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Cool or Fool? The Association Between Drinker Prototypes and Alcohol Consumption Using Multiple Time-Point Diary Assessments in Adolescent Males

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ABSTRACT

Objectives: There is still limited understanding of how different kinds of drinker prototypes are associated with adolescent drinking. This study uses the strengths of multiple time-point diary measures (enhanced validity of alcohol use measurement) to test the predictive value of abstainer, moderate and heavy drinker prototypes in social situations. We examined whether the favorability of these prototypes (i.e., "prototype evaluation"), the perceived similarity of these prototypes to one's self-image (i.e., "prototype similarity") assessed at baseline, and their interaction predict alcohol use assessed in social situations. *Methods*: Drinker prototypes were assessed in a baseline sample of 599 adolescents. Subsequently, a sample of 77 alcohol-using 16 to 18-year-old males reported their Friday and Saturday evening drinking behavior the next day during eight weeks (resulting in 495 daily measures). Alcohol use was assessed in the company of peers. *Results*: The more adolescents perceived themselves as similar to heavy drinker prototypes the higher their alcohol consumption in social situations. The more adolescents held favorable abstainer prototypes, the lower their alcohol consumption. The interaction between prototype evaluation and similarity was not significant. *Conclusions*: By using a more reliable and valid method to assess adolescents' alcohol use, the present study showed that more "extreme" drinker prototypes (i.e., heavy drinker and abstainer prototypes) are most predictive of adolescent alcohol use in social situations. Increasing the perceived dissimilarity to heavy drinker prototypes and the favorability of abstainer prototypes may therefore be important targets in interventions aimed at reducing adolescents' alcohol consumption.

According to research on socio-cognitive processes explaining adolescent drinking behaviors, adolescents' alcohol use is associated with the stereotypical impressions they form about the type of peers who drink or abstain, and about how the peer group perceives drinking. These stereotypical impressions are known as "drinker prototypes" (Gerrard et al., 2002; Gibbons & Gerrard, 1995). The typical drinker may, for example, be perceived as annoying or amiable, while the typical abstainer may be perceived as responsible or boring (Van Lettow, Vermunt, De Vries, Burdorf, & Van Empelen, 2012). According to the Prototype/Willingness model, drinker prototypes influence alcohol use via behavioral willingness (Gibbons, Gerrard, & Lane, 2003). Studies have also revealed a direct path from prototypes to alcohol use (Gerrard et al., 2002; Rivis & Sheeran, 2013). Relatively favorable drinker prototypes are found to be associated with increased self-reported alcohol consumption among adolescents (Andrews, Hampson, Barckley, Gerrard, & Gibbons, 2008; Gerrard et al., 2002; Spijkerman, Van den Eijnden, Overbeek, & Engels, 2007), while favorable abstainer prototypes are related to lower self-reported and observed alcohol use (Gerrard et al., 2002; Spijkerman, Larsen, Gibbons & Engels, 2010; Zimmermann & Sieverding, 2010).

Next to adolescents' evaluations (i.e., favorability) of drinker prototypes, their perceived similarity to drinker prototypes can also affect drinking. Prototypes are assumed to influence behavior through social comparison processes (Lane, Gibbons, O'Hara, & Gerrard, 2011). When adolescents perceive themselves to be rather similar to a prototype they are more likely to engage in the behavior associated with that prototype (Gibbons, Gerrard, & Lane, 2003; Rivis & Sheeran, 2003). Empirical findings have indicated that perceived similarity to drinker prototypes was related to drinking intentions

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among adolescents (Rivis, Sheeran, & Armitage, 2006) and self-reported drinking among young adults (Norman, Armitage, & Quigley, 2007).

According to previous studies on health risk and health protective behaviors, the interaction between adolescents' favorability of prototypes (i.e., "prototype evaluation") and their perceptions of how similar they are to these prototypes (i.e., "prototype similarity") contributes to the prediction of behavior (Gibbons, Gerrard, & Boney-McCoy, 1995; Van Lettow, De Vries, Burdorf, & Van Empelen, 2014). Concerning alcohol use, Rivis and colleagues (2006) found that the impact of prototype favorability on adolescents' intentions to drink was stronger when individuals perceived themselves as similar to these prototypes. However, other research found no interaction effect between prototype evaluation and similarity on undergraduate students' binge drinking (Norman et al., 2007).

