

# Master thesis

## The Youth of the Barns:

A study that examines the association between visiting barns and binge drinking by Dutch adolescents as well as the moderation effect of parental rules regarding alcohol use

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Mariska Zoon

# **The Youth of the Barns: A Study that Examines the Association Between Visiting Barns and Binge Drinking by Dutch Adolescents as well as the Moderation Effect of Parental Rules Regarding Alcohol Use**

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## **Abstract**

The present study described the adolescents who visit barns and examined the association between visiting barns and binge drinking by adolescents and tested whether this association was moderated by parental rules regarding alcohol use. Cross-sectional nationwide survey data from 7,750 Dutch pupils (mean age 14.2) were used to conduct logistic regression analyses. The sample was representative for the population pupils in secondary education between 11 and 18 years of age in The Netherlands. Results showed that 907 pupils (12%) visited barns. These adolescents were mostly boys and were slightly older, less educated and lived in less urbanized areas of The Netherlands than adolescents who did not visit barns. Visiting barns as well as less parental rules regarding alcohol use were associated with binge drinking as reported by adolescents. No indication was found for a moderating effect of parental rules regarding alcohol use on the association between visiting barns and binge drinking. Thus, this study demonstrated that visiting barns is a risk factor for binge drinking and that stricter rules by parents regarding alcohol use did not reduce binge drinking by adolescents in barns. Implications for prevention for binge drinking by adolescents in barns are addressed.

*Keywords:* Alcohol, Binge drinking, Barns, Adolescents, Alcohol-specific rules, Parents.

## **Introduction**

Excessive alcohol use in adolescence is associated with a variety of adverse consequences, including motor vehicle injury and death, aggression, sexual assault, unprotected sexual activity, and neurodevelopmental impairment (Kuunders, 2006; Mulder, 2005; Monshouwer, Verdurmen, Van Dorsselaer, Smit, Gorter & Vollebergh, 2008). Excessive alcohol use in early adolescence is known to increase the risk of alcohol dependence (Arria, Kuhn, Caldeira, O'Grady, Vincent & Wish, 2008). Excessive alcohol use is also known as binge drinking and is defined as consuming more than five glasses of alcohol on one occasion (Van Laar, Cruts, Verdurmen, Van Ooyen-Houben & Meijer, 2008). Results of a national survey by Monshouwer *et al.* (2008) on substance abuse shows that 36% of adolescents aged 11 to 18 years drank five or more glasses of alcohol on one occasion at least once in the last month. These national results are also part of the international European School Survey Project on Alcohol and Other Drugs (ESPAD-study)

and show that Dutch adolescents drink more intensively and frequently compared to adolescents in many other European countries (Hibell, Guttormsson, Ahlstrom, Balakireva, Bjarnason, Kokkevi & Kraus, 2009). Therefore, there is a need to understand which factors contribute to binge drinking in adolescence in The Netherlands.

In the last two to three years, interest in barns in The Netherlands increased substantially, both in the media and in politics. This increased interest is due to the growth in the number of barns. Lofts, sheds, caravans and greenhouses create hangout places for adolescents in more than 60 communities in The Netherlands and are commonly known as 'barns' (Mulder, 2005). These building structures, mostly on private yards, become places for adolescents to hang out, drink alcohol and attempt other activities. Barns are common in residential environments where there are few opportunities for leisure (Mulder, 2005). The age of adolescents using these barns ranges from 12 to about 23 years of age (Mulder, 2005). Almost always, alcohol is involved and adult or parental supervision is almost always absent (Korte, 2008; Mulder, 2005). A nationwide cross-sectional study by Mulder (2005) on the social functions of barns, shows that there is a concern by people who are somehow involved with barns (schools, residents) about binge drinking in barns by adolescents. The same study recommends parents to be more involved with their adolescent children who visit barns, to reduce binge drinking by adolescents in barns.

