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The influence of family support and living in an advantaged neighborhood on adolescent alcohol use in the Netherlands

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Master's Thesis in Sociology: Contemporary Social Problems

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June 24th, 2022

Abstract

Given the prevalence and consequences of adolescent alcohol use, identifying the factors that protect against this form of risk behavior is an important area of research. The role the neighborhood plays in the effect of family support on adolescent alcohol use remained unclear. Therefore, HBSC-data was used to analyze whether family support and living in an advantaged neighborhood are protective factors against adolescent alcohol use and to what extent this effect of family support on adolescent alcohol use is influenced by the neighborhood one lives in. A multilevel linear regression among 6497 respondents from the Netherlands between the ages of 12 and 18, revealed that family support and living in an advantaged neighborhood are indeed protective factors against adolescent alcohol use. It also showed that the effect of family support is weakened by living in an advantaged neighborhood. The findings of this research emphasize the importance of taking neighborhood effects into consideration when examining family support.

Ethical statement

This study was approved by the Ethical Review Board of the Faculty of Social and Behavioral Sciences of Utrecht University. The approval is filed under number 22-1527.

Introduction

Despite the fact that it is illegal for adolescents below the age of 18 to drink alcohol, alcohol use among adolescents can be considered fairly common in the Netherlands. The HBSC rapport of 2017 shows that half of the 16-year-old children in the Netherlands have been drinking alcohol in the last month (Stevens et al., 2018), even though adolescents seem to be aware of the health risks that come with drinking alcohol (De Looze et al., 2014). Although the numbers of drinking adolescents used to be even higher (De Looze et al., 2017), adolescent alcohol use remains a major concern for public health (Charrier et al., 2022). Maybe even more because the decline seems to be stagnating in recent years. Alcohol use by adolescents is seen as a public health risk because globally 4-6% of all diseases and injuries are attributable to alcohol (Rehm et al., 2009). The World Health Organization (WHO) estimates that over 15% of deaths in 2016 among the age group between the years of 15 and 19 were attributable to alcohol (World Health Organization, 2019). Furthermore, adolescent alcohol use has been associated with delinquency (French & Maclean, 2006), risky sexual behavior (Arata et al., 2003) and alcohol dependence in adulthood. The years between 13 and 18 are seen as a key period in the development of alcohol disorder (Marshall, 2014).

Adolescence is a period during which a young person has to cope with major social, emotional and physical changes (Pinkerton & Dolan, 2007). These changes can come with serious emotional problems such as loneliness, low self-esteem and social isolation (Helsen et al., 2000). Studying adolescent alcohol use often started with questioning the motives adolescents have to drink alcohol, and link these motives to those changes. Motives that are used, are often based on an adolescent expecting a negative effect to be reduced by drinking alcohol, such as peer-pressure and the fear of social exclusion or trying to cope with negative emotional states. But there are also motives where an adolescent expects alcohol to enhance a positive effect. For example, the thought that drinking alcohol will help to enhance their social life by gaining friends, or that drinking alcohol will elevate their happy mood and the enjoyment of a party even more (Kuntsche et al., 2005). While many earlier studies focused on these motives and risk factors, these factors are often very hard to change. Therefore, more recent research has shifted its focus to protective factors that could help negate these risk factors (Piko & Kovács 2010).

One of the protective factors that has often been researched is the support that an adolescent receives from his or her family. The relationship between perceived family support and the alcohol use of adolescents is well established. It has been shown that a higher level of family support leads to lower levels of alcohol consumption (Catanzaro & Laurent, 2004; Chaplin et al., 2012; Elisaus et al., 2018; Foxcroft & Lowe, 1997; Schwinn & Schinke, 2014). Family support can come in different forms. It can come in the form of providing supervision and preventing association with deviant peers, or as emotional- and esteem support by providing empathy and thereby improving the coping skills and self-esteem of an adolescent (Piko & Kovács, 2010). Seeing that family support is regarded as such an important protective factor, makes it a factor that needs to be assessed regularly. This leads to the first research question of this study: *To what extent does family support influence adolescent alcohol use?*

When looking at protective factors at a more structural level, the neighborhood an adolescent is living in has been one of the focuses. There seems to be an increase in evidence that living in a more advantaged neighborhood indeed plays a protective role in risky behavior of adolescents, such as alcohol use (Leventhal and Brooks-Gunn, 2000; Youngblade & Curry,

2006). An advantaged neighborhood is a neighborhood which offers social and economic resources that contribute to a residents well-being (Ross & Mirowsky, 2001). The protective role that an advantaged neighborhood has regarding adolescent behavior and well-being, is often ascribed to different kinds of social and economic capital, such as community integration, social order and the economic status of a neighborhood (De Haan et al., 2010; Lenzi et al, 2012; Leventhal & Brooks-Gunn 2000). Community integration (Beyers et al., 2004, Chuang & Chuang, 2008; De Haan et al., 2010), social order (Bernstein et al., 2007; Beyers et al., 2004; De Haan & Boljevac, 2010) and the economic status of the neighborhood (Chuang et al., 2005, De Haan et al., 2010) all have been shown to related to lower levels of alcohol use. Community integration says something about the way residents in a neighborhood are connected. Higher levels of community integration suggest more social cohesion between residents (Gracia & Herrero, 2007). While community integration and social cohesion are not always seen as a direct indication of neighborhood advantage, its positive role when it comes to health and wellbeing has been heavily substantiated by research (Friedkin, 2004; Wan et al., 2021). Social order can be exemplified by activities that are a sign of the breakdown of social control and fading social norms to people. One can think of activities such as substance use, burglary or fighting in the streets (Gracia & Herrero, 2007; Sampson, 2012). The economic status of a neighborhood says something about the wealth and income of the residents, and is considered as the main indication of neighborhood disadvantage (Ross et al., 2001). During this study, community integration, social order and neighborhood economic status will be used to indicate living in an advantaged neighborhood. To further enforce the evidence that living in a more advantaged neighborhood is related to lower levels of adolescent alcohol use, the second research question which this study tries to answer is: *To what extend does living in a more advantaged neighborhood influence adolescent alcohol use?*

