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## Friends' drinking norms and male adolescents' alcohol consumption: The moderating role of performance-based peer influence susceptibility



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### ABSTRACT

This study examined whether the relationship between friends' drinking norms and male adolescents' alcohol use is moderated by performance-based peer influence susceptibility. Seventy-three male adolescents ( $M = 17$  years) from three schools in the Netherlands were exposed to the drinking norms of "peers" (electronic confederates) in a chat room experiment. These peers were either popular or unpopular, and conveyed pro- or anti-alcohol norms. Peer influence susceptibility was defined as the change in adolescents' answers before and after exposure to the peer norms. Multilevel regression analyses indicated that the relationship between friends' drinking norms and adolescents' alcohol use (assessed during eight weekends) was moderated by susceptibility to the pro-alcohol norms of popular peers. This relationship was stronger for adolescents who were highly susceptible. These findings suggest that a behavioral measure of peer influence susceptibility could be useful in alcohol prevention programs to select adolescents at risk for negative peer socialization.

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Adolescent alcohol use is associated with long-term health-consequences such as increased risk for alcohol problems and dependence in adulthood (McCambridge, McAlaney, & Rowe, 2011), and several aversive short-term consequences, such as aggression and violent behavior, somatic problems due to intoxication, vandalism, accidents, poor school performance, risky sexual behavior, self-harm and suicide (Bonomo et al., 2001; Felson, Savolainen, Aaltonen, & Moustgaard, 2008; Huang, White, Kosterman, Catalano, & Hawkins, 2001; Miller, Naimi, Brewer, & Jones, 2007; Stolle, Sack, & Thomasius, 2009). One of the strongest correlates of adolescents' alcohol use is peers' drinking behavior (Hawkins, Catalano, & Miller, 1992; Leung,

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Toumbourou, & Hemphill, 2014). This may not be surprising, given that adolescents predominantly drink in peer groups. These groups generally show high similarities in alcohol use, due to a combination of selection and influence processes (Osgood et al., 2013). Adolescence is characterized as a transitional phase between childhood and adulthood, in which individuals attempt to become more independent from their parents and establish new social relationships with peers (Blakemore, 2008; Brown, 2004). Moreover, adolescents have a strong motivation to acquire social status in the peer group (LaFontana & Cillessen, 2010). Peers can signal, through their own drinking behavior, which behavior is appropriate and accepted in certain situations, and accordingly, which behavior is likely to lead to positive evaluation and social acceptance (Borsari & Carey, 2001). Adapting to the behavior and norms of peers could therefore increase adolescents' sense of accepted and valued behavior in the peer group, which may stimulate new social relationships with peers, detachment from parents and the development of a stable and favorable self-concept (see Brechwald & Prinstein, 2011).

Indeed, several studies yielded convincing evidence that adolescence is marked by increased sensitivity to peer influence (Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Gardner & Steinberg, 2005; O'Brien, Albert, Chein, & Steinberg, 2011; Smith, Chein, & Steinberg, 2014; Smith, Steinberg, Strang, & Chein, 2015; Weigard, Chein, Albert, Smith, & Steinberg, 2014). However, less is known about individual variability in the extent to which adolescents are influenced by peers. More specifically, there is still limited understanding of the role of peer influence susceptibility in the relationship between peers' and adolescents' alcohol use. The present study therefore focused on whether the association between friends' drinking norms and adolescents' alcohol use is moderated by adolescents' peer influence susceptibility.

Several methods have been designed to assess peer influence susceptibility. Frequently, susceptibility is assessed with questionnaires, in which participants are asked to report on their level of susceptibility or resistance to peer influence (e.g. Steinberg & Monahan, 2007; Sumter, Bokhorst, Steinberg, & Westenberg, 2009). Santor, Messervey, and Kusumakar (2000) found that self-reported peer influence susceptibility was positively related to alcohol consumption among adolescents. Related to peer influence susceptibility, previous research showed that social comparison moderated the relationship between perceived peer drinking norms and alcohol related negative consequences, such that the relationship between peer norms and negative consequences was stronger for college students who scored higher on social comparison (Litt, Lewis, Stahlbrandt, Firth, & Neighbors, 2012). Additionally, in a study focusing on delinquency, Miller (2010) showed that the effect of peers' delinquent behavior on adolescents' self-reported delinquent behavior was stronger when these adolescents scored high on peer influence susceptibility. These findings suggest that peer influence susceptibility is an important factor to include when studying the effect of peers' drinking behavior on adolescents' alcohol consumption. However, as influence processes may occur unconsciously and individuals may change their behavior unintentionally (Chartrand & Bargh, 1999), conclusions about peer influence susceptibility that are solely based on adolescents' self-reports may be incomplete and biased.