Because an image of binge drinking in barns by adolescents is sketched, the present study explores whether visiting barns is indeed associated with binge drinking. Also, to determine whether parents do have an influence on binge drinking by adolescents in barns, parental rules regarding alcohol use will be taken into account. This is, to our knowledge, the first study to do so. Also, a comparison between adolescents who do and do not visit barns has, to our knowledge, never been made by previous studies. Therefore, the present study compares the adolescents who visit barns with adolescents who do not visit barns, examines the association between visiting barns and binge drinking by adolescents and tests whether this association is moderated by parental rules regarding alcohol use. This study will add knowledge to the current knowledge there is about the adolescents that do visit barns, which can contribute to a more specific prevention program designed for adolescents that do visit barns. By including parental rules regarding alcohol, an advice can be given whether and to what extent, parents should set rules regarding alcohol use to reduce or even prevent binge drinking by adolescents that do visit barns.

### *Alcohol Consumption in Barns*

The image of binge drinking in barns is confirmed in a cross-sectional study by Snippe, Boxem & Bieleman (2007) on the association between adolescents who visit barns in the northern part of The Netherlands and possible disruption of public order (age 17 to 22). The alcohol consumption of adolescents is in most barns on average 6.5 to 8 glasses of beer per person per night. In some barns, this average is up to 15 glasses. This is consistent with the results of the study by Mulder (2005), which states that adolescents who visit barns, 12 to 23 year olds, consume on average 12 to 15 glasses of alcohol per person per night. To determine whether this amount of glasses of alcohol is different from adolescents who do not visit barns, we look at the national average of the amount of glasses of alcohol adolescents drink. Data from a national survey on the amount of alcohol by adolescents (12 to 17 years) shows that the average amount of glasses of alcohol a week varies from 6.3 glasses for 12-13 year olds to 16.7 glasses for 16-17 year olds (Vet & Van den Eijnden, 2007). A comparison between the two groups, alcohol consumption by adolescents who visit barns and the national average of alcohol consumption, is difficult to make, since the amount of glasses of alcohol per night and per week are being discussed and since the age of the participants is different. However, it appears from the previous results that alcohol use among adolescents who visit barns is higher than the national average of alcohol use by adolescents in The Netherlands. An explanation for the high amount of alcohol consumption in barns might be the low price of alcohol in the barn. The price for a beer in a barn is on average 50 eurocent to 1 euro, while the price in a pub could run up to 2,50 euro (Mulder, 2005). An observational and a cross-sectional study show that a low price for alcohol increases the accessibility of alcohol which in turn increases the amount of alcohol consumption (Chaloupke & Wechsler, 1996; Jones-Webb, Toomey, Short, Murray, Wagenaar & Wolfson, 1997). Accessibility of alcohol can influence consumption in two ways. Firstly, it may provide greater opportunities for adolescents to drink and secondly, alcohol availability may influence adolescent drinking by shaping normative expectations about appropriate drinking behavior (Jones-Webb *et al.*, 1997). A different explanation for the high amount of alcohol use in barns could be due to the homogeneity of the public in the barns. A barn is mostly small and the visitors are usually friends, which is different from a pub where there tend to be more different kinds of people. The homogeneity of the group in a barn can be the result of selection processes, which means that individuals who are similar in certain attributes purposefully select each other as friends (Kandel, 1978). Studies with a longitudinal design show that the similarity in alcohol use can be due to the individuals tendency to select friends that resemble themselves and to the influences of friends (Kandel, 1978; Ennett & Bauman, 1994). The presence of peers who drink alcohol is an important predictor for the alcohol consumption of adolescents (Scholte, Poelen, Willemsen, Boomsma & Engels, 2008; Overbeek, Bot, Sentse, Meeus, Knibbe & Engels, 2008).

Influence of friends can be explained by the social learning theory, which emphasized that a prerequisite for successful modeling behavior is that a model is liked or valued (Bandura, 1977). Also, in the presence of friends, adolescents tend to drink more alcohol (Bot, 2007).

#### *Parental Rules Regarding Alcohol Use*

As mentioned previous, Mulder (2005) recommends parents to be more involved with their adolescent children who visit barns, to reduce binge drinking by adolescents in barns. More involvement includes setting rules by parents (Arria *et al.*, 2008). The present study examines part of Mulders' recommendation by exploring the association between parental rules regarding alcohol use and binge drinking, as well as including parental rules as a moderator between visiting barns and binge drinking.

