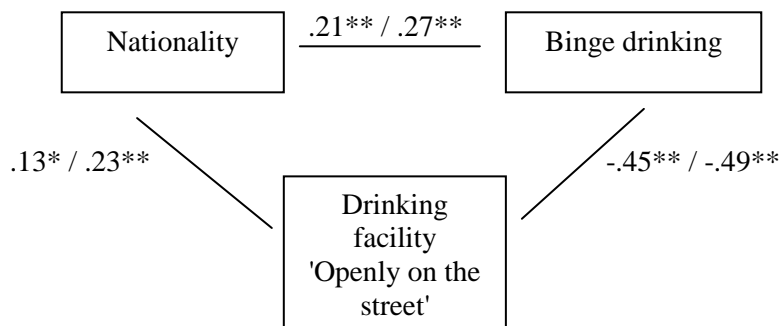


Figure 3. Regression analysis with significant predictor 'drinking facility openly on the street' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable.  $** p < .001$ ;  $* p < .05$ . Mediation analysis by means of the Sobel test showed  $t = -1.92 p = .055$ .

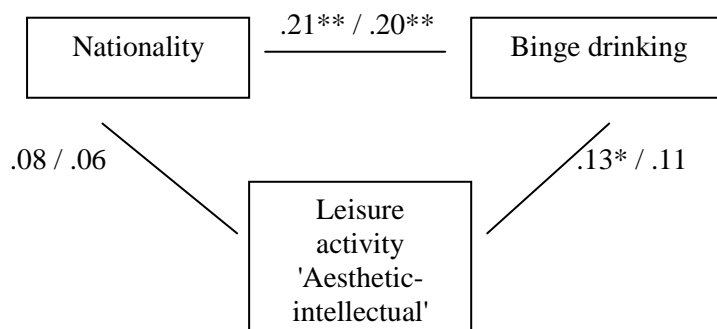


Figure 4. Regression analysis with significant predictor 'leisure activity aesthetic-intellectual' of the ANCOVA. The first reported beta coefficients are corrected for the third variable. The second beta coefficients are corrected for the third variable.  $** p < .001$ ;  $* p < .05$ . Mediation analysis by means of the Sobel test showed  $t = 1.34 p = .180$ .

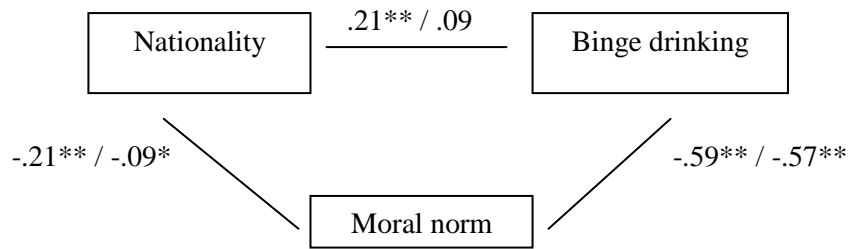


Figure 5. Regression analysis with significant predictor 'moral norm' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable.  $^{**} p < .001$ ;  $^{*} p < .05$ . Mediation analysis by means of the Sobel test showed  $t = 5.32$   $p = .000$ .

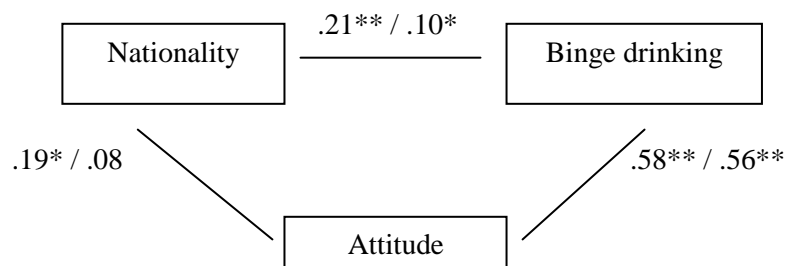


Figure 6. Regression analysis with significant predictor 'attitude' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable.  $^{**} p < .001$ ;  $^{*} p < .05$ . Mediation analysis by means of the Sobel test showed  $t = 4.31$   $p = .000$ .