To account for this limitation of self-reported susceptibility, some scholars proposed a performance-based measure to assess peer influence susceptibility more objectively. Allen, Porter, and McFarland (2006) asked adolescents and their close friends to respond separately to neutral hypothetical dilemmas. After they made their personal decisions, they were instructed to reach consensus about their decisions. Peer influence susceptibility was assessed as the degree to which the adolescent adapted his or her answer to the friend's answer. This study showed that adolescents' substance use problems were positively related to whether their close friends previously used substances, but only among highly susceptible adolescents. For less susceptible adolescents no associations between substance use problems and friends' substance use were found. Additionally, Prinstein, Brechwald, and Cohen (2011) created a performance-based measure of peer influence susceptibility to examine the relationship between male adolescents' and their friends' deviant behavior. They used a simulated Internet chat room to expose adolescents to deviant norms of peers. These peers were either popular/liked or unpopular/disliked. The adolescents were asked to respond to hypothetical scenarios about engagement in deviant behavior, and peer influence susceptibility was defined as the difference between adolescents' answers before and after exposure to the peer norms. The results indicated that adolescents' perceptions of their best friend's engagement in deviant behavior predicted their own engagement in deviant behavior. However, this association was only found for adolescents who were highly susceptible to popular/liked peers, while no moderation effects of susceptibility to unpopular/disliked peers were found. The researchers therefore suggest that adolescents' susceptibility to peer influence may depend on adolescents' desire to be similar to favorable peers (Gibbons, Gerrard, & Lane, 2003). A similar performance-based measure of peer influence susceptibility was used to examine whether the relationship between popular peer norms and adolescents' engagement in sexual activity was moderated by peer influence susceptibility (Choukas-Bradley, Giletta, Widman, Cohen, & Prinstein, 2014). Consistent with the results of Prinstein et al. (2011), this study revealed that the longitudinal association between the perceived number of sexual partners of popular peers and adolescents' own number of sexual partners was stronger for adolescents high in peer influence susceptibility.

In the present study, we used a comparable performance-based measure to examine whether the relationship between friends' drinking norms and male adolescents' alcohol consumption was moderated by adolescents' peer influence susceptibility. Moreover, peer influence susceptibility is not a fixed construct; the extent to which adolescents are influenced by peers depends on the type of peers and the type of norms that are conveyed by these peers (Teunissen et al., 2012). We therefore differentiated between the norms of popular and unpopular peers, and we made a distinction between peers' pro-alcohol and anti-alcohol norms. Pro-alcohol norms refer to peer norms that promote drinking while anti-alcohol norms refer to peer norms that promote little or no drinking. We created a performance-based measure with a  $2 \times 2$  between subjects design (i.e., popular vs. unpopular peers  $\times$  pro- vs. anti-alcohol norms) and we examined adolescents' peer influence susceptibility within these four conditions. In line with the study of Prinstein et al. (2011), we hypothesized that the

