Family structure and adolescents’ binge drinking: the role of parental monitoring

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Abstract

Despite the general decline in alcohol use among adolescents, binge drinking in this age group remains a serious public health problem. The overarching aim of this study was to examine the association between family structure and adolescents' binge drinking and to what extent this association is accounted for by differences in parental monitoring. The study utilised data from the Stockholm School Survey 2014, involving 12,540 students in 9th and 11th grade in the Stockholm Municipality, Sweden. The analytical sample was restricted to 10,279 students. Descriptive statistics, cross tabulations with chi-square tests, and binary logistic regression were applied in the analyses. Controlling for sociodemographic characteristics including gender, grade, and parental education, family structure was significantly associated with adolescents' binge drinking, where binge drinking was higher among students in the non-nuclear family structure compared with those in the nuclear family structure. However, the association between family structure and adolescents' binge drinking was not accounted for by differences in parental monitoring. In conclusion, the non-nuclear family structure is a risk factor, but also high parental monitoring is a protective factor in relation to adolescents' binge drinking. Accordingly, the findings of the study may be used as a basis for preventive work.

Key words: Family structure, Nuclear family, Non-nuclear family, Adolescent, Binge drinking, Parental monitoring, Social control theory
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Introduction

Adolescents' binge drinking is considered as a major public health concern. This has been evidenced by several studies that look into alcoholism and alcohol consumption patterns among the youth (The National Institute on Alcohol Abuse and Alcoholism, NIAAA, 2004; Olsson, Brolin Låftman, & Modin, 2019). Although adolescents' drinking is on a decline (Carlson, 2019; Norström & Svensson, 2014; Pape, Rossow, & Brunborg, 2018), it remains a serious health problem in many European countries (Kask, Markina, & Podana, 2013; Kuntsche, Rehm, & Ghmel, 2004; Measham & Brain, 2005), the United States (Thiele, 2012), and Australia (Chikritzhs, Pascal, & Jones, 2004). In Sweden, adolescent binge drinking remains a major public health problem (Ander, Abrahamsson, & Gerdner, 2017; Carlson & Almquist, 2016).

The term binge generally refers to the act of drinking so much alcohol at one point in time, or in a short time, or per drinking event that leads to intoxication (NIAAA, 2004). The technical definition of binge drinking, approved by NIAAA, is the model of alcohol consumption that raises the blood alcohol concentration (BAC) to or above 0.08g/l, and that is the level of drunkenness making it illegal to drive in the United States. The level of consumption considered as binge may vary in various countries. However, in Sweden, the quantity being classified as binge drinking is proportional to drinking a bottle of wine or 18cl of liquor at any drinking event (Leifman, 2012).

There have been many findings relating to factors that are positively associated with adolescent binge drinking. Some examples in the literature include individual factors such as drinking to cope with stress or some personal problems (Lac & Donaldson, 2016), drinking for sensation-seeking or to have fun (Legrand, Gomà-i-Freixanet, Kaltenbach, & Joli, 2007; Shin, Hong, & Jeon, 2012; Zuckerman, 2007), and lack of self-discipline or low self-control (Piquero, Gibson, & Tibbetts, 2002). However, some family-related factors have been noted to play a significant role in heavy drinking among youngsters. Two of those factors include family structure and parental monitoring.

Family structure and adolescents’ binge drinking

Family structure has been found to contribute significantly to children's and adolescents' well-being (Fransson, Brolin Låftman, Östberg, Hjern, & Bergström, 2018). The risk of alcohol and
other substance use among young people have been shown to differ by the type of family structure the person belongs to (Aquilino & Supple, 2001; Barret & Jay Turner, 2005; Rüütel, Sisask, Värnik, Värnik, & Carli et al., 2014). According to previous research in Sweden on youth health risk behaviours (see Olsson and Fritzell, 2017) young people living with both parents in the same household (i.e. nuclear family) have a lower likelihood to engage in risky behaviours than those not living with both parents in the same household (i.e. non-nuclear family). Also, in another study in Sweden about familial alcohol use and the related outcome of heavy drinking among adolescents, it was noted that heavy drinking was higher among adolescents living in the non-nuclear family structures compared with those living in the nuclear family structure (Olsson et al., 2019). Additionally, in a study of teenagers in France and the United Kingdom, a statistically significant difference for adolescent binge drinking was found between nuclear and non-nuclear family structures; adolescents living with both biological parents reported less alcohol consumption than those living with single parents or one biological parent and step-parent (Ledoux, Miller, Choquet, & Plant, 2002). Furthermore, in a study about family structure and problematic substance use among adolescents and young adults in the United States, a substantially higher level of the outcome was noted in respondents from single-parents compared with those from mother-father families (Barret & Jay Turner, 2005).