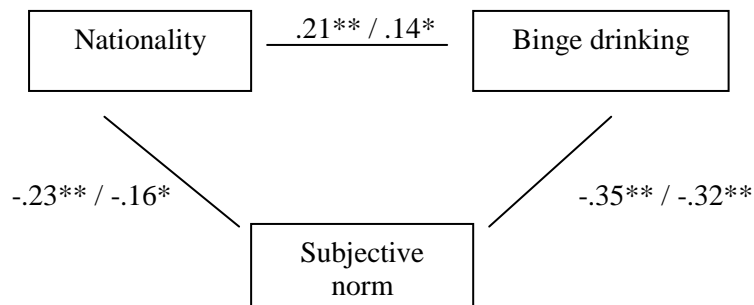


Figure 7. Regression Analysis with Significant Predictor 'subjective norm' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable.  $^{**} p < .001$ ;  $^{*} p < .05$ . Mediation Analysis by means of the Sobel test showed  $t = 2.50$   $p = .013$ .

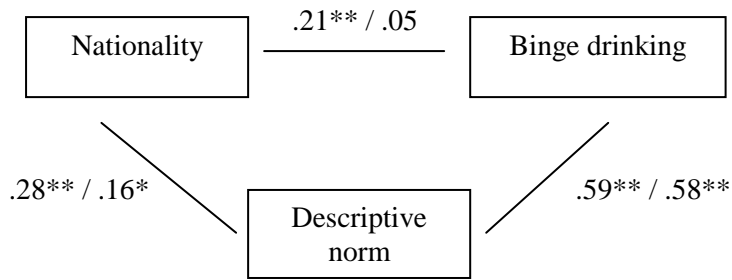


Figure 8. Regression Analysis with Significant Predictor 'descriptive norm' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable. \*\*  $p < .001$ ; \*  $p < .05$ . Mediation Analysis by means of the Sobel Test showed  $t = 4.31$   $p = .000$ .

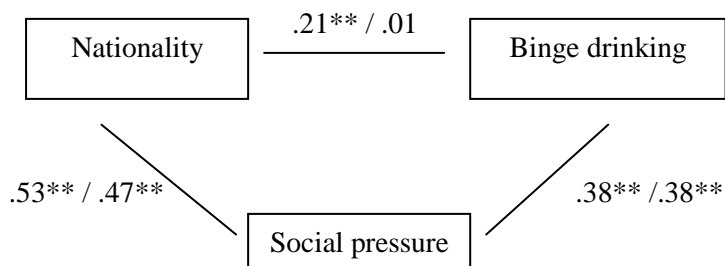


Figure 9. Regression Analysis with Significant Predictor 'social pressure' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable. \*\*  $p < .001$ ; \*  $p < .05$ . Mediation analysis by means of the Sobel test showed  $t = 3.66$   $p = .000$ .

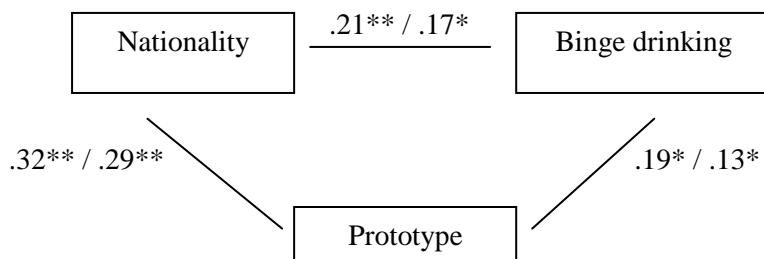


Figure 10. Regression analysis with the significant predictor 'prototype' of the ANCOVA. The first reported beta coefficients are uncorrected for the third variable. The second beta coefficients are corrected for the third variable. \*\*  $p < .001$ ; \*  $p < .05$ . Mediation analysis by means of the Sobel test showed  $t = 1.21$   $p = .226$ .

