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# The Non-drinking Adolescents – What Characterizes them based on Psychological Health, Social relations, and Attitudes towards Alcohol?

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# The Non-drinking Adolescents – What Characterizes them based on Psychological Health, Social relations, and Attitudes towards Alcohol?

This study investigated if non-drinking adolescents distinguished from drinking adolescents in psychological health, social relations, and attitudes towards alcohol. Also, if these attributes in 9th grade could predict non-drinking two years later. Longitudinal data over four data collections on ($N =$ 601) Swedish adolescents were collected through surveys from the longitudinal research program on adolescent development, LoRDIA. Comparative statistics showed non-drinkers ($n = 195$) had more internalizing problems, less externalizing problems, less positive attitudes towards alcohol, fewer friends and spent less time with their friends, than drinkers ($n = 406$). Regressions showed internalizing problems increased the probability and externalizing problems, positive attitudes towards alcohol, more days spent with friends per week reduced the probability of non-drinking two years later. Results concludes that alcohol's social position for Swedish adolescents has *not* changed, given that characteristics to non-drinkers remained stable over time.

Alcohol consumption among Swedish adolescents have been decreasing since the millennium shift (Pennay et al., 2018) and studies have indicated a decline of alcohol intake regardless of sociodemographic and cultural contexts (Brunborg et al., 2014; Norström & Raninen, 2018). Additionally, non-drinking adolescents is becoming an increasingly common phenomenon in the Swedish society (Norström & Svensson, 2014; Raninen et al., 2014). Whilst 90% of the 9th graders consumed alcohol 50 years ago, 36% of the 9th graders consumed alcohol in 2021 (Gripe, 2021). Beyond Sweden, the declining trend of adolescent's alcohol consumption has been noted in research from different parts of the world (de Looze et al., 2015; Kraus et al., 2018; World Health Organization [WHO], 2018). However, research up to now have not distinguished underlying factors to this trend (Carlson, 2019; Pennay et al., 2018). In aim to find explanations, several hypotheses have been empirically tested (Bhattacharya, 2016). For example, Gripe et al., (2018) questioned if alcohol had been replaced with cannabis but could not see an association with the declining trend of alcohol consummation within the Swedish adolescent population. Above that, the most frequent and globally investigated topics in relation to the phenomena were according to Pape et al., (2018) technology's influence, immigrations influence, changes in parenting style, changes in the social/cultural climate, political changes, and economical changes.

The hypothesis regarding technology/social medias and computer gaming's impact on adolescent drinking-patterns assumes that adolescents are less exposed to real-life interactions (involving alcohol situations), due to socializing/gaming on internet-based channels and that this significantly affects alcohol consumption (Pape et al., 2018). One may argue that this is a logical suggestion to explore, as alcohol consumption amongst adolescents decreased at the same time-period as social communication networks and video/computer gaming increased (de Looze et al., 2015; Bjereld et al., 2017). Studies focusing mainly on computer/video gamers have shown mixed support for this hypothesis (Coëffec et al., 2015; Halkjelsvik et al., 2021; Epstein et al., 2011; Van et al., 2014). For example, one study by Larm et al. (2019) showed a

positive correlation between gaming on the weekends and non-drinking amongst Swedish boys in 9th grade cross-sectionally, but the association could not be seen throughout a four-year-period of time. Another example is the suggestion by Van Rooij et al. (2014), that boys who reported high "problematic" videogaming were twice more likely to use alcohol, nicotine, or cannabis than those who did not play at this problematic level. Other studies suggested that social network sites had contributing effects to adolescents' alcohol consumption, meaning that it promoted to underage drinking (Brunborg et al., 2017; Gommans et al., 2015; Kraus et al., 2016).

Rogne et al. (2019) studied immigration in relation to adolescents drinking patterns and revealed that immigrants explained one-fifth of the decline in heavy episodic drinking amongst adolescents in Norway, but that the natives drinking pattern mattered more than the immigrants. In similar, Svensson and Andersson (2018) could not see an association between immigration and the increase of non-drinking adolescents amongst the Swedish adolescent population. Beyond this, there has been limited studies investigating the immigration hypothesis empirically, whereas publicized results do not indicate reliable support (Pape et al., 2018).

Stricter parenting styles, regarding underage-drinking have been associated with less inebriation amongst adolescents in studies by Sharmin et al. (2017) and Yap et al. (2017). Further research have also shown that adolescents who spent more time with their parents drank less (Kim et al., 2019). However, Raninen and Livingston, (2018) did not find supporting results and taken together, the hypothesis alone does not seem to explain the general downward trend of adolescent alcohol consumption according to Bhattacharya (2016) and Pape et al. (2018).

Additional (globally proposed) hypothesis has involved politics, economical and policy-driven changes, such as age limits and stricter laws etc. (Andersen et al., 2014; Pennay et al., 2015; Trolldal et al., 2020) and that this would explain the downward trend of adolescent's alcohol consumption. In Sweden, the legal drinking age is 18 years old. Systembolaget's social mission includes informing about the risks of alcohol and its damaging impacts on adolescent brains (Systembolaget, 2021). Systembolaget also cooperates with the police in attempt to stop illegal trade and give parents tools and arguments, to prevent them from providing their children with alcohol (IQ, 2021).

In the Swedish context, despite the trend of more non-drinkers, adolescents also start drinking at a later age than before (Guttormsson & Zetterqvist, 2019). In 2021, 71% of high school girls and 64% of high school boys were classified as alcohol consumers. In 2004, the figures were around 90% for both sexes (Gripe, 2021). In line with other countries (Keyes et al., 2012; Livingston, 2014), this indicates that the age of onset has been postponed over the past 20 years, both among 9th graders and high school students in Sweden (Gripe, 2021). In addition, Gripe, (2013) suggested that a delayed onset in parallel with changes in the normative climate contributed to the decreased trend of adolescent alcohol consumption seen in the Swedish society. Törrönen et al. (2019), interviewed Swedish adolescents about alcohol consumption and the age of onset and suggested that alcohol consumption no longer was an equally strong symbol of growing up and that the adolescents were more reflective and responsible, in comparison to earlier generations.