Research has identified many factors that could account for the association between family structure and adolescents' binge drinking. According to Barret and Jay Turner (2005), family structure intrinsically does not stand as a single and independent determinant of problematic substance use, but rather, it is a variable that is associated with unequal distribution of some factors that contribute to problematic substance use. One potentially important factor in the association between family structure and adolescents' binge drinking is parental monitoring (Barnes, Hoffman, Welte, Farrell, & Dintcheff, 2006; Getz & Bray, 2005). To simply define, parental monitoring is the germane skills applied in parenting throughout the life stages of the child (McMahon, 1998). Parental monitoring has been conceptualised as parenting behaviours involving attention to and trailing of the doings and whereabouts of the adolescent (Fröjd, Kaltiala-Heino, & Rimpelä, 2007; Kotchick, Dorsey, Miller, & Forehand, 1999).
Family structure and parental monitoring

Many researchers have demonstrated that nuclear family composition provides a better parental relationship with children compared to the non-nuclear family type (Fransson et al., 2018; Olsson & Fritzell, 2017). In a previous study, Ledoux et al. (2002) demonstrated that parental knowledge of the whereabouts of their children on Saturday night was higher in the intact families compared with the restructured, single parents and the other family types. Indeed, the effects of family structure on parental monitoring have been identified by many studies with lower monitoring in non-intact families (Florsheim, Tolan, & Gorman-Smith, 1998; Barret & Jay Turner, 2005). However, some researchers have noted that there is no association between family structure and parental monitoring (Shek, Xie, & Lin, 2015; Smetana & Daddis, 2002). Nevertheless, the association has been shown to exist in numerous studies. For example, it has been concluded that mothers in intact-families engaged in stronger parental monitoring than those in single-mother families (Pettit, Laird, Dodge, Bates, & Criss, 2001). Besides, Shek (2008) argued that perceived parental control and parent-child relationships were better in the nuclear family structure than in the non-nuclear family structures.

Many likely factors may account for lower monitoring in the non-nuclear family structures. For example, as has been explained, a family breakup may lead to financial problems especially in the case where only one parent must take care of all the responsibilities of the child. This can result in increased paid working hours by the parent therefore monitoring of the child will be reduced due to time constraints (Shek et al., 2015). Besides, marital disruption or too much work with single parenting (i.e. unpaid household work) could lead to stress thereby affecting the wellbeing of parents and hence impacting parenting processes (Shek et al., 2015). Further, it has been shown that the presence of a father in the nuclear family household provides greater support and monitoring in adolescents (Amato, 1987). The author argued that although many children may keep a good relationship with their stepfathers or father figures, they still receive less support and guidance from them as compared to children living in the nuclear family structure.

Parental monitoring and adolescents’ binge drinking

Research has made it clear that parental monitoring is associated with both risk and protective factors of substance use behaviours among young people (Fröjd et al., 2007). In a recent survey
about the declining alcohol consumption among adolescents, increased parental monitoring
was noted to be one of the factors causing this downward trend (Törrönen, Roumeliotis,
Samuelsson, Kraus, & Room, 2019). Increased parental monitoring, therefore, becomes a
protective factor for adolescents' alcohol use as has been shown (Duncan, Duncan, Biglan, &

An important mechanism to consider is that when parental control is lower, adolescents are
likely to be influenced by peer pressure (Brown, Mounts, Lamborn, & Steinberg, 1993). A
previous study noted that peer orientation was strongly associated with alcohol use and
influenced by parenting strategies (Barnes & Farrell, 1992). A review of European studies also
found a similar association (Kuntsche et al., 2004). This means that effective parenting
strategies are needed to prevent adolescents from the negative effects of peer pressure. In a
previous study, parenting strategies with strict rules were identified to be associated with less
alcohol use among adolescents (Ryan, Jorm, & Lubman, 2010). However, other studies found
that parenting strategies with strict rules accounted for higher levels of alcohol use among
adolescents and young adults (Matheson, 2016). In a study about adolescent adjustment,
including drug use, Kerr and Stattin (2000) explained why strict parental monitoring does not
work. The authors argued that when parental control is very high, adolescents have the feelings
of being controlled, which, in turn, is associated with poorer adjustment. Despite all these
contradictions in the literature, however, parenting strategies including increased parental
monitoring (Barnes et al, 2006; Getz & Bray, 2005), parental discipline (Mogro-Wilson, 2008),
and parental disapproval of adolescent alcohol use (Nash, McQueen, & Bray, 2005; Reifman,
Barnes, Dintcheff, Farrell, & Uhteg, 1998) were all associated with reduced alcohol use among
adolescents.

Theoretical perspective

The social control theory which provides a further explanation to health outcomes in young
people posits that low levels of attachment and commitment to establishments, for instance, the
family, give rise to deviant behaviours (Hirschi, 1969). For Hirschi, it is the bond that people
form with social institutions that controls their behaviours not to engage in criminal or deviant
activities. Young people who lack these social bonds are likely to engage in delinquent and
deviant behaviours. Four types of these social bonds were identified by Hirschi. The first and
second, which are attachment and commitment respectively, according to Hirschi (1969) refer
to the level of psychological affection that one has for those he or she wants to maintain good social relations with. Parents were considered as one of the most important institutions in this regard, where young people who form close attachments with their parents may not want to commit any crime or deviant acts that may threaten their relationship with them, hence, serve as means of social control. The third type of social bond which is involvement, relates to how people spend their time. For Hirschi, when young people spend their time on legitimate or prosocial activities, it means that they are not spending their time on deviant or delinquent acts. This implies that a poor parent-child relationship is a risk factor for problematic behaviours in children. In line with this type of bond, Fröjd et al. (2007) demonstrated that parental involvement in adolescents’ life contributes to healthy development, and that protection provided by parental supervision is essential for adolescents. The authors argued that parents knowing the whereabouts and friends of adolescents is a tangible way of assessing their involvement in adolescents’ life. The final type of bond, which is belief, refers to the degree of which one stick to the values that are connected to behaviours that conform to the law. According to Hirschi, prosocial attitudes control people from deviant acts and crimes they would have committed in the absence of a social bond. Consistently, it has been argued that with good parental monitoring strategies children develop good moral values, become aware of societal norms and try to adjust their behaviours accordingly (Bogenschneider & Wu, 1998).

