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Determinants of Adolescent Alcohol Abuse –
What role do older siblings and parents play?

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ABSTRACT

The purpose of this study was to investigate several variables as possible determinants of *adolescent binge drinking behaviour* and *the amount of alcohol usually consumed.* These variables were the *cognitive determinants* of the Theory of Planned Behaviour with reference to adolescent alcohol use, as well as risk factors and protective factors represented by the external variables of *older siblings (modelling, alcohol favouring behaviour)* and *parents (modelling, alcohol favouring behaviour, attempted and successful monitoring, rules)*.

Self-report questionnaires were filled in by a sample of 107 adolescent students from class five at a German rural secondary school. A considerably high frequency of binge drinking and large amounts of consumed alcohol among adolescents was documented. According to our expectations, bivariate correlation analyses indicated significant associations between the variables of the TPB and most of the sibling and parent factors and the indicators for adolescent alcohol use chosen for this study. Simultaneous regression analyses were conducted in view of adolescents' *usually consumed number of glasses* and revealed a comparable predictive power of siblings' and parental alcohol use and characteristics and a considerable amount of explained variance by the variables of the TPB. Simultaneous regression analyses on adolescents' binge drinking frequency showed highly predictive power of siblings' characteristics and alcohol use, especially alcohol favouring behaviour. With regard to adolescent *binge drinking behaviour*, hierarchical regression analyses indicated a independent influence of siblings' factors above parental influences.

The results of this study emphasize the relevance of external social factors in the context of adolescent drinking behaviour. These findings suggest to take parental and, in particular, older siblings' factors into consideration in regard to preventive interventions focussed on the reduction of adolescent alcohol use.

1. Introduction

Nowadays, children and adolescents grow up in a society in which consuming alcohol belongs to everyday's social life. They learn that drinking alcohol is culturally accepted and get to know the supposedly positive effects of it (Haffner, Roos, Steen, Parzer, Klett & Resch, 2006). Many social events such as weddings, birthday parties and even funerals are accompanied by alcohol. In Germany the consumption of alcohol is legal from the age of 16. According to a representative survey conducted by Al-Wiswasi (2003), most of the teenagers between 12 and 17 perceived alcohol as being easily available. In our society drinking alcohol can be seen as experience belonging to the years of youth (Haffner et al., 2006) and is understood as developmental task during adolescence (Al-Wiswasi, 2003). Theoretically and practically dealing with this legal substance and putting it into a reasonable and responsible frame imposes a high demand on adolescents (Al-Wiswasi, 2003). It should not be surprising that this challenging situation can cause problems.

The German Bundeszentrale für gesundheitliche Aufklärung (BZgA, 2008) published numbers about the extent of adolescent alcohol use. Accordingly, 2008 more than three quarters of young people between 12 and 17 stated that they had already drunk alcohol. Risky consumption, the so called binge drinking (5 or more glasses of alcoholic beverage on one occasion within the last month) was ascertained by one fifth of the respondents. Boys (23%) engaged more often in this risky behaviour than girls (17.7 %). The consumed amount of pure alcohol revealed alarming results: 6.2% of the adolescents drank an amount that is risky even for adults and 2 % consumed a profoundly dangerous amount of pure alcohol.

There are several problems that can come along with excessive alcohol consumption. Firstly, there is the direct health risk of intoxication (BZgA, 2008). From 2000 to 2007 the number of admissions to hospital of adolescent intoxications grew from 9500 to 23165 in Germany. About 16% of these intoxicated young people were aged 10 to 15 (Stolle, Sack & Thomasius, 2009). As said by Morrison and Bennet (2006) high intoxication leads to a 25-fold increase in the likelihood of accidents. Traffic accidents are the primary cause of adolescent deaths. One third of these fatal accidents are associated with alcohol consumption (Levy, Vaughn & Knight, 2002). Still worse intoxication can lead to coma and death by hampering respiration (Morrison & Bennet, 2006). Furthermore the adolescent brain development can be impaired by alcohol misuse (Tapert, Caldwell & Burke, 2004). This impairment is certainly most likely to occur in relation to an addiction. Holly and colleagues (1997) conducted the Early Developmental Stages of Psychopathology study and found out that more than 6% of adolescents at the age of 14 to 24 years are addicted to alcohol. In

addition adolescent alcohol abuse possibly lays the cornerstone for drinking problems during adulthood. The lifetime prevalence of alcohol induced disorders ranges from 4.6 to 32.4% (Essau, Karpinski, Peterman & Conradt, 1998).

The age at which alcohol was drunk for the first time seems to play a role when it comes to the development of alcohol addiction in adulthood. DeWitt and colleagues (2000) did research on this age. They figured out that the probability of becoming addicted was ten times higher for adolescents who had their first experiences with alcohol at the age of 11 to 12 than for those who drank alcohol for the first time when they were 19 years old.

Besides the above mentioned health related consequences that can be ascribed directly to alcohol misuse, there are several correlations between alcohol consumption and problematic behaviour. The high correlation of alcohol consumption and other harmful substance use like smoking (Haffner et al., 2006) shows how alcohol can indirectly impact unfavourably on health. Furthermore overly consumed amounts of alcohol can come along with problematic aggressive behaviour, poor school performance, as well as with social and psychological abnormalities (Haffner et al., 2006).

All these problematic consequences clearly give arguments for the inquiry of reasons for adolescent alcohol consumption. Recalling the above mentioned percentages of binge drinking behaviour, the questions arise *why* three fourth have drunk alcohol under the age of 17 and why one fifth does engage in binge drinking? Or let us put the question the other way around: why do *other* adolescents *not* engage in these behaviours? Getting insight into what makes young people drink as well as into what prevents them from it can help to develop effective interventions aimed at crucial determinants to counteract the problem of adolescent alcohol misuse.

To understand this complex phenomenon, the psychological determinants of adolescent drinking behaviour need to be investigated. The Theory of Planned Behaviour (TPB) is one of the most commonly used models to predict drinking behaviour. This theory assumes a person's intention directly to be the antecedent of behaviour (Ajzen, 1988). *"The stronger the intention to engage in a behavior, the more likely should be its performance",* says Ajzen (1991, p.181). Thus the *intention* to drink alcohol is assumed to increase actual drinking behaviour. According to the model there are three concepts which are antecedents of this *intention*. Firstly, there is the factor *attitude*. It is based on beliefs that the individual holds about the object of the attitude, which developed due to the association of attributes toward this object (Ajzen, 1991). Regarding adolescent alcohol consumption, the *attitude* in favour of alcohol should thus increase the *intention* to use the substance. Secondly, perceived social

pressure to perform or not perform a specific behaviour is conceptualised as *subjective norm* (Ajzen, 1988). This concept can be differentiated into *injunctive* and *descriptive norms*. The first ones are the norms concerning what is perceived as others' social approval or disapproval. The latter ones describe the perception of the behaviour performed by others (Cialdini et al., 1990). With regard to adolescent alcohol use, therefore, a low perception of *subjective norm* should therefore predict high consumption of the substance. The third factor being antecedent to *intention* is the concept of *perceived behavioural control (PBC)* (Ajzen, 1991). According to Ajzen (1991) *PBC* can be used synonymously with Bandura's term *self-efficacy*, which refers to believing that one can organize and execute the courses of action (Bandura, 1997). In this current study it will be referred to Bandura's concept of *self-efficacy* and low scores on this concept are assumed to predict high alcohol use among adolescents.

There is some support for the predictive efficacy of the TPB in the field of drinking behaviour (e.g. Armitage, Conner, Loach & Willetts, 1999). McMillan and Conner (2003) reviewed several papers on the application of the TPB and ascertained *attitude, subjective norm* and *PBC* to account for an average of 41% of the variance in drinking *intention*. Furthermore, *intention* and *PBC* accounted for an average of 28% of the variance in drinking behaviour. Very similar results were yielded by research conducted by Norman, Bennett and Lewis (1998) who applied this theoretical model to undergraduate students' binge drinking behaviour. It accounted for 29% of the variance in the frequency of binge drinking. The predictive value of the different concepts of the TPB is, however, supported to different degrees (Johnston & White, 2003). There is generally stronger evidence for the link between *attitudes* and *intentions* as well as *intention* and actual behaviour, than there is for the link between *subjective norm* and *intention*. This present research investigates the concepts of the TPB and the role they are playing when it comes to adolescent alcohol consumption.

The first research question of this investigation that emerges from these considerations is as follows: To what extent do the concepts of the TPB *attitude in favour of alcohol use, subjective norm not to use alcohol, self-efficacy not to use alcohol* and *intention to drink alcohol* influence regular adolescent alcohol use and the engagement in binge drinking behaviour?

The hypotheses, which derived from the literature study concerning the cognitive determinants of the TPB, are:

H1a: We expect high scores on the cognitive determinant *attitude in favour of alcohol use,* and low scores on *subjective norm not to use alcohol* and *self-efficacy not to use alcohol* to predict high scores on adolescent *intention to usually use large amounts of alcohol and*

engage in binge drinking behaviour.