Researchers that examined the association between drinker prototypes and young people's alcohol use employed various research methods to assess drinking. Their studies yielded important information about drinker prototypes, yet these different methods were also subject to limitations. Drinking behavior was predominantly based on retrospective self-reports over extensive time-periods, such as the past 3 (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997; Ouellette, Gerrard, Gibbons, & Reis-Bergan, 1999), and 6 months (Gibbons & Gerrard, 1995; Spijkerman et al., 2007), or the past year (Andrews et al., 2008; Gerrard et al., 2002). These retrospective self-reported data on alcohol use over relatively extensive time periods may have been distorted by recall bias (Ekholm, 2004; Engels, Knibbe, & Drop, 1997; Kuntsche & Labhart, 2012). A few studies included shorter time periods and assessed young adults' self-reported binge drinking at one or two weeks follow-up (Norman et al., 2007; Rivis & Sheeran, 2013). However, recall of alcohol consumption is found to decline already after two or three days (Ekholm, 2004). A restriction of using shorter time periods, however, is that the frequency of drinking during that period may be low, which could result in a floor effect (Rivis & Sheeran, 2013).

A general limitation of previous longitudinal drinker prototype research is that individuals are merely asked to indicate how much they drank while the social context is not taken into account. Drinker prototypes are assumed to influence adolescents' alcohol consumption in social situations in which they have the opportunity to drink (Gibbons et al., 2003), which is usually when they are accompanied by peers. Moreover, the underlying assumption is that adolescents are concerned about how drinking is socially evaluated, which

implies that the impact of drinker prototypes on adolescents' alcohol use may best be captured in a social context. To our knowledge, only one study assessed whether drinker prototypes contributed to the prediction of self-reported alcohol consumption at a social drinking occasion. Zimmermann and Sieverding (2010) assessed young adults' alcohol use a few days after the drinking occasion and found that drinker prototypes contributed to the prediction of alcohol consumption of men, not women.

Other studies on socio-cognitive processes of adolescent drinking use observations instead of self-reports to assess alcohol use (e.g., Bot, Engels, Knibbe, & Meeus, 2007; Koordeman, Anschutz, Van Baaren, & Engels, 2010; Larsen, Engels, Granic, & Overbeek, 2009; Spijkerman et al., 2010). These studies are often conducted in semi-naturalistic lab settings. The advantage of this type of observational research is that data are not biased by recall and self-report bias, and refer to social drinking situations in which participants actually have the opportunity to drink. Despite their advantages, observational designs may also entail some limitations. First, although bar lab settings resemble a naturalistic drinking context, participants are in a lab and not in their habitual drinking environments and may, therefore, inhibit their alcohol use or may be accompanied by other friends in the lab than during usual drinking occasions. Moreover, participants' alcohol use is assessed during a short period and during one occasion. This suggests that individuals' drinking behavior in the lab may not always be an accurate reflection of their usual alcohol consumption.

To minimize several of the limitations of previous drinker prototype studies, we used multiple time-point diary measures. An important advantage of this method is the high number of repeated assessments with short time-intervals minimizing recall bias. In this study, we reduced the recall periods of adolescents' drinking to one day. Moreover, in diary studies, assessment moments can be strategically selected, based on occasions or situations in which the behavior is most likely to occur (Shiffman, Stone, & Hufford, 2008). 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). In addition, diary studies involve multiple assessments over time, which accounts for the fact that adolescents' drinking behavior varies over time and across situations (Labhart & Kuntsche, 2014).

Next to including a more suitable measure for the assessment of adolescent alcohol use, we also employed a broader assessment of adolescents' drinker prototypes. Earlier studies predominantly focused on (heavy) drinker

or abstainer prototypes. However, according to later findings, individuals also form stereotypic perceptions of moderate or social drinkers (Spijkerman et al., 2010; Teunissen et al., 2014; Van Lettow et al., 2012; Van Lettow, De Vries, Burdorf, Norman, & Van Empelen, 2013). The association between moderate or social drinker prototypes and alcohol use has only been studied in young adults but not yet in adolescents (Spijkerman et al., 2010; Van Lettow et al, 2013; Van Lettow, De Vries, Burdorf, Conner, & Van Empelen, 2014). These studies found no significant associations between moderate drinker prototypes and alcohol use (Spijkerman et al., 2010; Van Lettow, De Vries, Burdorf, Conner, et al., 2014). Since adolescents tend to drink less heavily than young adults (Kuntsche & Gmel, 2013), their perceptions of drinkers and the predictive value of these perceptions might differ compared to those of young adults. Therefore, it is important to conduct further research in adolescent samples and examine whether various drinker prototypes such as moderate drinker prototypes, contribute to the prediction of adolescents' alcohol use.

