



## Path of socialization and cognitive factors' effects on adolescents' alcohol use in Taiwan

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### ABSTRACT

**Objectives:** The purpose of this study was to explore the direct and indirect effects of alcohol-related socialization factors and cognitive factors on adolescent alcohol use in a country with a low prevalence of drinking.

**Methods:** Data were obtained from the 2006 phase of the Child and Adolescent Behaviors in Long-term Evolution (CABLE) project, at which time the study participants were in grade nine (aged 14–15 years). Data from 1940 participants were analyzed. The main study variables included the current alcohol use of each adolescent, alcohol expectations, alcohol refusal efficacy, alcohol use among parents and peers, attitudes of the parents toward underage drinking, and peer encouragement of drinking. Path analysis was conducted to examine whether parental and peer socialization factors had direct effects on adolescent alcohol use, or whether they acted indirectly via cognitive factors.

**Results:** Among the participants, 19.54% had used alcohol in the previous month. Path analysis demonstrated that father, mother and peer alcohol use directly influenced alcohol use in adolescents. Attitudes of mothers toward underage drinking, peer drinking and peer encouragement of drinking had indirect effects on adolescent alcohol use that were mediated by cognitive factors.

**Conclusions:** This study demonstrated that alcohol-related socialization factors could directly influence adolescent drinking behavior and had indirect effects on alcohol use that were mediated by cognitive factors partially. Parents and peers play important roles in preventing adolescent alcohol use. Establishing appropriate alcohol expectations and strengthening alcohol refusal skills could aid in decreasing alcohol use in adolescents.

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### 1. Introduction

Adolescence is the key period in which alcohol use is initiated; the quantity of alcohol consumption increases, and drinking problems begin (Li, Duncan, & Hops, 2001). Studies have shown that a greater number of ninth grade students use alcohol compared to other grades (Kuo, Yang, Soong, & Chen, 2002; Li et al., 2001), which indicates that ninth graders are at high risk for developing alcohol-associated psychological, social or health problems.

Level of economic development influences drinking behavior. In the Western Pacific Region, although there is currently a low prevalence of drinking there is a high level of economic development coupled with strong promotion and marketing of alcoholic products (WHO, 2001, 2004). Research on underage drinking in northern Europe and the United States has demonstrated that the amount of alcohol consumed by adolescents has started to decline in these

countries (Donovan, 2007; Hibell et al., 2003). In contrast, alcohol intake in regions with traditionally lower alcohol consumption, such as East Asia and the Western Pacific region, has increased (WHO, 2004). Early attention to drinking problems in these countries could prevent an increase in the prevalence of harmful drinking behaviors.

Cross-national comparisons have found that demographic factors associated with drinking behavior in the past month differ between developed and developing countries (Priscilla, Kenneth, Riyadh, & Nilen, 2007). To date the majority of research on drinking behavior has been conducted in high prevalence settings with much less research conducted in low prevalence countries. There is evidence that alcohol consumption and the prevalence of alcoholism has dramatically increased in the past 40 years in Taiwan (Yang, 2002). The prevalence of underage drinking is also increasing. Chou, Liou, Lai, Hsiao, and Chang (1999) found that the prevalence of alcohol use at least once every month in adolescents aged 13–18 years in Taiwan has increased from 13% in 1991 to 16.7% in 1996. The study of factors associated with adolescent drinking behavior in a country with a low drinking prevalence that is experiencing rapid economic development, such as Taiwan, is an important area of research. Results from

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this research will aid in the development of appropriate interventions in Taiwan and other low prevalence drinking countries.

Studies investigating adolescent drinking behavior in industrialized countries have found that parents and peers are the key individuals who influence adolescent drinking behavior. The behavior of parents and parental attitudes toward underage drinking influence drinking behavior in adolescents. Adolescents with parents who drink alcohol are more likely to drink alcohol themselves (Duncan, Duncan, & Strycker, 2006). In contrast, non-support of underage drinking by parents decreases the likelihood of alcohol use by adolescents (van der Vorst, Engels, Meeus, & Dekovic, 2006; Yu, 2003). The drinking behavior of peers and peer encouragement to drink are important peer-related factors that influence drinking behavior in adolescents. The perceived number of classmates and close friends who drink is an important risk factor for adolescent drinking (Li, Barrera, Hops, & Fisher, 2002). Peers can increase the likelihood of alcohol use by adolescents through peer pressure or encouragement to drink (Simons-Morton, 2004). The influence of peers on alcohol consumption by adolescents has led to a rising prevalence of alcohol use by adolescents (Duncan et al., 2006), even in low prevalence drinking countries such as Taiwan (Yang, Yang, Liu, & Ko, 1998; Yeh, 2006).