### Discussion

Previous studies stated that the quantity of alcohol intake among young adults in the United Kingdom is similar to the intake in the Netherlands (Hibell, et al. 2007). Yet, the drinking culture in the UK appears to be different from the drinking culture in the Netherlands. The culture in the UK has been described as a dry culture, whereas the Dutch drinking culture is considered a wet culture (Pieterse, et al., 2010). Also, students in the UK rate their wellbeing significantly lower than Dutch students and the perception of getting and being drunk seems to be different among the populations, both suggesting underlying cultural differences (Gordon, et al., 2012; Hughes, et al., 2011; Szmigin, et al., 2008; UNICEF, 2007; van Wersch & Walker, 2009). The theoretical TMBD-model was designed to predict binge drinking and entails the variables that are most likely related to binge drinking. The

present study was designed to 1) determine which TMBD factors are associated with binge drinking among young adults and 2) identify and compare culturally determined differences in causal mechanisms underlying binge drinking among young adults in the United Kingdom and the Netherlands.

To determine which TMBD factors were associated with binge drinking, a bivariate analysis including the total sample was performed. This analysis showed that most of the TMBD variables were significantly associated with monthly binge drinking frequency, as expected considering the empirical evidence on which the model was based. However, there were some variables not related to binge drinking such as 'educational level', the personality traits 'hopelessness' and 'anxiety sensitivity', the cultural factors, parental influences 'parental/carer respect', 'alcohol specific quality of communication', 'parental monitoring', leisure time activities 'sports-action' and 'home activities' and 'behavioural willingness'. The fact that educational level, the two personality traits, the parental influences and willingness were not related to binge drinking was surprising since previous research did find relations (Chao, 2001; Kerr & Stattin, 2000; van der Vorst, et. al., 2005; Woicik, et. al., 2009). It is imaginable that these variables are not correlated because of the fairly homogeneous population, mainly existing of highly educated students living in a student accommodation. This might have limited the variance of the predictor 'educational level' and influenced the parental influences and leisure time activities. The parental influences might have been influenced because it seems to be the 'norm' to drink excessively while being a student living on campus. Parents might be less able to influence their children during young adulthood and/or might be more permissive during young adulthood because of the physical distance (Coleman & Cater, 2007). Also, leisure time activities are more accessible and affordable on campus, what might have increased the number of leisure time activities, distorting the outcomes. That hopelessness and anxiety were not correlated is interesting since most studies reported correlation coefficients of low to moderate size (.20 -.30) between all personality traits. Age may have played a vital part in these outcomes because SURPS studies often include young adolescents, while this study included young adults. The relationship between hopelessness, anxiety and binge drinking may not be apparent in an older population. It is also plausible that hopelessness and anxiety are intercorrelated by impulsivity and sensation seeking, which tend to be stronger predictors. With regard to behavioural willingness, it is plausible that because of the identity development of young adults, they might be more subject to the descriptive norm and social pressure of their peers, which might mediate the relation between the willingness to binge drink and binge drinking (Engineer, Phillips, Thompson & Nocholls, 2003).

When all variables were put together in one model, adding the variables per level of proximity, the majority of distal, cultural variables were partially, but not fully mediated by the cognitions. Six variables showed unique explanatory value of binge drinking in the final model. Respectively descriptive norm, gender and perceived behavioural control were strongest related to binge drinking, followed by drinking facility 'at home', leisure activity 'social-entertainment (e.g. going out, cinema, join a club etc.)' and prototype favourability. This is in line with the expectations, but the order of