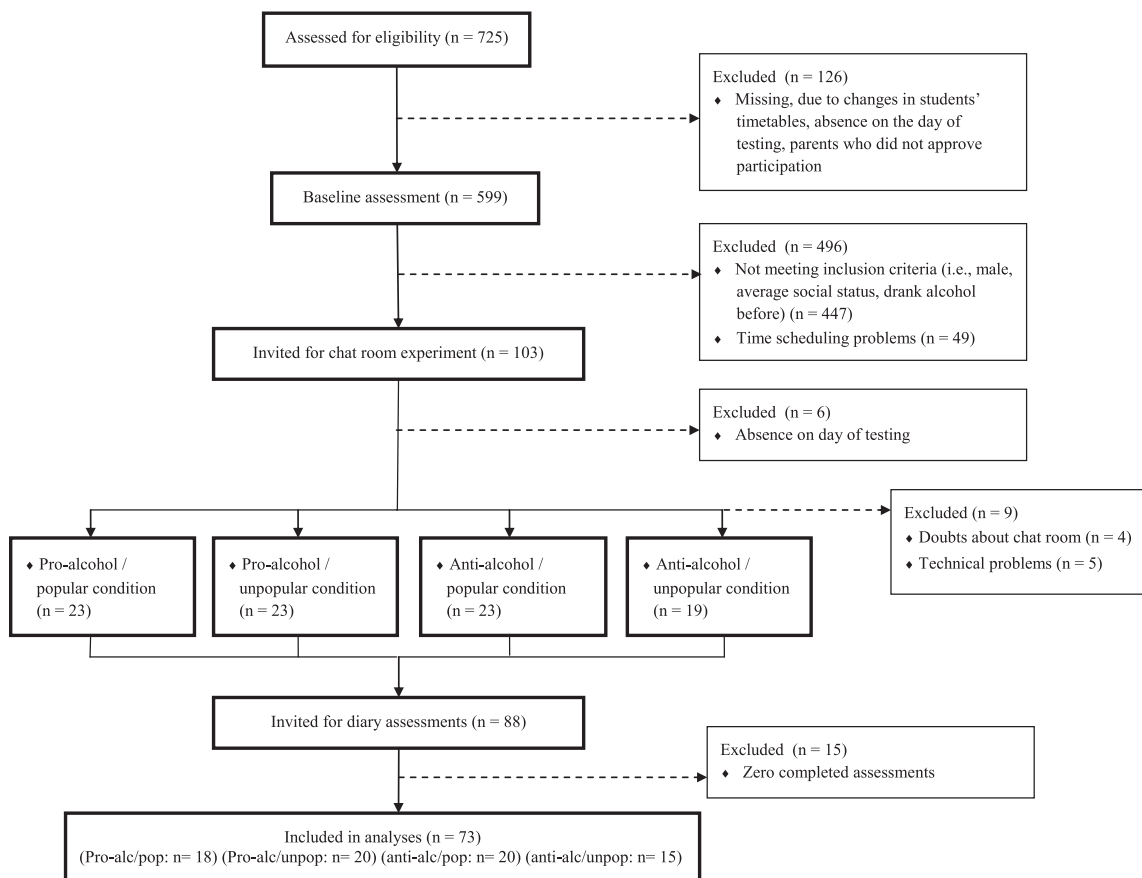


Fig. 1. Flow chart of the allocation of participants throughout the study.

relationship between friends' drinking norms and adolescents' alcohol use was moderated by adolescents' level of susceptibility to the pro-alcohol norms of popular peers. Additionally, we explored whether the association between friends' drinking norms and adolescents' alcohol use was moderated by adolescents' susceptibility to anti-alcohol norms of popular peers, and by susceptibility to the pro- or anti-alcohol norms of unpopular peers.

## Method

### Participants

Our study included three parts: 1) a baseline assessment consisting of class room questionnaire assessments, 2) a chat room experiment, and 3) multiple time-point diary assessments to measure adolescents' alcohol use. The allocation of participants throughout the study is depicted in Fig. 1. Three schools in the Netherlands provided a list with the names of all 4th or 5th grade students (= 10th and 11th grade in the US), resulting in a total number of 725 students. Parents received a letter with information about the study and returned a signed copy if they did not want their child to participate (i.e., passive consent). Data from 126 students were missing, due to changes in students' timetables, absence of students on the day of testing, and parents who did not approve participation. This resulted in a final sample of 599 adolescents (48.6% boys) who were included in the baseline assessment (part 1). Data were collected in 28 classes: 11 4th grade and 17 5th grade classes of pre-university and higher general secondary education. The legal purchasing age for alcohol in the Netherlands at the time of data collection was 16 years.<sup>1</sup> Participants were on average 17 years old ( $SD = 0.82$ ) and the majority (95%) was born in The Netherlands. Eighty-nine percent had ever drunk alcohol, 79% consumed alcohol in the past month, 56% consumed more than five drinks during one occasion (i.e., binge drinking) in the past month and the average number consumed glasses in the past week was 5.4 ( $SD = 9.05$ ). These numbers are highly comparable to the general population same-aged Dutch adolescents (Verdurmen et al., 2012). For the chat room experiment (part 2), we selected participants from the baseline assessment, based on the following criteria: (1) being male, (2) having an average social status, and (3) having drunk alcohol

<sup>1</sup> At present, the legal purchasing age for alcohol in the Netherlands is 18 years. At the time of data collection, this was 16 years.

before. Our decision to focus on boys was based on the finding that, of the 15 to 18 year-old adolescents who drink, boys generally show higher levels of alcohol consumption and higher frequencies of alcohol consumption, binge drinking and drinking to intoxication than girls (Verdurmen et al., 2012). Besides, girls showed higher self-reported resistance to peer influence than boys regarding neutral and/or anti-social behavior (Brown, Clasen, & Eicher, 1986; Steinberg & Monahan, 2007; Steinberg & Silverberg, 1986; Sumter et al., 2009). Moreover, young male adults reported more social pressure to drink (Suls & Green, 2003), and were more likely to adapt their attitudes to peer norms than females (Prentice & Miller, 1993). Levels of alcohol consumption of group members in a drinking context were also found to be more predictive of young male than female adults' drinking behavior (Bot, Engels, Knibbe, & Meeus, 2007). We selected only participants with an average social status since we expected that the effect of peer social status could best be captured in a 'neutral' status group (Cohen & Prinstein, 2006; Teunissen et al., 2012). For ethical reasons, we selected only participants who had drunk alcohol before. In total, 152 students met our selection criteria. Due to time scheduling problems, 49 students were unable to participate in this part of the study. This resulted in 103 students (67.8%) who were invited to participate in the chat room experiment. Data of four participants were excluded because they expressed serious doubts about interacting with real peers in the chat room ( $n = 99$ ; 65.1%). Six participants were absent on the day of testing ( $n = 93$ ; 61.2%) and five participants were excluded due to technical problems. The final sample in the chat room therefore included 88 students (57.9%). These 88 participants scored higher than the baseline sample on the perceived number of friends who drink ( $M = 2.99$ ,  $SD = 0.97$  vs.  $M = 2.72$ ,  $SD = 1.18$ ,  $t[137.71] = -2.34$ ,  $p = .021$ ) and willingness to drink ( $M = 4.68$ ,  $SD = 1.87$  vs.  $M = 3.81$ ,  $SD = 2.26$ ,  $t[136.72] = -3.88$ ,  $p < .001$ ). No differences were found regarding participants' age, frequency of alcohol use in the past month, frequency of binge drinking in the past month and amount of alcohol consumed in the past week.

