



## Peers and social network on alcohol drinking through early adolescence in Taiwan



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### ABSTRACT

**Objectives:** This study aims to identify peers and social network characteristics associated with drinking occasions through early adolescence.

**Methods:** The study sample of 1808 middle school students (aged 13–15 years) in northern Taiwan was collected via a two-wave longitudinal study of the Alcohol-Related Experiences among Children (AREC). Data concerning individual sociodemographics, family characteristics, peer influence, and alcohol drinking behaviors were collected via web-based self-administered questionnaire. Building upon the maximum of five friends nominated by young respondents at 7th grade, class-based social network was first constructed via the UCINET and Pajek; the network position (i.e., member, bridge, and isolate) for each student was subsequently ascertained. Complex surveys analyses and negative binomial regression models were used to evaluate concurrent and prospective relationship estimates.

**Results:** Effects of peers and social network were found to operate differentially by childhood alcohol experience. For the alcohol naïve youngsters, receiving higher peer's nomination at baseline was linked with subsequent increased drinking occasions (adjusted Incidence Rate Ratio [aIRR] = 1.06; 95% CI = 1.01–1.10), whereas having peers against alcohol drinking may reduce drinking occasions at 9th grade (aIRR = 0.59; 95% CI = 0.41–0.87). For the alcohol experienced youngsters, having parental alcohol offer, drinking peers, and attending classes of higher drinking norms may increase future drinking occasions by 90%, 80% and 44%, respectively.

**Conclusions:** Our results demonstrated that parental alcohol offer, peer norms, and social network may affect adolescent drinking occasions differentially depending on childhood drinking experience. The findings have implications for the interventions to reduce alcohol consumption in underage population.

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## 1. Introduction

Alcohol drinking has gradually become normative in the underage population. Results from 15 to 16 year-old students in 35 European countries reported that approximately 90% of youth have tried alcoholic beverages at least once in their lifetimes (ranges: 66–95%; Hibell et al., 2009), and the corresponding estimate was nearly 40% in Taiwan (Chen et al., 2008). The rise in alcohol

involved negative consequences in young people – as manifested in unprotected sexual behaviors, injuries, violent behaviors, and social maladjustment – has emerged as an urgent public health concern in many parts of the world (World Health Organization [WHO], 2014). Data from the WHO's 2004 Global Burden of Disease study indicated that “alcohol use” *per se* is the leading risk factor for the disability-adjusted life-years in the population aged 10 to 24-year-old (Gore et al., 2011). To reduce alcohol-related negative consequences in young population, it is crucial to understand the role of important social contextual predictors for alcohol drinking behaviors in early adolescence – the period when most of alcohol initiation emerges (Windle et al., 2008).

Peers and family have been recognized as two important social agents affecting the occurrence and transition of alcohol drinking problems in the underage population (Bjarnason et al., 2003;

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Bronfenbrenner, 1977; Donovan, 2004; Ennett et al., 2008; Institute of Medicine and National Research Council, 2011; Jones et al., 2012; Windle et al., 2008). In adolescence, behavioral similarities between youngsters and their peers gradually emerge in terms of alcohol drinking and substance use behaviors (Valente et al., 2004). Empirical evidence pointed out that the observed behavioral homophily between youngsters and peers may be the mixed results of two pathways (i.e., peer influence and peer selection) (Brechtwald and Prinstein, 2011); for alcohol drinking in early adolescence, peer influence is generally thought to be more substantial than peer selection (Mercken et al., 2012). Although the occurrence of alcohol initiation escalates in adolescence, many alcohol-experienced youngsters actually had their first drinks as early as in childhood, at the setting of family gathering wherein parents often served as the provider of alcoholic beverages (Chen et al., 2008; Donovan and Molina, 2014).

In the acquisition and maintenance of drinking behaviors, peer influence on underage drinking can operate via direct and indirect processes (Borsari and Carey, 2001). The direct process often involves increased availability and accessibility toward alcoholic beverages (e.g., alcohol offer; Wood et al., 2001), whereas the indirect process includes descriptive and injunctive norms concerning alcohol drinking (Eisenberg et al., 2014; Rimal and Real, 2005). Specifically, descriptive norms refer to the perceptions of what is actually done by others in one's social group (e.g., perceived peer drinking), and injunctive norms refer to perceptions of others' expectations to the behavior of interest (e.g., perceived peer approval of drinking; Borsari and Carey, 2001; Cialdini et al., 1990; Lapinski and Rimal, 2005). Available evidence generally showed that pro-alcohol descriptive norms (e.g., perceived higher prevalence of peer drinking) predict increased risk of alcohol initiation and consumption (D'Amico and McCarthy, 2006; Kelly et al., 2012; Kobus and Henry, 2010; Lee et al., 2012; Olds and Thombs, 2001), whereas injunctive norms were associated with reduced use of alcoholic beverages via the manifestation of peer disapproval of alcohol use (Keyes et al., 2012; Larimer et al., 2004; Mason et al., 2014; Mrug and McCay, 2013).