Previous cross-sectional and longitudinal studies with participants being approximately 11 to 16 years of age, show that strict parental rules regarding alcohol can postpone the onset of alcohol use and can decrease the likelihood of adolescent binge drinking (Koning, Engels, Verdurmen & Vollebergh, 2010; Moore, Rothwell & Segrott, 2010; Van der Vorst, Engels, Meeus, Dekovic & Van Leeuwe, 2005; Vet & Van den Eijnden, 2007). Setting rules regarding alcohol use by parents is part of alcohol-specific parenting which also includes attitudes, is often mentioned in the same sense as monitoring and communication and is closely linked to parental alcohol drinking. As well as rule setting, these family characteristics are closely associated with binge drinking by adolescents (Arria *et al.*, 2008; Koning *et al.*, 2010; Van der Vorst, Engels, Meeus & Dekovic, 2006). An explanation for these associations can also be found in social learning theory which emphasized that adolescents alcohol use behavior is often acquired from role models, such as parents (Bandura, 1977). Therefore, the values that parents have regarding alcohol use will influence adolescents. Particularly as parents are among the most important socializing agents in early adolescents' life (Duncan, Duncan & Strycker, 2006).

In barns, adolescent alcohol consumption takes place in a peer environment, where parents are absent during the majority of drinking episodes (Mulder, 2005). Thus, it is questionable whether parental behaviors remain influential in affecting their offspring's drinking levels when they are in a peer setting like a barn. However, results of a longitudinal twin-study by Poelen, Engels, Scholte, Boomsma and Willemsen (2009) show that parents have a small, but persistent effect on the drinking of their offspring (age 16 to 25). Possible, adolescents have internalized their parent's values about drinking alcohol (Bot, 2007). Therefore, we expect that parents do influence the alcohol use of adolescents during evening social events and entertainment with peers.

### *The Current Study*

The aim of the current study is to describe the adolescents who visit barns and to examine the association on visiting barns and parental rules regarding alcohol use with binge drinking by adolescents. Parental rules will also be taken into account as a moderator of visiting barns and binge drinking. In this study, five questions will be posed. 1.) What are the social characteristics of the adolescents who visit barns? 2.) Are the barns being used as a place of entertainment or as a place to drink alcohol before continuing the evening at another venue? 3.) Is there a significant association between visiting barns and binge drinking? 4.) Are parental rules regarding alcohol use associated with binge drinking? 5.) Do parental rules regarding alcohol use moderate the association between visiting barns and binge drinking?

First, consistent with prior literature, we expect to find that adolescents who visit barns are more likely to binge drink than adolescents who do not visit barns. Second, hypothesized is that strict parental rules regarding alcohol use lowers the risk of binge drinking. Lastly, expected is that binge drinking for adolescents who visit barns, would be reduced or suppressed by stricter parental rules regarding alcohol use.

### **Method**

#### *Procedure*

Data for this study were collected as part of a cross-sectional research project on substance abuse in the adolescent population in The Netherlands (Monshouwer *et al.*, 2008; more information see Trimbos Institute, Peilstationsstudy). Since 2003, the Peilstationsproject has been completely part of the ESPAD-study (Monshouwer *et al.*, 2008).

Schools were randomly selected and were stratified by levels of urbanization. Schools received written information in advance of the survey, describing the research project and goals. Authorization from each school was required, however, authorization from the pupils' parents was not. This procedure resulted in the participation of 153 schools, where the questionnaire was administrated in 354 classes and was completed by 7,550 pupils during October and November 2007. A total of 640 (7.8%) pupils were absent during the research and did not complete the questionnaire. The written questionnaire was completed at the participants' own school during annual assessments. Written instruction on how to complete the questionnaire were provided and trained research assistants, employees of the Trimbos Institute or the Municipal Health Service (GGD), provided verbal instructions. Confidentiality in the treatment of the data was explicitly guaranteed.