Empirical studies indicate that social control theory is relevant in order to understand the links between family structure, parental monitoring, and adolescents’ binge drinking. It has been demonstrated that lack of parental monitoring is associated with increased rates of alcohol use among teenagers (Ledoux et al., 2002). Parental based interventions such as parental discussions have been noted to be associated with decreased alcohol consumption among young people (Doumas, Turrisi, Ray, Esp, & Curtis-Schaeffer, 2013). Oppositely, it has been shown that adolescents who spent less time with their families had an increased risk of substance use (Adlaf & Ivis, 1996). This implies that adolescents not living with both biological parents may experience an increased likeability of problematic substance use because of the lower levels of monitoring that have been found in the non-nuclear family households as compared to the nuclear family type (Ledoux et al., 2002). However, it has been noted that the risk of exposure to binge drinking was reduced when an additional adult relative was present in a single-family household (Suh, Schutz, & Johanson, 1996). Consistent with this, Aquilino and Supple (2001) argued that higher levels of substance use among young
people were attributed to decreased parental monitoring and the absence of adult supervision. Besides, it has been demonstrated that adolescents who face the greatest risk of exposure to decreased parental monitoring are those living in households where none of their parents was present (Ledoux et al., 2002). Yet, mother-father families were noted to offer the highest level of monitoring and hence the greatest protection for adolescents’ binge drinking (Barret & Jay Turner, 2005; Suh et al., 1996).

Adolescents’ binge drinking and sociodemographic characteristics

The present study also examines how some sociodemographic characteristics such as gender, grade (the year or level of a student) and parental educational level may influence the association between family structure and adolescents' binge drinking. Many studies concerning the determinants of binge drinking among young people have investigated the gender differences in relation to the outcome. For example, a study by Piko and Vazsonyi (2004) on the influence of adolescent leisure-time dimensions on alcohol and other drug use found a positive association, in which the effect was the same for both boys and girls. However, other studies have identified that the differences between boys and girls vary across countries. For example, in a cohort study among secondary school students in Australia at age 14-15 years, more males than females reported past week binge drinking (Degenhardt, O'Loughlin, Swift, & Romaniuk, et al., 2013). Also, from the European School Survey Project on Alcohol and Other Drugs (ESPAD) in 2015 among 35 countries, substantial gender differences were identified in half of the countries where more boys than girls reported heavy episodic drinking in the last 30 days. However, there were also countries where binge drinking was more common among girls than among boys (The ESPAD group, 2016).

Regarding the effect of grade on adolescents’ binge drinking, it has been noted from numerous studies that grade is associated with both risk and protective factors. In a survey among adolescents in grade 8, 10 and 12, it was noted that binge drinking among the respondents keeps rising with increasing grade (Miech, Johnston, O’Malley, Bachman, Schulenberg, & Patrick, 2019). Similarly, it has been shown that binge alcohol use was higher among old adolescents compared with young adolescents (Hemstrom, Leifman, & Ramstedt, 2002; Substance Abuse and Mental Health Services Administration, SAMHSA, 2018). In a CDC report, the prevalence of underage binge drinking was 4% among grade 8 students and 14% among grade 12 students (Centers for Disease Control and Prevention, CDC, 2020). These are clear pieces of evidence
showing that binge drinking is higher among adolescents in higher grades than those in lower grades.

The association between parental education level and adolescents’ alcohol consumption has been examined in many studies. A previous study found no association (Wallace, Forman, Guthrie, Bachman, O’Malley, & Johnston, 1999). However, other researchers found that high parental education is associated with decreased binge drinking among children (Chalfin & Deza, 2018). Nevertheless, in a systematic review about parental socio-economic status and binge drinking among adolescents, the majority of the studies found no association between parental education and the outcome in terms of developed countries, and a weak positive association in developing countries (Kwok & Yuan, 2016).

**Aim of the study**

The overarching aim of this study is to examine the association between family structure and adolescents’ binge drinking and to what extent this association is accounted for by differences in parental monitoring.

**Research questions**

1) Is family structure associated with adolescents’ binge drinking?
2) Does parental monitoring differ by family structure?
3) Is parental monitoring associated with adolescents’ binge drinking?
4) To what extent can any association between family structure and adolescents’ binge drinking be attributed to differences in parental monitoring?

**Methods**

**Data material**

This study utilised questionnaire data derived from the Stockholm School Survey, a cross-sectional survey conducted biennially by the Department of Social Services in the Stockholm Municipality, Sweden. It is performed among all students in the 9th year of compulsory school (grade 9), ages 15-16 and 2nd year of upper secondary school (grade 11), ages 17-18. The respondents included all students who attend public schools, whereas independent (private)
schools were invited to participate but on a voluntary basis. The purpose of the survey was to measure behavioural patterns and other social outcomes among adolescents, which may help in policy-making and preventive programs. The questions covered students’ life situations, school work, drug use, etc. The current study utilised data collected from students in both grade 9 and 11 in 2014 (n=12,540). The analytical sample was restricted to those who responded to all the questions included in the analyses (n=10,279). This forms 82.0% of the total sample.

**Ethical considerations**

The Swedish ethical regulations for research were conformed to. Hence, ethical approval was considered not necessary. First, Stockholm School Surveys are performed anonymously, and participation in the study is not mandatory. Respondents are told not to write their names anywhere on the questionnaire form or the reply envelope in order to keep their anonymity. Also, no specific schools were included in the findings from the present study making ethical review not necessary. Furthermore, ethical consent from caregivers is not needed when respondents are 15 years of age and understand what participation entails (Codex, 2018).