Regarding previous research on the non-drinking Swedish adolescent, the field has mainly suggested a number of social attributes associated to the characteristic of a non-drinker. These are generally that they had more problems in social relationships in comparison to drinkers (Kivimäki et al., 2014), felt less close to their friends (Lund & Scheffels, 2019), had fewer friends (Kivimäki et al., 2014) and that they struggled more to find new friends (Hoel et al., 2004; Larm et al., 2018). Demant and Järvinen (2011) also proposed that non-drinkers differed on different social aspects in comparison to drinkers, whereas they did not take part in the current social normative climate. Above this, previous research have indicated that non-drinkers performed better in school and were associated with health benefits, such as high

wellbeing and high life satisfaction (Larm et al., 2018). However, resent research (Raninen & Livingston, 2018) have questioned these earlier theories and assumptions regarding the characteristics of the non-drinking adolescents. A resent cross-sectional study by Raninen et al. (2021) proposed that Swedish adolescent non-drinking 9th graders in contradiction to earlier research (Hoel et al., 2004; Larm et al., 2018) did not differ in social abilities in relation to drinkers and, on the contrary, had more *prosocial* behavior than drinkers. Prosocial behavior is described as a moral behavior, characterized by sharing, helping and cooperation with others, and is fundamental for engaging social relations (Ding et al., 2018). Thus, Raninen et al. (2021) argued that the social marker of alcohol consumption amongst 9th graders in Sweden had shifted, meaning that drinking was not the norm anymore (like it was in previous generations) and that non-drinkers sociability was not affected by their non-drinking status (like they seemed to be in previous generations). They also argued that the scientific research field is outdated as regards for knowledge about non-drinkers in a modern time (Raninen et al., 2021). This study argues that a contribution through longitudinal research on the same non-drinking adolescents over different psychological and social attributes is required to further comment on the social position of alcohol within the Swedish adolescent population. In addition, a measure on adolescents' attitudes towards alcohol would be extensive to previous research (Törrönen et al., 2019) in aim to investigate how adolescents relate to alcohol in relation to their own perception of it.

The present study will examine the same generation of adolescents as the study by Raninen et al. (2021), though capture them at a younger age and follow them longitudinal up to age 17. By measuring another sample from the same population (i.e., children born in 2001), would the outcome be similar on psychological health and social relations? Since Raninen et al. (2021) determined that it is *more* norm-breaking to drink at the age of 15-16 today (when in 9th grade), it would be interesting to also study an older age group where the expectation is that the majority are drinkers (i.e., two years later). This is important to study because even though the non-drinking group has grown (Pennay et al., 2015), there is a gap in the literature examining non-drinking adolescents longitudinally. Some research has shifted focus from examining what characterizes those who drink, to examine those who do not drink during their adolescent years (Lund & Scheffels, 2019; Scheffels et al., 2020), but longitudinal studies on psychological health, social relations and alcohol attitudes on the adolescent Swedish non-drinkers, taking this updated information into consideration (i.e., postponed age and change in alcohols cultural position) is still absent within the scientific literature.

The first aim of this study was to examine the characteristics of Swedish adolescent non-drinkers between the ages of 12 – 17. The second aim was to analyze if psychological health, social relations, and attitudes towards alcohol in 9th grade could predict non-drinking two years later. By measuring the same adolescents both cross-sectionally and longitudinally, the two research questions were:

1. Do non-drinking adolescents differ from drinking adolescents in psychological health, social relations, and attitudes towards alcohol?

2. Can psychological health, social relations, and attitudes towards alcohol in 9th grade predict non-drinking in the second year of high school (two years later)?


# Method


This study was performed using data that was originally collected within the framework of the five-wave longitudinal program "Longitudinal Research on Development in Adolescence (LoRDIA)". The primary purpose of the project is to examine adolescents over

time with particular focus within social networks, school attendance, wellbeing, mental health, alcohol use and drug consumption. Data from four of the total five data collections were used as foundation for the present study.

## Participants

This study used longitudinal data over four data collections: Adolescent surveys from timepoint 1 (T1) ($n$ = 1515, 12.5 years), timepoint 2 (T2) ($n$ = 1467, 13.3 years), timepoint 3 (T3) ($n$ = 1322, 14.3 years) and timepoint 4 (T4) ($n$ = 949, 16.9 years). The analytical sample of this study included those adolescents who had answered the question "Have you ever been drinking alcohol? (Do not count light beer or weak cider) (No/Yes)" throughout all the measured timepoints (T1, T2, T3, T4) within the LoRDIA-program. Those who had not answered the above question at any of the measurement occasions were automatically excluded (79 individuals from T1, seven individuals from T2, 13 individuals from T3 and 3 individuals from T4). The analytical sample for the present study accordingly resulted in 601 participants (245 boys and 356 girls). The mean age at T4 was 16.0 ($SD$ = 0.4) where 32% answered "No, I have *never* been drinking alcohol" throughout all (4) timepoints and were therefore identified as "non-drinkers". The remaining 67% answered "Yes, I have been drinking alcohol" in T1 and/or T2 and/or T3 and/or T4 were identified as "drinkers". For an overview, se Figure 1.
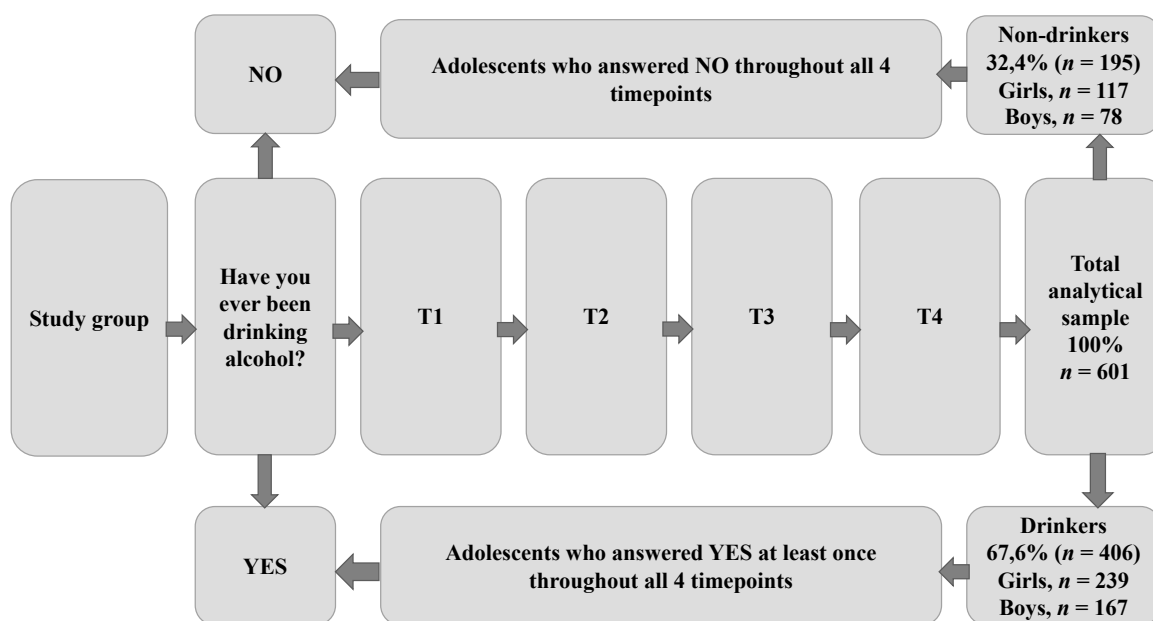