H1b: We expect high scores on the concept of adolescent *intention to use alcohol regularly and engage in binge drinking behaviour* to predict high *actual, usual adolescent alcohol consumption* and the *engagement in binge drinking behaviour.*

One of the limitations of Ajzen's TPB is the fact that it only pays attention to deliberate decisions that are made by systematic utilization of accessible information (Ajzen, 1988). Though, also external variables and unconscious psychological mechanisms which exert influence on this conscious, cognitive processing should be taken into consideration. The social context in which an adolescent grows up, could be a good starting point for the investigation of these external, unconscious variables.

The social influence that peers exert on adolescent alcohol use is a field of research that has already been intensely investigated. Jaccard, Blanton and Dodge (2005, p.135) state that *"[l]iterally thousands of studies have examined peer influence in adolescence"* and their results document the strong association between adolescent alcohol consumption and that of a friend's (Scholte et al., 2008). Thus, peer use of alcohol seems to be a crucial risk factor for the drinking behaviour of teenagers. However, this seemingly stable body of evidence can be weakened. Jaccard and colleagues (2005) inquired a close friend's influence in the context of adolescent drinking and they controlled for confounding variables such as parallel events and selection effects. They still found associations between peer and adolescent behaviour, but these effects were not strong anymore.

Thinking of an adolescent's social environment a further field of interest comes to mind: *older siblings* could be an external variable that might be able to impinge determiningly on adolescent alcohol consumption. Although brotherly and sisterly impact seems quite obvious, this field of inquiry has not gotten a lot of attention, yet. Aside from the self-evident genetic similarities, this relationship can be assumed to be significant due to its long-term nature and the shared identification with the same father and mother (Brook et al. 1988). Needle and colleagues (1986) suggest that brothers and sisters have an important and unique role beyond the influence of peers. Hence, in this present study we are especially interested in older sibling's influences impinged on adolescent alcohol use.

Argys, Averett and Rees (2006) suggest two ways in which especially older siblings affect younger brothers and sisters. On the one hand, there is the induction of the younger sibling to engage in risky behaviours, which works either by explicit introduction or directly via exposure. On the other hand, the older sibling can intentionally or unintentionally serve as a model. This latter suggestion leads to Bandura's Social Learning Theory (Bandura, 1977). It

states that people learn by observing the behaviour of others. Thus, alcohol drinking older brothers and sisters can be *risk factors* for their younger siblings by representing role models for them. The relevance of the concept of *modelling* with reference to substance use is stressed by Bandura (1977). He states that imitation plays a major role in developing and maintaining addictive behaviours. Supporting evidence for the association between sibling and adolescent alcohol use is given by some investigators (e.g. Brook, Brook, Whiteman & Gordon, 1988; D'Amico & Fromme, 1997).

In line with the first pathway, named by Argys and colleagues (2006), which constitutes the younger siblings' introduction and exposure to alcohol, the study at hand contemplates the older siblings' *alcohol favouring behaviour*. Referring to this *favouring behaviour,* it can be thought of the older sibling providing the younger one with alcoholic drinks, the joint consumption of alcohol and the older sibling taking the younger sibling along to occasions where alcohol is being drunk. We assume a set of attitudes, manifested in support and encouragement to use alcohol underlying to these aspects. Brook and colleagues (1988) called the underlying concept of these aspects *advocacy* and the results of their study showed a strong association between the older sibling's advocacy and the younger sibling's behaviour concerning drugs. Marks and colleagues (2005) conclude from the learning theory that the present social environment that provides opportunities and encouragement to drink makes the difference between moderate and problematic drinking behaviour to a certain degree. With reference to the special context of siblings' relations Needle and colleagues (1986) ascertained older siblings to play a decisive role in providing adolescents with alcohol. Our concept of the sibling's *alcohol favouring behaviour* certainly contains the concept of modelling to some extent, as well. This makes us even more expect that older siblings' *alcohol favouring behaviour* forms a *risk factor* by encouraging younger siblings, adolescents, to consume alcohol. If not further specified, throughout this paper the term *sibling* will always refer to an *older sibling*.

The research questions emerging from these previous considerations referring to siblings are as follows: To what extent do the *risk factors* of *siblings serve as alcohol favouring role model* and does *siblings' alcohol favouring behaviour* increase adolescent usual alcohol use and the engagement in binge drinking behaviour?

The hypothesis that derived from the conducted literature research with reference to older siblings are as follows:

H2: We expect high scores on the risk factors of an *siblings serving as alcohol favouring role model* and *siblings' alcohol favouring behaviour* to predict a high *usual adolescent alcohol*

consumption and *a high frequency in the engagement in binge drinking behaviour.*

Brook and colleagues (1988) examined the scarce body of literature referring to siblings' effects and concluded that generally there is evidence for siblings having more influence on alcohol use than parents do. This could mean that the siblings' impact independently accounts for the main part of the variance in adolescent drinking behaviour. Though, a competitive assumption must be taken into consideration as well: shared parental influence could explain part of this variance. Gfroerer (1987), for example, supposed that conjoint parental influences could explain part of the effects that are ascribed to siblings. Thus, we will now take a closer look at those parental aspects.

Parents affecting their children's consumption of alcohol has been subject of numerous inquiries, but results are inconsistent (Bahr, Hoffmann & Yang, 2005; Scholte et al., 2008). Especially the role that parents play as models has been investigated. A significant association between parental and adolescent alcohol consumption was, for example, documented by Van der Vorst and colleagues (2005) and by the Heidelberger Jugendgesundheitsstudie 2005 (Haffner et al., 2006). Power and colleagues (2005), however, did not detect a direct association between the drinking behaviour of parents and their offspring's, for instance. To understand this relationship and especially the complex underlying determinants further inquiry, therefore, is indicated.

Analogously to siblings' characteristics, parents' *alcohol favouring behaviour will* be investigated as well. According to Needle et al. (1986), parents play a less important role in providing adolescents with alcohol than do siblings. But due to the idea of advocacy and the share that modelling has in our concept of *alcohol favouring behaviour*, we still expect it to have influence on adolescents' drinking behaviour.

A possible protective factor is the parental *monitoring behaviour referring to alcohol use and going out at night. "When monitoring is high, teens may feel constrained to act in prosocial ways because they believe their parents are watching them and expect them to conform"* (Bahr, Hoffmann & Yang, 2005, p. 531). There is evidence for this assumption made by Bahr, Hoffmann and Yang, for parents not watching and supervising their children to have a positive association with initiation of using drugs (Svensson, 2000) and active monitoring to have a moderating effect on adolescent drinking behaviour (National Institute on Alcohol Abuse and Alcoholism, 1997). Steinberg and colleagues (1992) found the two aspects of monitoring behaviour, namely that adolescents perceive to be *attempted* by their parents and actually *successful parental monitoring,* both as factors of the dimension of

parental supervision and strictness.

Furthermore, clear rules within the family in terms of alcohol use and going out at night can suppress adolescent alcohol abuse (National Institute on Drug Abuse, 1997). Hence, in the study at hand the possible *protective factor parental rules referring to alcohol use* is taken into consideration as last aspect of the external variable represented by parents.

The research questions that derive from the just conducted literature study is formulated as follows: To what extent do the *risk factors* of parents *serving as alcohol favouring role models* and parents' *alcohol favouring behaviour* influence regular adolescent alcohol use and engagement in binge drinking? To what extent do the *protective factors parental monitoring behaviour* and *rules referring to alcohol use* influence regular adolescent alcohol use and engagement in binge drinking behaviour?

The hypotheses tested by means of this study that concern parents are as follows:
H3a: We expect high scores on the risk factors of parents *serving as alcohol favouring role models* and parents' *alcohol favouring behaviour* to predict high *usual adolescent alcohol consumption* and *a high frequency in the engagement in binge drinking behaviour.*
H3b: We expect high scores on the protective factors *parental monitoring behaviour and rules referring to adolescent alcohol use and going out at night* to predict a low *usual adolescent alcohol consumption* and *a low frequency in the engagement in binge drinking behaviour.*

In summary, the purpose of this study is to investigate the *cognitive determinants* of the TPB, as well as risk factors and protective factors represented by the external variables of *older siblings* and *parents* as predictors of *the amount of alcohol usually consumed by adolescents* and *adolescent binge drinking behaviour.*

2. Method

Participants and Procedure

A total of 109 students in four classes of the fifth year at a rural secondary school in Wertingen, Southern Germany, took part in the survey. The data of 107 respondents could be used for further analysis. The survey was administered by the same teacher for all four classes in the mornings of two sequent days. Additionally, the teacher of the current lesson was present. The assessment was conducted by means of an anonymous self-report questionnaire with 72 questions, which was composed specially for this study (see Appendix). On its first

page there was an explanation about the study's objective and instructions for how to fill in the questionnaire. To assure anonymity the students were provided with adhesive envelopes into which the completed form could be returned. The completion took about 15 minutes.

Measures

The measures of this study included assessments of demographic variables, alcohol use and social cognitive variables derived from the Theory of Planned Behaviour as well as sibling and parental characteristics. These assessments are described in detail in the following paragraphs.