While the effects of family support and living in a more advantaged neighborhood on adolescent alcohol use are widely acknowledged and often researched, the question whether these effects influence each other remains unclear. Suggesting that family support and living in an advantaged neighborhood not only have an effect on adolescent alcohol use, but influence each other as well, is in line with the ecological model of Bronfenbrenner (Onwuegbuzie, 2013) and the literature review of Leventhal and Brooks-Gunn (2000). Those are both stating the protective effects of these factors do not happen on their own, but are also related with each other. Neighborhood characteristics may moderate relationships at an individual-level. When examining individual and neighborhood effects on adolescent alcohol use, it is therefore important to know how they influence each other, but currently studies on this topic are rare (Jackson et al., 2014). This study tries to fill this empirical gap in knowledge, by examining whether the effect of family support on adolescent alcohol use is different for people living in an advantaged neighborhood. To do so, the third research question is as follows: *To what extend is the effect of family support on adolescent alcohol use influenced by living in a more advantaged neighborhood?*

There are currently several interventions regarding family support that are being used to reduce adolescent alcohol use such as the *Multidimensional Family Treatment* (Dutch Youth Institute, n.d.; Rowe & Liddle, 2008) or the *Strengthening Families Program* (Kumpfer & Magalhães, 2018). In addition there has also been the call to introduce new interventions such as the *Iceland model*, in which family support also plays a rather large role (Bouma, 2017). Smit and colleagues (2008) showed the effectiveness of such interventions based on family support. When using new interventions, the context of an environment has to be taken into

consideration (Koning et al., 2018; De Wilde et al., 2019). Knowing to what extent the effect of family support on adolescent alcohol use is influenced by the neighborhood, can help professionals take the environment into consideration, and use the family based interventions where they are most effective. Answering the first three research questions leads to the answer of a more policy related question which can help professionals with this consideration, namely: *How can family support and neighborhood characteristics be used to form policy and select interventions to reduce adolescent alcohol use?*

To answer these questions, the Dutch Health Behavior in School-Aged Children (HBSC) data from 2017 will be used in conjunction with Dutch register data. The HBSC dataset comes from a cross-national WHO collaborative survey-study on health behavior, well-being, and social context of children between the age of 12 and 18 in 50 countries across Europe and North America.

Theory

Family support and adolescent alcohol use

Many researchers regard receiving family support as an important protective factor when it comes to adolescent alcohol use (Piko & Kovács, 2010). One way a family can offer support when it comes to adolescent alcohol use, is by monitoring the alcohol use of the adolescent and advising him or her on the consequences. Better knowledge of the negative outcomes reduces alcohol use (Scheier & Botvin, 1997) and parental supervision has shown to be a large protective factor when it comes to adolescent alcohol use (Ennet et al., 2008; Li et al., 2000). Parental supervision can influence the behavior of an adolescent by preventing them to take part in risky situations and hanging out with deviant peers (Li et al., 2000). Setting rules on alcohol use can give an adolescent guidelines to what behavior is acceptable. Rule-setting by parents played a significant role in the decline in drinking among adolescents in recent decades (De Looze et al. 2017).

A second way a family can offer support, is by offering them so called esteem support. Esteem support is seen as informing someone about their personal worth (Pinkerton & Dolan, 2007). Parental warmth and esteem support are negatively correlated to adolescent problem behavior such as alcohol use (Chan & Chan, 2013; Mogro-Wilson, 2008). Peer pressure and the fear of social exclusion have been targeted as markers for deviant adolescent behavior such as alcohol use (Abbey et al., 2006; Allen et al., 2006). Although it seems there are no studies directly relating parental warmth to the susceptibility to peer pressure, it is assumed that parental warmth and support are conducive to receptiveness of adolescent to guidance from their parents, and the ability to withstand peer pressure (Chan & Chan, 2013). It is assumed that weaker bonds with family members result in adolescents learning behavior primarily from peer groups, while stronger bonds with family members are likely to result in adolescents being primarily socialized by their family (Oetting & Donnermeyer, 1998). Having a positive self-esteem and self-confidence is one of the most important characteristics to withstand peer pressure and the fear of social exclusion. Self-esteem consists of feelings such as self-liking, self-respect and self-acceptance, and can be used as an overarching term for a person's overall self-worth. Having a low self-esteem, may lead to adolescents being more willing to adhere to the pressure from peers because they feel the need of external validation. Self-esteem and the ability to resist adhering to peer pressure are thought to be related to the relationship between the parent and the adolescent (B'amaca & Umana-Taylor, 2006).

Family support can also act as a protective factor in the form of emotional support. Emotional support consist of showing empathy and listening to someone. Popularly known as ‘being there’ for someone. It is generally believed that emotional support is helpful in coping with one’s negative emotions (Pinkerton & Dolan, 2007). Higher levels of perceived family support are indeed associated with more healthy coping responses and less depression (Catanzaro & Laurent, 2009). Because levels of perceived family support appear to have this effect on coping, it seems reasonable to suggest that higher levels of family support makes for less of a need for adolescents to drink alcohol to cope with a negative emotional state. Bountress and her colleagues (2017) showed that emotional support indeed has a buffering effect on adolescent alcohol use when coping with emotions after traumatic events. Considering that parental monitoring, esteem support and emotional support from the family all have negative effects on adolescent alcohol use, leads to the following hypothesis.

Hypothesis 1: Adolescents who perceive more family support drink less alcohol.

Advantaged neighborhoods and adolescent alcohol use

Numerous studies have concluded that living in a more advantaged neighborhood comes with health benefits (van Praag et al., 2009). As stated before, when it comes to adolescent alcohol use, there are multiple studies that describe the protective role a more advantaged neighborhood can have (Leventhal and Brooks-Gunn, 2000; Youngblade & Curry, 2006).