*Figure 1*. Flowchart representation of the analytical sample.

## Procedure

This study was performed within the framework of the research program Longitudinal Research on Development in Adolescence (LoRDIA), consisting of data from four different timepoints (T1, T2, T3 and T4). The first data collection (T1) started in 2013, when the participants from the two age cohorts were about 12 and 13 years old and followed up yearly

until 2017 and 2018, when the participants were about 17 years old. Before participation could take part, a written consent was collected, and brief information were given about the purpose of the study. The participants who were younger than 15 years of age at the time of participation, were in addition also required to have a participant's approval from their parents. The participants answered the questionnaires during school hours in their classroom, whilst researchers within the project were present to answer questions and similar. The survey took approximately 1-2 hours to complete, consisting of about 350 questions in total. Responsible for the data collection were scientists within the project with guidance from the initiator and chief executive of the LoRDIA-project Arne Gerdner (Professor of Social Work, Phd in Psychiatry). For a more in-depth presentation of the procedure regarding the data collection, go to Boson (2016, 2018). The research program has been approved by the Region Research Ethics Board in Gothenburg, Sweden (Case number: 362-13)

## Measures

**Drinking status.** Drinking status was measured with the question "Have you ever drunk alcohol, more than just one single sip (don't count light beer or weak cider)" with the response alternative "Yes/no" in T1, T2 and T3. In T4 the participants were asked "How often do you drink alcohol?" With response alternatives; "Never/Once a month/2-4 times a month/2-3 times a week/4 times per week". The answers were dichotomized for every measuring occasion into: No = 1, and Yes = 0. Additionally, to look at these groups independently, a binary variable was created, containing all those who answered (1) No throughout all (4) test occasions and those who answered (0) Yes at least once throughout all (4) test occasions. This question was originally structured within the Swedish Council for Information on Alcohol and Other Drugs (CAN) annuals study of Swedish school students' drug and alcohol habits (Gripe, 2013), which are based upon the Swedish government's ANDT strategy (Ministry of Social Affairs, 2013).

**MHC-SF**. Mental health was measured with the Swedish version of the scale, Mental Health Continuum Short Form (MHC-SF; Boson, 2015). MHC-SF was originally created by Keyes (2009) and validated by Lamers et al. (2011). The scale contains 14 statements that fallow from the question "How often, during the last month have you felt…?", in purpose to measure emotional, social, and psychological wellbeing. Three items aim to target emotional wellbeing, six items to target psychological wellbeing, and five items to target social wellbeing. MHC-SF can additionally be divided into different subscales depending on the aims of interest. Thus, for the purpose of the present study, it was used as its whole to capture the adolescent's mental wellbeing in a broader spectrum. Example of items are: "How often during the last month have you felt happiness/joy?", How often during the last moth have you felt that you have something important to contribute to society?" and "How often during the last month do you feel that you can handle everyday demands?" The ratings were the following: 0 = never, 1 = 1-2 times per week, 2 = approximately one time per week, 3 = approximately 2-3 times per week, 4 = almost every day and 5 = every day. The total amount of mental wellbeing was calculated by the mean score of the 14 items (that range from 0 to 70), whereas a higher score indicates higher mental wellbeing. The scale was used in T3 and T4 and showed a slight high internal consistency in both T3($a$ = .95) and T4 ($a$ = .93).

**SDQ-S**. Psychological problems was measured with the Swedish version of The Strengths and Difficulties Questionnaire (SDQ-S; Goodman & Goodman 2009; Lundh et al. 2008). SDQ-S is validated and commonly used (Malmberg et al. 2003; Smedje et al. 1999), consisting of 25 items on psychological attributes that fallow from the question "How do the following statements correspond how you are as a person?" to explore emotional, peer-

relational, prosocial and hyperactivity behaviors and problems. The scale was divided into three different subscales; internalizing problems; externalizing problems and prosocial behavior, which is also how the scale is preferred to be used in low risk, general population samples (Goodman et al., 2010).

Internalizing problems contains five items regarding emotional symptoms and five items regarding peer-relational problems. Examples of items are "I worry a lot" and "I have one or several friends". The ratings were the following: 0 = incorrect, 1 = partly correct, 3 = totally correct. The total amount of internalizing problems was calculated by the mean score of the 10 items (that range from 0 to 20). A higher score indicates a higher general internalizing problem. The scale was used in T1, T3, T4 and Cronbach's alphas at T1/T3/T4 were $a = .56/.73/.70$.