**Variables**

Binge drinking was the main dependent variable whereas family structure was the main independent variable. Parental monitoring was included as a potential mediator. Furthermore, gender, grade and parental education were added as control variables.

**Measures**

**Binge drinking**

Binge drinking was measured using the proxy of intense alcohol use: “How often do you drink the following amount of alcohol at any one time?”: 18 cl spirits [half a “kvarting”] or a whole bottle of wine or four large bottles of strong cider/alcopop or four cans of class III beer or six cans of class II beer. Response options were [1] Do not drink alcohol, [2] Never, [3] Very seldom, [4] A few times each year, [5] A few times a month, [6] A couple of times a month, and [7] A few times a week. Answers were dichotomised into “less often” (options 1 to 4) vs “a few times a month or more” (options 5 and 6). Responses that fall under less often were classified as “not binge drinking” with the latter being “binge drinking”.

**Family structure**

**Parental monitoring**

Parental monitoring was captured with three items: 1. "Do your parents/guardians know where you are when you are out with your friends in the evening?" 2. "Do your parents/guardians know who your friends are that you're with in your spare time?", and 3. "Do your parents/guardians know what you spend your money on?" Though all the answers were slightly different across each question, they have been arranged in hierarchical order with the range 1-4 showing that "options 1" represent the highest and "options 4" being the lowest regarding parental monitoring. Based on these three items, a dichotomous variable was created. The value 1 was assigned to those who have replied 1 or 2 on all the three items (indicating high monitoring). Those who replied 3 or 4 on any of these three items were given the value 0 (indicating low monitoring). Those with missing information on any of the three items were coded as 9 and subsequently recoded as missing.

**Gender**

Gender was assessed through the question: “Are you a boy or a girl?” Response options were Boy or Girl.

**Grade**

Grade was measured by the question: “What year are you attending?” Response options were 9 or 2 at upper secondary school.

**Parental education**

Parental education was captured with the question: "What is the highest education your parents have?" Response options were [1] Old elementary school [folkskola] or compulsory school [max 9 years schooling], [2] Upper secondary school, [3] University and university college, [4] Don't know. The question was framed in a way that respondents could select an option for each parent (Mother and Father). Answers were dichotomised into "Tertiary" (at least one parent attended university), "Not tertiary" (both parents less than university, and Don't know or
missing values). This variable has been operationalised in the same way in a previous study which also utilised the Stockholm School Survey (Carlson, 2019). In that study, it was demonstrated that approximately 25% of the respondents in the analytical sample did not know (or did not answer) the questions about parental education. To check for possible biases the researcher tested for alternative statistical analyses including multiple imputations and found almost no differences between the original models and the alternative multiple imputation models (Carlson, 2019).

Statistical analyses

All analyses were performed by SPSS, version 25. Descriptive statistics of the study variables were produced in a frequency table to show how the variables were distributed within the analytical sample. Also, cross tabulations with chi-square tests were computed to identify the association between the independent variable and the dependent variable as well as the association between the independent variable and the hypothesised mediator. Further, binary logistic regression analyses of binge drinking were conducted, presenting odd ratios (OR), 95% confidence intervals (95% CI), and Nagelkerke $R^2$. Finally, descriptive statistics of the study variables (total sample) was also produced in a frequency table to show the distribution of missing variables within the total sample (see Appendix).

Analytical strategy

The assumption behind the binary logistic regression analysis was to examine the links between family structure, parental monitoring and adolescents’ binge drinking whilst adjusting also for gender, grade and parental education. The crude analyses include the association between one variable at a time and binge drinking. Model 1 included the independent variable (family structure) in addition to the control variables (gender, grade and parental education). Model 2 included the hypothesised mediating variable (parental monitoring) in addition to the control variables. Model 3 included family structure and parental monitoring as well as the control variables.

To evaluate the potentially mediating role of parental monitoring in the association between family structure and adolescents’ binge drinking, Baron and Kenny's (1986) model for mediation was followed. The first step of this model involved assessing whether there is an association between the independent and the dependent variable which, in the present study,
means the association between family structure and adolescents’ binge drinking. The second step was to assess whether there is an association between the independent variable and the hypothesised mediator. In the present study, this refers to the association between family structure and parental monitoring. The third step was to assess whether there is an association between the hypothesised mediator and the dependent variable. In the present study, this means the association between parental monitoring and adolescents’ binge drinking. The final step involved an analysis that includes both the independent variable and the hypothesised mediator. If the association between the independent and the dependent variable is attenuated and turns non-significant, there is mediation (Baron & Kenny, 1986). In the present study, this means the association between family structure (independent variable) and adolescents’ binge drinking (dependent variable) whilst controlling for parental monitoring (hypothesised mediator).

Results

Table 1 shows the descriptive statistics of all the variables that form part of the study. According to the operationalisation used in this study, 24.9% of the participants were involved in binge drinking. Most of the respondents (57.1%) were from the nuclear family structure. Approximately two-thirds of the participants (64.9%) reported high parental monitoring with approximately one third (35.1%) been less monitored. Among the control variables, categories with the higher proportions were girls (53.9%), students in grade 11 (56.8%) and students having parents with tertiary education (56.1%).