Bandura (1986) states that the impact of the environment on behavior is mediated through cognition. Individuals receive environmental stimuli and internalize associated cognitions, which lead to the promotion or limitation of particular behaviors. It is possible that in addition to a direct effect on drinking behavior, parental and peer drinking can influence adolescent alcohol use indirectly via cognitive processes such as alcohol expectations and alcohol refusal efficacy (Nash, McQueen, & Bray, 2005; Young, Connor, Ricciardelli, & Saunders, 2006). The majority of research in this area has investigated the separate effects of individual cognitive factors on alcohol use. However, Young et al. (2006) suggest that the effects of alcohol expectations and alcohol refusal efficacy on the types of drinking behavior should be examined together. In general, alcohol expectations include both positive and negative characteristics (Cameron, Stritzke, & Durkin, 2003). Studies have shown that positive alcohol expectations can predict drinking behavior typology and drinking problems, whereas negative alcohol expectations appear to be less predictive of drinking behavior (Young et al., 2006; Zamboanga, Horton, Leitkowsky, & Wang, 2006). Consequently, it is not common for both types of alcohol expectations to be measured in studies examining the use of alcohol in adolescents. Leigh and Stacy (2004) state that because positive and negative outcome expectations share some common, associated factors, the incorporation of both expectancy types into modeling causes suppression effects that can unmask associations between a particular expectancy and alcohol use, thereby influencing the interpretation of the results. Therefore, they recommend that studies include both positive and negative outcome expectations.

Although extensive research has been conducted on the effects of parental, peer and cognitive factors on drinking behavior, the mutual associations between these factors and their potential mediating effects remain unknown. To date, the majority of research has focused specifically on the effects of parental or peer drinking or another parental/peer factor on drinking behavior. However, in real life, there are no single factors that act alone to influence alcohol use. In the present study, we assumed that cognitive factors could be affected by peer and family factors, and we confirmed the individual contribution of different cognitive factors. The main aim of this study was to examine the relationship of parental and peer factors in influencing adolescent drinking behavior and to elucidate any novel cognitive mechanisms underlying these relationships. We constructed a theoretically driven multiple mediation model (see Fig. 1), and we hypothesized that parental and peer factors influence adolescent drinking behavior directly as well as functioning indirectly through associations with various cognitive factors that subsequently influence adolescent drinking behavior.

## 2. Method

### 2.1. Study sample

The data used in this analysis were obtained from the Child and Adolescent Behaviors in Long-term Evolution (CABLE) project (Yen, Chen, Lee, & Pan, 2002). The present study included the 2499 students in cohort 2 of the CABLE project who were in the fifth grade in 2002 at study commencement (when study participants were aged 10–11 years) and in the ninth grade in 2006 (when study participants were aged 14–15 years). Participants with missing data were excluded resulting in a final sample of 1940 students with complete data that were included in analyses (77.63% of the baseline sample). The chi-squared test was used to assess differences between the baseline and final samples in regards to demographic variables (sex, residential area, father's education level, mother's education level). No significant differences were found between the samples.

As the CABLE project is a school-based project, the clustering effect of schools for adolescent drinking behavior should be taken into account. As a result, we used GEE modeling with an exchangeable working correlation matrix to investigate the presence of clustering effects. The correlation coefficient of  $-0.003$  from this modeling indicates that the correlation of ever drinking behaviors among adolescents within each school was very low. Therefore, we were able to ignore the clustering effect and analyze the data as an independent sample.

### 2.2. Measures

Variables included in the present study were selected based on social cognitive theory. Based on our study aims and a literature review, the dependent variable in our analyses was drinking behavior. After controlling for background variables that are known to be associated with alcohol consumption, including demographics, parental SES, and parenting behavior (Denton & Walters, 1999; Latendresse et al., 2008; Richter, Leppin, & Nic Gabhainn, 2006), we investigated the effects of behavioral modeling, social norms, social persuasion, and cognitive factors associated with positive and negative alcohol expectations and alcohol refusal efficacy on drinking behavior. Data on dependent and independent variables was obtained from the 2006 questionnaire apart from data on parenting behavior that was only collected in the 2004 questionnaire.

#### 2.2.1. Drinking behavior

For a more comprehensive understanding of drinking behavior and to capture a greater range of variability in drinking typologies it is important to consider drinking frequency, drinking quantity, drinking environment and even types of alcohol consumed when measuring drinking behavior (Dawson, 1998; Gmel, Graham, Kuendig, & Kuntsche, 2006; Midanik et al., 1998; Pirkis, Irwin, Brindis, Patton, & Sawyer, 2003). However, the appropriate measure of drinking behavior also depends on the aim of the particular study. As adolescents are at a stage where they experiment with new behaviors, we considered 'ever drinking' to be an important indicator of their drinking behavior. Ever drinking status was assessed by the single question "Have you ever drunk alcohol?" Responses were rated using a six-point scale that ranged from one (never) to six (every day in the last month). Based on these responses, we divided the ever-alcohol users into two groups: "Have not consumed alcohol in the past month" and "Have consumed alcohol in the past month".

#### 2.2.2. Parental alcohol use

Participants' perceptions of the alcohol use of their mother and father were measured using a six-point scale. Participants were asked "Does your father drink alcohol?" and "Does your mother drink alcohol?" Responses ranged from one (never) to six (every day in the

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