Externalizing problems contains five items regarding conduct problems and five items regarding hyperactivity problems. Example of items are "I get very angry and often lose my temper" and "I am restless. I can't be still a long time". The ratings were the following: 0 = incorrect, 1 = partly correct, 3 = totally correct. The total amount of internalizing problems was calculated by the mean score of the 10 items (that range from 0 to 20). A higher score indicates a higher general externalizing problem. The scale was used in T1, T3, T4 and Cronbach's alphas at T1/T3/T4 were $a = .58/.75/.76$.

Prosocial behavior is a positive scale that only contains 5 items regarding prosocial behavior. Examples of items are "I often share with other people" and "I try to be nice to other people". The ratings were the following: 0 = incorrect, 1 = partly correct, 3 = totally correct. The total amount of prosocial behavior was calculated by the mean score of the 5 items (that range from 0-10). A higher score indicates a higher general prosocial behavior. The scale was used in T1, T3, T4 and Cronbach's alphas at T1/T3/T4 were $a = .66/.64/.67$.

**Attitudes towards alcohol.** Attitude towards alcohol is a positive scale and was measured in LoRDIA by seven statements at T3 and T4: (1) Alcohol generally has a positive effect on people (makes them feel good, happy), (2) Alcohol can both help and harm how well a person works with others (makes them want to have fun together/makes them mean to others), (3) Alcohol makes people think better and strengthens their coordination (people understand things better/do things better), (4) Alcohol improves sexuality (more enjoyable/feels more romantic and sexy/makes it more easy to have sex), (5) alcohol makes people feel stronger and more powerful (easier to fight/speak in front of others/stand up for others) and (6) Alcohol helps people relax, feel less tense and to stop thinking about their mistakes at school/work. The ratings were the following: 0 = totally not correct, 1 = not correct, 3 = uncertain, 4 = correct, 5 = absolutely correct. The total amount of positive attitudes towards alcohol was calculated by the mean score of the 6 items. A higher score indicates a more positive attitude towards alcohol use. Cronbach's alphas at T3/T4 were $a = .70/.70$.

**Social Relations.** Social relations were measured with two different questions that are originally part of constructed and validated scale that explores social activities within adolescents and children (Arvidsson, 2013; Arvidsson et al., 2012; Kerr & Stattin, 2000; Stattin & Kerr, 2000). The first question was: How often do you make new friends? The ratings were: 1 = seldom, 2 = sometimes, and 3 = often. This question was used in T1, T2, T3 and T4. The second question was: During a regular week, how many days do you usually spend with friends? The ratings were: 1 = never, 2 = less than one day per week, 3 = one day per week. This question was used in T3 and T4.

## Statistical Analyses

Descriptive comparisons with t-test and chi-square tests were made between non-drinkers and drinkers on the independent variables (psychological health, social relations and

attitudes towards alcohol) and the confounding variables (age, gender, cannabis use, computer use, parents' educational level and religion). Information about effect sizes were estimated by Cohen's *d* for independent sample t-test and can be interpreted as .20 = small effect, .50 = medium effect, and .80 = large effect (Cohen, 1988). Information about effect sizes were estimated by Cramér's *V* for chi-square and can be interpreted as <0.20 = small effect, .20 - .39 = medium effect and .40 - .59 = large effect (Rea & Parker, 2014). The total study sample (*n* = 601) did expectedly not answer all research questions, but the ones who did not were kept in the dataset and included in all analyses, thus reported as "intern missing" to that specific item. To explore predictors for the non-drinking group, two different models of binary logistic regressions were computed. The first without confounding variables (model 1), the other with confounding variables (model 2). Information about effect size (OR) were included. Before the logistic regressions, analyses in terms of a crosstabulation to explore multicollinearity were made, along with analyses for inspections of outliers by standardized residuals. Preliminary analysis further suggested that the assumption of multicollinearity was met regarding all seven independent variables (SDQ internalized, *Tolerance* = .59, *VIF* = 1.69; SDQ externalized, *Tolerance* = .75, *VIF* = 1.32; SDQ prosocial, *Tolerance* = .32, *VIF* = 1.21; How often do you make new friends?, *Tolerance* = .85, *VIF* = 1.16; During a regular week, how many days do you usually spend with friends?, *Tolerance* = .84, *VIF* = 1.18; Alcohol attitude, *Tolerance* = .94, *VIF* = 1.05; MHC-SF, *Tolerance* = .59, *VIF* = 1.68). Inspection of residual values revealed that there were six outliers in model 1 (std. residual = 2.86/3.66/2.84/3.60/3.11/3.72) and five in model 2 (std. residual = 3.93/3.50/3.72/2.56/4.48). To rule out any potential extreme effects, a parallel logistic regression was performed where these outliers were excluded. The results from that regression did not though, differ from the original binary logistic regression that will be presented in the study, hence all the outliers were kept in the dataset and included in the main analysis. The results from the binary logistic regression without these outliers will accordingly not be presented in this study. The significant level was determined at $p < 0.01$ for independent sample t-tests. For all other analyses conducted in the present study, the significant level was determined at $p < 0.05$.

# Results

Statistical analyses in the present study were made in aim to answer the two research questions for the present study; (1) Do non-drinking adolescents differ from drinking adolescents in psychological health, social relations, and attitudes towards alcohol? (2) Can psychological health, social relations, and attitudes towards alcohol in 9th grade predict non-drinking in the second year of high school (two years later)? The result section that fallows, will consist of preliminary analyses, comparative statistics, and binary logistic regressions. Respectively, it will be presented in that order, below.