The present study examined whether the evaluation of and perceived similarity to abstainer, moderate and heavy drinker prototypes, and the interaction between evaluation and similarity, contributed to the prediction of male adolescents' alcohol use in social drinking situations. We included only male adolescents, as research suggested that drinker prototypes have stronger effects on drinking behavior among males than females (Chassin, Tetzloff, & Hershey, 1985; Gibbons & Gerrard, 1995; Teunissen et al., 2012; Zimmermann & Sieverding, 2010). Moreover, 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). We hypothesized that positive evaluations of and perceived similarity to heavy drinker prototypes were related to higher levels of alcohol consumption. For abstainer prototypes, we expected that positive evaluations and similarity were related to lower drinking levels. We had no a priori hypothesis about the association between moderate drinker prototypes and adolescent drinking, or about the interaction between prototype evaluation and similarity.

Method

Participants

Our study included two parts; a baseline assessment, consisting of class questionnaire assessments (part 1) and multiple time-point diary measures (part 2). The baseline assessment included 599 adolescents (48.6% boys), from three middle-sized schools in the Netherlands. The average age of the participants was 17 years ($SD = 0.82$). The majority (95%) was born in the Netherlands and 89.1% had ever drunk alcohol. At the time of data collection, the legal purchase age for alcohol in the Netherlands was 16 years.[1] The minimum age of the participants in our sample was 16 years. In total, 28 classes were enrolled in the study: 11 fourth-grade (= 10th grade in the U.S) and 17 fifth-grade (= 11th grade in the US) classes of higher general secondary and pre-university education. The diary assessments (part 2) included 77 participants, resulting in 495 measures. We selected these participants from the baseline assessment, based on the following criteria: (1) being male, (2) having an average social status,[2] and (3) having ever drunk alcohol before. Eighty-two percent of these 77 participants consumed alcohol in the past month; 64% drank five or more glasses of alcohol during one occasion in the past month (i.e., binge drinking), and they consumed on average 5.4 glasses of alcohol in the past week. These numbers are highly comparable to the general population same-aged Dutch male adolescents (Verdurmen et al., 2012).

Procedure

Our study was approved by the Ethical Committee of the Faculty of Social Sciences at Radboud University. Parents received a letter with information about the study, and could give passive consent for their child's participation. The three participating schools included a total number of 725 students. Due to absence of students on the day of testing, changes in students' timetables, and parents who did not approve participation, data from 126 students (17.4%) were missing, which resulted in a final sample of

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[1] At present, the legal purchase age for alcohol in the Netherlands is 18 years.
[2] This study was part of a larger research project. This selection criterion was included for another research question that is outside the scope of this study. After the baseline assessment and before participants completed the diary assessments, they were included in a chat room experiment in which they were exposed to the ostensible alcohol norms of either popular or unpopular "peers." These "peers" were actually preprogrammed e-confederates who communicated either pro-alcohol or anti-alcohol norms. To examine the effect of the social status of the peers, it was important to include only participants with an average social status. We assumed that the effect of the social status of the peers could best be captured in adolescents with average social status since this group may have the opportunity to move both up or down in social status. The selection of participants was based on sociometric assessments (i.e., for each participant, a difference score between the standardized number of most popular and least popular nominations was computed. Scores between −1.0 and +1.0 indicated average social status). All participants were debriefed before they entered the diary assessments; they were informed that they did not interact with real peers in the chat room and that the alcohol norms the peers communicated were pre-programmed by the researchers (see Teunissen et al, 2014). No differences between the chat room conditions were found regarding participants' average levels of alcohol use in the diary assessments, or participants' prototypes measures assessed at baseline.

599 adolescents who were included in the baseline assessment (part 1). In the baseline assessment, we assessed students' evaluations of and perceived similarity to drinker prototypes.