The absence of poverty is considered the main indication for an advantaged neighborhood (Ross et al., 2001). Several studies have suggested a relationship between poverty in a neighborhood and adolescent alcohol use (Chuang et al., 2005, De Haan et al., 2010). More advantaged neighborhoods offer more resources that can help an adolescent. The availability and quality of resources such as schools, community centers and parks are generally better at higher income neighborhoods (Leventhal and Brooks-Gunn, 2000). Resources like schools and community centers play a large role in building self-esteem and social competence (Karcher, 2005). Those are factors which play a large role in adolescent alcohol use (Scheier et al., 2010). It is also thought that living in a neighborhood with a higher economic status removes a strain of economic stress that people have to cope with. A strain that adolescents living in a neighborhood with a lower economic status do encounter (Morrison Gutman et al., 2005). The stressors of this economic strain are enclosed in activities in everyday life. In regular daily hassles and activities, adolescents are confronted with a lack of economic resources of the people around them. This confrontation can lead to frustration and sadness (Elliott, 2000), emotional states that can act as motives to drink (Kuntsche et al., 2005).

Next to poverty, one of the signs of a more advantaged neighborhood is social order. This can be either physical order, such as the absence of abandoned buildings, graffiti, noise vandalism and filth, or social order, such as loitering, crime, conflicts and public drinking (Ross & Mirowsky, 2001). A lack of social order is an indication to residents that social norms are fading (Gracia & Herrero, 2007; Sampson, 2012). Collective perceptions on social norms come with shared expectations on adhering to those norms (Sampson, 2012). If the shared norm in a neighborhood is that adolescent alcohol use is abnormal, an adolescent might choose not to drink alcohol to adhere to that expectation. Especially, since an often used motive to explain that adolescents drink is because of the fear of social exclusion (Kuntsche et al., 2005). It can also be the case that other residents are also more likely to intervene if they do see adolescents drink if it’s not the shared norm. Having a collective perception of order in the neighborhood

can have a growing effect on the trust and participation of residents in their neighborhood (Jackson et al., 2016). Trust among residents can work as a protective factor against alcohol use because it increases the likelihood that an adolescent will reach out for social support. Because where the benefits of social support seem obvious, an adolescent may worry that they will burden the other person or that they will lose face by revealing their emotions and problems (Barbee & Cunningham, 1995). The latter being especially important during the adolescent period (Fabes et al., 1999). More interpersonal trust leads to more positive expectations about how another person is going to treat them than less interpersonal trust. With a more positive expectation there is less of a fear of losing face or a feeling that the other is burdened (Mortenson, 2009). Therefore, with more interpersonal trust an adolescent is more likely to seek support. Social order is likely to increase the chance that neighbors will intervene, but it also contributes to adolescents finding social support and are willing to adhere to social norms.

Living in a neighborhood with a high level of community integration may not be desired by everyone. Although when it comes to health benefits, increased community integration and social cohesion are often emphasized as highly beneficial (Friedkin, 2004; Wan et al., 2021). Therefore, community integration can be seen as a sign of an advantaged neighborhood when it comes to adolescent alcohol use. Since an adolescent spends most of its time in his or her neighborhood (Rankin & Quane, 2002), the neighborhood can be the place where an adolescent is able to build a supportive network which can work as a protective factor (Lenzi et al., 2012). Whether an adolescent can create and use such a supportive neighborhood, depends on availability and willingness of people in their neighborhood to take on a supportive role. Adolescents living in a neighborhood with more social cohesion have more people available to reach out to. Therefore, perceiving more support and having the knowledge that there are others in the neighborhood whom they can trust and are looking out for them (Aisenberg & Herrenkohl, 2008). Kim and Ross (2009) showed that this social support from a neighborhood could act as a protective factors against stressors such as sadness and loneliness. But a neighborhood with improved social cohesion does not only give adolescents support to reach out to. The findings of Jackson et al. (2016) show a protective effect in alcohol use from the neighborhood, through collective efficacy. This means that improved social cohesion also plays a protective role by providing supervision and if necessary intervening themselves. Having supervision and authority figures ,such as other adults from the neighborhood, decreases the potential for adolescent alcohol drinking by making alcohol use harder and less rewarding (Maimon & Browning, 2012). This way, supervision at a neighborhood-level could play a broad role in the well-being of adolescents (Sampson, 2012). Other parents living in a neighborhood with a high community integration could also exert pressure on the parents of alcohol drinking adolescents to function as more responsible parents (Simons et al., 2005). It could even be so that parents work together in supervising the neighborhoods youth, forcing adolescents adhere to the shared social norms (Maimon & Browning, 2012). This could lead to adolescents feeling an extra layer of supervision, reducing their norm deviant behavior in fear of sanctions (Fagan et al.,2014). Since signs of a more advantaged neighborhood, such as a neighborhoods economic status, social order and community integration all seem to play a protective role against adolescent alcohol use, the following hypothesis is formulated accordingly:

Hypothesis 2: Adolescents living in a more advantaged neighborhood drink less alcohol.

Family support in an advantaged neighborhood

The protective role of family support and the protective role of the neighborhood show us that the well-being and alcohol use of an adolescent is influenced on multiple levels. In the ecological model of Bronfenbrenner, it is assumed that the influences of these protective factors do not happen in a vacuum and are influenced by each other (Onwuegbuzie, 2013). In his ecological model of human development, Bronfenbrenner describes that the development of children is formed through a complex web of social contexts. Bronfenbrenner categorizes these social contexts into four concentric systems. Namely, the micro-, the meso-, the exo- and the macrosystems. The family of an adolescent is considered to be part of the microsystem, while neighbors are considered to be part of the exosystem. The idea behind Bronfenbrenner's ecological model is that these systems constantly influence each other and that this influence can go both ways (Härkönen, 2001). For example, the parents of an adolescent may talk to neighbors and form new ideas on parenting based on that conversation. While this conversation brought new ideas to the parents of the adolescent, it may have also changed the view of the neighbors. Following this logic, it is thought that support from the family is influenced by the neighborhood an adolescent is living in (Byrnes & Miller, 2012, Leventhal and Brooks-Gunn, 2000).