Demographic variables

Several *demographic variables* were determined. To begin with, gender and age of the adolescent and the older sibling were assessed (1=female; 2=male / age in years; 0=no older sibling). Furthermore it was investigated if the older sibling still lived at home (1=yes; 2=no; 0=no older sibling). Concerning the parental aspects, the demographic variable assessed in this study was the living situation, whether the adolescent lived with both parents (1), with the mother (2) or the father (3), or under other circumstances (4, *to be specified*).

Alcohol use was assessed by three indicators. Firstly the respondents were asked at what age they had consumed alcohol for the first time. If they had not drunk alcohol before, they could answer *„I have never drunk alcohol"* and were coded „0". Secondly, to determine their binge drinking behaviour, the respondents had to indicate the number of times they had drunk 5 or more glasses of alcoholic beverage in a row during the previous month. Thirdly they were asked about the number of glasses of alcoholic drinks they usually consumed.

Variables of the TPB

Attitude in favour of binge drinking was measured with 5 items on a 7 point semantic differential scale. The respondents were asked to evaluate the statement *„If I drank more than 5 glasses of alcoholic drinks in a row in the future, I think it would be..."* on the basis of the five opposed pairs of adjectives: „*bad* (1)*...good* (7)*"; „not ok* (1)*...ok* (7)*"; „unreasonable* (1)*...reasonable* (7) *"; „not cool* (1) *...cool* (7) *"* and *„not normal* (1)*...normal* (7) ". Hence, high scores on this variable indicated the advocacy of binge drinking. The alpha scores for the scale measuring the concept of *attitude* were .88.

For the assessment of *subjective norm not to binge drink* we asked for the evaluation of eight statements about the (dis-)approval of the respondent's binge drinking behaviour by siblings, friends, parents and classmates, respectively, (e.g. *„My friends think that I should not drink more than 5 glasses of alcoholic drinks in one evening"*), standing for their

normative beliefs, and the respondent's *motivation to comply*, represented by the appraisal of the siblings', friends', parents' and classmates' opinion *(e.g. „I take my friends' opinion to heart")*. The eight statements were to be rated on a 5-point Likert scale (*normative beliefs:* -2=strongly disagree...2=strongly agree; *motivation to comply:* 1=strongly disagree...5=strongly agree). Subjective Norm was computed by multiplying the specific normative beliefs with the corresponding indicators of their motivation to comply Coefficient alpha for *subjective norm with regard to binge drinking* was .71 in our sample.

Self-efficacy not to binge drink was measured on the basis of three further declarative sentences about the confidence in abstaining from alcohol under differing circumstances (*„It's easy for me not to drink more than 5 glasses of alcoholic drinks when my friends drink more than 5 glasses of alcoholic drinks."; „It's easy for me to reject alcohol when it is offered to me"; „It would be easy for me never to drink more than 5 glasses of alcoholic drinks in one evening again").* A 5-point Likert scale was used (1=strongly disagree... 5=strongly agree). The items formed a poorly reliable scale (α = .60).

Intention to engage in binge drinking was assessed by the evaluation of three statements on basis of a 5-point Likert scale ranging from *„strongly disagree"* to *„strongly agree"*: *„I intend to / I expect to / I want to drink more than 5 glasses of alcoholic drink in one evening in the future".* A reliable scale was formed by these three items (α = .92).

Siblings' Characteristics

Since the influence older siblings have on their younger *siblings' drinking behaviour* is in the particular interest of this study students were asked if they had older siblings. If this was not the case they answered *„I don't have an older sibling",* which was coded „0". If they had older siblings, they were requested to answer the following questions with reference to the older sibling they felt closest to and/or spend most time with. *Siblings' alcohol use* was investigated by asking the respondents to estimate three indicators: the number of times the older sibling had drunk more than 5 glasses of alcoholic drinks in a row during the previous month; the number of glasses the sibling usually drinks; the age at which the sibling had drunk alcohol for the first time. Referring to ever having drunk alcohol, the respondents had the possibility to answer *„I don't know."* (0). *Siblings' alcohol favouring behaviour* was measured with a three-item scale (α = .91): *„I often drink alcohol with my older sibling", „My older sibling often takes me along to friends, parties or the like" and „My older sibling often offers me alcohol"*. The possibility of rating from *„strongly disagree"* to *„strongly agree"* on a 5-point Likert scale was provided.

Parental Characteristics

Parental drinking behaviour was indicated by the respondents' estimation of the number of times their parents had drunk more than 5 glasses of alcoholic drinks in a row during the previous month and the number of glasses they usually drink. *Parental alcohol favouring behaviour* was assessed with three items (α = .80): *„I often drink alcohol with my parents ", „My parents often take me along to occasions where alcohol is being drunk" and „My parents often offer me alcohol"*. Again a 5-point Likert scale was applied (1=strongly disagree... 5=strongly agree). *Attempted parental monitoring with regard to binge drinking* was investigated by asking the respondents to indicate in what sense parents *try* to know about three aspects of *going out at night* and *drinking alcohol*: *„To what extent do your parents attempt to know where you are going to at night / how much alcohol you drink / if you drunk alcohol without permission?"*. Response options for these items were: *„They don't try at all"* (1)*; „They try a bit"*(2)*; „They try a lot"*(3). The alpha scores were .67 for our sample. *Successful parental monitoring with regard to binge drinking* was examined by the respondents' perception of the extent to what parents *actually* know about these aspects (*„To what extent do your parents actually know where you are going to at night/ how much alcohol you drink / if you drunk alcohol without permission?"* - „*They don't know at all*" (1); *„They know a bit"* (2); *„They know well"* (3)). The alpha scores for *successful parental monitoring with regard to binge drinking* were .69. *Parental rules* were referred to by the last two items of the questionnaire (α = .81). The respondents were asked about the appraisal and their compliance of permanent rules made by their parents (*„Are permanent rules, made by your parents, regarding to ‚going out at night' and ‚drinking alcohol', alright for you?"; „Do you always comply with rules regarding to ‚going out at night' and ‚drinking alcohol'?")*. A 5-point Likert scale was offered again (1=strongly disagree... 5=strongly agree).

Data Analysis

Firstly, we computed descriptive statistics and analysed gender differences concerning several demographic variables, variables of the TPB, sibling's characteristics and parental characteristics. Independent sample t-tests were used for this purpose. Secondly we conducted bivariate correlation analyses to assess the relations between the TPB variables *attitude in favour of binge drinking, subjective norm against binge drinking, self-efficacy not to binge drink* and the *intention to binge drink*. Furthermore, we examined the intercorrelations between the indicators for adolescent alcohol use, *age of first alcohol use, frequency of binge drinking* and *usually consumed number of glasses*, and the TPB variables, the sibling's

characteristics and parental characteristics. Also the correlations between those siblings' and parents' characteristics were analysed, which both had significant associations with the two indicators for adolescent alcohol use. Thirdly, the variables which correlated significantly with adolescent *binge drinking frequency* and *usually consumed number of glasses* were to be included in simultaneous regression analyses. Finally, variables significantly correlating with adolescents' *binge drinking frequency* were analysed by means of a hierarchical regression analysis. We analysed the data by using the statistical program SPSS version 16.0 for Windows. The student population allowed us to assume a normal distribution on our research question.

3. Results

Descriptive Statistics

Several demographic variables were analysed. In Table 1 the particular frequencies and percentages concerning *gender, age,* the *adolescents' living situation,* the *number of siblings* and the *older sibling's living situation* of boys and girls can be found. This table also contains the absolute and relative numbers of girls and boys who engaged in binge drinking at least once within the previous month and reported to drink at least one alcoholic drink on a regular basis.

Table 1: Frequencies and Percentages of Demographic Variables of Boys and Girls

	Demographic Variables of the Sample (N = 107)			
	Boys		Girls	
	n	%	n	%
Gender	58	54.2	49	45.8
Age				
14	11	19.0	12	24.5
15	43	74.1	31	63.3
16	3	5.2	6	12.2
17	1	17		
Living Situation				
With Parents	50	86.2	42	87.5
With Mother	7	12.1	6	12.5
With Father	1	1.7		
Number of Siblings				
0	31	53.4	26	53.1
1	23	39.7	19	38.8
2	3	5.2	2	4.1
3	1	1.7		
4			2	4.1

(Table continues)

Table 1 *(continued)*

	Boys		Girls	
	n	%	n	%
Sibling's Living Situation				
At Home	23	39.7	16	32.7
Not at Home	2	3.4	5	10.2
No Older Sibling	31	53.4	26	53.1
Binge Drinker?				
Yes	36	62.1	18	36.7
Regular Drinker?				
Yes	54	93.1	48	98.0

About 46% of the sample were girls and the mean age of the respondents was 15 years, ranging from 14 to 17 years, with only one boy aged 17. The majority of the male and female adolescents lived with both parents (86.2% and 87.5%, respectively). About 53% percent of the boys and girls had no older sibling. 92% of the boys and about 76% of the girls with older siblings lived together with them. Among the boys 62.1% and among the girls 37.5% had engaged in binge drinking behaviour during the previous month (see Table 1). The maximum frequency of binge drinking within one month for boys and girls was six times. 93.1% of the male and even 98.0 % of the female adolescents reported the usual consumption of at least one alcoholic drink (see Table 1). The reported maximum number of usually consumed glasses was 9 for the boys and 15 for the girls.