### *Participants*

Participants were pupils from various secondary schools in The Netherlands. The sample was representative for the population of pupils between 11 and 18 years of age in The Netherlands and consisted of a total of 7,750 participants: 49.7% boys and 50.3% girls, who were on average 14.2 years of age ( $SD = 1.53$ ). The pupil sample included 21.1% in lower secondary vocational practical education (low education), 29.1% in lower secondary vocational theoretical education (between low and middle education), 25.7% in higher general secondary education (middle education) and 23.1% in pre-university secondary education (high education). The level of urbanization of the areas the participants live in, was divided into very strong urbanization (16.2%), strong urbanization (28.5%), moderate urbanization (20.4%), little urbanization (21.4%) and non-urban (13.5%). Most participants were Dutch (81.0%). Most participants were non-religious (60.8%), others identified themselves as being Catholic (13.3%), Christian (16.7%), Muslim (6.3%) and Other (2.9%).

### *Measures*

*Binge drinking* measures whether or not pupils drank more than five glasses of alcohol on one occasion in the last four weeks. The original answers (ranging from 1 = never, 2 = one time, 3 = two times to 7 = nine times or more) were converted into a binary variable, whereas 0 = no binge drinking (original answer 1) and 1 = did binge drink (original answers 2 to 7) (Hibell *et al.*, 2009).

*Visiting barns* measures whether or not pupils has visited a barn in the last four weeks. The original answers (ranging from 0 = never, 1 = one time, 2 = two times to 10 = ten times or more) were converted into a binary variable, whereas 0 = did not visit barns (original answer 0) and 1= did visit barns (original answers 1 to 10).

*Average amount of glasses of alcohol a week* was calculated by summing up the product of ('On how many of the four weekdays do you drink alcohol?') and ('If you drink alcohol during the week, how many glasses of alcohol on average do you drink each day?') to the product of ('On how many of the three days of the weekend do you drink alcohol?') and ('If you drink alcohol during the weekend, how many glasses of alcohol on average do you drink each day?') (Vet & Van den Eijnden, 2007). Answers for the items concerning the amount of days were indicated on a four- or five-point scale (ranging from 0 = I don't drink on week days to 4 = 4 days). Answers for the items concerning the amount of glasses of alcohol were indicated from zero to 20 or more glasses of alcohol, on a 12-point scale.

*Drinking alcohol at a barn before going out to a pub/club* refers to whether or not scholars drank alcohol at a barn before they continued the evening at another venue like a pub or club. Original answers were yes or no.

*Parental rules regarding alcohol use* refers to the rules that parents used regarding their children(s) use of alcohol. The shortened version of the scale consisted of three items: 'Are you allowed to drink one glass of alcohol at home, in the presence of your parent(s)?', 'Are you allowed to drink multiple glasses of alcohol at home, in the presence of your parent(s)?' and 'Are you allowed to drink alcohol with friends at a party?' (Van der Vorst *et al.*, 2005). Answers for the individual items were indicated on a five-point scale (ranging from 1 = definitely yes to 5 = definitely not) and were added together, so that possible scores were 3 to 15. A higher score indicates stricter rule setting by the parents (Cronbach's  $\alpha = .89$ ).

Demographic variables, which were expected to be confounders, were included in the analysis. These were gender, age in years, level of education (measured on a four-point scale ranging from 1 = lowest education to 4 = highest education), religion and level of urbanization (measured on a five-point scale ranging from 1 = non-urban to 5 = very strong urbanization).

### *Strategy of Analyses*

Descriptive analyses were conducted on confounders (gender, level of education and level of urbanization) to describe the pupils who did visit barns versus the pupils who did not visit barns. Subsequently, independent sample t-tests on continuous variables were carried out to examine whether the variables age and amount of glasses a week, were significantly different between the pupils that did and did not visit barns. For the pupils who visited barns, frequencies on drinking alcohol in a barn before going out to a pub/club were examined.

Further, multiple logistic regression analyses of visiting barns and parental rules on binge drinking were performed. In logistic regression analyses, regression of a dependent variable with two categories on a set of independent variables can be tested. In the current study, logistic regression analyses were conducted to compare the group that did binge drink to the group that did not binge drink on confounders (gender, age in years, level of education, religion and level of urbanization), visiting barns and parental rules. Also, the interaction effect of parental rules \* visiting barns was tested.