Table 1. Descriptive statistics for the study variables (n=10,279)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Binge drinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>7716</td>
<td>75.1</td>
</tr>
<tr>
<td>Yes</td>
<td>2563</td>
<td>24.9</td>
</tr>
<tr>
<td><strong>Family structure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>5871</td>
<td>57.1</td>
</tr>
<tr>
<td>Non-nuclear</td>
<td>4408</td>
<td>42.9</td>
</tr>
<tr>
<td><strong>Parental monitoring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>3607</td>
<td>35.1</td>
</tr>
<tr>
<td>High</td>
<td>6672</td>
<td>64.9</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girl</td>
<td>5545</td>
<td>53.9</td>
</tr>
<tr>
<td>Boy</td>
<td>4734</td>
<td>46.1</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>4438</td>
<td>43.2</td>
</tr>
<tr>
<td>11</td>
<td>5841</td>
<td>56.8</td>
</tr>
<tr>
<td><strong>Parental education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-tertiary</td>
<td>4509</td>
<td>43.9</td>
</tr>
</tbody>
</table>
A cross tabulation of family structure and binge drinking, presented in Table 2, indicates that binge drinking was more common among students in non-nuclear family structure (27.7%) as compared with those in nuclear family structure (22.9%). The difference between these categories was statistically significant ($\chi^2=31.02$, $p<0.001$).

**Table 2. Binge drinking by family structure (n=10,279)**

<table>
<thead>
<tr>
<th>Family structure</th>
<th>Binge drinking</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td>Nuclear</td>
<td>77.1</td>
<td>22.9</td>
<td></td>
</tr>
<tr>
<td>Non-nuclear</td>
<td>72.3</td>
<td>27.7</td>
<td>31.02***</td>
</tr>
</tbody>
</table>

***$p<0.001$  

Table 3 presents a cross tabulation of family structure and parental monitoring, indicating that the proportion of respondents with high parental monitoring was higher in the nuclear family structure (68.8%) as compared to the non-nuclear family structure (59.7%). The difference between the categories was statistically significant ($\chi^2=90.80$, $p<0.001$).

**Table 3. Parental monitoring by family structure (n=10,279)**

<table>
<thead>
<tr>
<th>Family structure</th>
<th>Parental monitoring</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td>Nuclear</td>
<td>31.2</td>
<td>68.8</td>
<td></td>
</tr>
<tr>
<td>Non-nuclear</td>
<td>40.3</td>
<td>59.7</td>
<td>90.80***</td>
</tr>
</tbody>
</table>

***$p<0.001$  

Table 4 shows the results of binary logistic regression analyses of binge drinking. The crude analyses show that, regarding family structure, adolescents living in the non-nuclear family structure were more likely to involve in binge drinking than those living in the nuclear family structure (OR 1.29, 95% CI 1.18-1.41). The difference between the categories was statistically significant at the 0.1% level. With regards to parental monitoring, adolescents who experienced low parental monitoring had higher odds of binge drinking than those who experienced high parental monitoring (OR 1.79, 95% CI 1.64-1.96); the difference was statistically significant at the 0.1% level. Furthermore, in the crude model, the odds for binge drinking were not statistically significant for gender (OR 1.01, 95% CI 0.92-1.10). Grade was highly associated
with binge drinking; the odds of students in grade 11 were almost three times higher compared to those in grade 9 (OR 2.91, 95% CI 2.64-3.22). There was a non-significant association for parental education and binge drinking (OR 1.09, 95% CI 1.00-1.20). In Model 1, including family structure as well as gender, grade and parental education, the increased likelihood of adolescents in non-nuclear families to engage in binge drinking remained roughly the same as in the crude model, with just a non-negligible reduction in the effect size (OR 1.27, 95% CI 1.16-1.39). Model 2 includes parental monitoring and control variables. The result for parental monitoring (OR 1.80, 95% CI 1.64-1.98) did not differ notably from that in the crude model. This means that controlling for gender, grade and parental education does not have any substantial effect on the association between parental monitoring and binge drinking. Also, with regards to these control variables, the associations with binge drinking are very similar to those presented in the crude analyses. Finally, in Model 3, including family structure, parental monitoring, as well as the control variables, the association between family structure and binge drinking showed only a small reduction in the effect size (OR 1.21, 95% CI 1.10-1.33). This indicates that the association between family structure and binge drinking was not mediated by parental monitoring because the association was not substantially attenuated when parental monitoring was added to the model, and it remained statistically significant.

Table 4. Binary logistic regression analyses of binge drinking (n=10,279)

<table>
<thead>
<tr>
<th></th>
<th>Crude OR (95% CI)</th>
<th>Model 1 OR (95% CI)</th>
<th>Model 2 OR (95% CI)</th>
<th>Model 3 OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family structure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear (ref.)</td>
<td>1</td>
<td>1</td>
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<td>1.21*** (1.10-1.33)</td>
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<td>0.95 (0.87-1.05)</td>
<td>1.00 (0.91-1.10)</td>
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Nagelkerke R²

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<th>Crude</th>
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<th>Model 3</th>
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<td>0.07</td>
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***p<0.001 **p<0.01 *p<0.05
Crude: includes one variable at a time.
Model 1: includes family structure + control variables (gender, grade and parental education).
Model 2: includes parental monitoring + control variables.
Model 3: includes family structure + parental monitoring + control variables.

**Discussion**

The main purpose of this study was to examine the association between family structure and adolescents’ binge drinking and to what extent this association was accounted for by differences in parental monitoring. The results indicated that family structure was significantly associated with adolescents’ binge drinking, where binge drinking was higher among students in the non-nuclear family structure compared with those in the nuclear family structure. However, the association between family structure and adolescents’ binge drinking was not attributed to parental monitoring.