Alcohol Use of the Adolescents, Siblings and Parents

Table 2 shows mean scores and standard deviations on adolescent alcohol use. The data indicate a rather young age of first alcohol consumption (12 years) and a considerable frequency of binge drinking of about one time per month, and a mean of three glasses of alcohol on a usually consumed by adolescents. Furthermore Table 2 contains descriptive statistics on siblings' and parents' alcohol use.

Table 2: Mean Scores and Standard Deviations of Alcohol Use of Boys and Girls, their Siblings' Alcohol use and their Parents' Alcohol Use

	Alcohol Use of the Adolescents (N = 107)	
Variable	Boys	Girls
Age of First Alcohol Consumption	11.65 (1.78)	12.10 (1.62)
Frequency of Binge Drinking per Month	1.36 (1.53)	0.90 (1.61)
Usually Consumed Nr. of Glasses	2.97 (2.08)	3.21 (2.99)

(Table continues)

Table 2 *(continued)*

Siblings' Alcohol Use (N = 50)

Variable	Boys	Girls
Age of First Alcohol Consumption	12.53 (1.78)	12.67 (2.57)
Frequency of Binge Drinking per Month	2.54 (2.30)	1.90 (2.57)
Usually Consumed Nr. of Glasses	4.39 (2.74)	3.71 (3.58)

Boys' and Girls' Parents' Alcohol Use (N = 107)

Variable	Boys	Girls
Frequency of Binge Drinking per Month	1.47 (2.96)	1.55 (3.25)
Usually Consumed Nr. of Glasses	2.57 (1.22)	3.05 (1.71)

By means of a univariate analysis of variance, significant differences could be detected between the adolescents' *usually consumed number of glasses* and their higher estimates of the *siblings' usually consumed number of glasses*, $F(2, 134) = 7.75$, $p < .01$. No significant differences were found concerning their own *frequency of binge drinking* and their estimates for the *siblings' binge drinking frequency* and *age of first alcohol consumption*. Furthermore the univariate analysis of variance detected no significant differences regarding the adolescents' own alcohol use and the estimation of their parents' alcohol use.

Variables of the TPB referring to Alcohol Use

The mean scores and standard deviations on the variable of the TPB with reference to boys' and girls' binge drinking behaviour are shown in Table 3.

Table 3: Mean Scores and Standard Deviations of TPB Variables of Boys and Girls referring to Alcohol Use

TPB Variables of the Sample (N = 107)

Variable	Boys	Girls
Attitude in favour of Binge Drinking (1 – 7)	3.50 (1.36)	3.20 (1.31)
Subjective Norm against Binge Drinking (-10 – 10)	-.34 (2.76)	-.26 (3.59)
Self-Efficacy not to Binge Drink (1 – 5)	3.90 (.84)	3.97 (.83)
Intention to Binge Drink (1 – 5)	3.23 (1.17)	2.94 (1.34)

Possible gender differences were taken into consideration, which altogether were not significant. Referring to the variable *attitude in favour of binge drinking* the mean scores indicated a slightly negative point of view towards excessive alcohol use. The mean scores on *subjective norm against binge drinking* showed that adolescents were little aware of social pressure not to binge drink and/or did not comply with social norms. On average the adolescents' scores on the variable *self-efficacy not to binge drink* implied a moderate to good confidence in the ability to refrain from binge drinking. The boys' and girls' *intention to binge drink* was rather neutral.

Siblings' and Parents' Characteristics

The scores on one risk factor represented by a siblings' characteristic were analysed (see Table 4). The adolescents scored lowly on the variable of *siblings' alcohol favouring behaviour*, implying very little to no perceived actions that would reveal a sibling's advocacy of alcohol.

Table 4: Mean Scores and Standard Deviations of Older Siblings' and Parents' Characteristics of Boys and Girls

Siblings' Characteristics of the Sample (N = 50)		
Variable	Boys	Girls
Siblings' Alcohol Favouring Behaviour (1 – 5)	2.08 (1.12)	1.74 (.99)
Parents' Characteristics of the Sample (N = 107)		
Variable	Boys	Girls
Parents' Alcohol Favouring Behaviour (1 – 5)	1.95 (.77)	2.11 (.84)
Attempted Parental Monitoring (1 – 3)	2.39 (.53)	2.22 (.55)
Successful Parental Monitoring (1 – 3)	2.21 (.57)	2.14 (.56)
Rules ref. to Adol. Alcohol Use (1 – 5)	2.70* (1.19)	3.17* (.96)

*$p < 0.05$.

Table 4 also contains the descriptive statistics of parents' characteristics of boys and girls. On average the concept of *parental alcohol favouring behaviour* was scored on lowly by the adolescents. Furthermore *attempted parental monitoring* and *successful parental monitoring* had moderately high scores, implying parents to considerably engage in monitoring behaviour.

The analyses with reference to gender differences concerning descriptive statistics about variables of the TPB (see Table 3), siblings' characteristics (see Table 4) and parents' characteristics (see Table 4) revealed no significance with the exception of the parental variable *rules referring to adolescent alcohol use and going out at night*. The girls scored significantly higher on this variable than boys and revealed a more positive approval and higher motivation to comply with these rules ($t(102) = -2.18$; $p < .05$).

Bivariate Correlations between the Indicators for Adolescent Alcohol Use and the Variables of the TPB

To test our hypotheses and decide which variables to include in regression analyses, bivariate correlation analyses were conducted on the relations of the indicators for adolescent alcohol use among themselves and their associations with variables of the TPB. In Table 5 the corresponding data can be found.

The age of first alcohol consumption had no significant association with the other two indicators for alcohol use, *frequency of binge drinking* and *usually consumed number of glasses*. But a highly significant and positive relation between these two latter variables could be detected.

The results of the bivariate correlation analysis on the relation between the TPB variables being antecedent to *intention to binge drink* demonstrated a significant correlation with this *intention to binge drink* on a significance level of alpha = 0.01. According to our expectation, there was a positive correlation between *attitude in favour of binge drinking* and *the intention to binge drink. Subjective norm against binge drinking* and *self-efficacy not to binge drink* correlated significantly and negatively with the *intention to binge drink* (see Table 5).

Table 5: Intercorrelations between Indicators for Adolescent Alcohol Use, between Variables of the TPB and between Indicators for Adolescent Alcohol Use and Variables of the TPB (N = 107)

	Age of First Alcohol Consumption	Frequency of Binge Drinking per Month	Usually Consumed Nr. of Glasses	Intention to Binge Drink
Age of First Alcohol Consumption	-	.04	-.09	-.16
Frequency of Binge Drinking per Month		-	.49**	.52**
Usually Consumed Nr. of Glasses			-	.55**

(Table continues)

Table 5 *(continued)*

	Age of First Alcohol Consumption	Frequency of Binge Drinking per Month	Usually Consumed Nr. of Glasses	Intention to Binge Drink
Attitude in Favour of Binge Drinking	-.17	.50**	.60**	.77**
Subjective Norm against Binge Drinking	-.17	-.25*	-.39**	-.46**
Self-Efficacy not to Binge Drink	.02	-.27**	-.25**	-.35**

*p < 0.05. **p < 0.01.

Thus, these results confirm our first hypothesis H1a, which states that high scores on the cognitive determinant *attitude in favour of alcohol use*, and low scores on *subjective norm not to use alcohol* and *self-efficacy not to use alcohol* predict high scores on adolescent *intention to drink alcohol.*

There was no significant correlation between the variable *intention to binge drink* and the *age of first alcohol consumption*. But in accordance with our expectation the correlations between *intention to binge drink* and *frequency of binge drinking* and *usually consumed number of glasses* were significant. Hence, our second hypothesis H1b, which stated that high scores on the concept of *intention to binge drink* predict high actual adolescent alcohol consumption, is confirmed as well.

Bivariate Correlations between Siblings' Alcohol Use and Adolescent Alcohol Use

Next the intercorrelations between siblings' alcohol use and adolescent alcohol use were examined. Table 6 contains the particular data.

Table 6: Intercorrelations between Adolescent Alcohol Use and Older Sibling's Alcohol Use and Older Sibling's Characteristics (N = 50)

	Siblings' Age of First Alc. Consumption	Siblings' Frequency of Binge Drinking per Month	Siblings' Usually Consumed Nr. of Glasses	Siblings' Alcohol Favouring Behaviour
Age of First Alcohol Consumption	.56**	- .19	- .14	- .20
Frequency of Binge Drinking per Month	.02	.54**	.59**	.44**
Usually Consumed Nr. of Glasses	.13	.45**	.51**	.47**

**p < 0.01.

The *siblings' age of first alcohol consumption* showed no significant correlation with

the adolescents' *frequency of binge drinking* and *usually consumed number of glasses*. On a significance level of alpha = .01, adolescents' *age of first alcohol* was significantly correlated with the *siblings' age of first alcohol use*. The *siblings' frequency of binge drinking* and the *siblings' usually consumed number of glasses* were highly significantly and positively correlated with the adolescents' *frequency of binge drinking* and *usually consumed number of glasses*. The *siblings' alcohol favouring behaviour* was also positively correlated with adolescents' *frequency of binge drinking* and *usually consumed number of glasses*, on a significance level of alpha = 0.01 (see Table 6). According to these results of the data analysis hypothesis H2 is confirmed. This hypothesis stated that the risk factors represented by older siblings increase adolescent alcohol consumption.