## Results

### *Social Characteristics*

The first question in the current study addressed the social characteristics of the adolescents who visited barns. Descriptive analyses showed that 907 scholars (12%) did visit barns. Out of these, 60.1% were boys and 39.9% girls. This was significantly different from the group that did not visit barns, since they consisted out of 48.2% boys ( $\chi^2 (1) = 44.41; p = .00$ ). Among the adolescents who did visit barns, 29.7% were in low education next to 21.1% of the adolescents who did not visit barns. This was also a significant difference ( $\chi^2 (3) = 77.63; p = .00$ ). Adolescents who did visit barns were more likely to participate in low education than adolescents who did not visit barns. Among the adolescents who did visit barns, 24.4% lived in non urban areas of The Netherlands next to 12.1% of the adolescents who did not visit barns, which was a significant difference ( $\chi^2 (4) = 177.77; p = .00$ ). Out of the adolescents who did visit barns, 67.9% has been binge drinking next to 32.6% of the adolescents who did not visit barns. This difference in binge drinking was also significant ( $\chi^2 (1) = 425.54; p = .00$ ) which means that adolescents who did visit barns, binge drink significantly more than adolescents who did not visit barns. Two independent-sample t-tests on interval variables were conducted to compare the age in years and the amount of glasses of alcohol a week between adolescents who did and did not visit barns. First, there was a significant difference in scores of age for adolescents who did visit barns (Mean = 14.6,  $SD = 1.42$ ), and adolescents who did not visit barns (Mean = 14.2,  $SD = 1.53$ ;  $t (7,548) = -7.13, p = .00$ ). The magnitude of the differences in the means was very small ( $\eta^2 = .01$ ). Second, there was a significant difference in scores of amount of glasses of alcohol a week for adolescents who do visit barns (Mean = 10.61,  $SD = 14.72$ ) and adolescents who do not visit barns (Mean = 2.99,  $SD = 6.56$ ;  $t (7,394) = -15.24, p = .00$ ). The magnitude of the differences in the means was small ( $\eta^2 = .03$ ).

The second question addressed the issue whether the adolescents who visit barns used the barn as a place to drink alcohol before continuing the evening at another venue or whether they stay there all evening to socialize with peers. Out of the adolescents who visited barns, 28.1% reported they drank alcohol at a barn before they went on to another venue. This meant that 71.9% of the adolescents who visited barns did not use the barn as a place to drink alcohol before continuing the evening at another venue. They see the barn as a place of entertainment, instead of a place where you go before you go to other evening entertainment places.

### *Association Between Visiting Barns and Binge Drinking*

The third question addressed the issue whether there was a significant association between visiting barns and binge drinking. Model 1 in Table 1 shows the results of the associations between the confounding variables and binge drinking. Model 2 in Table 1 shows the results when the variable visiting barns was added.

A significant odds ratio (OR) with a value above 1 indicates that the independent variable increases the odds of the dependant having a value of 1 (did binge drink). Model 1 shows that almost all the confounding variables were significantly associated with binge drinking, with age, gender, level of education and level of urbanization all having an OR with a value above 1. This meant that older adolescents, being male, having a lower level of education than pre-university secondary education and living in less urbanized areas of The Netherlands, all predicted binge drinking. The different types of religion almost all have an OR with a value below 1, but only Christian and Muslim were significant. This meant that adolescents who are not religious (reference category) were more likely to binge drink than adolescents who are Christian or Muslim. Model 2 shows the results when visiting barns was added. Adolescents who visited barns were approximately four times (OR = 4.37,  $p < .001$ ) more likely to binge drink than adolescents who did not visit barns. Age was still a significant predictor of binge drinking, as was level of education and religion. For instance, adolescents who were in low education were approximately three times (OR = 2.98,  $p < .001$ ) more likely to binge drink than adolescents who were in high education.

### *Moderation by Parental Rules Regarding Alcohol Use*

The fourth question addressed the issue whether parental rules regarding alcohol use was associated with binge drinking. Model 3 in Table 1 shows the results when parental rules regarding alcohol use was added. Model 4 in Table 1 included the interaction effect of parental rules \* visiting barns. Did parental rules regarding alcohol use moderate the link between visiting barns and binge drinking?