The ecological model of Bronfenbrenner stems from 1979, and has been used as inspiration many times (Härkönen, 2001). Nevertheless, studies on how family support and the neighborhood one lives in might influence each other and their effect on adolescent alcohol use, are relatively rare. Therefore, much to how this might work is unknown (Jackson et al., 2014). The few studies that have studied the subject give mixed ideas and results. On the one hand, there is the idea that the protective effect of family support is strengthened. A study by Booth & Shaw (2019) is an example of this idea. They followed the assumption that parenting is more effective when there is more social control, because it is easier for parents to monitor their children's behavior. An assumption which they found support for by checking if the perception of parental monitoring of adolescents was correlated to characteristics of the neighborhood such as social cohesion and social order. By finding significant correlations over time, they concluded that parental supervision is more effective in a neighborhood with higher levels of social cohesion and social order. Adding to the idea that the two protective factors might reinforce each other, Morrison Gutman et al. (2005) suggested that a lower economic status of the neighborhood does not only influence the adolescent, but also puts a financial strain on their parents. The psychological stress that comes from this financial strain results in being less capable to provide effective care and support for their child. The findings of these studies suggest that living in an advantaged neighborhood increases the effectiveness of the family support on adolescent alcohol use.

On the other hand, there are reasons to why the protective role of family support is not strengthened by living in an advantaged neighborhood, but the effect of family support is weakened by living in a disadvantaged neighborhood. Perhaps the most obvious reason to why this might be the case is that a more disadvantaged neighborhood generally has more risk factors for alcohol use, such as drinking peers (Bronner et al., 2011). More risk factors mean that family support is perhaps needed more and there is more to protect an adolescent against. An intervention can have a bigger impact when there is a bigger problem. These extra risk factors may also lead to parents feeling extra motivated to engage in parenting behaviors to buffer the extra risk factors which are present (Gonzales et al., 2011). Fagan and Wright (2012)

also suggested that the effect of family support on adolescent alcohol use might be weakened by a more advantaged neighborhood. According to them, the layer of supervision that living in a more advantaged neighborhood might bring could also lead to parents supervising their children less closely, because they are in the understanding that other people are providing the oversight, leading to an increase in alcohol use.

It could be the case that that the suggestions on how the effect of family support is influenced by living in a more advantaged neighborhood, as suggested above, are all correct since the reasoning behind the suggestions do not seem to contradict each other. Considering that this is the case, the following hypothesis was formulated on the belief that the need for family support is indeed larger for people facing more risk factors in a more disadvantaged neighborhood.

Hypothesis 3: The effect of family support on alcohol is weaker for adolescents living in a more advantaged neighborhood.

Methods

Data sources and sample

For this study, data from the 2017 Dutch round of the HBSC-study was used. The HBSC is a cross-national WHO collaborative study with a new measurement round every four years. The HBSC study measures the health behavior, well-being, and social context of young people in 50 countries across Europe and North America. To get a representative sample of Dutch youth attending secondary education between the ages of 12 and 18, the HBSC-study takes the following steps. First, a random sample stratified by urbanization level of schools in the Netherlands was drawn. Of the approached schools for the study, 67 secondary schools participated, a response rate of 37%. Second, depending on school size, three to five classes were randomly picked. Within those selected classes, all students were asked to participate in the survey, which resulted in a 92% response rate on a student-level. The individual non-response was measured at the moment the questionnaire was being administered by using the teacher. Data collection took place on a computer, under exam conditions with a research assistant administering the questionnaires in a classroom. Participation of the HBSC study was voluntary. Parents, teachers and students were informed on forehand and were able to refuse or stop at any time. This process resulted in a sample of 7,450 respondents from the Dutch secondary school system. The HBSC dataset does not contain any respondents receiving special education and there seems to be a slight overrepresentation of schools in an urban area, but is still considered to be a representative sample of Dutch youth between the age of 12 and 18 years old (Moor, 2020; Roberts et al., 2009).

Respondents that had a missing or non-valid value on one of the used variables were excluded from this study. Respondents younger than 12 years old or older than 18 years old were also removed. The ages from 12 to 18 are considered to be the ages in which children attend secondary school in the Netherlands (Eurydice, 2021), therefore respondents outside those ages are not considered to be representative for this age group. This led to a removal of 108 respondents who were considered to be too young and 21 respondents who are considered to be too old. After the exclusion of these respondents, the used dataset for the current study consisted of 6,497 respondents, which was 87,2% of the total respondents in the used dataset.

Operationalization

Alcohol use (dependent variable)

To investigate the alcohol use of adolescents, this study measures the frequency in which adolescents drank alcohol in the last four weeks. This frequency of alcohol use was measured by the following question: *On how many days did you drink alcohol in the last four weeks?* Respondents could answer this question on a seven-point Likert scale with the following options: *Never, 1 or 2 days, 3-5 days, 6-9 days, 10-19 days, 20-29 days, 30 days or more*. This variable was treated as continuous with the option *Never* being valued at 0 and the option *30 days or more* at 6. Alcohol use was positively skewed with a skewness of 1.45. 59.1% of the students did not drink any alcohol in the last four weeks and 12,5% did only drink 1 or 2 days.