Bivariate Correlations between Parents' Alcohol Use and Adolescent Alcohol Use

With regard to parents' alcohol use, the relation between their *binge drinking frequency* and *usually consumed number of glasses* and the adolescents' indicators of alcohol use were analysed (see Table 7).

Table 7: Intercorrelations between Adolescent Alcohol Use and Parents' Alcohol Use and Parents' Characteristics (N = 107)

	Parents' Frequency of Binge Drinking per Month	Parents' Usually Cons-umed Nr. of Glasses	Parents' Alcohol Favouring Behaviour	Parents' Attempted Monitoring	Parents' Successful Monitoring	Rules ref. to Adol. Alcohol Use
Age of First Alcohol Consumption	-.08	-.13	- .33**	- .02	.06	.01
Frequency of Binge Drinking per Month	.25*	.11	.10	- .08	- .05	-.17
Usually Consumed Nr. of Glasses	.23*	.52**	.20*	- .19	- .23*	-.28**

*p < 0.05. **p < 0.01.

On a significance level of alpha = 0.05, the parental *binge drinking frequency* was positively correlated with the adolescents' *binge drinking frequency* and *usually consumed number of glasses*. Parents' *usually consumed number of glasses,* revealed a highly significant correlation with adolescents' *usually consumed number of glasses*. Table 10 shows the highly significant and negative correlations between *parents' alcohol favouring behaviour* and the *age of first alcohol*. The *adolescents' usually consumed number of glasses* was significantly correlated with the following parental characteristics: positively with *parents' alcohol favouring behaviour,* negatively with *parents' successful monitoring* and negatively with

rules referring to adolescent alcohol use and going out at night. Hypotheses H3a and H3b thus are confirmed, since parental risk factors were demonstrated to go along with an increase of adolescent alcohol use and parental protective factors with a decrease in adolescent alcohol use.

Furthermore, to find out about the differences or similarities in parents' influence on adolescents and siblings, we examined the bivariate correlations between those of the siblings' and parents' characteristics that had both been significantly correlated with the indicators for adolescent alcohol use. These characteristics were siblings' and parents' *binge drinking frequency, usually consumed number of glasses* and *alcohol favouring behaviour*. The results of the correlation analysis can be found in Table 8.

Table 8: Intercorrelations between Siblings' and Parents' Characteristics (N = 50)

	Siblings' Frequency of Binge Drinking per Month	Siblings' Usually Consumed Nr. of Glasses	Siblings' Alcohol Favouring Behaviour
Parents' Frequency of Binge Drinking per Month	.30*	.29*	.05
Parents' Usually Consumed Nr. of Glasses	.40**	.31*	.24
Parents' Alcohol Favouring Behaviour	.29	.14	.46**

*p < 0.05. **p < 0.01.

Siblings' and parents' *binge drinking frequency* and *usually consumed number of glasses* were significantly to highly significantly intercorrelated among each other. Also siblings' and parents' *alcohol favouring behaviour* was significantly associated on a significance level of .01.

Predictive Power of Parental Characteristics, Siblings' Characteristics and Variables of the TPB with regard to Usually Consumed Number of Glasses

To examine the particular predictive power of the parental characteristics, the siblings' characteristics and the variables of the TPB, simultaneous regression analysis were conducted for the part of the sample with an older sibling. The previous bivariate correlation analysis had revealed the variables which significantly correlated with the dependent variable and thus were included in these analyses. Table 9 shows the results of these analyses. No significant correlations with any of the demographic variables had been detected and therefore none of these variables were included in any of the following analyses.

Table 9: Summary of Simultaneous Regression Analyses for Variables Predicting Adolescents' Usually Consumed Number of Glasses

Variable	β
Parents' Characteristics (N = 50)	
Model 1	
Parents' Usually Consumed Nr. of Glasses	.59*
Parents' Binge Drinking Frequency per Month	.04
Parents' Alcohol Favouring Behaviour	.14
Parents' Successful Monitoring	-.15
Rules referring to Adolescent Alcohol Use	-.19*
Siblings' Characteristics (N = 50)	
Model 2	
Siblings' Binge Drinking Frequency per Month	.09
Siblings' Usually Consumed Nr. of Glasses	.23
Siblings' Alcohol Favouring Behaviour	.17
Variables of the TPB (N = 50)	
Model 3	
Attitude in favour of Binge Drinking	.05
Subjective Norm against Binge Drinking	.04
Self-Efficacy not to Binge Drink	.12
Intention to Binge Drink	.21

Note. R^2= .35 for Model 1; R^2 = .32 for Model 2; R^2 = .43 for Model 3.
*p < 0.05.

Parental Characteristics

The first model contained the parental characteristics *parents' usually consumed number of glasses, parents' binge drinking frequency, parents' alcohol favouring behaviour* and *rules referring to adolescent alcohol use and going out at night,* which had correlated significantly with the dependent variable of adolescents' *usually consumed number of glasses*. The regression analysis showed a significant amount of explained variance, (R^2 = .35), F (5, 41) = 4.39, p < .01. The relation between *parents' usually consumed number of glasses* and *adolescents' usually consumed number of glasses* was highly significant (β = .59). On an alpha level of .05, the relation between the independent variable *rules referring to adolescent alcohol use* and the dependent variable were significant as well, in a negative direction (β = -.19).

Siblings' Characteristics

The second model of the siblings' characteristics had a significant R^2 as well (R^2 = .32), F (3, 40) = 6.30, p < .01. The three variables *siblings' binge drinking frequency, siblings' usually consumed number of glasses* and *siblings' alcohol favouring behaviour* showed nonsignificant associations with adolescents' *usually consumed number of glasses*.

Variables of the TPB

The variables of the TPB, *attitude in favour of binge drinking, subjective norm against binge drinking, self-efficacy not to binge drink* and *intention to binge drink,* were included in the third model and a third simultaneous regression analysis was conducted. Again a significant amount of explained variance was demonstrated, (R^2 = .43), F (4, 44) = 8.14, p < .01. None of the variables of the TPB had a significant regression coefficient.

Predictive Power of Parental Characteristics, Siblings' Characteristics and Variables of the TPB with regard to Adolescent Binge Drinking Frequency

With regard to the dependent variable of adolescent binge drinking frequency simultaneous regression analyses and a set of hierarchical regression analyses were conducted. Again only the data of the respondents with an older sibling were used. The results of the simultaneous regression analyses are shown in Table 10.

Table 10: Summary of Simultaneous Regression Analyses for Variables Predicting Adolescents' Binge Drinking Frequency per Month

Variable	β
Parents' Characteristics (N = 50)	
Model 1	
Parents' Binge Drinking Frequency per Month	.16**
Siblings' Characteristics (N = 50)	
Model 2	
Siblings' Binge Drinking Frequency per Month	.12
Siblings' Usually Consumed Nr. of Glasses	.12
Siblings' Alcohol Favouring Behaviour	.15*
Variables of the TPB (N = 50)	
Model 3	
Attitude in favour of Binge Drinking	.05
Subjective Norm against Binge Drinking	-.02
Self-Efficacy not to Binge Drink	.08
Intention to Binge Drink	.15

Note. R^2= .20 for Model 1; R^2 = .46 for Model 2; R^2 = .39 for Model 3.
*p < 0.05.

Parents' Characteristics

The parental factor *parents' binge drinking frequency* per month showed a significant amount of explained variance, (R^2 = .20), F = (1,46) = 11.58, p < .01. The variable had a highly significant correlation coefficient (β = .16), which indicated its high predictive power.

Siblings' Characteristics

Siblings' binge drinking frequency, usually consumed number of glasses and alcohol favouring behaviour were included in the second model and revealed a significant, large amount of explained variance ($R^2 = .46$), $F(3,40) = 11.33$, $p < .01$. The variable of siblings' alcohol favouring behaviour had the greatest predictive power of the three variables with a significant regression coefficient of .15 on a significance level of .05.

Variables of the TPB

The third model contained the four variables of the TPB with regard to adolescent binge drinking behaviour. R^2 was .39 and significant, $F(4, 44) = 7.15$, $p < .01$. None of the variables had a significant correlation coefficient.

To find out about the *relative* predictive power of these three models, hierarchical regression analyses were conducted on the dependent variable adolescents' *frequency of binge drinking* per month. Hence, parents' characteristics were entered into the first step of the regression equations, siblings' characteristics into the second and variables of the TPB into the third. Table 11 contains the results of this set of analyses.