The diary assessments (part 2) were scheduled between four and fourteen weeks after the baseline assessment. In total, 152 students (25.4%) met our selection criteria for participation. Forty-nine students of 5th grade higher general secondary education (32.2%) were not able to participate in this part of the study as the schools indicated that this part was too close to the students' upcoming exams. Eleven selected students (7.2%) were absent on the day of recruitment at school and five students (3.3%) declined to participate. This resulted in a sample of 87 adolescents who were sent online questionnaires. Ten of these students (11.5%) did not return any questionnaire. The final sample therefore included 77 male participants. T-tests revealed that the final sample was younger than the initial sample meeting the selection criteria ($t[130] = 3.28$; $p = .001$) and scored lower on frequency of alcohol consumption ($t[131] = 2.61$; $p = .010$) and binge drinking ($t[131] = 3.91$; $p < .001$) in the past four weeks, and the number of drinks in the past week ($t[131] = 2.69$; $p = .008$). These differences were caused by the fact that a relatively large number of 5th grade participants dropped out. Fifth-grade students are older and generally consume more alcohol than 4th grade students (Verdurmen et al., 2012). No significant differences were found regarding drinker prototypes.

During recruitment, students were informed that our study focused on alcohol use and leisure activities among adolescents, and were asked to provide their e-mail address and cell phone number if they agreed to participate. We used the diary assessments to examine whether participants had spent time with peers the previous night, and if so, we assessed their levels of alcohol consumption. Every Saturday and Sunday morning during eight weeks (i.e., 16 measures), we e-mailed participants a link to an online questionnaire. Participants were instructed to complete this questionnaire the same day. If they did not complete the questionnaire the same day, we sent them a text message on their cell phone the next day to remind them. All participants who completed at least one of the 16 assessments were included. On average, participants completed 14 assessments ($SD = 3.34$), with a minimum of 2 and a maximum of 16 assessments. Participants received a gift card of 25 Euro if they completed at least two-thirds of all assessments. Sixteen assessments of 77 participants result in 1,232 possible assessments, of which 129 were missing (10.5%). Since we were interested in participants' social drinking behavior, we included only those assessments in which participants reported to have spent time with peers, regardless of whether they drank alcohol or not ($n = 495$, 40.2%). In the heavy drinker prototypes analyses, 484 assessments (97.8%) were included, due to missing baseline assessment scores on heavy drinker prototypes.

Materials

Baseline assessment

Drinker prototypes

We presented a translated definition of a prototype to participants, similar to Gibbons, Gerrard, and Boney-McCoy (1995). Accordingly, we asked participants to think about the type of peer that never (or barely) drinks alcohol, and to indicate how positive they were about this type of peer (i.e., "prototype evaluation"). They could answer on a five-point scale, ranging from 1 = *not positive at all* to 5 = *very positive*. In addition, we asked them to indicate how similar they were to this type of peer (i.e., "prototype similarity"). Again, they could give their answer on a five-point scale, ranging from *not at all* to *very similar*. We asked these same two questions about peers who drink moderately and peers who drink heavily (Rivis et al., 2006; Rivis, Sheeran, & Armitage, 2011; Rivis & Sheeran, 2013; Teunissen et al., 2014). We provided no definition of moderate and heavy drinking, to prevent enforcing consumption levels to these prototypes that may not match participants' vision of these prototypes (Van Lettow et al., 2013). Participants were asked to estimate the number of glasses that moderate and heavy drinkers consume during each occasion. Moderate drinkers were expected to consume about four glasses per occasion ($M = 3.94$, $SD = 1.62$), while heavy drinkers were thought to consume about ten glasses during each occasion ($M = 10.41$, $SD = 4.21$).

Binge drinking

Participants were asked to indicate how often they consumed five or more glasses of alcohol during one occasion in the past four weeks. They could select 0 ("never"), 1 ("1 time"), 2 ("2 times"), 3 ("3 or 4 times"), 4 ("5 or 6 times"), 5 ("7 or 8 times") or 6 ("9 times or more") (Mares, van der Vorst, Engels, & Lichtwarck-Aschoff, 2011).

Multiple time-point diary assessments

Peer presence

Each measurement 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 the participant answered "yes," he was asked about his alcohol consumption (see below) and his data were included in the analyses. If he answered "no," he received several filler items and his data were excluded.

Table 1. Means (standard deviations) and correlations for binge drinking, heavy drinker, moderate drinker and abstainer prototype evaluation and similarity, and alcohol consumption in multiple time-point diary assessments ($n = 77$).