## Bivariate analyses of confounding variables

To control for potential impact on the outcome to the main analyses and the dependent variable, comparisons between non-drinkers and drinkers through confounding variables regarding age, gender, cannabis use, computer use, parental educational level and religious affiliation were produced. Gender was conducted as a binary category, answered through the boxes: girl/boy. Cannabis use was measured with the question "Have you been using cannabis within the last year?" with the response alternatives "No", "one time", "Several times", "One

time per month", "Every week". Parents educational level was measured with the question "What's your mothers/fathers' education?" with the response alternatives "Less then 9 years in school", "nine-year primary school or similar", "high school", "post-secondary education", "degree from collage/University", "post-graduate education". Religious affiliation was measured with the question "What's your religious affiliation?" with the response alternatives "I don't have a religious affiliation", "Christian", "Muslim", "Jewish", "Buddhist", "other". Computer use was measured with the question "How often do you play games on your computer during a normal weekday?" with the response alternatives "Never/seldom", "less then every week", "approximately once per month", "every week". Apart from the above, this question was not included in the survey from T4 and was therefore collected from the surveys in T3 instead. Table 1 shows descriptive statistics for the confounding variables in the analytical sample.

Table 1.
*Descriptive statistics on confounding variables for the analytical sample.*

|  | Drinkers | | Non-drinkers | |
| --- | --- | --- | --- | --- |
|  | *n* | *%* | *n* | *%* |
| **Have you been using cannabis within the last year?** | | | | |
| No | 355 | 87.8 | 193 | 99.5 |
| One time | 27 | 6.7 | 1 | 0.5 |
| Several times within this year | 16 | 4.0 | | |
| One time per month to every week | 4 | 1 | | |
| Several times per month | 3 | 0.7 | | |
| **How often do you play games on your computer during a normal weekday?** | | | | |
| Never/seldom | 41 | 10.3 | 22 | 11.3 |
| Less than every week | 91 | 22.8 | 32 | 16.5 |
| Approximately once per week | 151 | 37.8 | 75 | 38.7 |
| Several days per week | 116 | 29.1 | 65 | 33.5 |
| **Whats your mothers Education?** | | | | |
| Less than nine years in school | 11 | 2.9 | 4 | 2.2 |
| Nine-year primary school or similar | 23 | 6.1 | 10 | 5.5 |
| Highschool (12 years in school) | 108 | 28.4 | 159 | 28.2 |
| Post-secondary education (at least 1 year) | 55 | 14.5 | 28 | 15.3 |
| Degree from collage/University | 172 | 45.3 | 87 | 47.5 |
| Postgraduate education (doctoral degree) | 11 | 2.9 | 3 | 1.6 |
| **Whats your fathers Education?** | | | | |
| Less than 9 years in school | 13 | 3.5 | 10 | 5.6 |
| Nine years of primary school or similar | 33 | 8.9 | 23 | 12.9 |
| Highschool (12 years in school) | 136 | 36.7 | 199 | 36.2 |
| Post-secondary education (at least 1 year) | 60 | 16.2 | 25 | 14.0 |
| Degree from collage/university | 115 | 68.0 | 54 | 32.0 |
| Postgraduate education (doctoral degree) | 14 | 3.8 | 3 | 1.7 |
| **Whats your religious affiliation?** | | | | |
| I don't have a religious affiliation | 191 | 47.6 | 64 | 34.0 |
| Christian | 193 | 48.1 | 105 | 55.9 |
| Muslim | 11 | 2.7 | 14 | 7.4 |
| Other | 6 | 1.4 | 5 | 2.6 |

Blank fields indicate that no answer is registered to that question

Analyses using t-tests showed a significant difference regarding cannabis-use, indicating that drinkers used cannabis in greater occurrence than non-drinkers by 0.21, 95% CI [ 0.14, 0.27], $t(422) = 6.11$, $p = .001$ (two-tailed). The effect size was small to medium (Cohens $d = .37$). Analyses using chi-square test for independence indicated a significant association between religion and drinking status, $\chi^2$ (2, $n = 589$) = 14.17, $p = .001$, *Cramer's V* = .15, whereas non-drinkers differed in the distribution in terms of being more likely to belong to a religion/or no religion beyond Christianity. There was no significant difference between non-drinkers and drinkers regarding age, gender, computer use and parental educational level.

## Research Question 1: Do non-drinking adolescents differ from drinking adolescents in psychological health, social relations, and attitudes towards alcohol?

For comparison of mean scores between non-drinkers and drinkers on psychological health, social relations and alcohol attitudes in the different timepoints (T1, T2, T3, T4), independent samples t-tests were made separately for each timepoint on all independent variables (see Table 2).

Table 2.
*Comparison of means between non-drinkers and drinkers, for T1, T2, T3 and T4.*

|  |  | Drinkers | | Non-drinkers | | | | |
|---|---|---|---|---|---|---|---|---|
|  |  | *n* | *M (SD)* | *n* | *M (SD)* | *t* | *p* | *d* |
| T1 | SDQ Internal | 400 | 3.2 (1.3) | 193 | 3.3 (1.4) | 1.42 | .154 | |
| T1 | SDQ External | 401 | 5.5 (1.6) | 193 | 5.2 (1.4) | 2.49 | .013 | |
| T1 | SDQ Prosocial | 401 | 2.8 (1.5) | 192 | 3.0 (1.4) | 1.67 | .095 | |
| T1 | New friends | 391 | 2.1 (0.5) | 192 | 1.9 (0.5) | 3.60 | .001* | .31 |
| T2 | New friends | 309 | 1.8 (0.3) | 166 | 1.7 (0.4) | 2.45 | .015 | |
| T3 | Mental Health | 397 | 46.3 (14.5) | 193 | 47.2 (14.7) | -0.67 | .502 | |
| T3 | SDQ Internal | 402 | 4.7 (3.2) | 194 | 5.3 (3.3) | -2.09 | .037 | |
| T3 | SDQ External | 402 | 5.3 (3.3) | 194 | 4.1 (3.0) | 4.13 | .001* | .36 |
| T3 | SDQ Prosocial | 404 | 8.3 (1.5) | 194 | 8.4 (1.4) | -0.13 | .889 | |
| T3 | Alcohol Attitudes | 397 | 2.8 (0.6) | 188 | 2.6 (0.6) | 3.50 | .001* | .31 |
| T3 | New friends | 400 | 2.0 (0.5) | 192 | 1.9 (0.5) | 2.69 | .007* | .23 |
| T3 | Time with friends | 398 | 3.3 (0.8) | 194 | 2.8 (1.0) | 5.17 | .001* | .48 |
| T4 | Mental Health | 404 | 48.1 (13.5) | 190 | 47.4 (14.6) | 0.55 | .582 | |
| T4 | SDQ Internal | 406 | 5.2 (3.3) | 195 | 6.0 (3.5) | -2.64 | .008* | -.23 |
| T4 | SDQ External | 406 | 5.5 (3.3) | 195 | 4.2 (2.9) | 4.88 | .001* | .40 |
| T4 | SDQ Prosocial | 406 | 8.7 (1.5) | 195 | 8.5 (1.6) | 1.54 | .123 | |
| T4 | Alcohol Attitudes | 394 | 3.1 (0.5) | 195 | 2.7 (0.6) | 6.58 | .001* | .61 |
| T4 | New friends | 398 | 2.0 (0.6) | 191 | 1.8 (0.5) | 3.88 | .001* | .34 |
| T4 | Time with friends | 402 | 3.3 (0.8) | 187 | 2.8 (1.0) | 6.54 | .001* | .62 |