**Family structure, parental monitoring and adolescents’ binge drinking**

The first research question intended to investigate whether family structure was associated with adolescents’ binge drinking. It was identified that binge drinking was more common among adolescents from the non-nuclear family side compared with their other counterparts. The difference between the categories was statistically significant. This means that young people living with both biological parents are less likely to binge drink while those who are not living with both biological parents are more likely to binge drink. This has been evidenced by several studies that investigate family situations and adolescents’ health risk outcomes (Barret & Jay Turner, 2005; Olsson & Fritzell, 2017; Rüütel, et al., 2014). However, family structure as such does not stand as a single and independent determinant of problematic substance use, but rather, it is a variable that is associated with unequal distribution of some factors that contribute to this problem (Barret & Jay Turner, 2005). One potentially important factor in the association between family structure and adolescents' binge drinking is parental monitoring (Barnes et al., 2006; Getz & Bray, 2005).

The second research question intended to investigate the differences in parental monitoring by family structure. The results showed that the proportion of respondents with high parental monitoring was higher in the nuclear family structure as compared to the non-nuclear family structure. The difference between the categories was statistically significant. Other studies also came up with similar conclusions (Ledoux et al., 2002; Pettit et al., 2001). An important mechanism that was noted to contribute to most of the differences in monitoring by family structure.
structure was due to single parenting on childbearing. For instance, time resource is a very important factor to consider when talking about responsible parenting. Single parenting contributes to lower monitoring levels of children as compared to mother-father parenting because of time factors. This could be explained by some of the negative consequences of divorce or family breakup on single parenting which include financial problems especially when all the responsibilities of the child are loaded on one parent. This may lead to increased paid working hours by the parent. In this case, monitoring of the child will be reduced due to time constraints (Shek et al., 2015). Also, another problem with single parenting is “stress” due to too much work (i.e. unpaid household work). This may affect the wellbeing of parents and hence impacting parenting processes (Shek et al., 2015). This means that other than single-parent families, the non-nuclear family structure may provide effective monitoring because of other family members in the household that could provide support and guidance to the children. It has been argued that the presence of adult supervision in a single-parent household provided the same level of monitoring like the mother-father families (Suh et al., 1996). However, the nuclear family structure has been demonstrated to provide better parental monitoring than the non-nuclear family structure. For instance, it has been noted that many children maintain a good relationship with their stepfathers or father figures, but the support and guidance they receive from them is less as compared to children living in the nuclear family structure (Amato, 1987).

The third research question aimed to examine whether parental monitoring was associated with adolescents’ binge drinking. It was noted that adolescents who experienced low parental monitoring had higher odds of binge drinking than those who experienced high parental monitoring, with the difference being statistically significant. These findings were in line with other previous studies (Barnes et al., 2006; Getz & Bray, 2005). Also, consistent with these findings is the social control theory (Hirschi, 1969) which suggests that young people who experience poor parental relationships have an increased probability to engage in risky behaviours. One possible mechanism that could provide an explanation to this is the fact that adolescence is a recognised critical period during which peer influences become stronger and at this stage adolescents believe that doing what friends do is the best way to fit in the society. Therefore, when parental control is lower, peer influences may take over and this means that adolescents are likely to affiliate and copy the lifestyles of their friends (Brown et al., 1993). Peer orientation, however, is strongly associated with adolescents' binge drinking (Barnes &
Farrell, 1992). This is a possible pathway which shows that low parental monitoring is a likely risk factor of adolescents’ binge drinking and that parents have to adopt effective parenting strategies to prevent their children from the negative effects of peer pressure. In a previous study, parenting strategies with strict rules were identified to be associated with less alcohol use among adolescents (Ryan et al., 2010). However, other studies found that parenting strategies with strict rules accounted for higher levels of alcohol use among adolescents and young adults (Matheson, 2016). These contradictions in the findings could, in part due to how the parental monitoring variable has been conceptualised or measured. According to Kerr and Stattin (2000), parental monitoring has been conceptualised as tracking and surveillance, however, has been operationalised as knowledge of daily activities, which is obtained through adolescents' disclosure of information. They concluded that high parental monitoring was associated with good adjustment. But the explanation to this association was, in large part, due to children's disclosure of information rather than how parents' tracking and surveillance efforts did. The assumption was that when parental control is very high, adolescents have the feelings of being controlled, which, in turn, is associated with poorer adjustment. Also, in another study (Barnes & Farrell, 1992), parental monitoring was part of parental control scales and was operationalised as adolescents' disclosure of information and parents' knowledge about this information. The other three scales were related to parenting strategies intended to control children's behaviour, including coercive control, inductive control and specific rules for behaviour. Among all these four scales, parental monitoring was the strongest and uniform predictor for adolescents' outcomes and higher levels of parental monitoring were associated with lower levels of alcohol consumption, other substance use and deviant behaviours.

The last research question aimed to examine whether the association between family structure and adolescents’ binge drinking was attributed to differences in parental monitoring. The results from binary logistic regression analyses indicated that the association between family structure and adolescents’ binge drinking was not accounted for by differences in parental monitoring because the association was not substantially weakened, and also remained statistically significant when parental monitoring was added to the model. As shown in the literature other possible mechanisms could rather be attributed to the association between family structure and adolescents' binge drinking.