	M (SD)	Scale	Binge drinking	Heavy drinker evaluation	Heavy drinker similarity	Moderate drinker evaluation	Moderate drinker similarity	Abstainer evaluation	Abstainer similarity
Binge drinking past 4 weeks	1.17 (1.22)	0 – 6							
Heavy drinker evaluation	2.68 (0.97)	1 – 5	.03						
Heavy drinker similarity	2.08 (0.91)	1 – 5	.54***	.35**					
Moderate drinker evaluation	3.99 (0.62)	1 – 5	− .17	− .12	− .21				
Moderate drinker similarity	3.47 (0.88)	1 – 5	.09	− .10	.04	.62***			
Abstainer evaluation	3.42 (0.92)	1 – 5	− .34**	− .05	− .42***	.08	− .16		
Abstainer similarity	2.68 (0.99)	1 – 5	− .50***	− .05	− .58***	− .05	− .29*	.49***	
Alcohol consumption	3.40ª(2.50)	1 – 5	.44***	− .03	.37**	− .18	.05	− .47***	− .39***

* $p < .05$; ** $p < .01$; *** $p < .001$.
Note. Higher prototype scores reflect more positive prototype evaluations and higher perceived similarity.
ªAverage number of glasses consumed during each occasion with peers in diary assessments.

Participants' alcohol consumption

We assessed participants' alcohol consumption with the following question: "How many standard glasses of alcohol did you drink during that period with peers?" To indicate what is meant by a standard glass, an overview of standard units of several beverages was provided with the corresponding number of standard glasses (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, Poelen, Kleinjan, Lemmers, & Engels, 2013; Voogt, Kuntsche et al., 2013). One glass represents 10 grams of ethanol. Participants could select *Did not drink* (coded as 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*. Midpoints of categories were used, with 17.75 for the highest category (16 glasses plus half range to the midpoint of the adjacent category) (Kuntsche, Wiers, Janssen, & Gmel, 2010).

Analyses

We used multilevel modeling performed in Mplus 7 software (Muthén & Muthén, 1998–2012) to account for the fact that our measures were clustered within individuals (Goldstein, Browne, & Rasbash, 2002). Separate two-level regression analyses for heavy drinker, moderate drinker and abstainer prototypes were conducted. We controlled for participants' previous drinking behavior (i.e., binge drinking in the past four weeks). Alcohol consumption of the participant (assessed by diary assessments) was included as dependent variable and binge drinking, evaluation of and similarity to the prototypes (assessed at baseline), and the interaction between evaluation and similarity as individual-level predictors. Since alcohol consumption of the participant was positively skewed,

we used log transformations (Tabachnick & Fidell, 2001).

Results

The means and standard deviations for all study variables are presented in Table 1. This table also includes the correlations between these variables. Alcohol consumption in the diary assessments was positively correlated with heavy drinker prototype similarity, and negatively correlated with abstainer prototype evaluation and similarity.

Heavy drinker prototypes

We conducted a two-level regression analysis in which we tested whether heavy drinker prototype evaluations and similarity predicted participants' alcohol consumption in social company, measured by multiple time-point diary assessments across eight weeks (Table 2). We found that perceived similarity to heavy drinker

Table 2. Alcohol consumption in diary assessments regressed on binge drinking in past 4 weeks, evaluations of and similarity to drinker prototypes (unstandardized regression weights, with standard errors in parentheses).

	Heavy drinker prototypes	Moderate drinker prototypes	Abstainer prototypes
Model without the interaction term			
Binge drinking	0.07 (0.07)	0.16** (0.06)	0.10 (0.06)
Prototype evaluations	− 0.10 (0.07)	− 0.17 (0.12)	− 0.20** (0.06)
Prototype similarity	0.22* (0.09)	0.12 (0.09)	− 0.10 (0.09)
Model with the interaction term			
Binge drinking	0.05 (0.07)	0.16** (0.06)	0.10 (0.06)
Prototype evaluations	− 0.10 (0.07)	− 0.16 (0.12)	− 0.23*** (0.06)
Prototype similarity	0.24** (0.09)	0.13 (0.10)	− 0.07 (0.09)
Evaluation x Similarity	− 0.11 (0.06)	0.02 (0.08)	− 0.09 (0.06)

Note * $p < .05$; ** $p < .01$; *** $p < .001$.

prototypes predicted alcohol consumption, indicating that higher similarity was related to more drinking. No significant contribution of heavy drinker prototype evaluations and no significant interaction effect was found.