All 88 participants who completed the chat room experiment were invited to participate in the diary assessments (part 3). All participants who completed at least one of the 16 assessments were included, resulting in 73 (83.0%) out of the 88 participants. No significant differences were found between the participants who dropped out ( $n = 15$ ) and the final sample of 73 participants with respect to the relevant baseline measures. Comparing the final sample of 73 to the baseline sample of 599, the final sample only scored higher on the perceived number of friends who drink ( $M = 3.10$ ,  $SD = 0.86$  vs.  $M = 2.71$ ,  $SD = 1.18$ ,  $t[112.88] = -3.37$ ,  $p = .001$ ) and willingness to drink ( $M = 4.83$ ,  $SD = 1.74$  vs.  $M = 3.81$ ,  $SD = 2.27$ ,  $t[108.43] = -4.46$ ,  $p < .001$ ). Of the possible total of 1168 assessments (73 participants times 16 assessments), a small part (124 assessments, 10.6%) was missing. Since we were interested in the possible effects of friends' drinking norms and peer influence susceptibility on participants' drinking behavior, we assessed adolescents' alcohol consumption when they were accompanied by peers. We, therefore, only included the assessments in which participants reported to have spent time with peers, regardless of whether they drank alcohol or not. This resulted in 466 assessments (40.0% of 1168), which were included in the analyses.

### Procedure

Our study was approved by the Ethical Committee of the Faculty of Social Sciences at Radboud University. In the baseline assessment (part 1), we assessed students' drinking behavior, their willingness to drink, and their friends' drinking norms. In addition, using sociometric methods, students' popularity and friendship affiliations were assessed. The chat room experiment (part 2), was scheduled between four and fourteen weeks after the baseline assessment. The chat room experiment used a 2 (popular vs. unpopular peers)  $\times$  2 (pro-alcohol vs. anti-alcohol norms) between subjects design. Participants were randomly assigned to one of four conditions, which means that participants were interacting with "peers" who communicated either pro-alcohol or anti-alcohol norms and who were either popular or unpopular. For ethical reasons and to prevent any effects on adolescents' alcohol consumption in real life, we debriefed all participants after we completed the chat room data collection at each school. Subsequently, the chat room participants were invited to participate in the diary assessments. Students were informed that this part of the study focused on alcohol use and leisure activities among adolescents and they provided their e-mail address and cell phone number if they agreed to participate. Since adolescents predominantly drink at Fridays and Saturdays (Verdurmen et al., 2012), we assessed their alcohol consumption the next day (i.e., at Saturdays and Sundays), to minimize recall bias. We used the diary assessments to examine whether participants spent time with peers the previous night (i.e., Fridays and Saturdays), and if so, we asked for participants' level of alcohol consumption. These assessments started the weekend after the student participated in the chat room and after they were debriefed. Every Saturday and Sunday during eight weeks (i.e., 16 measures), we e-mailed participants a link to an online questionnaire. Participants were instructed to complete the questionnaire the same day. If they did not complete the questionnaire that day, we sent them a text message on their phone the next day to remind them. If participants completed at least two-thirds of all assessments, they received a gift card of 25 Euro.

## Materials

### Baseline assessment

#### Popularity and friendship affiliations

We examined adolescents' peer-perceived popularity and friendship affiliations using sociometric assessments. All participants in the baseline assessment received a numbered, alphabetized list with the names of all students within their grade, and wrote down the numbers of the students who were "most popular" and the students who were "least popular".

Participants could nominate up to 24 peers for each question. We calculated and standardized the total number of received nominations on most popular and least popular for each participant. A difference score between the number of most popular and least popular nominations was computed, with higher scores indicating higher levels of peer-perceived popularity (Parkhurst & Hopmeyer, 1998). Participants with scores between  $-1.0$  and  $+1.0$  were perceived as having average social status and were selected for participation (Cohen & Prinstein, 2006). Peer nominations are considered the most valid and reliable method to assess peer status in adolescence (Jiang & Cillessen, 2005). Additionally, participants nominated up to 24 peers whom they perceived to be their best friends. We included these friendship nominations to identify the best friends of the most popular and least popular peers, whose names we presented in the chat room as a manipulation of the popularity of the “peers” (described below).

#### *Friends' drinking norm*

We defined the friends' drinking norm as the number of friends that drink alcohol at least once a month. Participants could select *no one* (0); *less than half* (1); *half* (2); *more than half* (3); *everyone* (4) (Scholte, Poelen, Willemsen, Boomsma, & Engels, 2008).

#### *Willingness to drink*

Participants' willingness to drink was assessed with 12 hypothetical drinking scenarios (Teunissen et al., 2012). An example of a scenario is: “You are in a bar with your friends. You feel that you already drank too much, but again another alcoholic drink is handed to you. What would you do?”. Participants could indicate on a 10-point scale how willing they would be to take the drink (0 = *I would definitely not take the drink*; 9 = *I would definitely take the drink*). Cronbach's alpha of this scale was .93, indicating good reliability. We included 5 filler items on other types of behavior as well, such as deviant behavior and risk taking. Participants completed this questionnaire twice: first in the baseline assessment and a second time in the chat room experiment, after they saw the answers of the “peers”.