Other than easy access and norms favorable toward alcohol, peers can also exert effects on underage drinking behaviors in the form of social relationships (Ennett et al., 2006; Kobus and Henry, 2010; Mundt, 2011; Valente et al., 2004). One's social relationship can be characterized by social ties (e.g., indegree) and network position (e.g., members, bridges, and isolates); within a peer network, social ties and position may represent not only differential opportunities to access resources (e.g., information or material sharing; Wasserman and Faust, 1994), but also differential pressure to conform to social norms (Valente et al., 2004). As to social ties, *indegree* refers to the number of friendship nominations received from others; a higher indegree value often indicates greater popularity. In terms of network position, people with *member* position have more social ties/links within their peer group than those who occupied bridge position or were isolators. The *bridge* position indicates having connections to two or more peer groups and the *isolate* position refers to no nominations received or sent (De Nooy et al., 2005; Wasserman and Faust, 1994). To date, findings have generally supported the observation that popular students (i.e., higher indegree) are more likely to drink (Mundt, 2011; Tucker et al., 2011, 2013); however, the effects of social network position are rather mixed. Some evidence found that students occupying the bridge position were more likely to consume alcoholic beverages (Henry and Kobus, 2007; Valente et al., 2004), and some studies have linked increased risk of alcohol drinking with the member position (Osgood et al., 2014).

Although studies on peer influence and social networks have added valuable evidence in the topic of underage drinking behaviors (Ennett et al., 2006; Henry and Kobus, 2007; Mundt et al., 2012;

Tucker et al., 2013), available evidence is not without limitations. First, prior studies approaching peer factors on underage drinking often treated young people with different drinking experience as a homogeneous group. Because prior alcohol experience may affect one's access to alcohol and peer selection, the pooled analyses may miss the opportunity to detect possible subgroup heterogeneity (e.g., prevalent and incident drinkers) and associated drinking stage-dependent predictors (Anthony and Chen, 2004). In addition, when social network constructs were examined in relation to drinking behaviors among adolescents, alcohol consumption has often been approached in a dichotomous nature. The extent to which the social ties and position may affect drinking occasion or intensity is less understood, particularly in early adolescence when the escalation of alcohol drinking emerges. Finally, prior evidence concerning social network effects on adolescent alcohol drinking was mainly derived from western societies (e.g., United States). Given that cultural variation may exist in peer network formation and peer interaction process (Chen and French, 2008), it would be worthwhile to explore whether social network attributes may have similar effects in other societies. To address these scientific gaps, the present study turned to a prospective cohort of middle school adolescents who were followed-up over a year. Our longitudinal study is aimed at examining the extent to which direct/indirect peer influences and peer network may affect alcohol drinking occasions through early adolescence in Taiwan. Also, to address stage-dependent liability (Anthony and Chen, 2004), the analyses were carried out with stratification by alcohol drinking experience in childhood.

## 2. Methods

### 2.1. Study design and participants

The study sample of 1808 middle school students (aged 13–15 years) in northern Taiwan was collected via a two-wave longitudinal survey of the Alcohol-Related Experiences among Children (AREC) project. The multi-stage probability sampling method was used to randomly select 11 schools from all 73 public middle schools in Taipei in academic year (AY) 2009 on the basis of school characteristics (e.g., school size) and physical environment surrounding schools (e.g., mass transportation density). All seventh-grade students attending the sampled schools in the fall semester of the AY 2009 were eligible to participate. The baseline survey was conducted during the spring semester of seventh grade and the fall semester of eighth grade (i.e., through the whole 2010 year). The baseline sample comprised 1926 youngsters, aged 13–14 years (baseline response rate = 55%); subsequent follow-up was conducted in ninth grade during the AY 2011 ( $n = 1857$ , follow-up rate = 96%). The relatively lower baseline response rate was primarily due to lack of active parental consent (e.g., absent parents or guardians). The average interval between two waves of assessment was 13 months. This study has been approved by the institutional review board at the National Health Research Institutes (EC0980605). Positive written informed consents from parents and youngsters were both required. All respondents received a stationary gift set with a value of NT 45 dollars (~1.5 USD) upon completion.

### 2.2. Measures

To gain better validity and assure confidentiality, the AREC II study collected data via web-based self-administered questionnaires during class hours in school. Most of respondents took 25–30 min to complete the survey. The questionnaire covered

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