*Other possible mechanisms*
Problematic alcohol use in the family is one important factor that has been noted to be associated with risky alcohol consumption among young people (Bonomo, Coffey, Wolfe, Lynskey, & Bowes et al., 2001; Olsson et al., 2019). Adolescents who have been exposed to a drunken family member engaged in early alcohol initiation and problematic alcohol use than those who were not exposed (Rüütel et al., 2014). This is possible because children could get access to alcohol at home and may be tempted to drink (SAMHSA, 2018). Children coming from the non-nuclear family structure are more vulnerable because familial substance use has been shown to be less common among the nuclear family type than among the other family types. For example, a higher level of substance use was found among divorced parents than in married couples (Power, Rodgers, & Hope, 1999). On the other hand, parental alcohol use was noted to have no relationship with problematic alcohol use among young people (Havey & Dodd, 1993). Nonetheless, it has been shown that parental alcohol behaviours are strongly associated with alcohol socialization process (Noll, Zucker, & Greenberg, 1990). This is in line with the findings that adolescents living with both birth parents have higher rates of abstinence from alcohol use compared with those living in the non-nuclear family types due to their lower exposure to familial alcohol use (Rüütel et al., 2014).

Also, the family structure difference in adolescents’ binge drinking may be explained by the stress exposure experienced by adolescents. According to Turner and Lloyd (2003), stress plays an important role in risky substance use. Stress has been demonstrated to be higher among adolescents in single-parent families due to their exposure to economic deficits (Gore, Aseltine, & Colton, 1992). Children who live in single-parent families have been shown to experience greater stress than those who live in the same household with two custodial parents because of their less access to resources (Fransson et al., 2018). Stress due to family situations had been explained to be caused by perceived discrimination against children from broken homes (Barret & Jay Turner, 2005). Despite the little attention about this explanation in the literature, however, it has been argued that children from divorced or separated homes feel some form of discrimination which, in turn, is associated with problematic substance use (Whitbeck, Hoyt, McMorris, Chen, & Stubben, 2001).

Additionally, the family structure difference in adolescents' alcohol use may be accounted for by differences in perceived social support, which was noted to be significantly higher for adolescents from the nuclear family side compared with their other counterparts (Barret & Jay
Turner, 2005). Social support has been argued to be a protective factor against adolescent substance use (Wills, Resko, Ainette, & Mendoza, 2004). Similarly, social support has been demonstrated to be an important component of well-being (Cohen & Wills, 1985; Kort-Buttler, 2010). For instance, children in non-nuclear families are being exposed to financial difficulties (Shek & Leung, 2013), and that social support may buffer against the effects of such stressors on the risk of e.g. alcohol use (Cohen & Wills, 1985). In a previous study among 24 countries, it was noted that children living with both biological parents had higher social support, more material resources and good health than those living with single mothers (Brolin Låftman, 2010). A good explanation for this is the concept of social condition as a fundamental cause of diseases and the risk of developing negative behavioural patterns (Link & Phelan, 1995).

Regarding the social inequalities in health, it has been explained that different groups will have different experiences of material conditions, psychosocial support and behavioural choices making them more or less susceptible to poor health (Commission on Social Determinants of Health, 2008). Thus, adolescents from non-nuclear families become more vulnerable because research has shown that socioeconomic status (in terms of income) was higher in the nuclear family type than in all the non-nuclear family types (Fields, 2003). Children with lower social support networks and less access to resources are associated with lower self-esteem (Kort-Butler, 2010) and an increased risk of stress exposure (Barret & Jay Turner, 2005). Thus, perceived social support becomes a protective factor since it has been shown to reduce the negative effects of stress (Hamdan-Mansour, Puskar, & Sereika, 2007) which include binge drinking (NIAAA, 2004).

Despite some of these factors identified in the literature and a large number of studies that examine the association between family structure and adolescents' binge drinking, however, the empirical grounds connecting family structure and adolescents’ binge drinking stays inconclusive. This could be due to methodological weaknesses associated with many of these studies, by utilising non-random sample procedures and small sample sizes, hence limiting the external validity of the findings. Also, many of these studies are based on cross-sectional design and that many of the causal links are established on theoretical rather than empirical explanations. Therefore, there is a need for robust longitudinal studies on this topic.

Adolescents’ binge drinking and sociodemographic characteristics
Additionally, the present study investigated the associations between adolescents’ binge drinking and sociodemographic characteristics (gender, grade and parental education).

Regarding gender differences, the results showed the same effect for both boys and girls. In line with these findings, other studies also came into the same conclusion (Piko & Vazsonyi, 2004). However, other studies found contradictory results. For example, in a study among young adolescents in Australia, binge drinking was found to be higher in males than in females (Degenhardt et al., 2013). There is no consistent pattern in the gender difference in binge drinking across countries because, in a survey among different countries, binge drinking was the same for both boys and girls in some countries, higher for boys in some countries and higher for girls in some countries (The ESPAD group, 2016). Hence, this is a knowledge gap where other researchers could find explanations for these variations.

Regarding the association between grade and adolescents’ binge drinking, the results showed that binge drinking was more common among students in grade 11 compared to students in grade 9. It was noted that almost all the studies reviewed were consistent with these results where binge drinking was lower among young adolescents or students in lower grades compared with old adolescents or students in higher grades (CDC, 2020; Hemstrom et al., 2002; Miech et al., 2019; SAMHSA, 2018). An obvious explanation for grade differences in binge drinking may be due to alcohol control policies making underage drinking illegal and therefore restricting and limiting underage access to alcohol (The ESPAD group, 2016). In the present study, almost all the students in grade 9 were below 18 years making them form part of the restricted group while a substantial portion of the students in grade 11 have reached 18 years and have the right to purchase alcoholic beverages in some places.