Table 11: Summary of Hierarchical Regression Analyses for Variables Predicting Frequency of Adolescent Binge Drinking per Month

	Model 1 N = 50	Model 2 N = 50	Model 3 N = 50
	β	β	β
Parents' Binge Drinking Frequency per Month	.16**	.12**	.16**
Sibling's Binge Drinking Frequency per Month		.07	-.06
Sibling's Usually Consumed Number of Glasses		.12	.11
Sibling's Alcohol Favouring Behaviour		.18**	.24**
Attitude in Favour of Binge Drinking			-.03
Subjective Norm against Binge Drinking			-.12**
Self-Efficacy not to Binge Drink			-.18**
Intention to Binge Drink			.07

Note. $R^2 = .23$ for Model 1; $\Delta R^2 = .43$ for Model 2; $\Delta R^2 = .15$ for Model 3.
*p < 0.05. **p < 0.01.

Significant positive associations were observed between the parental characteristics of *parents' binge drinking frequency* and *adolescent binge drinking frequency* in the first model

of the regression analyses (β = .16), on a significance level of .01. The amount of explained variance was significant as well (R^2 = .23), F (1,40) = 11.95, p < .01. The addition of siblings' characteristics in the second model of the analyses resulted in a large significant increment in the amount of explained variance, (ΔR^2 = .43), F (4, 37) = 17.74, p < .01. Parents' binge drinking frequency still showed a highly significant positive association with the dependent variable in model 2 (β = .12). Among the siblings' characteristics variables *siblings' alcohol favouring behaviour* revealed a highly significant association with *adolescent binge drinking frequency* and therby the greatest predictive power of siblings' variables (β = .18). In the next step *parents' binge drinking frequency* and *siblings' alcohol favouring behaviour* still revealed highly significant associations. In this third model, the addition of the variables of the TPB resulted in a significant but smaller increase in R^2 (ΔR^2 = .15), F (8, 33) = 16.86, p < .01. The variables *subjective norm* against binge drinking and *self-efficacy not to binge drink* were highly significant predictors of the dependent variable (β = -.12, β = -.18, respectively).

4. Discussion

Conclusions and Implications

The aim of this study was to examine the associations between the variables of parental alcohol use and characteristics, siblings' alcohol use and characteristics as well as cognitive variables of the TPB and the indicators for adolescent alcohol use chosen for this study. These indicators were *age of first alcohol consumption, adolescent binge drinking behaviour* and number of usually consumed glasses.

With respect to our sample, the indicator of adolescents' *age of first alcohol consumption* turned out to be of little explanatory value. Due to previous research, which detected an association between the age of first alcohol consumption and later addiction (DeWitt et al., 2000) we included this indicator in our investigation. If we assume current adolescent drinking habits to have predictive power with regard to the development of an addiction, however, the missing correlation between *age of first alcohol consumption* and the two other obviously more meaningful indicators for alcohol use, *frequency of binge drinking* and *usually consumed number of glasses*, failed to complement DeWitt and colleagues' finding. The only statistically significant associations of adolescents' *age of first alcohol consumption* could be detected with regard to *siblings' age of first alcohol* and *parents' alcohol favouring behaviour*. Since adolescents' as well as siblings' first contact with alcohol can quite possibly have been a singular event, the informative value of these associations is

arguable. To clarify the meaningfulness of this indicator and with it, the interpretation of the found signficant correlations, information would be needed whether first contact with alcohol was the beginning of regular drinking behaviour.

Consistent with previous findings (BZgA, 2008), we collected evidence that a substantial part of our student sample regularly consumed alcohol and a smaller but still considerable proportion engaged in binge drinking. Compared to the data gathered by the BZgA (2008), the boys of the sample of our study engaged in binge drinking almost three times as often and the girls reported more than twice the frequency of binge drinking. Though, it should be mentioned that the sample of this study was mainly aged 14 to 15 and the sample of the BZgA also included adolescents at the age of 12 to 13, among which alcohol use could be less common. Our data clearly imply that alcohol use and misuse is prevalent among adolescents aged 14 to 15 and that this age group represents an important target for preventive interventions to reduce alcohol abuse.

Our hypotheses referring to the variables of the TPB could be confirmed, which is consistent with the literature (e.g. Armitage, Conner, Loach & Willetts, 1999) and provides further support for the application of this theoretical model in the view of adolescent alcohol use. In repect of the *number of glasses* of alcoholic drinks *usually consumed by adolescents*, the variables of the TPB could account for 43% of the explained variance. Alongside the external factors included in our study, these cognitive variables could explain only 15% of the variance in *adolescent binge drinking behaviour*. *Self-efficacy not to binge drink* and *subjective norm against binge drinking* had significant predictive power (see Table 11). The significance of the latter concept, *subjective norm against binge drinking*, indicates the relevance of the social context in view of adolescent alcohol use.

With regard to the hypotheses concerning siblings' influences, again in accordance with previous findings (e.g. Brook, Brook, Whiteman & Gordon, 1988; D'Amico & Fromme, 1997), we could find convincing evidence for our hypothesized assumptions. A *sibling's binge drinking frequency,* its *usually consumed number of glasses* and its *alcohol favouring behaviour* was highly significantly associated with our two indicators for adolescent alcohol use. The simultaneous regression analysis showed a substantial amount of variance in adolescent *binge drinking behaviour* that was explained by these three characteristics of siblings (see Table 10). *Siblings' alcohol favouring behaviour* turned out to be the factor with most predictive power among the three variables. This was also the case in the hierarchical regression analysis. In the third model, in which all predictive variables were taken together, *siblings' alcohol favouring behaviour* was the variable with more predictive power than all

the other variables (see Table 11). These findings emphasize the relevance of the social context adolescents grow up in, with reference to alcohol use. Furthermore the importance of the role that active advocacy of alcohol, for example offering the substance to the adolescent, plays with regard to adolescent binge drinking is demonstrated. By means of simultaneous regression analysis, it was shown that *siblings' binge drinking frequency*, *usually consumed number of glasses* and *alcohol favouring behaviour* were also able to explain a quite large proportion, more than 30%, of the variance in the amount of *alcohol usually consumed* by adolescents (see Table 9). Accordingly, these results offer further support for the high importance of the role older brothers and sisters play with regard to adolescent drinking behaviour. Hence, the need to take this external factor into consideration when creating interventions targeted at the restriction of adolescent alcohol consumption is indicated. The focus of drug prevention programs has lain on school programs directed at peers (Gorman, 1997), but the growing evidence of siblings' influence should initiate the extension of this focus.

Therefore, we need to know to what extent there is a difference between the influence exerted on adolescent alcohol use by peers and siblings. If the exertion of this influence does not appear to differ, with regard to contents, intervening actions could be the same for peers and older siblings. At this point, the differentiation of peers and siblings would be needed to answer the question in how far siblings *are* peers.

As for the understanding of the manner *siblings* influence adolescents, our study has figured out the following. Factors of a sibling's drinking behaviour and *alcohol favouring behaviour* were highly significantly and positively associated with adolescent alcohol use. Accordingly, siblings' alcohol related *behaviour* that actively influences the adolescent's alcohol related behaviour and is passively modelled on by the adolescent, could be a promising target of preventive interventions. For that purpose, for instance, focussing on knowledge and attitude of the older siblings could help to modify their own drinking behaviour and thus indirectly the younger sibling's drinking behaviour. Another approach could be to directly inform older siblings about their influence on their younger siblings' drinking behaviour, the manner of this influence and possibilities to modify it in a positive way.

Regarding to parental alcohol use and characteristics, our study could also confirm the hypothesized assumptions made about the supposed parental risk factors and protective factors. The statistical analyses proved significant positive associations between *parental binge drinking frequency* and *adolescent binge drinking frequency*. Furthermore adolescents'

usually consumed number of glasses was significantly and positively correlated with the parental risk factors and significantly and negatively correlated with the parental protective factors. The only exception was *parents' attempted monitoring*, which showed a negative but nonsignificant association with adolescents' *usually consumed number of glasses*. The simultaneous regression analyses showed that parental characteristics were able to explain 20% and 35% of the variance in adolescent *binge drinking behaviour* and their *usually consumed number of glasses*, respectively. The importance of parental aspects to be included in preventive actions is thereby proven. Interventions with the focus on the facilitation of communication between parents and adolescents regarding responsible handling of alcohol could be suggested. When it comes to parents making rules as intervening action to reduce adolescent alcohol use, the gender difference in appraisal of these rules and motivation to comply should be taken into consideration (see Table 4). Perhaps the boys' appraisal and motivation to comply could be improved by an adjusted manner of parent-child communication.

To refer to the shared influences of siblings within one family, which were assumed by Gfroerer (1987), the intercorrelations between parents' and siblings' characteristics were examined and found to be significant (see Table 8). This makes us suppose that the associations between siblings' characteristics and adolescents' alcohol use might be explained by common parental influences. Though, the hierarchical regression analysis reveals a clearly independent exertion of influence by siblings above that of parents' (see Table 11). And this regression analysis offered us support for Brook and colleagues' (1988) finding about the greater influence of siblings compared to parents , too.