Family support (independent variable)

The independent variable was the support an adolescent perceives from his or her family. This perception of family support was derived from the following four survey statements. 1. *The people in my nuclear family try their best to help me.* 2. *At home I get the emotional support I need.* 3. *At home I can talk about my problems.* 4. *At my home they help me with decision making.* Respondents could respond to these statements by indicating how much they agree with them on seven-point Likert scale ranging from 1 being the lowest indication of agreement with “Very strongly disagree” to 7 being the highest indication with “Very strongly agree”. These questions have been assembled into one scale ranging from 0 to 6 with 0 being the lowest indication of family support and 6 being the highest. Before assembling the scale an exploratory factor and reliability analysis has been done. The four items on the family support all had a significant correlation with each other of at least .719 and at most .796. The Kaiser-Meyer-Olkin measure of sampling adequacy was .85, above the recommended value of .6, and Bartlett’s test of sphericity was significant ($\chi^2(6) = 20217,328, p < .05$). The reliability analysis had a Cronbach’s Alpha of .914, which can be considered reliable (Field, 2009). All indications of a valid and reliable variable. However, family support was skewed heavily negative (-1.94). family support being this heavily skewed gives an means that most of the students are clustered on the right side of the family support scale perceiving a lot of family support, but should not give any analytical problems given the rather large sample size (Field, 2009).

Advantaged neighborhood (independent and moderating variables)

Measuring the advantaged neighborhood was done by analyzing three underlying variables, community integration, social order, and neighborhood economic status. In line with earlier described theory these three underlying variables are all indications of an advantaged neighborhood when it comes to health and well-being. The neighborhood variables as used, were all included in the dataset and were originally created by obtaining register data and aggregating them to the HBSC-study based on their four-digit postal code. The respondents were from 1473 different postal codes from a total of 4072 in the Netherlands. Community integration, social order, and neighborhood economic status were coded so a higher score would reflect a more advantaged neighborhood. The dataset included no original postal codes or underlying variables, such as the original register data, to ensure anonymity for the respondents. A random group identifier was used to identify each neighborhood cluster.

The first variable which was used for indicating an advantage neighborhood, was *community integration*. Community integration was measured by using the social fragmentation index in the dataset. Social fragmentation is seen as a sign of poor community

integration (Roberts et al., 2020). The social fragmentation index was originally constructed by adding the z-scores for a 4-digit postal code on the following variables: percentage of adults living in a single-person household, percentage of unmarried adults, the percentage of rented houses in the private sector and percentage of adult residents who had moved to the neighborhood in the last 12 months. Mobility, single-person households, households privately renting and unmarried residents are associated with social fragmentation in a neighborhood (Chakravarty et al, 2014; Congdong, 1996). *Social order* is the second neighborhood variable that was used as to indicate an advantaged neighborhood. To measure social order the safety score from the Leefbaarometer 2.0 was used. This safety score was measured based on registered crimes such as car thefts, disruption of public policy, nuisance, vandalism and violent felonies. These registered crimes were calculated for blocks of a 100 square meters after which they were assigned to postal codes (Leidelmeijer et al., 2020). The third variable that was used to indicate neighborhood advantage is *Neighborhood economic status*. The prevalence of poverty in a neighborhood is considered as one of the main indications for disadvantage in a neighborhood (Ross et al., 2001). The variable was originally measured by combining the percentage of households with an income below the poverty line, the standardized median income and unemployment rate of the 4-digit postal code.

The three neighborhood variables community integration, social order and neighborhood economic status were all positively correlated. Community integration has a strong correlation with social order, $r(6496)=.668$, $p<.001$, and neighborhood economic status, $r(6496)=.696$, $p<.001$. Social order and neighborhood economic status had a strong correlation of $r(6496)=.592$, $p<.001$. These correlations indicate that while there is a strong relationship between the three variables, the variables do measure a different aspect of an advantaged neighborhood.

Control variables

Next to the main independent variables, this study controlled also for several other important factors. The economic situation of a respondent's family showed to be associated with adolescent alcohol use (Lemstra et al., 2009). The economic situation of the family was measured by using the validated *FAS scale*. This FAS scale is based on 6 questions which reflect purchasing power by asking respondents about material resources and patterns of consumption. The six questions are: 1. "Does your family own a car, van or truck?", which could be answered by (0) "No", (1) "Yes one", or (2) "Yes, two or more" 2. "Do you have your own bedroom for yourself?", which could be answered by (0) "No" or (1) "Yes" 3. "During the past 12 months, how many times did you travel away on holiday with your family? ?", which could be answered by (0) "Not at all", (1) "Once", (2) "Twice", or (3) "more than twice". 4. "How many computers does your family own?", which could be answered by (0) "None", (1) "One", (2) "Two" or (3) "More than two". 5. "Does your family have a dishwasher? which could be answered by (0) "No" or (1) "Yes". 6 "How many bathrooms (room with a bath or shower) are in your home?", which could be answered by (0) "None", (1) "One", (2) "Two", or (3) "More than two". The scores on these questions were added together resulting in a scale ranging from 0, indicating a low economic status of the family, to 13, indicating a high economic status of the family (Richter et al., 2009). Next to the family, friends also play an important role in adolescent alcohol use (Kuntsche et al., 2005). While studies agree on the importance of the relationship between the friends of an adolescent and his or her alcohol use, findings on the nature of this relationship seem to be mixed (Groh et al., 2007; Poelen et al.,

2007; Wang et al.,2015). To take the influence of friends into account, *friend support* was included as a control variable. This was measured by assembling a scale-score from the response to the following four statements: 1. *My friends really try to help me* 2. *I can count on my friends when something goes wrong* 3. *I have friends to whom I can tell everything* 4. *I can talk about my problems with friends*. The responses to these statements were on a 7 point likert scale. The assembling of these responses lead to a scale-score ranging from 0 being the lowest to 6 being the highest level of friend support. With a Cronbach’s alpha of .935, this scale can be considered reliable. Studies of *gender* differences in adolescent alcohol use have shown consistently that males consume alcohol more frequently (Webb et al., 2002; Schulte et al., 2009). Therefore, this study controlled for gender by asking the question “are you a boy or a girl?” Being a boy was coded as 1 and being a girl was coded as 0. The HBSC rapport of 2017 (Stevens et al, 2018) showed differences in alcohol use for different *age* groups and *school level*. Therefore, age and school level were also used as control variables. Age was computed by subtracting the month and year of birth from the survey date, after which the variable was centered around the average age of 14.63. For school level, the school type to which the students were currently enrolled was asked. This reflects the Dutch educational system which consisted of the categories 0 “*VMBO Kader*”, which is preparatory vocational secondary education”, 1 “*VMBO-TL*”, which is theoretical vocational secondary education, 2 “*HAVO*”, which is senior general secondary education”, and 3 “*VWO*”, which is pre-university education”. The spread of school level among respondents was as follows: 15.8% Preparatory vocational secondary education, 27.6% Theoretical vocational secondary education, 25,8% Senior general secondary education, and 30,8% VWO “Pre-university education”.