Effect size (cohens *d*) only shown for significant difference ($p < 0.01$) between non-drinkers and drinkers.
- indicates higher scores in non-drinking group.
*$p < 0.01$

Results showed that non-drinkers scored lower to the question "How often do you make new friends?" in T1, T3, and T4. This indicates that non-drinkers made less new friends in T1, T3 and T4 than drinkers. To the question, "During a normal week, how many days do you

usually spend with friends?" non-drinkers scored lower than drinkers in T3 and T4. These results indicates that non-drinkers spent less time with their friends in comparison to the drinkers in T3 and T4. As regards for attitudes towards alcohol, lower mean values were seen for non-drinkers in T3 and T4 in comparison to drinkers in T3 and T4. This indicates that drinkers had more positive attitudes towards alcohol in T3 and T4. Regarding externalizing problems, there was a significant difference in mean scores between non-drinkers and drinkers in T3 and T4. This indicates that drinkers had more externalizing problems then the non-drinkers T3 and T4. Reverse results were shown for internalizing problems, where non-drinkers had higher mean values than the drinkers in T4. This indicates that non-drinkers had higher internalizing problems than drinkers in T4.

**Research Question 2: Can psychological health, social relations, and attitudes towards alcohol in 9th grade predict non-drinking in the second year of high school (two years later)?**

Two binary logistic regression were performed to assess the impact of several factors on the likelihood that participants would report that they had not been drinking ever in T4. First a model containing only independent variables, second an adjusted model (containing both the independent variables and confounding variables of interest). The models will be referred to as model 1 and model 2, below.

Model 1 contained seven independent variables (internalizing problems, externalizing problems, prosocial behavior, mental health, regularly of making new friends and days spent with friends per week).

The full model containing all predictors was statistically significant, $\chi2$ (7, $N = 568$) = 62.66, $p < .001$, indicating that the model was able to distinguish between participants who reported and did not report drinking throughout their adolescent years. The model as a whole explained between 10,4% (Cox and Snell R squared) and 14,6% (Nagelkerke R squared) of the variance in drinking status, and correctly classified 69.4% of cases.

As shown in Table 3, four of the independent variables made a unique statistically significant contribution to the model (internalized problems, externalized problems, alcohol attitude and days spent with friends per week).

Table 3.
*Model 1, Logistic regression predicting the likelihood of becoming a non-drinker in T4.*

|  | B | SE | Wald | df | *p* | OR | 95% CI OR | |
|  |  |  |  |  |  |  | LL | UL |
|---|---|---|---|---|---|---|---|---|
| SDQ Internal | .11 | .03 | 9.04 | 1 | .003* | 1.12 | 1.04 | 1.21 |
| SDQ External | -.14 | .03 | 15.02 | 1 | .001* | .86 | .80 | .93 |
| SDQ Prosocial | -.07 | .07 | .95 | 1 | .327 | .93 | .80 | 1.07 |
| Mental Health | .01 | .00 | 3.49 | 1 | .062 | 1.01 | .99 | 1.03 |
| Alcohol Attitudes | -.41 | .14 | 7.89 | 1 | .005* | .65 | .49 | .88 |
| New friends | -.13 | .18 | .54 | 1 | .461 | .87 | .60 | 1.25 |
| Time with friends | -.41 | .10 | 14.40 | 1 | .001* | .66 | .53 | .81 |

CI, confidence interval; OR, odds ratio; SE, standard error.
*$p < 0.05$

The strongest predictor of reporting to be a non-drinker in T4 was externalized problems, (recording an odds ratio of .86) and days spent with friends per week (recording an odds ratio of .66). The externalized problems odds ratio of .86 suggested that for every increase

in externalized problems, participants were .86 less likely to become a non-drinker in T4, controlling for other factors in the model. The odds ratio of .66 for days per week spent with friends was also less than 1, indicating that for every additional day per week spent with friends, participants were .66 times less likely to report being a non-drinker, controlling for other factors in the model. Another predictor of reporting to be a non-drinker was internalized problems, recording an odds ratio of 1.12. This indicated that respondents who had higher internalizing problems were over 1.12 times more likely to report being a non-drinker than those who did not have as much internalizing problems, controlling for all other factors in the model. The odds ratio of .65 for positive attitudes towards alcohol was less than 1, indicating that for every additional score on the positive alcohol scale, respondents were .64 times less likely to report being a non-drinker in T4, controlling for other factors in the model.

Model 2 contained the seven independent variables (internalizing problems, externalizing problems, prosocial behavior, mental health, regularly of making new friends and days spent with friends per week) together with seven additional confounding variables (Age, Gender, Cannabis use, Computer use, Parents educational level and religious affiliation).

The full model containing all predictors was statistically significant, $\chi2$ (14, $N = 501$) = 87.75, $p < .001$, indicating that the model was able to distinguish between participants who reported and did not report drinking throughout their adolescent years. The model as a whole explained between 16,1% (Cox and Snell R square) and 22,4% (Nagelkerke R squared) of the variance in drinking status, and correctly classified 71.9% of cases.