#### *Chat room experiment*

We asked participants to join a virtual Internet chat room. Each participant was tested individually at school and was under the impression that three other students from their school were participating at the same time in the chat room. In reality, these other students in the chat room were pre-programmed electronic confederates (‘e-confederates’), and their popularity was manipulated. All three e-confederates were either popular or unpopular, depending on the condition. The selection of these e-confederates was based on the sociometric assessment in the baseline assessment: popular e-confederates received social status scores higher than  $+1.0$  and unpopular e-confederates lower than  $-1.0$ . Consistent with previous studies (Cohen & Prinstein, 2006; Teunissen et al., 2012), we excluded e-confederates' names in the chat room (for student privacy purposes), but we manipulated their popularity by presenting the first names and last initials of three best friends of each e-confederate on the screen. These friends were all popular or unpopular (depending on the condition), and their selection was based on the sociometric nominations. This popularity manipulation was strengthened by presenting two hobbies of the e-confederates, characteristic of popular or unpopular adolescents (popular condition: e.g., ‘going out’; unpopular condition: e.g., ‘reading’).

In the chat room, participants responded to the same hypothetical scenarios as in the baseline assessment, to assess their willingness to drink. At all times, the participant was the last one to give his answer to each scenario, to make sure he was exposed to the answers of the three e-confederates first. We used the e-confederates' answers to manipulate the peer drinking norm. These answers were based on the willingness to drink scores on the baseline assessment, and were divided into conformity items and control items (cf. Cohen & Prinstein, 2006). On nine of the twelve drinking scenarios, e-confederates' answers were about 1 SD above the mean score for that scenario on the baseline assessment (in the pro-alcohol condition) or 1 SD below the mean score for that scenario (in the anti-alcohol condition). These scenarios were called ‘conformity items’. On the other three drinking scenarios, the e-confederates gave average responses, equal to the baseline assessment score on that scenario. These scenarios were called ‘control items’. The e-confederates gave average responses to the filler items as well. For each participant we computed a mean score on the conformity items, with higher scores indicating more willingness to drink. A more detailed description of the chat room is presented in Cohen and Prinstein (2006) and Teunissen et al. (2012).

At the end of the chat room interaction, participants rated the popularity of the three e-confederates, as a manipulation check. Answers were given on a five-point scale, ranging from 1 (‘not popular at all’) to 5 (‘very popular’). A t-test revealed that participants in the popular condition ( $M = 3.76$ ,  $SD = 0.48$ ) perceived the e-confederates as more popular than the participants in the unpopular condition ( $M = 2.30$ ,  $SD = 0.63$ ;  $t [71] = -11.27$ ,  $p < .001$ ). Thus, the manipulation was likely to have been successful.

#### *Peer influence susceptibility*

To create a measure of peer influence susceptibility, we compared adolescents' answers on the conformity items in the baseline assessment (i.e., private responses), with their answers on the same items in the chat room (i.e., after they were exposed to the answers of peers) (Prinstein et al., 2011). To account for the fact that the chat room included a pro-alcohol and

an anti-alcohol (between subjects) condition, we computed the absolute difference scores between adolescents' mean scores on the conformity items in the baseline assessment and in the chat room.

### Multiple time-point diary assessments

#### Peer presence

Each diary assessment at Saturday and Sunday started with the question: "Did you spend time with peers last evening (for example with friends or classmates)? With 'evening' we mean between 6 PM and 6 AM." If participants answered 'yes', we asked them about their alcohol consumption (see below) and their data were included in the analyses. If they answered 'no', they received several filler items and their data were excluded.

#### Adolescents' alcohol consumption

Participants were asked: "How many glasses of alcohol did you drink during that period with peers?" They could select *Did not drink (0); 1 or 2 glasses; 3 or 4 glasses; 5 or 6 glasses; 7, 8, or 9 glasses; 10 to 15 glasses; 16 glasses or more*. An overview of standard units of several beverages was provided with the corresponding number of standard glasses, to ascertain that participants understood what was meant by a standard glass (e.g., 1 glass of beer = 1 standard glass; 1 bottle of beer = 1.5 standard glasses; 1 bottle of wine = 7.5 standard glasses; etc.) (e.g., Voogt, Kuntsche et al., 2013; Voogt, Poelen et al., 2013). Midpoints of categories were used, with 17.75 for the highest category (16 glasses plus half range to the midpoint of the adjacent category; see e.g., Kuntsche, Wiers, Janssen, & Gmel, 2010).