Regarding parents' education and adolescents' binge drinking, the results showed no significant association between these two variables. Since research has argued that high socioeconomic status contributes to good health and a protective factor for risky behaviours (Link & Phelan, 1995), it was expected that children having parents with tertiary education would engage in less binge drinking compared with those having parents with no tertiary education. A previous study found that high parental education is associated with decreased alcohol consumption levels among young people (Chalfin & Deza, 2018). However, in line with the present study, parental education was found not to be significantly associated with adolescents’ alcohol use.
(Bosque-Prous et al., 2017; Wallace et al., 1999). This implies that socioeconomic inequalities in youth drinking may arise from other factors rather than parental education.

**Strengths and limitations of the study**

The present study has some methodological strengths and limitations. A major strength of the present study is attributed to the data material, which involves a large sample size of students in the Stockholm municipality. Also, the approach used in operationalising binge drinking in this study was accurate since it has been approved by other researchers (Lac & Donaldson, 2016). In this approach, binge drinking was classified as constant alcohol binging in many drinking events. According to the researchers, binging alcohol once a while or occasionally is not enough to tag a person as a binge drinker, despite the potential of reasonable consumption on most of the drinking events.

However, there are some limitations identified in the present study. First, the results are likely to be influenced by both internal and external non-response, which could limit the internal and external validity of the study. As estimated by the Stockholm City Administration, the external attrition in the Stockholm School Survey 2014 is 24% (Stockholm School Survey, 2014). However, since the characteristics of the non-responders are not known, it is difficult to draw any conclusions about any possible bias.

Also, looking at the descriptive statistics of the total sample (see Appendix), it shows that some categories among the study variables were underrepresented (see Table 1). These categories include non-nuclear family structure, boys, students in grade 9, and students not having parents with tertiary education. This could affect the internal validity of the study. It has been shown that attrition counteracts the internal validity of the study in case the attrition patterns are related to either the dependent or independent variable (see Barry, 2005). Again, some of the variables had high missing categories due to internal non-response (see Appendix), which could also affect both the internal and external validity of the study.

Secondly, the data were based on self-report measurements, which could result in over or underestimation of binge drinking but also the other measures e.g. parental monitoring. However, it has been explained that self-report measurements could be valid if only the respondents understood the questions (McHugh, Sugarman, Kaufman, Park, Weiss, &
With the Stockholm School Survey, there is a high possibility for the respondents to understand the questions because of their age and the process of answering the questions which have been supervised. Furthermore, there is evidence that self-report measures on sensitive information like substance use are valid and reliable. The hypothesis is that when confidentiality and anonymity are assured, it would compensate respondents to give accurate information without any distortion (Harrell, 1997). One limitation concerning adolescent self-reports is, however, the fact that adolescents do not always have adequate knowledge about their parents’ education (Lien, Friestad, & Klepp, 2001). This is reflected in the present study through the fact that large numbers skipped the questions on parents’ education or answered, “don’t know”.

Third, in the Stockholm School Survey private schools are invited to participate but on a voluntary basis. This implies a non-random sampling procedure, hence the results obtained might not reflect a true estimate of the corresponding population parameter (Campbell, MacHin, & Walters, 2007).

Finally, because the present study is cross-sectional, it is not possible to deduce any causal trajectories between family structure and adolescents’ binge drinking. A related limitation here concerns omitted variable bias – i.e. there may be some underlying factor which is associated with both family structure and binge drinking, which may explain the associations found, for instance, economic adversity in the household.

Conclusions

The present study conducted among students in 9th and 11th grade in the Stockholm Municipality examines the association between family structure, parental monitoring and adolescents' binge drinking. The findings indicate that first, family structure is significantly associated with adolescents' binge drinking, where binge drinking is higher among adolescents from the non-nuclear family structure as compared to adolescents from the nuclear family type. Second, family structure is significantly associated with parental monitoring, where adolescents from the nuclear family structure experience higher monitoring compared with those from the non-nuclear family type. Third, parental monitoring is significantly associated with adolescents' binge drinking, where adolescents who experience higher monitoring are less likely to binge drink compared with their other counterparts. Finally, the findings show that the
association between family structure and adolescents' binge drinking is not accounted for by differences in parental monitoring. The present study also investigates how the sociodemographic characteristics of adolescents influence binge drinking by controlling for respondents' gender, grade and parents' educational level. About the findings, only grade is significantly associated with binge drinking, where students in grade 11 are more likely to binge drink compared with students in grade 9.

In general, despite the gross decline in adolescents’ alcohol use since the past two decades, the results from the present study suggest that adolescent binge drinking should be considered as a major public health problem because the proportion of students who engage in binge drinking is rather substantial. Also, it is relevant for responsible stakeholders to know that the non-nuclear family structure is a risk factor, but also that high parental monitoring is a protective factor in relation to adolescents’ binge drinking. Accordingly, the findings of the study may be used as a basis for preventive work.

Acknowledgements

I am very thankful to my supervisor Sara Brolin Låftman for her support and guidance throughout the process of this thesis. I also give many thanks to my elder brother Bright James Nyarkoh for his support and motivation throughout my academic journey. This thesis is dedicated to you.


The validity of self-reported drug use: Improving the accuracy of survey estimates. 


### Appendix

**Descriptive statistics for the total sample (n=12,540)**

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