As shown in Table 4, only one of these variables (beyond the above mentioned) made a unique statistically significant contribution to the adjusted model. The odds ratio of .09 for cannabis usage was less than 1, indicating that for every increase in cannabis use the participants were .09 times less likely to report being a non-drinker in T4, controlling for other factors in the model.

Table 4.
*Model 2, Logistic regression predicting the likelihood of becoming a non-drinker in T4.*

|  | B | SE | Wald | df | $p$ | OR | 95% CI OR | |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | LL | UL |
| SDQ Internal | .14 | .04 | 10.24 | 1 | .001* | 1.15 | 1.05 | 1.25 |
| SDQ External | -.14 | .04 | 12.09 | 1 | .001* | .86 | .80 | .93 |
| SDQ Prosocial | -.06 | .08 | .58 | 1 | .443 | .93 | .79 | 1.10 |
| Mental Health | .01 | .00 | 3.31 | 1 | .069 | 1.01 | .99 | 1.03 |
| Alcohol Attitudes | -.50 | .16 | 9.16 | 1 | .002* | .60 | .43 | .83 |
| New friends | -.13 | .21 | .39 | 1 | .530 | .87 | .57 | 1.33 |
| Time with friends | -.38 | .12 | 9.99 | 1 | .002* | .68 | .53 | .86 |
| Age | -.04 | .23 | .02 | 1 | .864 | .96 | .60 | 1.52 |
| Gender | .04 | .23 | .02 | 1 | .867 | 1.04 | .65 | 1.66 |
| Cannabis use | -2.40 | .95 | 6.37 | 1 | .012* | .09 | .01 | .58 |
| Computer use | .15 | .11 | 1.73 | 1 | .187 | 1.16 | .92 | 1.47 |
| Mothers' education | .15 | .11 | 1.82 | 1 | .176 | 1.17 | .93 | 1.47 |
| Fathers' education | -.20 | .10 | 3.62 | 1 | .057 | .81 | .65 | 1.00 |
| Religion | .00 | .12 | .00 | 1 | .974 | 1.00 | .78 | 1.28 |

CI, confidence interval; OR, odds ratio; SE, standard error.
*$p < 0.05$

# Discussion

The aim of the present study was to examine if non-drinking adolescents differed from drinking adolescents in psychological health, social relations, and attitudes towards alcohol. Also, if psychological health, social relations, and attitudes towards alcohol in 9th grade could predict non-drinking in the second year of high school (two years later).

First, non-drinkers in general made less friends throughout the adolescent years (from age 12 to 17) and spent less time with friends in 9th grade and in the second year of high school. These results support previous research on adolescent non-drinkers that indicated they had fewer social relations, fewer friends and struggled more to find new friends (Hoel et al., 2004; Kivimäki et al., 2014; Larm et al., 2018). The results confirm this previous research, hence, do not agree with the results from Raninen et al. (2021) indicating that non-drinkers were more prosocial than drinkers in 9th grade.

The non-drinkers in the present study were additionally characterized by less externalizing problems in both 9th grade and in the second year of high school, but more internalizing problems in the second year of high school. Boson (2018) found that internalizing problems were a protective factor linked to intoxicating drinking in 9th grade. Hence, the result from this study confirms that internalizing problems continue to be a "protective" factor for intoxicating drinking two years later. The present study results are also consistent with previous studies (Boson, 2016; Kuperman et al., 2013), indicating that non-drinking was associated with less externalizing problems.

Results from the present study also suggests that non-drinkers distinguish by less positive attitudes towards alcohol. This could be interpreted as consistent to recent studies (Scheffels et al., 2020; Törrönen et al., 2019) that argue adolescents nowadays are more responsible, reflective, and no longer see alcohol as an equally strong symbol of growing up (in comparison to previous generations). In addition, the present study reveals that *both* non-drinkers and drinkers scored arguably low, indicating that both groups had relatively low levels of positive attitudes towards alcohol in general, but that non-drinkers had significantly even lower levels of positive attitudes towards alcohol consumption.

The results from the binary logistic regression further suggested significant associations between internalized problems, externalized problems, attitudes towards alcohol and days spent with friends per week, in 9th grade and non-drinking two years later. The strongest predictor of reporting to be a non-drinker in the second year of high school was less externalizing problems, followed by less days spent with friends per week. Internalizing problems (in 9th grade) *increased* the probability, and externalizing problems, positive attitudes towards alcohol, more days spent with friends per week (in 9th grade) *reduced* the probability of non-drinking two years later. These results are a unique contribution to the research field.

Further, both non-drinkers and drinkers revealed similar score values on the Health Continuum Short form scale (MHC-SF) and the SDQ-prosocial scale. Both groups indicated somewhat high scores to MHC-SF, meaning that both groups had a high amount of mental wellbeing. Whilst previous studies have distinguished non-drinkers by greater mental wellbeing (Hoel et al., 2004; Larm et al., 2018) no significant difference between non-drinkers and drinkers were observed in the present study. However, indications that adolescents in general scored high values on wellbeing (at the same timepoint that the data was collected) have been observed in previous research (Boson et al., 2016; WHO, 2016).

Apart from this, Boson (2016) argued that girls' and boys' mental health could take different forms and whilst the present study did not examine non-drinking boys and girls independently, future studies should take this into consideration and examine non-drinking

adolescent boys and girls on psychological health, social relations and alcohol attitudes separately.