### Analyses

Examining the scores on peer influence susceptibility, we found one outlier in the anti-alcohol/unpopular condition. We transformed the score of this participant into the mean score plus two standard deviations (Field, 2009). To examine whether the association between friends' drinking norms and adolescents' alcohol consumption was moderated by participants' peer influence susceptibility, we used Mplus software, version 7 (Muthén & Muthén, 1998–2012). With Mplus the clustering of our diary assessments within individuals can be accounted for. We standardized peer influence susceptibility scores and friends' drinking norms and we created an interaction term between these two variables. We conducted a two-level regression model, with peer influence susceptibility, friends' drinking norms and the interaction term as between level predictors and adolescents' alcohol consumption (assessed by diary assessments) as dependent variable. Since alcohol consumption was positively skewed, we used log transformations. Moreover, the chat room included a 2 × 2 between subjects design (pro- vs. anti-alcohol norms and popular vs. unpopular peers) to account for the notion that peer influence susceptibility depends on the popularity of peers and the norms that are conveyed by these peers. Indeed, ANOVA analyses revealed that participants' susceptibility scores differed between conditions ( $F[3,72] = 5.67; p = .002$ ). We included chat room condition as a grouping variable in Mplus to examine the associations between friends' drinking norms, peer influence susceptibility and adolescents' alcohol consumption within each chat room condition. No differences between conditions were found regarding participants' baseline assessment scores on willingness to drink, levels and frequency of alcohol consumption and friends' drinking norms. Each condition included between 15 and 20 participants, resulting in between 103 and 129 observations within each condition.

## Results

The means and standard deviations of friends' drinking norms, peer influence susceptibility and adolescents' alcohol consumption, as well as the correlations between these variables, are presented in Table 1. We found a positive correlation between friends' drinking norms and adolescents' mean level of alcohol consumption in the diary assessments, indicating that having more drinking friends was associated with higher levels of adolescents' alcohol consumption. The correlation between peer influence susceptibility and adolescents' alcohol consumption was not significant.

The results of the Mplus regression model, in which we included the friends' drinking norms, peer influence susceptibility and the interaction between these two variables to predict adolescents' alcohol consumption, are presented in Table 2.

**Table 1**

Descriptive statistics and correlations between friends' drinking norms, peer influence susceptibility and adolescents' alcohol consumption in multiple time-point diary assessments ( $n = 73$ ).

	<i>M</i>	<i>SD</i>	Peer influence susceptibility	Adolescents' alcohol use
Friends' drinking norms	3.07 <sup>a</sup>	0.89	.06	.32*
Peer influence susceptibility	1.70	1.42		-.08
Adolescents' alcohol use	3.34 <sup>b</sup>	2.53		

Note.

\* $p < .01$ .

<sup>a</sup> Indicates that, on average, more than half of the group of friends drinks regularly.

<sup>b</sup> Average number of glasses consumed during each occasion with peers in diary assessments.

**Table 2**

Adolescents' alcohol consumption regressed on friends' drinking norms, peer influence susceptibility, and the interaction between norms and susceptibility (B values, S.E. in brackets).

	Pro-alcohol/popular condition	Pro-alcohol/unpopular condition	Anti-alcohol/popular condition	Anti-alcohol/unpopular condition
Intercept	1.37** (0.15)	1.27** (0.07)	0.78** (0.12)	1.06** (0.12)
Friends' drinking norms	0.25 (0.20)	0.16 (0.13)	0.33* (0.12)	0.23 <sup>†</sup> (0.12)
Susceptibility	−0.15 (0.18)	0.58** (0.16)	0.08 (0.17)	−0.17 <sup>†</sup> (0.09)
Intercept	1.44** (0.12)	1.29** (0.08)	0.76** (0.11)	1.06** (0.12)
Friends' drinking norms	0.42** <sup>a</sup> (0.15)	0.20 <sup>†</sup> (0.11)	0.41* (0.16)	0.23 <sup>†</sup> (0.12)
Susceptibility	−0.03 (0.15)	0.58** (0.15)	0.24 <sup>†</sup> (0.14)	−0.18 (0.11)
Norms × susceptibility	0.42* (0.14)	0.14 (0.32)	−0.23 (0.21)	0.02 (0.10)

Note. \*\* $p < .001$ ; \* $p < .01$ ; <sup>†</sup> $p < .10$ .

The main effects of friend's drinking norms and peer influence susceptibility are presented in the upper half of the table. The lower half of the table represents the results of the analyses in which the interaction term is included. The columns represent the chat room conditions (i.e., the grouping variable).

<sup>a</sup> The finding that friends' norms became significant after including the interaction, might be due to suppression effects.

Starting with the main effects, we found a positive contribution of friends' drinking norms in the anti-alcohol/popular condition and a marginally significant contribution in the anti-alcohol/unpopular condition. The fact that the significance of the effect of friends' drinking norms varied between conditions is probably due to slight differences in standard errors and in the number of participants and observations in each condition (ranging between 15 and 20 participants and between 103 and 129 observations). Additionally, we found a positive contribution of peer influence susceptibility in the pro-alcohol/unpopular condition, and a marginally significant negative contribution in the anti-alcohol/unpopular condition. When including the interaction term between friends' drinking norms and peer influence susceptibility, a significant interaction effect was found in the pro-alcohol/popular condition. This interaction effect is depicted in Fig. 2 and shows that adolescents drank more when they had many drinking friends than when they had few drinking friends, and this effect is strongest when they were highly susceptible to peer influence. When adolescents scored low on peer influence susceptibility, friends' drinking norms seemed to be unrelated to adolescents' drinking. In the other chat room conditions, this interaction effect was not significant.<sup>2</sup>