Limitations of the Study

This study has several limitations. To begin with, the generalizability of our findings is arguable, since demographic variables, drinking rates and other background variables can vary in a number of aspects. Regarding to that, Wechsler and colleagues (1994) mentioned the variation along several dimensions like institutional selectivity, region of the country and aspects like rural versus urban area. Haffner et al. (2006) found significant differences between drinking behaviour of students from bigger cities and rural areas with higher levels of alcohol consumption with regard to the latter. Furthermore the study has not controlled for demographic variables like SES, ethnicity and religion, which could exert influence on adolescent alcohol use. Due to the regional features, however, with respect to these issues, the

composition of the sample was assumed to be rather homogeneous. The internal comparability and hence the ability to ascribe effects on variable on dependent variables to the explanatory factors should therefore have been warranted. Yet, the generalizability could, at the same time, be diminished. Of course the small sample size of 107 respondents, and with respect to older siblings' variables 50 respondents, limits the validity and reliability of the results of our study additionally.

Further, the requirement of ecological validity is not satisfied in our study. The survey was administered at school and not in a natural drinking context. Larsen and colleagues (2009) demand an administration in a more natural setting and did research in a „bar lab". However, from our point of view, the ecological validity is also doubtful in such a kind of experimental setup. We leave the question open, if in a genuine natural setting, like on an actual party, self-report data could be more valid due to the features of a survey and, of course, the factor of actual alcoholization.

In addition, the cross-sectional design of the study at hand represents a limitation. Correlations between siblings' and parents' influences of our sample were detected by means of statistical analysis. Though, the present design does not allow a temporal ordering of these associations and forecloses prospective examination of the variables. A longitudinal design would settle these claims. Thus, a longitudinal follow-up study of our sample could provide us with deeper insight. By means of this approach, possible fluctuations in adolescent alcohol use and all of the other inquired factors could be considered, as well.

Moreover, in this present study we did not differentiate between characteristics of father and mother, but merely used the term of „parents". Drinking habits as well as monitoring behaviour could differ between the female and the male parent.

The study at hand was conducted by means of a self-report questionnaire and did not gather data from siblings and parents in person. In our opinion it is debatable if that represents a further limitation of the study at hand. Researchers found adolescents to be capable informants about parental behaviours, for instance (Moskowitz & Schwarz, 1982). According to Gray and Steinberg (1999), adolescent perception of parents' behaviour is as crucial in adolescents' development as actual parental behaviour. For interventive actions this implies the modification of parents' and siblings' behaviour to change the perception of the adolescent and thereby alter adolescents' response to it. It could also be thought of the direct modification of adolescents' *perception* of parents' and siblings' alcohol use.

Finally, we want to remark that correlations, like obtained by our study, of course, cannot give evidence of causal relations. Correlations could be a sign of causality, but on the

one hand, the direction of the causal relationship remains unclear. With regard to the content of our investigated variables, it seems not probable, that the adolescents' drinking behaviour influences an older sibling's drinking behaviour, or even less, their parents' alcohol use. With respect to parental monitoring behaviour and rules, yet it seems less far-fetched, that parents adapt these variables according to the adolescent's drinking behaviour. On the other hand, spurious correlations could be caused by the influence of third variables, like, for example, common friends of the older and the younger sibling.

Despite these limitations, our study provides us with contributions to the body of research on risk factors and protective factors in the context of adolescent alcohol use and abuse. In particular, we could shed some light on the role of the so far scarcely investigated external social factor of older siblings and its relevance for the basic processes that exercise influence on adolescents and their drinking behaviour. Thereby, our study offers interesting starting points for further research and can help to focus preventive interventions on promising targets.

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University of Twente
The Netherlands

Liebe Schülerin der 9. Klasse, lieber Schüler der 9. Klasse,

mit dem vor Dir liegenden Fragebogen führe ich eine Untersuchung zum Thema „Alkoholkonsum bei Jugendlichen“ durch. Der Bogen beinhaltet Fragen, die Dich, Deine Geschwister und Deine Eltern betreffen.

Die Teilnahme an dieser Umfrage ist freiwillig. Es dauert nur circa 10 Minuten den Fragebogen auszufüllen und Du würdest mir mit Deiner Teilnahme sehr helfen!

Bitte schreibe Deinen Namen nicht auf den Bogen! Deine Angaben werden völlig anonym verarbeitet. Wenn Du mit allen Fragen fertig bist, kannst Du den Bogen gefaltet in das beiliegende Kuvert stecken und das Kuvert zukleben.

Es geht um Deine Meinung und Einschätzung. Es gibt keine richtigen oder falschen Antworten! Es kommt nur darauf an, dass Du die Fragen ehrlich und alleine beantwortest.

Wenn Du Interesse an den Ergebnissen der Untersuchung hast, schicke eine Email mit dem Betreff „Umfrage ’09“ an: < l.korn@student.utwente.nl > und Du bekommst eine Version von der Arbeit, sobald sie fertig ist!

Vielen Dank für Deine Mithilfe!

Lena Korn
Universität Twente, Enschede

1. Wie alt bist Du? _____ Jahre

2. Was ist Dein Geschlecht? *(Kreuze an)*

O männlich

O weiblich

3. Wie alt warst Du, als Du das erste Mal Alkohol getrunken hast?

_____ Jahre

O Ich habe noch nie Alkohol getrunken.

4. Wie oft hast Du in den letzten 4 Wochen bei einer Gelegenheit (z.B. Party) mehr als 5 Gläser Alkohol getrunken?

Mit „1 Glas“ Alkohol ist folgendes gemeint: z.B. ein Glas Sekt oder Wein, ein Glas oder eine Flasche Bier, ein Alkopop, ein Mischgetränk (z.B. Wodka Lemon, Tequila Sunrise), ein Schnapsglas hochprozentiger Alkohol oder Likör etc. *(Trage die Anzahl ein)*

_____

5. Wenn Du alkoholische Getränke zu Dir nimmst, wie viele Gläser trinkst Du dann typischerweise bei einer Gelegenheit? *(Trage die Anzahl ein)*

_____

(Bei der folgenden Frage sollst Du in jeder Reihe jeweils den Kreis ankreuzen, der Deiner Antwort am nächsten kommt, z.B. wenn Du es eher schlecht fändest machst Du weiter links ein Kreuz beziehungsweise wenn Du es gut fändest weiter rechts)

Wenn ich in Zukunft bei einer Gelegenheit mehr als 5 Gläser Alkohol trinken sollte, fände ich das…

6. Schlecht	**O O O O O O O**	Gut
7. Nicht OK	**O O O O O O O**	OK
8. Unvernünftig	**O O O O O O O**	Vernünftig
9. Nicht cool	**O O O O O O O**	Cool
10. Nicht normal	**O O O O O O O**	Normal

Nun würde ich gerne wissen wie Du es findest mehr als 5 Gläser Alkohol an einem Abend zu trinken. *(Kreuze bei jeder Aussage die zutreffende Antwort an)*

		trifft über-haupt nicht zu	trifft nicht zu	teils-teils	trifft zu	trifft sehr zu
11.	Erst wenn ich mehr als 5 Gläser Alkohol an einem Abend getrunken habe, gefällt es mir richtig gut/ habe ich richtig Spaß	O	O	O	O	O
12.	Wenn ich mehr als 5 Gläser Alkohol an einem Abend trinke, trau ich mich mehr	O	O	O	O	O
13.	Ich finde es zu teuer mehr als 5 Gläser Alkohol an einem Abend zu trinken	O	O	O	O	O
14.	Selbst nicht mehr als 5 Gläser Alkohol zu trinken, obwohl meine Freunde/ Freundinnen mehr als 5 Gläser Alkohol trinken, fällt mir leicht	O	O	O	O	O
15.	Alkohol zu verweigern, wenn ich ihn angeboten bekomme, fällt mir leicht	O	O	O	O	O
16.	Nie mehr als 5 Gläser Alkohol an einem Abend zu trinken würde mir leicht fallen	O	O	O	O	O
17.	Meine Geschwister finden, dass ich nicht mehr als 5 Gläser Alkohol an einem Abend trinken sollte	O	O	O	O	O
18.	Ich nehme mir die Meinung meiner Geschwister sehr zu Herzen	O	O	O	O	O
19.	Meine Freunde/ Freundinnen finden, dass ich nicht mehr als 5 Gläser Alkohol an einem Abend trinken müsste	O	O	O	O	O
20.	Ich nehme mir die Meinung meiner Freunde/Freundinnen sehr zu Herzen	O	O	O	O	O
21.	Meine Eltern finden, dass ich nicht mehr als 5 Gläser Alkohol an einem Abend trinken sollte	O	O	O	O	O
22.	Ich nehme mir die Meinung meiner Eltern sehr zu Herzen	O	O	O	O	O
23.	Meine Mitschüler / Arbeitskollegen finden, dass ich nicht mehr als 5 Gläser Alkohol an einem Abend trinken sollte	O	O	O	O	O
24.	Ich nehme mir die Meinung meiner Mitschüler / Arbeitskollegen sehr zu Herzen	O	O	O	O	O
25.	Ich *habe vor* in Zukunft mehr als 5 Gläser Alkohol an einem Abend zu trinken	O	O	O	O	O
26.	Ich *erwarte* dass ich in Zukunft mehr als 5 Gläser Alkohol an einem Abend trinken werde	O	O	O	O	O
27.	Ich *will* in Zukunft mehr als 5 Gläser Alkohol an einem Abend trinken	O	O	O	O	O