Moderate drinker prototypes

Alcohol consumption was not predicted by evaluations of, or perceived similarity to moderate drinker prototypes The interaction between evaluation and similarity was also not significant (Table 2).

Abstainer prototypes

The results presented in Table 2 show that the more positive the evaluations of abstainer prototypes, the lower the levels of alcohol consumption in social company. There was no significant contribution of abstainer similarity or the interaction.[3]

Discussion

This is the first study that included multiple time-point diary measures to examine the association between drinker prototypes and adolescents' alcohol use in social drinking situations. We were able to assess adolescents' alcohol consumption at multiple time points, which provides a more accurate indication of adolescents' drinking behavior than recalling alcohol consumption over extensive periods (Kuntsche & Labhart, 2012; Shiffman, 2009). We focused on adolescents' drinking behavior in the company of peers, as drinker prototypes are assumed to be most relevant in these social contexts. In addition, this study examined whether various drinker prototypes (i.e., heavy drinker, moderate drinker and abstainer) were associated with adolescents' alcohol use, and whether the interaction between prototype evaluation and similarity was a relevant predictor.

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[3] In order to compare the predictive power of the three prototypes, we ran additional analyses in which we included abstainer, moderate drinker and heavy drinker prototypes similarity in one model, and abstainer, moderate drinker and heavy drinker prototypes evaluation in a second model. The results are highly similar to the results reported above. Focusing on drinker prototype similarity, heavy drinker prototypes are the strongest predictor of participants' alcohol use (albeit marginally significant: $B = 0.14$, $S.E. = 0.08$, $p = .066$). The second model including prototype evaluation revealed that only evaluation of abstainer prototypes contributed to the prediction of alcohol use ($B = -0.28$, $S.E. = 0.07$, $p < .001$). The finding that heavy drinker similarity is only marginally significant when the three drinker prototypes are included in one model is probably due to the fact that heavy drinker similarity is strongly correlated with abstainer similarity (see Table 1). When we also include binge drinking in the analyses, abstainer evaluation is still significant ($B = -0.23$, $S.E. = 0.07$, $p < .001$); heavy drinker similarity is not significant ($B = 0.10$, $S.E. = 0.08$, $p = .186$).

The results indicated that higher perceived similarity to heavy drinker prototypes was associated with higher levels of alcohol consumption. The evaluation of heavy drinker prototypes was not related to drinking behavior. This finding is in line with previous studies that suggested that prototype similarity is a stronger predictor of drinking behavior than prototype evaluation (Norman et al., 2007; Rivis et al., 2006). According to the Prototype/Willingness model, social comparison processes are important for the effect of prototypes on willingness and behavior (Gibbons et al., 2003). Individuals are assumed to compare themselves with certain prototypes and these comparisons affect behavioral willingness and behavior. Individuals who perceive themselves as dissimilar to the risk taker prototype may be more likely to focus on differences between the prototype and themselves, which results in lower willingness to engage in risks. Individuals who perceive high levels of similarity between themselves and the prototype may be more likely to focus on those similarities, leading to higher willingness to engage in the risk behavior (Thornton, Gibbons, & Gerrard, 2002). Research indicated that individuals who compared themselves with drinkers were less willing to drink if they perceived themselves as dissimilar to those drinkers, and more willing to drink when they perceived themselves as similar (Lane et al., 2011). Our results suggest that adolescents are more likely to drink, if the image of the heavy drinker matches their self-concept, and less likely to drink if their self-concept is different from the heavy drinker prototype.

Regarding abstainer prototypes, the results are less consistent. We found that evaluations of the abstainer prototypes were stronger associated with drinking behavior than perceived similarity to these prototypes. More specifically, more positive evaluations of abstainer prototypes were related to lower alcohol consumption. Previous research also indicated that adolescents' abstainer evaluations were associated with subsequent alcohol use (Gerrard et al., 2002). Yet, other studies showed that only abstainer similarity and not evaluation contributed to the prediction of adolescents' intentions to drink (Rivis et al., 2006). Research among young adults showed that both abstainer evaluation and similarity predicted intentions to drink, while only abstainer similarity predicted drinking behavior (Van Lettow, De Vries, Burdorf, Conner, et al., 2014). In addition, Zimmermann and Sieverding (2010) found that abstainer similarity predicted young male adults' willingness to drink, while abstainer evaluation interacted with willingness to drink, such that alcohol consumption was higher among those men who scored high on willingness to drink and who evaluated the abstainer negatively. There may be several possible