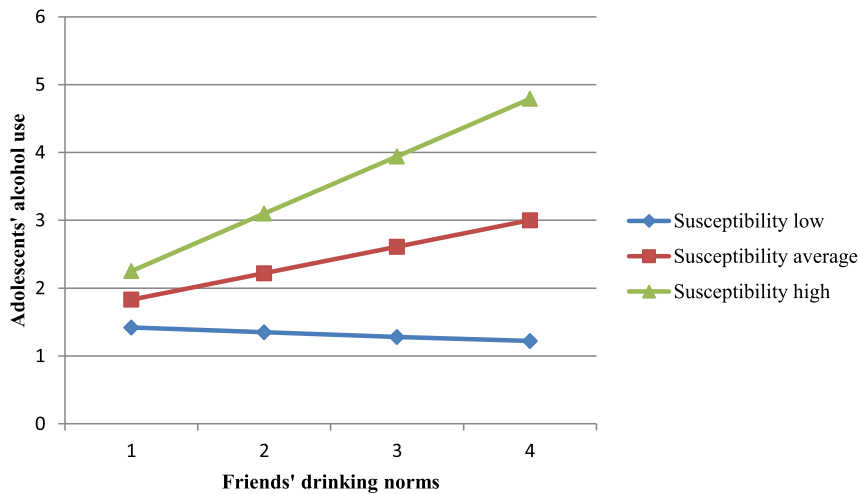
## Discussion

Although previous research has convincingly showed that peer norms play a crucial role in adolescents' alcohol use, the role of individual variability in susceptibility to peer norms in this context has largely been underexposed. We therefore examined whether the association between friends' drinking norms and male adolescents' alcohol use was moderated by peer influence susceptibility. We used an innovative, performance-based measure of peer influence susceptibility, which accounts for the limitations of self-reported susceptibility frequently used in prior research. Moreover, to test whether peer influence susceptibility is a general construct, or whether it depends on specific peers or norms, we differentiated between susceptibility to pro-alcohol and anti-alcohol norms and popular and unpopular peers.

The findings revealed that the relationship between friends' drinking norms and male adolescents' alcohol consumption was moderated by adolescents' susceptibility to the pro-alcohol norms of popular peers. When adolescents were not susceptible to the pro-alcohol norms of popular peers, we found no association between friends' norms and adolescents' alcohol use. Although peer drinking norms play an important role in adolescent alcohol use, these results suggest that there is not per definition a direct effect of peer norms on adolescents' drinking, as is generally assumed. The extent to which adolescents' alcohol use is influenced by drinking norms of friends seem to depend on their level of peer influence susceptibility. This implies that susceptibility to peer influence is an important construct to include in research on the relationship between peer norms and adolescent drinking behavior.

We found no moderating effects of susceptibility to unpopular peers. These findings are consistent with the results of Prinstein et al. (2011), who found that best friends' engagement in deviant behavior predicted adolescents' own engagement in deviant behavior, but only when adolescents were susceptible to the deviant norms of popular peers. Previous research indicated that individuals are more strongly influenced by close friends than by more distant peers (Baer, Stacy, & Larimer, 1991; Yanovitzky, Steward, & Lederman, 2006) and by popular rather than unpopular peers (Cohen & Prinstein, 2006; Teunissen et al., 2012). This implies that adolescents are more likely to conform to the norms of peers they prefer to be associated with, which suggests that susceptibility to favorable peers may be a better indicator of peer influence susceptibility than susceptibility to unfavorable peers. This may explain why no moderating effect of susceptibility to unpopular peers was found.

<sup>2</sup> We ran additional analyses in which we coded the pro-alcohol/popular condition as 1 and tested it formally against the other three conditions (coded as 0). We included adolescents' alcohol consumption as dependent variable and friends' norms, susceptibility, condition (1/0), all 2-way interactions, and the 3-way interaction between friends' norms, susceptibility and condition as predictors. We found the 3-way interaction to be significant ( $B = 0.40$ ,  $S.E. = 0.17$ ,  $p = .015$ ), which supports our finding that chat room condition (pro-alcohol norms/popular peers) moderates peer influence susceptibility.



**Fig. 2.** Adolescents' alcohol use in multiple time-point diary assessments, predicted by the interaction between friends' drinking norms and peer influence susceptibility in the pro-alcohol/popular condition.

Additionally, we examined the moderating role of susceptibility to anti-alcohol norms of popular peers. Previous research showed that adolescents' generally conformed to pro-alcohol as well as anti-alcohol norms of popular peers in a chat room experiment (Teunissen et al., 2012). However, our results indicated that the relationship between peers' and adolescents' drinking was not moderated by susceptibility to peers' anti-alcohol norms. A possible explanation could be that most of the participants reported that more than half of their group of friends, or even all of their friends were regular drinkers. When these adolescents are going out or spend time with friends, as was the case in our diary assessments, it is less likely that there is an evident anti-alcohol norm. If anti-alcohol norms are less present in real-life situations, an individual's level of susceptibility to anti-alcohol norms may not be highly relevant when examining the relationship between friends' drinking norms and adolescents' alcohol use. The fact that our study exclusively included participants who reported to have drunk alcohol before might have contributed to this explanation, since adolescents are more likely to select friends with similar drinking levels (e.g., Burk, Van der Vorst, Kerr, & Stattin, 2012). Yet, further research is warranted to examine this explanation.