Model 3 shows that parental rules regarding alcohol use was significantly associated with binge drinking. Adolescents who scored higher on parental rules and thus perceived more rules regarding alcohol use from their parents had a lower chance to binge drink (OR = .78,  $p < .001$ ) than adolescents who scored lower on parental rules and thus perceived less rules regarding alcohol use from their parents. Age was still a significant predictor of binge drinking, as was gender, level of education and religion. Model 4 shows that parental rules regarding alcohol use did not moderate the association between visiting barns and binge drinking, the moderation effect was not significant (OR = .99,  $p > .05$ ). Chi-square resulting from Model 4,

shows that Model 4 was not significant better than Model 3 was. Model 3 was therefore the best-fitting model in this study (-2Log likelihood = 6999.68) with 689.51 points less than Model 2 and accounted for 41% of the explained variance.

Table 1

*Summary of Logistic Regression Analyses for Visiting Barns and Rules of Parents Predicting Binge Drinking, Controlling for Background Variables*

Predictors	Model 1			Model 2			Model 3			Model 4		
	OR	95 % CI for OR		OR	95 % CI for OR		OR	95 % CI for OR		OR	95 % CI for OR	
<i>Age</i>	1.99***	1.92	2.08	1.99***	1.91	2.07	1.37***	1.30	1.44	1.37***	1.30	1.44
<i>Gender</i>												
Female (reference)	1			1			1			1		
Male	1.16**	1.04	1.29	1.08	.97	1.21	1.14*	1.01	1.28	1.14*	1.01	1.28
<i>Level of education</i>												
High education (reference)	1			1			1			1		
Low education	3.31***	2.80	3.92	2.98***	2.51	3.53	3.17***	2.64	3.81	3.17***	2.64	3.80
Between low and middle education	2.37***	2.01	2.78	2.16***	1.84	2.55	2.16***	1.81	2.57	2.16***	1.81	3.80
Middle education	1.73***	1.48	2.03	1.62***	1.38	1.90	1.48***	1.25	1.76	1.48***	1.25	1.76
<i>Religion</i>												
Non religious (reference)	1			1			1			1		
Catholic	.89	.76	1.05	.89	.76	1.05	.95	.80	1.13	.95	.80	1.13
Christian	.57***	.49	.67	.55***	.47	.65	.63***	.53	.74	.63***	.53	.74
Muslim	.14***	.10	.19	.12***	.09	.17	.44***	.32	.61	.44***	.32	.61
Other	.96	.26	3.53	.95	.26	3.49	2.12	.56	8.01	2.13	.57	8.01
<i>Level of urbanization</i>												
Very strong urbanization (reference)	1			1			1			1		
Non-urban	1.46***	1.19	1.79	1.18	.96	1.45	1.03	.83	1.29	1.03	.83	1.29
Little urbanization	1.40***	1.17	1.69	1.24*	1.03	1.50	1.08	.88	1.31	1.07	.88	1.31
Moderate urbanization	1.19	.99	1.44	1.09	.91	1.32	.95	.78	1.16	.95	.78	1.16
Strong urbanization	1.08	.91	1.29	1.06	.89	1.27	.99	.82	1.19	.99	.82	1.19
<i>Visiting barns</i>				4.37***	3.68	5.20	3.62***	3.02	4.35	3.84***	2.39	6.16
<i>Rules of parents</i>							.78***	.77	.80	.78***	.77	.80
<i>Rules of parents * Visiting barns</i>										.99	.95	1.05
<i>-2Log Likelihood</i>		7990.21			7689.19			6999.68			6999.61	
<i>Chi-Square</i>		1645.89***			301.02***			689.51***			.07	
<i>R<sup>2</sup></i>		.28			.32			.41			.41	

Note:

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

R-square = Nagelkerke

## Discussion

The aim of the present study was to describe the adolescents who visit barns and to explore whether visiting barns is related to binge drinking by adolescents between the ages of 11 and 18 years old. The present study is one of the few studies that explores adolescents who visit barns

and is, to our knowledge, the first to make a comparison between adolescents who do and do not visit barns. It is also, to our knowledge, the first study to examine the moderation effect of parental rules regarding alcohol use on visiting barns and binge drinking. It is known that stricter parental rules regarding alcohol use can reduce the onset and amount of binge drinking (Koning *et al.*, 2010; Moore *et al.*, 2010; Van der Vorst *et al.*, 2005; Vet & Van den Eijnden, 2007). Nothing, however, is known whether parental rules also reduce binge drinking by adolescents in barns. The current study contributes to the knowledge there is about adolescents who visit barns, by providing a comparison between adolescents who do and do not visit barns and by involving parental rules regarding alcohol use in the association of visiting barns and binge drinking. Overall, the results show that the profile of adolescents who visit barns is most likely to be male, slightly older, is less educated and lives in less urbanized areas of The Netherlands than an adolescent who does not visit barns.

In line with hypothesis 1, a positive relation between visiting barns and binge drinking was found. Adolescents who do visit barns were more likely to binge drink than adolescents who do not visit barns. This association exists after controlling for a number of background variables, such as gender, age, level of education, religion and level of urbanization. Although Mulder (2005) and Korte (2008) do not mention binge drinking but alcohol consumption instead, the conclusion can be made that the results of the current study are in accordance with the findings of the cross-sectional studies of Mulder (2005) and of Korte (2008). One explanation for the support for the association between visiting barns and binge drinking might be due to the homogeneity of the social group in the barns, where peers influence each other. Individuals adjust their drinking rates to those around them by modeling their behavior (Andrews, Tildesley, Hops & Li, 2002; Bot, 2007). This modeling is due to automatism (Bot, 2007) or to gain acceptance in the group (Oostveen, Knibbe & De Vries, 1996). This homogeneity however, can be the result of selection processes, where individuals tend to select friends on personal characteristics and who resemble themselves (Kandel, 1978). The cross-sectional data of the present study does not allow us to draw conclusions about causality. However, an observational study by Bot (2007) shows that the association between influence of peers and consuming alcohol in entertainment places still exists after controlling for selection processes. Therefore, we conclude that individuals in a barn influence each others' alcohol behavior. The same study of Bot (2007) also shows that positive expectancies and expectancies of the effects of alcohol on arousal (e.g. drinking makes me happy, enjoyable) were related to a higher amount of drinking level. This may apply for the barns. Namely, findings from the national study by Mulder (2005) shows that 'having fun' is rated as the most important social function of barns. Assumed is, that barns are more homogeneous than other entertainment places, for instance a pub. The adolescents in barns will thus be more influenced by each other. However, further research

should take other entertainment places in consideration to examine whether the adolescents who visit barns, also visit other entertainment places, for instance pubs, and to examine the differences between alcohol consumption in barns and in other entertainment places.

Secondly, the present study provides evidence for hypothesis 2. The findings indicate that stricter parental rules regarding alcohol use decreases the adolescents' likelihood to binge drink. Other studies report the same finding (e.g., Koning *et al.*, 2010; Moore *et al.*, 2010; Van der Vorst *et al.*, 2005; Vet & Van den Eijnden, 2007). A cross-sectional study by Koning *et al.* (2010) with both adolescent and parent reports, show that setting rules regarding alcohol use by parents is closely related to parental attitude regarding alcohol use and parental alcohol use, which together can be seen as parental behavior regarding alcohol use. Parents are the primary socializing agents during early adolescence (Duncan *et al.*, 2006) and parental behavior has a major influence on their offspring (Koning *et al.*, 2010). The results in the present study support social learning theories stating that adolescent behavior is often acquired from role models (Bandura, 1977). Other studies suggest that adolescents perceive their parents as having legitimate authority over safety issues such as alcohol drinking and they judge these to be matters of parental decisions, rather than personal choices (Smetana, Campione-Barr & Daddis, 2004; Smetana & Daddis, 2002). This suggests why adolescents might be open to parents' rules about drinking alcohol. However, because of the cross-sectional associations in this model, caution is required in interpreting the direction of the association. It cannot be excluded that the association between parental rules and binge drinking is reverse and that parental rules regarding alcohol use is a reacting on adolescents' involvement in alcohol use.