Further, the study's results did not coincide with the description of adolescents from a previous cross-sectional study on non-drinking 9th grade Swedish adolescents (Raninen et al., 2012), which found no difference in social position between non-drinkers and drinkers and that non-drinkers above that had more prosocial behavior. The present study results instead indicates that non-drinking adolescents distinguish significantly from drinking adolescents in social and psychological attributes, suggesting that alcohol's social position throughout adolescence in the Swedish population has *not* changed, given the fact that less social relations in 9th grade predicted non-drinking two years later. Initially, this study discussed that since Raninen et al. (2021) determined that it is *more* norm-breaking to drink at the age of 15 today (when in 9th grade), it would be interesting to study a non-drinking *older* age group where the expectation is that the majority is drinkers (i.e., in the second year of high school). Given the present results, this study thus suggests that the characteristics to non-drinkers (less social relations, less externalizing problems and less positive attitudes towards alcohol) were cohesive over the time period from 9th grade up to the second year of high school, given that adolescents were strictly non-drinkers throughout all adolescent years. This means that whilst the normative climate changed (from 9th grade to second year of high school), these characteristics to the non-drinkers did not. The results could also therefore extend previous suggestions (Gripe, 2013) that changes in social climate (in interaction with postponed age of alcohol onset) could have impacted to the decreased trend of adolescent alcohol consumption observed in the Swedish society (Norström & Raninen, 2018). In summary, the question that evoke from this is: can we *really* talk about changed positions for alcohol culture here, or is it just simply a delay in drinking-patterns?

Beyond this study's main results, lower rates of cannabis use were a significant predictor to non-drinking in the adjusted model. Similar effects have been observed by previous research associating non-drinking with less cannabis use (Larm et al., 2018). Also, in line with Gripe et al. (2018) the present results further support the proposition that alcohol has not been replaced with cannabis.

Given the fact that a declining trend of adolescent alcohol consumption is observed in Sweden (Norström & Raninen 2018) and different parts of the world (Pennay et al., 2018), it is of huge importance to distinguish meaningful social and psychological contributing factors that underlie the characteristics to the behavior of an adolescent non-drinker. Distinguishing these characteristics and building a profile to the adolescent non-drinker may additionally also benefit other scientific research areas, associated to adolescent developmental factors. Targeting non-drinkers longitudinal, the present study contributed to more knowledge about characteristics to the non-drinking Swedish adolescent between the time period of 12-17 years.

Considering ethical aspects of the results, there are some things that need further attention. Since the results in principle indicate that alcohol consumption still is a part of a normal development for Swedish adolescents, we should acknowledge the complexity of adults' potential attitudes towards these results. If alcohol consumption is considered as a normal part of adolescent development, it automatically accompanies a problem around *accepting* that alcohol is a normal part of adolescent development. We must further ask: How does it affect whether the adult world has a normal (or perhaps an acceptable) approach to alcohol consumption amongst adolescents? The results from the present study suggest that non-drinkers had significantly more internalizing problems in the second year of high school and less externalizing problems in both 9th grade and high school. Questions that arouse are: should we be satisfied about the fact that adolescents are showing need for autonomy and exhibiting a higher degree of externalizing problems? Or should we instead highlight the positive effects of internalizing symptoms, that were associated to non-drinking? For example, the internalized

adolescent at least stays away from norm-breaking behavior (i.e., alcohol consumption). Since liberation and autonomy is an important part of adolescents normal and positive development (Hwang, 2019), the present study results (that non-drinkers were associated with internalized problems in the second year of high school) hence could be interpreted as favorable rather than abnormal.

## Limitations

First, the analytical sample consisted of more girls than boys (356 girls and 245 boys) and initial group comparisons revealed that non-drinkers and drinkers differed regarding religious affiliation, whereas non-drinkers were significantly less Christian than the drinkers. This means that there was an initial difference between non-drinkers and drinkers that could have affected the results. An important note thus, is that the effect size was very small, (showed by *Cramer's V* = .15). Second, there are general notions about participants, for example that participants and non-participants can differ in some ways initially (just by being more prone to participating). For example, exclusion analyses from one of the original studies within the LoRDIA project, represented by Boson et al. (2016) indicate that boys with externalizing problems drop out, year after year. The same study revealed gender differences within adolescents' health problems meaning that boys had more externalizing problems and girls more internalizing problems (Boson et al., 2016). This indicates a risk that the proportion of boys with externalizing problems is not sufficiently represented in this present study. The influence this could have on the study results, is something that could be discussed further. Beyond this, we must always consider that there may be a distortion when it comes to self-reporting.

Another important note regarding the analysis is that many t-tests were conducted and therefore we need to interpret the results of the study with caution. Even thus the study provided information about effect sizes we need to have a critical perspective in drawing too high assumptions from the significant results. The significant level was determined at the stringent value of $p < 0.01$ for each group comparison through independent sample t-test. This makes overly liberal interpretations impossible, but nevertheless the valuation of the significance level could be discussed further. Given the analysis method, there is a considerable risk of incorrectly rejecting one or several null hypotheses. A disadvantage of the present study is therefor that this was not addressed further. To control for type 1 error, a Bonferroni adjustment to the alpha level of the conducted t-tests would benefit the judgement of the significant results. Since 19 significance tests were performed, a Bonferroni adjustment to an alpha level of .05 would suggest .05/19=.003. This indicates that two of the results that is presented as statistically significant in the present study ($p$ = .007/.008) would not survive such correction. This is a potential weakness that the reader should take into consideration when interpreting the presented results and conclusions of this study.

## Conclusions

The present study suggests two main conclusions. First, non-drinkers were continuously characterized by less social relations, less positive attitudes towards alcohol and less externalizing problems throughout the time period from 9th grade up to second year of high school (two years later). Second, predictions indicated significant associations between internalized problems, externalized problems, attitudes towards alcohol and days spent with

friends per week, in 9th grade and non-drinking two years later. The strongest predictor of reporting to be a non-drinker in the second year of high school was less externalized problems, followed by less days spent with friends per week. These results are a unique contribution to the research field, indicating that psychological characteristics to non-drinking Swedish adolescents in 9th grade significantly predicted to non-drinking two years later. Whereas resent studies (Raninen et al., 2021) suggested a shift in the social marker of alcohol consumption amongst Swedish adolescent, this study remains skeptical towards that proposition. Instead, this study suggests that less social relations in 9th grade increased the likelihood of becoming a non-drinker two years later and that the overall characteristic of an adolescent Swedish non-drinker did *not* change over the time period from 9th grade up to the second year of high school.

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