All included variables can be seen in Table 1. For all these included variables variance inflation factors were checked to see if there was a case of multicollinearity, but with all factors being below 5.0 there was no indication of such a problem (Field, 2009). The variance inflation factors can be found in Appendix 1.

Descriptive statistics

Table 1. displays the descriptive statistics which indicate that although there are slightly more women than men in the dataset and, there is an even spread of age, gender and school level in the dataset. Indications of a representative sample for Dutch youth.

Table 1. Descriptive Statistics

	Minimum	Maximum	Mean	S.D.
Individual characteristics (N=6497)				
Alcohol use	0	6	1.20	1.85
Family support	0	6	5.03	1.34
Age	-2.63	3.36	0	1.54
Gender (1=male)	0	1	.48	
School level	0	3	2.70	1.06
Support friends	0	6	4.76	1.34
FAS-scale	0	13	9.01	1.88
Neighborhood characteristics (N=1473)				
Social order	-.20	.45	.00	.11
Community integration	-10.80	3.52	.00	2.12
Neighborhood economic status	-9.72	10.64	.00	2.36

Analysis

IBM SPSS software version 26 was used to perform a linear regression to analyze the data. Model 1 includes the direct effect of family support on the alcohol use of adolescents. After this, in model 2, the control variables and the neighborhood variables were added to the model one by one and retained if significant. No control variables were removed due to not being significant. In model 3 the variables indicating an advantaged neighborhood, community integration, social order, and neighborhood economic status, were added to model 2 to test hypothesis 2. In model 4, 5 and 6 the interaction variables between family support and the advantaged neighborhood variables are added separately to test if there is a moderating effect. Model 4 includes the interaction between community integration and family support, model 5 includes the interaction between social order and family support, and model 6 includes the interaction between neighborhood economic status and family support.

With adding the neighborhood variables from the data set, and certain groups of adolescents living in the same neighborhood, the dataset consists of clusters and can be viewed as hierarchical. Hierarchical data makes it more likely that the model errors are codependent. Therefore, a multilevel model is used to reduce the possible influence of such spherical errors. According to Jackson and colleagues (2014), a multilevel model is ideally suited to analyze contextual effects while at the same time analyzing variables at the individual- and the neighborhood-level. A maximum likelihood estimation method was used to compare the different models. For each variable was checked whether a random slope would increase the fit of the model and reduce remaining variance including the control variables. According to Barr et al., (2011) many researchers are not including random slopes for control variables because they are afraid this will lead to higher rates of Type 1 errors, however Barr and his colleagues argue that this is not the case, and random slopes for control variables should be included because they potentially reduce the amount of noise in ones data. Only a significant random slope for the control variables age and gender was found and no random slope was found for the main variables. Including a random slope for age and gender caused a random intercept to be insignificant. Finding a significant random slope for age and gender means being part of a different neighborhood cluster causes the effect of age and gender on adolescent alcohol use to be different. Finding no significant random slope for family support or the neighborhood variables indicates that there is not such a different effect for respondents between different neighborhood clusters.

Results

Results of family support and adolescent alcohol use

Table 2 shows the results of the multilevel linear regression analysis. Model 1 shows that family support ($b=-.191$, $p<.001$) is a significant negative predictor of alcohol use. Adolescents who are perceiving more family support are less likely to drink alcohol often. This significant result remained ($b=-0.187$, $p<.001$) after adding the individual control variables to the model which can be seen in model 2. This means that support was found for hypothesis 1, stating that adolescents who perceive more family support drink less alcohol. When looking at the control variables in model 2, age ($b=-.613$, $p<.001$) seems to be the biggest influence included. Older adolescents more often drink alcohol than younger ones. Also, boys drank alcohol more frequently than girls ($b=.248$, $p<.001$). Perceiving more support from friends ($b=.151$, $p<.001$) has a positive relation with the frequency of alcohol use among adolescents, meaning that adolescents perceiving more support from friends are drinking alcohol more

frequently. A family's economic situation also proved to be an significant predictor for adolescent alcohol use ($b=.115$, $p<.001$). The higher the economic status of a family, the more often an adolescents is likely to drink alcohol. Including the control variables significantly improved the model with a difference of 2095.466 in -2 Log Likelihood (-2LL) between model 1 (26224.771) and model 2 (24129.305) (Field,2009).

Results of advantaged neighborhoods and adolescent alcohol use

In model 3 the variables community integration, social order and neighborhood economic status were added to test hypothesis 2. A decrease of 58,841 in -2LL compared to model 2 suggests that adding the neighborhood variables significantly improves the model in predicting adolescent alcohol use. The model shows that neighborhood characteristics, social order ($b=-1.415$, $p<.001$), community integration ($b=.032$, $p=.032$) and neighborhood economic status ($b=-.031$, $p=.023$) all have a significant direct effect on adolescent alcohol use. Social order and neighborhood both have a negative effect meaning that higher degrees of social order and neighborhood economic status are associated with lower adolescent alcohol use and thereby offering support for hypothesis 2. However, neighborhood community integration has a positive effect on adolescent alcohol use meaning that higher levels of community integration are associated with higher adolescent alcohol use. These findings give only partial support for hypothesis 2, which states that adolescents living in a more advantaged neighborhood drink less alcohol.

Results of Interaction between neighborhood variables and family support on adolescent alcohol use.