explanations for these ambivalent findings. Previous research frequently examined the additional contribution of drinker prototypes over variables of the Theory of Planned Behavior (Rivis et al., 2006; Van Lettow, De Vries, Burdorf, Conner, et al., 2014; Zimmermann & Sieverding, 2010). This could suggest that there is less variance left to be explained by the evaluation of abstainer prototypes, resulting in smaller effects of abstainer evaluation on drinking behavior.

In addition, there are generally two methods used in previous studies to assess the evaluation of drinker prototypes: direct measures, such as used in this study (i.e., directly rating the favorability of drinker prototypes on a scale; e.g., Rivis et al., 2006; Zimmermann & Sieverding, 2010) and indirect measures (i.e., evaluating drinker prototypes on a list of adjectives; e.g., Gerrard et al., 2002; Van Lettow, De Vries, Burdorf, Conner, et al., 2014). Previous research suggested that the association between prototypes evaluation and behavior is stronger for direct than indirect measures (Van Lettow, De Vries, Burdorf, & Van Empelen, 2014). This difference in measurement of abstainer evaluations may have contributed to the ambivalence in results regarding the impact on drinking behavior. More research on the impact of abstainer prototypes evaluation and similarity is therefore needed, to examine the relative importance of both constructs for adolescents' alcohol use.

This is the first study that examined the association between moderate drinker prototypes and adolescent alcohol use. The few studies that included moderate drinker prototypes found no significant association with young adults' self-reported drinking in the past week (Van Lettow, De Vries, Burdorf, Conner, et al., 2014) and observed alcohol use in a bar lab (Spijkerman et al., 2010; i.e., social drinker prototypes). Our results are in line with these findings; evaluations of and perceived similarity to moderate drinker prototypes did not contribute to the prediction of adolescents' alcohol use in social situations. These findings indicate that moderate drinker prototypes can be considered less important in the prediction of alcohol use among young adults as well as among adolescents. A possible explanation for these findings is that moderate drinker prototypes are less salient than heavy or abstainer prototypes. Heavy drinking and abstaining can be considered more "extreme" or notable behavior than drinking moderately. These "extreme" behaviors are more likely to be associated with clear and vivid stereotypical images, which in turn are expected to have a stronger influence on behavior than less vivid images (cf. Spijkerman et al., 2010). Although moderate drinker prototypes are generally evaluated more positive and felt similar to than abstainer or heavy drinker prototypes (Van Lettow

et al., 2013), focusing interventions on these prototypes may not be the most effective strategy to reduce adolescents' alcohol use.

This study also examined whether the interaction between prototype evaluation and similarity was associated with adolescent alcohol use. In general, the interaction between evaluation and similarity is suggested to contribute to the prediction of health-related behaviors, such that individuals are more likely to engage in the behavior when they evaluate the prototype positively *and* when they perceive themselves as similar to that prototype (Gibbons et al., 1995; Van Lettow, De Vries, Burdorf, & Van Empelen, 2014). Theoretically, favorable prototypes are assumed to have a stronger influence on behavior for individuals who perceive themselves as quite similar to that prototype than for individuals who do not perceive themselves as similar (Gibbons & Gerrard, 1995). Yet, research focusing on the interaction between prototype evaluation and similarity predicting drinking behavior yielded ambivalent findings. Rivis et al. (2006) found that this interaction between evaluation and similarity significantly contributed to the prediction of adolescents' intentions to drink. In addition, a study by Ouellette and colleagues (1999) revealed that this interaction had an indirect effect on adolescents' alcohol consumption via behavioral willingness. Other research found no significant contribution of this interaction to the prediction of young adults' binge drinking (Norman et al., 2007), or to the change in young adults' alcohol use (Gibbons & Gerrard, 1995). Our results are in line with these last studies, as we found no significant interaction effect for abstainer, moderate drinker and heavy drinker prototypes evaluation and similarity on adolescents' alcohol use. Although the exact explanation for these inconsistent findings is not clear, our results provided no evidence that the interaction between prototype evaluation and similarity contributes to adolescents' alcohol use.