strength is surprising. Descriptive norm appears stronger related than gender, while other studies have found an extreme association between gender and binge drinking (e.g. Stolle, et. al., 2009). However, the descriptive norm regarding alcohol use for students is fairly expressive, especially in the UK (Engineer, et. al., 2003; Norman, Conner & Stride, 2012). Perceived behavioural control too, was found to be related to alcohol use in many previous studies (Collins & Carey, 2007). Finally, the strong association with drinking facility 'at home' was striking, since it was expected that the English population rarely drinks at home (Szmigin, et. al., 2008; van Wersch & Walker, 2009). Again, this might have been influenced by the predominantly student sample, because they have too little financial resources to always go out to drink where it is more expensive to drink. Overall the model has a fairly high explained variance of monthly binge drinking frequency, namely 62.4 percent. It is notable that adding the distal, cultural factors adds 23 percent of explained variance: the strongest growth of all levels.

Various analyses were performed to find culturally determined differences in causal mechanisms underlying binge drinking among young adults. The overall results give the impression that binge drinking fits more in the UK dry drinking culture, whereas it is significantly less prevalent in the Dutch wet drinking culture. There seemed to be a difference in norm between the two countries in which the young adults in the UK stand more acceptingly towards excessive alcohol use than the young adults in the Netherlands do. Also, the Dutch sample seems more aware of the dangers of alcohol abuse. The results showed that the UK sample is just as impulsive as the Dutch, but the fact that impulsiveness is a stronger predictor of binge drinking in the UK might indicate that their binge drinking experiences are usually hedonistic of nature. Thus, the description of the UK drinking style as hedonism (Szmigin et. al., 2008) seems righteous. The Dutch young adults were more aware of the dangers, drank less impulsively, but still took in a large amount of alcohol, often in a private, social setting. Therefore the term *binging*; a gross intake, without necessarily glorify being drunk, seems more appropriate for the Dutch drinking culture. This appears to be consistent with the expected difference in binge drinking culture between the UK and the Netherlands.

In reference to the cultural predictors, the difference in alcohol specific rules, drinking facility 'openly on the street', 'at home' and 'at a restaurant or pub' and the leisure activities were remarkable. Results suggested that the English young adults had less alcohol specific rules when they went out than the Dutch, which is consistent with the more permissive norm in the UK. The English sample drank openly in the street less often. This was unexpected since policy in the UK states that people under eighteen years old are not allowed to drink alcohol in pubs and pubs have limited opening hours (Licensing Act, 2003; Measham & Brain, 2005). This might have lured people to drink in the streets. Furthermore, in England one goes out to get drunk, something that in the Netherlands could be done at home, at a friend's house and in a restaurant as well (Gordon, et. al., 2012). Apparently this was not the case in this population. Again, this might be an effect of the predominantly student population, because they are over eighteen and no longer have parental rules to comply to, they can drink at home and friends' houses more. Striking was the difference in leisure activities. Based on previous research

it was expected that since the UK has limited organized leisure activities (van Wersch, 2009), they would have shown to perform significantly less leisure activities than the Dutch sample. This does not seem to be the case in this population: they are equally involved in home activities, only slightly less involved in sports-action and aesthetic-intellectual activities and even more involved in social-entertainment activities. This can be considered in line with the expectations since the sports-action and aesthetic-intellectual activities are the activities that usually are more organized, whereas home activities and social entertainment are not. The higher mean in leisure activity social-entertainment might also explain the significant difference in binge drinking, considering the fact that social entertainment includes going out. Also, because of the overrepresentation of students, often living on university campus, the outcomes may have been influenced because they have relatively easy access to a wide array of leisure activities. In addition, these leisure activities have been measured by a shortened questionnaire, which might have had an effect on the results. In this study the emphasis was placed on the organized leisure activities, while this emphasis was not explicitly measured with the shortened version. The extended version might have given more depth to the conclusions that can be drawn with regard to the organized leisure activities.