In model 4, 5, and 6 the cross-level interactions between family support and the neighborhood variables community integration, social disorder and neighborhood economic status were added separately to model 3 to test hypothesis 3. In model 4 the interaction between community integration and family support is added to test whether community integration moderates the effect of family support on adolescent alcohol use. The interaction between community integration and family support does show a significant positive effect ($b=,013$, $p=.050$) on adolescent alcohol use. This positive effect means that in neighborhoods with higher levels of community integration the negative effect of family support on alcohol is weaker. In model 5 the interaction between social order and family support is added and shows that this interaction between social order and family support is significant ($b=.444$, $p<.001$). Meaning that in neighborhoods with higher levels of social order the effect of family support on adolescent alcohol use is weaker. In model 6 the interaction between neighborhood economic status and family support is added and shows that this interaction between neighborhood economic status and family support is significant ($b=.025$, $p<.001$). Which indicates that, next to higher levels of community integration and social order, higher levels of neighborhood economic status also weakens the effect of family support on adolescent alcohol use. finding that higher levels of all three neighborhood variables weaken the effect of family support on adolescent alcohol use confirms hypothesis 3, stating that the effect of family support on alcohol is weaker for adolescents living in a more advantaged neighborhood. After adding these interactions, there was with a difference in -2LL of 3.844 with model 3 compared to model 4, 13.042 to model 5 and 20.717 to model. This suggests that adding the interactions significantly improved the models in explaining adolescent alcohol use. This further confirms the earlier sketched suggestion that the neighborhood variables moderate the effect of family support on adolescent alcohol use.

Table 2. Results of the Multilevel Linear Regression Analyses on Adolescent Alcohol Use. (*N*-individuals=6497, *N*-Neighborhoods=1473)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	2.194***	.089	-8,510***	.236	-8.434***	.235	-8,418***	0,235	-8.406***	.235	-8,430***	.235
Individual variables												
Family support	-.192***	.017	-.184***	.016	-.184***	.016	-.186***	.016	-.188***	.016	-.190***	.016
Friends' support			.151***	.016	.149***	.016	.149***	.016	.148***	.016	.148***	.016
Age			.613***	.013	.616***	.013	.616***	.013	.617***	.013	.618***	.013
Gender (1=male)			.248***	.042	.244***	.042	.243***	.042	.241***	.042	.240***	.042
School level			-.121***	.020	-.116***	.020	-.115***	.020	-.116***	.020	-.116***	.020
FAS-scale			.115***	.011	.102***	.011	.101***	.011	.101***	.011	.102***	.011
Neighborhood variables												
Social order					-1.415***	.323	-1.399***	.323	-1,391***	.322	-1,389***	.322
Community integration					.032*	.015	.031*	.015	.031*	.015	.030*	.015
Neighborhood economic status					-.032*	.014	-.032*	.014	-.032*	.014	-.032*	.014
Across level interactions												
Community integration * family support							.013*	.007				
Social order * family support									.444***	.123		
Neighborhood economic status * family support											.025***	.006
Covariance parameters												
Residual	3.101***	.058	2,246***	.044	2.252***	.044	2.250***	.044	2,247***	.044	2.244***	.044
Intercept	.291***	.039										
Age			.000***	.000	.000**	.000	.000***	.000	.000***	.000	.000***	.000
Gender			.139**	.050	.141**	.049	.143**	.049	.144**	.049	.142**	.049
Deviance												
-2 log likelihood	26224.771		24129.305		24070.464		24066.620		24057.422		24049.747	

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

Conclusion and Discussion

The first research question this study tries to answer is, *to what extent does family support influence adolescent alcohol use?* Previous research shows that family support can be considered as a large protective factor when it comes to adolescent alcohol use (Catanzaro & Laurent, 2004; Chaplin et al., 2012; Elisaus et al., 2018; Foxcroft & Lowe, 1997; Schwinn & Schinke, 2014). This study showed there is indeed a negative relationship between family support and adolescent alcohol use. This negative relationship can be explained by previous studies which show that family support influences adolescent alcohol use through parental monitoring (Ennet et al., 2008; Li et al., 2000), esteem support (Chan & Chan, 2013; Mogro-Wilson, 2008), and emotional support (Bountress et al., 2017). After combining the results of this study and previous studies, it can be concluded that adolescents who perceived higher levels of family support, drink alcohol significantly less often.

Second, this study tries to show to what extent living in a more advantaged neighborhood influences adolescent alcohol use. Congruent with other studies (Bernstein et al., 2007; Beyers et al., 2004; Chuang et al., 2005; De Haan & Boljevac, 2010; De Haan et al., 2010), the results of this study show that living in an advantaged neighborhood is indeed associated with adolescent alcohol use. Adolescents living in a neighborhood with higher levels of social order and a higher neighborhood economic status show to use alcohol less frequently. Possible explanations for these findings are that neighborhoods with higher levels of social order and a higher neighborhood economic status have less risk factors for alcohol use (Brenner et al., 2011), and adolescents living there experience less economic strain (Morrison Gutman et al., 2005). Another explanation why adolescents are drinking less in neighborhoods with higher levels of social order, could also be because adolescents do not to drink because they fear social exclusion (Kuntsche et al., 2005), or other residents are more likely to intervene if drinking, which makes it harder and less rewarding to drink (Maimon & Browning, 2012). While the results of this study are congruent with other studies on the relations of social order and neighborhood economic status with adolescent alcohol use, the results of this study are not congruent with other studies on the relation between community integration and adolescent alcohol use. The results of this study indicate that community integration is positively associated with adolescent alcohol use, while previous studies showed an opposite effect (Beyers et al., 2004, Chuang & Chuang, 2008; De Haan et al., 2010). An explanation for these opposite findings could lay in the geographical differences. The current study is based on Dutch respondents, while the previous mentioned studies were held in respectively the USA (De Haan et al., 2010), the USA and Australia (Beyers et al., 2004) and Taiwan (Chuang & Chuang, 2008). It could be that differences in social norms on alcohol use between these countries and the Netherlands lead to different results, since motives for alcohol use are often social (Kuntsche et al., 2005). When taking previous research and the findings of this study into account, it can be concluded that living in an advantaged neighborhood does influence adolescent alcohol use. However while the findings on social order and neighborhood economic status were in line with previous research, and show them as a protective factor. The findings on community integration were not, suggesting that more research needs to be done on possible confounding factors such as geographical differences to further understand this relationship.