In contrast to hypothesis 3, no significant moderation effect of parental rules regarding alcohol use on the relation between visiting barns and binge drinking is found. It was expected that for those adolescents who visit barns, the need to binge drink would be reduced or suppressed by stricter parental rules regarding alcohol use. An explanation for the lack of the moderation effect might be due to the 'time-out' hypothesis, which suggests that entertainment places are time-out situations. Time-out situations allow individuals to perform impulsive and expressive behavior, which is socially approved or even stimulated in this specific situation, the barns (Wilks & Callan, 1988). In the time-out situation, adolescents seem to define their own norms about alcohol drinking in public drinking places, and this behavior may be inconsistent with the acquired (parental) norms. A cross-sectional study by Oostveen *et al.* (1996) on the association of social influence on adolescents' (15-24 year olds) binge drinking in public drinking places examines this time-out hypothesis. Results show that the norms of friends and family remain important whilst drinking in public drinking places. Since norms of friends and family was measured as one variable, the outcome is not clarifying. It could be that the norms of friends (who are also present in the drinking places) are more important than the norms of

family (the acquired norms), which means that the time-out hypothesis is confirmed. It could also be the other way around, which means that the hypothesis should be rejected. The present study assumes that the norms of friends will be of more influence than the norms of parents, since the Odds Ratio for visiting barns is much higher than the Odds Ratio for parental rules (see Table 1) and thus accepts the time-out hypothesis which suggests that people set their own norms in barns when away from the daily pressures. These own norms are similar to their friends' norms, which are reflected by the homogeneity in the barns.

### *Limitations and Strengths*

Although the present study has several strengths, such as the large sample size and the representativeness of the sample, there are some limitations. The cross-sectional design does not allow us to draw conclusions about causality or possible bi-directional effects between parental rules and binge drinking. It cannot be excluded that the association between, for instance, parental rules and binge drinking is due primarily to parents reacting on adolescents' involvement in alcohol use by lessening rules on drinking alcohol. A longitudinal design would help to unravel possible bi-directional effects. Further, current study used only data obtained by adolescent self-report. It might be useful to include data obtained by parent-report. Studies show that family members experience alcohol-specific socialization differently (Van der Vorst *et al.*, 2005; Van der Vorst *et al.*, 2006). This stresses the importance of being cautious about generalizing conclusions on the basis of self-reports of one person. Future longitudinal research on the influence of parental rules on binge drinking should therefore take not only adolescent self-report, but also parent-report into account. Finally, although the selected sample is representative for the population scholars between 11 and 18 years of age in The Netherlands, the results cannot be generalized to other cultures. For instance, it is unknown whether barns are present in countries other than The Netherlands. The barns in The Netherlands are quite specific and cannot be compared to other evening social venues. More international studies are needed to establish whether barns exist in other countries and if they can be compared to the Dutch barns.

### *Implications*

The findings of the present study demonstrate that, cross-sectionally, visiting barns is related to a higher likelihood of binge drinking by adolescents. Binge drinking is dangerous, especially for young people. For instance, it can cause irreparable damage to the young brain and lower the limits of adolescents by involving in delinquent or dangerous acts (Kuunders, 2006; Monshouwer *et al.*, 2008). Therefore, it is important to reduce or prevent binge drinking by adolescents. The results from this study shows new information, namely that visiting barns is a

risk factor for binge drinking. The association between visiting barns and binge drinking is explained by the influence of peers. Prevention programs specifically focused on adolescents who visit barns, can focus upon the adolescent's ability to refuse offers to drink more. However, we assume that to some extent alcohol consumption is the unintended consequence of visiting barns, measures influencing the availability and/or the drinking rate might also be an effective way to decrease heavy drinking among young people. In this context one can think of making alcoholic beverages more expensive or promoting social activities known to be associated with lower drinking rates like dancing or playing games (Oostveen *et al.*, 1996). Findings also demonstrate that strict parental rules are related to a lower likelihood of binge drinking by adolescents. However, the influence of visiting barns on binge drinking is not weakened nor strengthened by the amount of rules adolescents receive from their parents regarding alcohol use. Therefore, we reject the recommendation of involving parents, made by Mulder (2005). However, parental involvement includes more than parental rules regarding alcohol use. More research is needed to examine parental behavior in a wider context.

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