Nun folgen einige Fragen, die Deine Geschwister betreffen:

28. Hast Du ältere Geschwister? *(Kreuze an)*

O ja
O nein

Falls Du keine älteren Geschwister hast, gehe weiter zu Frage 49 (‚Deine Eltern betreffend')

29. Wie alt sind Deine älteren Brüder? *(Trage das Alter in Jahren ein bzw. kreuze an)*

_____, _____, _____ O ich habe keine älteren Brüder

30. Wohnen Deine älteren Brüder noch zuhause? *(Kreuze an, bzw. trage die Anzahl ein)*

O ja (wie viele? _____)
O nein O ich habe keine älteren Brüder

31. Wie alt sind Deine älteren Schwestern? *(Trage das Alter in Jahren ein bzw. kreuze an)*

_____, _____, _____ O ich habe keine älteren Schwestern

32. Wohnen Deine älteren Schwestern noch zuhause? *(Kreuze an, bzw. trage die Anzahl ein)*

O ja (wie viele? _____)
O nein O ich habe keine älteren Schwestern

Die folgenden Fragen beziehen sich auf den älteren Bruder oder die ältere Schwester, der/die Dir am nächsten steht und/oder mit dem/der Du am meisten Zeit verbringst:
(Kreuze bei jeder Aussage die zutreffende Antwort an)

		trifft überhaupt nicht zu	trifft nicht zu	teils-teils	trifft zu	trifft sehr zu
33.	Ich fühle mich meinem älteren Bruder/ meiner älteren Schwester nahe	O	O	O	O	O
34.	Ich teile meine Gedanken und Gefühle mit meinem älteren Bruder / meiner älteren Schwester	O	O	O	O	O
35.	Ich verbringe *gerne* Zeit mit meinem älteren Bruder / meiner älteren Schwester	O	O	O	O	O
36.	Ich verbringe *viel* Zeit mit meinem älteren Bruder / meiner älteren Schwester	O	O	O	O	O
37.	Es ist mir wichtig, dass mein älterer Bruder/ meine ältere Schwester gut über mich denkt	O	O	O	O	O
38.	Ich trinke mit meinem älteren Bruder / meiner älteren Schwester oft Alkohol	O	O	O	O	O
39.	Mein älterer Bruder / meine ältere Schwester nimmt mich oft mit zu Freunden, auf Partys und/oder ähnliches	O	O	O	O	O
40.	Mein älterer Bruder / meine ältere Schwester bietet mir oft Alkohol an	O	O	O	O	O
41.	Ich spreche mit meinem älteren Bruder / meiner älteren Schwester oft über meine Erfahrungen mit Alkohol (wie viel ich trinke, ob ich betrunken war, etc.)	O	O	O	O	O
42.	Ich bekomme es oft mit, wenn mein älterer Bruder / meine ältere Schwester Alkohol trinkt	O	O	O	O	O

43. Wie alt, denkst Du, war Dein älterer Bruder/ Deine ältere Schwester als er / sie das erste Mal Alkohol getrunken hat? *(Kreuze die zutreffende Antwort an.)*

_____ Jahre
O Er / Sie hat noch nie Alkohol getrunken
O weiß ich nicht

44. Wie oft, denkst Du, hat Dein älterer Bruder/ Deine ältere Schwester in den letzten 4 Wochen bei einer Gelegenheit mehr als 5 Gläser Alkohol getrunken?
(Trage die Anzahl Gelegenheiten ein)

_____

45. Wenn Dein älterer Bruder / deine ältere Schwester alkoholische Getränke zu sich nimmt, wie viele Gläser, denkst Du, trinkt er / sie dann typischerweise bei einer Gelegenheit? *(Trage die Anzahl ein)*

_____

Nun würde ich gerne wissen wie Du es einschätzt, wie Dein älterer Bruder / Deine ältere Schwester es findet, mehr als 5 Gläser Alkohol an einem Abend zu trinken.
(Kreuze bei jeder Aussage die zutreffende Antwort an)

		trifft überhaupt nicht zu	trifft nicht zu	teils-teils	trifft zu	trifft sehr zu
46.	Erst wenn er / sie mehr als 5 Gläser Alkohol an einem Abend getrunken hat, gefällt es ihm / ihr richtig gut/ hat er / sie richtig Spaß	**O**	**O**	**O**	**O**	**O**
47.	Wenn er / sie mehr als 5 Gläser Alkohol an einem Abend trinkt, traut er / sie sich mehr	**O**	**O**	**O**	**O**	**O**
48.	Er / Sie findet es zu teuer mehr als 5 Gläser Alkohol an einem Abend zu trinken	**O**	**O**	**O**	**O**	**O**

Nun folgen noch einige Fragen, die Deine Eltern betreffen:

49. Wie wohnst Du? *(Kreuze an)*

O Ich wohne bei meinen Eltern
O Ich wohne bei meiner Mutter
O Ich wohne bei meinem Vater
O anders, und zwar wohne ich _____

Ein paar Fragen zum Verhältnis und dem Kontakt zu Deinen Eltern: *(Kreuze an)*

		trifft überhaupt nicht zu	trifft nicht zu	teils-teils	trifft zu	trifft sehr zu
50.	Ich fühle mich meinen Eltern nahe	**O**	**O**	**O**	**O**	**O**
51.	Ich teile meine Gedanken und Gefühle mit meinem Eltern	**O**	**O**	**O**	**O**	**O**
52.	Ich verbringe *gerne* Zeit mit meinen Eltern	**O**	**O**	**O**	**O**	**O**
53.	Ich verbringe *viel* Zeit mit meinem Eltern	**O**	**O**	**O**	**O**	**O**
54.	Es ist mir wichtig, dass meine Eltern gut über mich denken	**O**	**O**	**O**	**O**	**O**
55.	Ich trinke oft mit meinen Eltern Alkohol	**O**	**O**	**O**	**O**	**O**
56.	Meine Eltern nehmen mich oft mit zu Gelegenheiten, bei denen Alkohol getrunken wird	**O**	**O**	**O**	**O**	**O**
57.	Meine Eltern bieten mir oft Alkohol an	**O**	**O**	**O**	**O**	**O**
58.	Ich spreche mit meinem Eltern oft über meine Erfahrungen mit Alkohol (wie viel ich trinke, ob ich betrunken war, etc.)	**O**	**O**	**O**	**O**	**O**
59.	Ich bekomme es meist mit, wenn meine Eltern Alkohol trinken	**O**	**O**	**O**	**O**	**O**

60. Wie oft, denkst Du, haben Deine Eltern in den letzten 4 Wochen bei einer Gelegenheit mehr als 5 Gläser Alkohol getrunken? *(Trage die Anzahl ein)*

_____

61. Wenn Deine Eltern alkoholische Getränke zu sich nehmen, wie viele Gläser, denkst Du, trinken sie dann typischerweise bei einer Gelegenheit? *(Trage die Anzahl ein)*

_____

Inwiefern *versuchen* Deine Eltern zu wissen... *(Kreuze an)*

		sie versuchen es gar nicht	**sie versuchen es ein wenig**	**sie versuchen es sehr**
62.	... wohin Du gehst, wenn Du abends weggehst?	**O**	**O**	**O**
63.	... mit wem Du abends weggehst?	**O**	**O**	**O**
64.	... wie viel Alkohol Du trinkst?	**O**	**O**	**O**
65,	... ob Du unerlaubt Alkohol getrunken hast?	**O**	**O**	**O**

Inwiefern *wissen* Deine Eltern tatsächlich... *(Kreuze an)*

		sie wissen es gar nicht	**sie wissen es ein wenig**	**sie wissen es genau**
66.	... wohin Du gehst, wenn Du abends weggehst?	**O**	**O**	**O**
67.	... mit wem Du abends weggehst?	**O**	**O**	**O**
68.	... wie viel Alkohol Du trinkst?	**O**	**O**	**O**
69.	... ob Du unerlaubt Alkohol getrunken hast?	**O**	**O**	**O**

Und nun noch ein paar abschließende Fragen zu Abmachungen mit Deinen Eltern: *(Kreuze die jeweils zutreffende Antwort an)*

		trifft über-haupt nicht zu	**trifft nicht zu**	**teils-teils**	**trifft zu**	**trifft sehr zu**
70.	Gibt es feste Regeln von Deinen Eltern, die abends weggehen und Alkohol trinken betreffen?	**O**	**O**	**O**	**O**	**O**
71.	Findest Du diese Regeln von Deinen Eltern ok?	**O**	**O**	**O**	**O**	**O**
72.	Hältst Du Dich immer an Absprachen, die abends weggehen und Alkohol trinken betreffen?	**O**	**O**	**O**	**O**	**O**

Wenn Du mit dem Ausfüllen aller Fragen fertig bist, kannst Du den Bogen falten, in das Kuvert stecken und das Kuvert zukleben.

Vielen Dank für Deine Mitarbeit! *Hartelijk bedankt!*