Third, this study tries to answer the question, *To what extent is the effect of family support on adolescent alcohol use influenced by living in a more advantaged neighborhood?* Studies on how living in an advantaged neighborhood influences the effect of family support

on adolescent alcohol use are rare. Studies by Booth and Shaw (2020) and Morrison Gutman et al. (2005), suggested that living in an advantaged neighborhood could lead to more effective parenting and thereby strengthening the effect of family support on adolescent alcohol use. However the results of this study suggest the opposite and show that the effect of family support is weaker in advantaged neighborhoods. Higher levels of community integration, social order, and neighborhood economic status were all associated with a weaker effect of family support on the alcohol use of adolescents. A possible explanation for this finding could be, that more advantaged neighborhoods have less risk factors for adolescent alcohol use (Brenner et al., 2011), which family support can protect them from. However, while this explanation sounds highly plausible for neighborhoods with higher levels of social order and neighborhood economic status, the results of the second research question indicate that this is not the case for higher levels of community integration. A possible explanation could be offered by the suggestion of Fagan and Wright (2012). Saying that parents are maybe watching their children less closely when they believe other people are providing oversight due to high levels of community integration.

Strengths, limitations and future research

The findings in this study are based on a large representative dataset, which can be considered as a strength in this research. However, there are also some limitations that must be taken into consideration. First, while the measurement of the dependent variable alcohol does show the frequency of alcohol use, and although such a self-reported measure can be considered reliable (Del Boca & Darkes, 2003), the way the used question has been asked does not indicate the amount of alcohol that is being used per time. Asking respondents about the amount of alcohol as well as the frequency would perhaps have shed more light on the full process that is going on.

Second, the cross-sectional character of the data does not allow causal claims. Therefore, it is hard to conclude whether more family support indeed leads to less alcohol use or that perhaps it is the other way around. The first can be considered the most obvious explanation for the relationship, when taking into account the consulted literature. Nevertheless, the assumption that parents are offering more support because their child is drinking, can't be fully disregarded due to the cross-sectional character of the data. Studies using longitudinal data could perhaps offer more support for causal claims.

Third, this research focused only on the neighborhood as a community factor, while recent research shows school characteristics also play a role in the life of adolescents (Brons, 2022). However, looking at neighborhoods is likely to include part of the influence that schools have on adolescents because Dutch adolescents appear to go to school relatively close to their home (Van Goeverden & De Boer 2008). Also, the way the neighborhood variables are measured has its strengths and limits. The register data that were used can be considered precise and reliable, but a four-digit postal code does not necessarily reflect an area that people consider as their neighborhood. It does indicate a living area of a respondent, but it may neglect prominent physical features like railroad or major streets that act as boundaries of a neighborhood (Leventhal & Brooks-Gunn 2000).

The results and design of this studies indicate several interesting options for future research. First, asking more in-depth questions about the sorts of family support could perhaps give more insight to the mechanisms behind the effect of family support on adolescent alcohol use. This could explain whether this effect is indeed the results effective parental monitoring,

esteem support and emotional support. Second, measuring the neighborhood differently could further validate the results of this study. For example, by asking respondents about how they perceive social order and community integration in their neighborhood. Third, the current study uses data which consist of Dutch respondents. Since there is a lack of research on how living in an advantaged neighborhood influences the effect of family support on adolescent alcohol use, it is hard to say to what extent the results of this study can be generalized to other countries. Performing similar studies outside of the Netherlands, could help the external validity of this research.

Since there was a lack of knowledge on how the role of family support on adolescent alcohol use is effected by the neighborhood, this study contributed significantly to understanding this relation. Showing that living in an advantaged neighborhood does indeed weaken the effect of family support, gives insight to where family based interventions can be used most effectively.

Policy implications

The findings of this study show once again what an important role family support plays in adolescent alcohol use. This is valuable information as it can provide guidance for policy makers to what alcohol prevention programs should look like. Interventions that are based on family support, like the *Multidimensional Family Treatment* (Dutch youth institute, n.d.; Rowe & Liddle, 2008) and the *Strengthening Families Program* (Kumpfer & Magalhães, 2018) are already being used in the Netherlands and there is a call for new approaches which focus on family support, like the *Iceland model* (Bouma, 2017). Koning et al. (2018) pointed out that it is important to take the context of an environment into consideration when using interventions to reduce adolescent alcohol use. The results of this study acknowledge this remark. Family support plays a significantly larger role in more disadvantaged neighborhoods. Therefore it is advised to use family based interventions in those neighborhoods. This counts especially for neighborhoods that have lower levels of social order and a lower neighborhood economic status, because these seem to be neighborhoods where adolescents drink more often. Social community teams have an increasing role in alcohol prevention in the Netherlands, but are often coping with a lack of knowledge and skill in this area (Bransen et al., 2016). Assuming that these teams often have a good understanding of the characteristics of the neighborhoods they are working in, gives them an opportunity to implement the findings of this study on a daily basis. When working in less advantaged neighborhoods, these teams should especially be investing in family support based interventions. Seeing that family support plays such a protective role, makes it important to keep investing in programs based on family support and offer support for introducing other programs which focus on family support.

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Appendix 1. Variance Inflation Factors

Table A1.	
<i>Variance Inflation Factors of All Included Variables (N-individuals=6497, N-Neighborhoods=1473)</i>	
Variable name	VIF
Family support	1,214
Friends' support	1,255
Age	1,046
Gender	1,068
School level	1,107
FAS scale	1,130
Social Order	2,456
Community integration	1,936
Neighborhood economic status	2,188