Examining the differences in cognitive mechanisms underlying binge drinking, there seemed to be some major differences between the two nationalities. The results suggest that the English sample intended to drink less alcohol to a lesser extent than the Dutch, had a positive moral norm and attitude towards binge drinking and had a perceived behavioural control that indicates that they are uncertain whether they are capable of refusing an alcoholic drink. Also, the UK descriptive norm was that nearly everyone drinks. Furthermore, they often felt that their friends and family wanted them to drink and they often felt pressured to drink more than six units of alcohol in one occasion. This was strongly in contrast with the Dutch sample.

To see whether the apparent differences found in the descriptive statistics are statistically significant further examinations were performed. The ANCOVA showed that there were many differences in predictors and binge drinking between the two countries. This suggested that nationality plays a role in binge drinking. The variables for which nationality explained variance were: current living situation; primary occupation; hopelessness; anxiety sensitivity; alcohol specific rules; drinking facilities 'openly on the street', 'hidden place outside my home' and 'at a restaurant or pub'; leisure activities 'aesthetic-intellectual' and 'sports-action'; intention; moral norm; perceived behavioural control; attitude; subjective norm; descriptive norm; social pressure and prototype. Surprisingly, most predictors that differed significantly per nationality were not significantly associated with binge drinking. For instance, the ANCOVA showed that in the UK social pressure was much more prevalent than in the Netherlands. However, this did not have enough effect on binge drinking in both populations to be included in the multiple regression analysis. This was also the case for alcohol specific rules: the young adults in the Netherlands had significantly more rules, but alcohol specific rules was not included in the multiple regression analysis. There were also some strong significant differences that were included in the multiple regression analysis, but were not found significantly

associated with binge drinking in either population such as drinking facilities 'at a restaurant or pub' and 'openly on the street', prototype favourability and attitude. Also, similarity was found to be comparable between the two populations, but did have significant influence on binge drinking in the UK sample only. Drinking facility 'at home' was also found similar in the UK and the Netherlands, but was only significantly associated with binge drinking in the Dutch sample.

The multiple regression analysis showed three predictors were associated with binge drinking in the UK sample. In order of strength: similarity, leisure time activity 'aesthetic-intellectual' and perceived behavioural control. Whereas descriptive norm, gender, drinking facility 'at home' and moral norm were associated with binge drinking in the Dutch sample.

The findings of the ANCOVA and the multiple regression analysis enhanced the conjecture of a moderation effect of nationality on binge drinking. However only the effect of gender and similarity on binge drinking was moderated by nationality. In the UK gender was negatively moderated and in the Netherlands positively. Similarity was positively moderated in the UK and in the Netherlands negatively. Perceived behavioural control could be considered slightly moderated. These results suggest that there is a difference in how these cognitions affect binge drinking in the UK and the Netherlands. Gender was strongly moderated by nationality which might have been a consequence of the fact young women binge drink more than men that in the UK and it is the other way around in the Netherlands (Hibell, et. al., 2004). The fact that the regression analysis showed differentiation for every predictor between countries, but the moderation analysis did not, might have been a consequence of adding a selection of predictors per regression level, while in the moderation analysis only one predictor was analysed. Supposedly interactions between predictors might have caused the differences in the regression analysis, but might also differ per country. Further examination was outside the scope of this study, but is a possible subject for future research.

The mediation analysis showed five mediators that mediated the relation between nationality and binge drinking: social pressure; descriptive norm; moral norm; subjective norm and attitude. This is in line with the expectations and earlier descriptive results of this study. The English attitude, moral, subjective and descriptive norm all seem to be positive towards binge drinking. Also, English young adults seem to feel socially pressured more often. These findings can be recognized in results of many other studies such as the studies of van Wersch (2009), Szmigin, et. al. (2007) and Coleman & Cater (2007). The difference between social pressure in the UK and the Netherlands is astonishing. A possible explanation might be that the Dutch population is more tolerant towards dissenters than the English population and a Dutch person therefore does not need to fear exclusion of the peer group after refusing a drink. Many studies have focussed on (the questioning of) tolerance and the acceptance and permissiveness of (homo)sexuality and different religions in the Netherlands. Also, the Dutch drug and prostitution tolerance have been widely discussed (e.g. Almond, 2010; Blum, 2010; Buruma, 2007; Wilmer, Treas & Newcomb, 1998). Surprisingly, no study was found discussing the impact that 'the Dutch tolerance' has on the effect of social pressure. This result might encourage further research with regard to the effect the Dutch tolerance might have on social pressure in