This study has some limitations that should be discussed. We assessed friends' drinking norms as adolescents' perceptions of the number of friends that drink regularly. Future research should include other operationalizations of friends' norms, for example observed friends' drinking, to examine peer norms more objectively and to include multiple aspects of friends' drinking norms such as quantity and frequency of alcohol use. Next to these descriptive norms, future research could also focus on friends' injunctive norms, which refer to adolescents' perception of their friends' approval of drinking (Borsari & Carey, 2001). A second limitation is that the number of participants in each condition was relatively small. Our four chat room conditions each included between 15 and 20 participants. However, because of our multiple time-point diary assessments, in which we measured adolescents' drinking behavior repeatedly over eight weeks, each condition included between 103 and 129 observations. Our sample therefore included a sufficient number of observations in each condition and the number of participants is comparable to several other studies using multiple time-point assessments (e.g., Fulford, Johnson, Llabre, & Carver, 2010; Knowles et al., 2007; Scharf, Martino, Setodji, Staplefoote, & Shadel, 2013; Silk et al., 2007). Nevertheless, future research would benefit from including larger sample sizes to increase power and to test whether our results are replicated. A third limitation is that we tested the moderating effect of peer influence susceptibility within the four chat room conditions (i.e., condition was included as grouping variable in the analyses) and we did not formally test the 4-way interaction effect (i.e., friends' norms  $\times$  susceptibility  $\times$  popular/unpopular peers  $\times$  pro-/anti-alcohol norms), due to the limited sample sizes. Again, future research using larger samples could examine these interaction effects more thoroughly. Fourth, our diary assessments merely included adolescents' alcohol use in the company of peers. Since adolescents are considered more likely to drink in the company of peers than alone, we may have found a stronger relationship between friends' drinking norms and adolescents' alcohol use. Future research could therefore focus on adolescents' overall alcohol use, regardless of the company, to examine whether similar results are found. A final limitation pertains to the generalizability of our findings. Our study included only boys, with average social status, attending higher education levels. Future studies should include a broader sample to examine whether our findings can be generalized. Moreover, future research should indicate whether our results are generalizable to other countries. Although the legal purchasing age for alcohol was lower in the Netherlands (at the moment of data collection) compared to other countries, alcohol use of Dutch adolescents is highly comparable to the average drinking levels of adolescents in other European countries (Hibell et al., 2009). However, previous research suggests that alcohol use of Dutch adolescents is higher compared to adolescents in the U.S., where the laws regarding alcohol use are more strict (Simons-Morton, Pickett, Boyce, Ter Bogt, &



Vollebergh, 2010). It is therefore not clear whether similar results concerning the relationship between friends' drinking norms, peer influence susceptibility and adolescents' alcohol use would be found among adolescents in the U.S.

Our findings showed that the relationship between friends' drinking norms and adolescents' alcohol use depended on adolescents' susceptibility to peer influence, which could be a useful insight for alcohol prevention and intervention programs. Interactive intervention programs based on the 'social influence model' are considered most effective in reducing adolescent alcohol use (Cuijpers, 2002; Faggiano et al., 2010; Tobler et al., 2000). These programs contain several components, such as normative education, which includes correcting the overestimation of the perceived prevalence of peer use and the social acceptability of alcohol use. A second important component is teaching adolescents efficient refusal skills to resist direct and indirect peer pressure to use alcohol (Botvin, 2000; Cuijpers, 2002). Previous research has suggested that poor refusal skills are indeed likely to increase adolescents' conformity to peers' alcohol use (Allen, Chango, Szwedlo, Schad, & Marston, 2012). However, the results of these school-based universal alcohol prevention programs are mixed and the effect sizes are generally modest (Agabio et al., 2015; Foxcroft & Tsertsvadze, 2012). Selective prevention programs, aimed at specific risk groups, may be more effective (Offord, 2000). The results of the present study suggest that performance-based measures may help to identify adolescents at risk for negative peer socialization effects. Preventive interventions may therefore be directed at this specific group of adolescents, who may benefit most from participation. Performance-based measures not only benefit from high predictive validity, these measures also have high ecological validity. The susceptibility measures did not depend on adolescents' self-reports and adolescents were probably unaware that they were being influenced, which strongly resembles implicit peer influence processes in daily life (Prinstein et al., 2011). The present study included an extensive performance-based measure (i.e., four conditions), as one of the goals was to examine whether peer influence susceptibility depended on specific peers and norms. When performance-based measures are applied to select risk groups for interventions, the results of the present study could be used to create a simplified version of a performance-based measure. More specifically, these measures may be most effective in selecting at risk youth by including the norms of popular or well-liked peers that promote drinking. Future research should examine whether these simplified measures can be applied to select adolescents at risk for negative peer socialization, and whether intervention programs prove to be especially beneficial for this group.

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