Present findings should be interpreted in light of several limitations. First, due to the lack of an experimental design, our study does not provide definite conclusions about the causal relationship between adolescents' drinker prototypes and their alcohol consumption in social drinking situations. However, we used multiple time-point diary measures, which have considerably higher ecological validity than experiments. In general, a disadvantage of repeated diary assessments is that there is a potential for reactivity. We found no indications of reactivity in our data. Research suggests that reactivity is most likely to emerge when participants are trying to change the behavior that is being assessed and when the behavior is assessed before it is executed. When this is not the case, small or no effects of reactivity are found (see Shiffman et al., 2008). Since participants in our study were probably

not motivated to change their drinking behavior, and we assessed drinking behavior the consecutive day, reactivity may have been negligible. A second limitation is that we did not include alcohol consumption of the peers in the diary assessments. As shown by Spijkerman et al. (2010) drinking of the peer group forms a strong predictor of young adults' observed alcohol use in a social drinking context and the predictive value of drinker prototypes might change when the drinking behavior of peers is controlled for. In a next step, diary studies could therefore be extended by including peer drinking levels to examine the additive impact of drinker prototypes on adolescents' alcohol use in social settings. Third, although reporting alcohol consumption during a short recall period (i.e., the previous night)strongly reduces recall bias compared to longer recall periods (e.g., Ekholm, 2004), it is still possible that our data were to some extent biased due to memory distortions. Future research may therefore benefit from including multiple assessments during the evening, using smart phones, to minimize recall bias (Kuntsche & Labhart, 2012). Another limitation is that the present study provides no information about the stability of drinker prototypes, as prototypes were exclusively assessed at baseline. Previous research among young adults revealed that stability of the perceived similarity to drunk and abstainer prototypes moderated the relationship between prototypes and drinking intentions. Stable perceptions of prototype similarity were a stronger predictor of intentions to drink than unstable perceptions (Van Lettow, De Vries, Burdorf, Conner, et al., 2014). This effect was only found for intentions; no moderating effects of prototype stability were found for the relationship with drinking behavior. Yet, more research is needed to investigate the moderating effects of drinker prototype stability on adolescents' alcohol use. Fourth, as part of a larger study, we included only male adolescents with average social status, who attended higher education levels. Future studies should include females, as well as students of lower education levels, to examine whether our results can be generalized to broader populations. Finally, a limitation is also that we assessed adolescents' alcohol use only during weekends and in the presence of peers. It is therefore unclear whether the relationship between drinker prototypes and alcohol use is similar for adolescents who drink while unaccompanied by peers or during weekdays. However, given that adolescents predominantly drink during weekends and when accompanied by peers (Verdurmen et al., 2012), this assessment method should have yielded a reliable reflection of adolescents' usual alcohol use.

To conclude, the present study introduced multiple time-point diary assessments to examine the association between drinker prototypes and adolescents' alcohol use in social settings. This signifies an important contribution to drinker prototypes research, since this method reduces recall bias and yields a more accurate reflection of alcohol use. This in turn results in a more precise examination of the relationship between drinker prototypes and adolescent alcohol use over time. Including a more accurate measure of alcohol use, we found that drinker prototypes contributed to the prediction of adolescent drinking. More specific, our results indicated that more "extreme" prototypes (i.e., heavy drinker and abstainer prototypes) were most predictive of adolescents' drinking behavior. This finding is consistent with prior research and establishes the importance of these drinker prototypes for adolescent drinking behavior. Interventions may therefore be aimed specifically at these drinker prototypes, to reduce adolescents' alcohol use. Previous research indicated that drinker prototypes are malleable (Gerrard et al., 2006; Litt & Stock, 2011; Teunissen et al., 2012; Teunissen et al., 2014), and that these adaptations in drinker prototypes can affect drinking behavior (Gerrard et al., 2006; Teunissen et al., 2012). Intervention programs could include information revealing that adolescents generally attribute negative characteristics to the type of peer that drinks heavily and positive characteristics to the type of peer that abstains. Accentuating the negative characteristics of heavy drinker prototypes may decrease the perceived similarity to heavy drinker prototypes, resulting in reduced levels of alcohol use. Increasing the favorability of abstainer prototypes may have inhibiting effects on adolescents' drinking behavior as well. Including such information about drinker prototypes may prove to be a valuable addition to existing intervention programs.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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