comparison to other countries. However, with regard to this study, one should bear in mind that the mediation analysis was performed with cross-sectional data what might have distorted the outcomes. Also, all mediators were mutually associated with each other thus it might be possible that merely one mediation effect was found. Because of this contingency it is also unclear which mediator is the strongest. In future research more complex multivariate analyses with a larger sample should be executed to answer this question.

That the English cognitions towards binge drinking were found predominantly positive and the alcohol intake is extreme does not void the fact that the alcohol intake in the Netherlands is also still excessively and damaging. This study proves that both countries should still take action to discourage and decrease alcohol intake. It suggests a risk profile for the UK and the Netherlands that can be used for designing interventions. In the UK the cognitions are most important; social pressure, attitude, descriptive norm, perceived behavioural control and leisure activity 'aesthetic intellectual' (e.g. reading, museums, playing an instrument, play chess, tinker etc.). In the Netherlands these are drinking at home, moral, subjective and descriptive norm. By using these predictors, interventions will have a close fit with the needs and shortcomings of the target group and will make the intervention more effective (Hamberg - van Reenen & Meijer, 2012). As an effect of the interventions young adults should realize that alcohol and in particular binge drinking is damaging and has lifelong consequences and thus should not be considered normal, acceptable and/or encouraged.

This study can be considered useful, but while interpreting the results, one should bear some limitations in mind. The basic characteristics of the samples were significantly different with regard to age, sex and primary occupation. The English sample was significantly older, there were significantly more female than male participants and more students than non-students. Especially the surplus of students might have lead to underestimating the differences, considering the independent living situations and the lack of direct parental contact. Although the two samples might not be best suited for comparison, it is plausible that the cultural factors are correctly measured, because culture is usually broadly carried. Either consciously or unconsciously. Furthermore, the TMBD model was composed of several variables that were expected to be associated with binge drinking. However, there might be other predictors of binge drinking that were not included in the study, although this is not expected. Also, some shortened versions of questionnaires were used, such as leisure times activities, smoking and similarity, similarity better validated than leisure time activities. Although the measurements yielded expected results, it might not measure all aspects of the behaviours and might give some slightly distorted outcomes.

For future research it is recommended to recruit equal populations, so that the outcomes of the study can be contributed to the measured constructs only. Also, it is advised to use as complete as possible measurement instruments, carefully considering the work load and attention span of the respondents. In coming studies it would also be interesting to broaden the age range of the respondents to see which factors trigger the onset of binge drinking. This might be useful to prevent the onset of binge drinking in adolescence.



This study determined which factors of the TMBD were associated with binge drinking and found cultural differences in binge drinking between English and Dutch young adults. Eighteen out of twenty-seven factors of the TMBD were correlated with binge drinking. Factors that were strongest associated with binge drinking were descriptive norm, gender, perceived behavioural control, drinking facility 'at home', leisure activity 'social-entertainment' and prototype favourability. The predictors that mediated the relation between nationality and binge drinking, were moral norm; attitude; subjective norm; descriptive norm and social pressure. Descriptive norm is the predictor that explains binge drinking and shows a major difference between nationality as well. This proves that there is a cultural difference between the United Kingdom and the Netherlands, something that was not commonly acknowledged. With these outcomes, interventions could be designed, tailored to the factors that are strongest related to binge drinking in order to discourage and decrease alcohol intake. This might decrease the damage and possible long-term consequences of excessive alcohol use among young adults and therefore decrease health care costs.

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