

# BMJ Open Do parents play different roles in drinking behaviours of male and female adolescents? A longitudinal follow-up study

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## ABSTRACT

**Objective:** Gender differences in the associations between adolescent drinking behaviour, and perceived parental drinking behaviours and attitudes towards underage drinking, were investigated.

**Methods:** Data were drawn from two cohorts in the Child and Adolescent Behaviours in Long-term Evolution project. We used data from 2009 to 2006, when cohorts 1 and 2, respectively, were in grade 9. No cohort effect was found, so the two cohorts were pooled; 3972 students (1999 boys and 1973 girls) participated in the study. The major variables included adolescent drinking behaviours over the last month, and perceived parental drinking behaviours and parental attitudes towards underage drinking. The effects of the combination of parental drinking behaviours, and attitudes on the drinking behaviours of male and female adolescents, were analysed by logistic regression.

**Results:** The drinking behaviour of boys was correlated with the drinking behaviours and attitudes of their fathers but not with those of their mothers. Among boys, having a non-drinking father who was against underage drinking (OR=0.27, 95% CI 0.16 to 0.46), a non-drinking father who was favourable towards underage drinking (OR=0.61, 95% CI 0.39 to 0.94), or a drinking father who was against underage drinking (OR=0.44, 95% CI 0.23 to 0.85) significantly decreased the likelihood of alcohol consumption, whereas maternal behaviour and attitude were not significant influences. Among girls, having a non-drinking father who was against underage drinking (OR=0.52, 95% CI 0.30 to 0.91) or a non-drinking father who was favourable towards underage drinking (OR=0.51, 95% CI 0.32 to 0.83) significantly decreased the likelihood of alcohol consumption, as did having a non-drinking mother who was against underage drinking (OR=0.23, 95% CI 0.09 to 0.60).

**Conclusions:** The influences of fathers and mothers on the drinking behaviour of their adolescent children differed by offspring gender.

## INTRODUCTION

Underage drinking is a social and public health issue that receives much attention.

## Strengths and limitations of this study

- This study considered the effects of the combination of parental drinking behaviours and attitudes on the drinking behaviours of male and female students.
- This study pooled two cohorts and examined the influence of parental behaviours and attitudes on the drinking behaviours of male and female students.
- This study considered only drinking behaviour over the last month and did not consider amount or frequency of alcohol use.
- Parental drinking behaviours and attitudes were reported by adolescents rather than by parents.

Drinking behaviour differs significantly across gender. The stages in the developmental trajectories of various drinking behaviours occur earlier among males than among females, and drinking frequency and amount of alcohol consumed are higher among males.<sup>1</sup> Recently, however, gender convergence in the drinking behaviours of adolescents has been reported.<sup>2 3</sup> Because of the modern emphasis on gender mainstreaming, paying attention to the relevant factors associated with drinking behaviours across gender can be expected to facilitate the development of appropriate strategies for preventing adolescent drinking.

Multiple factors influence drinking behaviour, and the family plays an important role with regard to adolescent drinking behaviour. Family members, especially parents, affect the substance use of adolescents.<sup>4</sup> The drinking behaviours of parents and their attitudes towards underage drinking are both associated with alcohol use among adolescents.<sup>5</sup> Many studies have shown that children are more likely to drink if both parents are drinkers, rather than if only one or neither drink.<sup>6–8</sup> Various indicators of

adolescent alcohol use, including age at first alcohol use, lifetime alcohol use, alcohol use over the last year, alcohol use over the last month and excess alcohol use, are associated with parental drinking behaviour. Child-reported levels of parental drinking have been reported to be significantly associated with alcohol drinking in children.<sup>9</sup> However, studies of the individual influences of paternal and maternal drinking behaviours on the drinking behaviours of their male and female children have not shown consistent results. For example, Yu and Perrine<sup>10</sup> reported that paternal drinking behaviours influence the drinking behaviours of sons, whereas maternal drinking behaviours influence those of daughters. Other investigators have argued that the influence of maternal drinking behaviours on children's drinking behaviours is greater than that of paternal drinking behaviours,<sup>11–13</sup> and Yeh<sup>14</sup> reported that fathers significantly influence the excessive drinking behaviours of their children, whereas mothers have no influence. However, most studies argue that parental alcohol use increases the likelihood of alcohol use in children, although Haugland *et al*<sup>15</sup> found that male adolescents with alcohol-abusing mothers were less likely to use alcohol to excess than were male adolescents whose mothers did not abuse alcohol. Overall, these studies consistently emphasise that the individual drinking problems of parents influence the drinking problems of their male and female children.

Kelly *et al*<sup>16</sup> argued that parental attitudes towards underage drinking influence the drinking behaviours of their children (regardless of offspring gender), whether the attitudes were clearly articulated during a discussion of drinking behaviour or during the development of rules to restrict alcohol use. Van der Vorst *et al*<sup>17</sup> reported that the outcomes of discussions between adolescents and their parents about drinking behaviours differ by gender: males are significantly influenced, whereas females are not. Other studies have indicated that parental restrictions on adolescent alcohol use can delay the start of alcohol use among adolescents, can decrease the frequency and amount of alcohol consumption,<sup>18–21</sup> and can delay the development of harmful drinking behaviours.<sup>21</sup> However, the aforementioned studies did not distinguish fathers from mothers. A study that did distinguish between the effects of paternal and maternal attitudes about underage drinking on the drinking behaviours of their underage children at different ages showed that paternal drinking rules significantly delay alcohol use among younger children, whereas maternal attitudes do not have the same effect.<sup>19</sup>

The drinking behaviours of parents are associated with their attitudes towards underage drinking. Compared to parents who do not drink, parents who drink usually have more-relaxed rules with regard to underage drinking.<sup>19–23</sup> Most of the previous studies of parental drinking behaviours and attitudes regarded these variables as independent, and introduced them into joint models or used one of them as a mediator. No previous study has

examined the relationship between adolescent drinking behaviours and parental drinking behaviours, and attitudes towards underage drinking.

In summary, previous studies of the effects of parental drinking behaviours and attitudes towards underage drinking on adolescent drinking behaviours have the following limitations. First, previous studies have not adequately considered the various same-gender, and cross-gender, interactions of paternal and maternal drinking behaviours and attitudes, with the drinking behaviours of male and female children. Moreover, previous studies focused on geographical areas with a high prevalence of alcohol use in Europe and the Americas. In developed countries, underage drinking behaviour, which has long been a concern, has recently begun to decrease.<sup>24–25</sup> Interestingly, the wine industry has begun to focus its marketing efforts on Western Pacific countries with developed economies and low rates of alcohol consumption.<sup>26</sup> Taiwan is in this region; therefore, investigation of Taiwanese data on the parental factors that affect underage drinking behaviour can help to establish an effective mechanism for preventing underage drinking in areas with low rates of alcohol consumption. On the basis of a review of the above-described literature, the major purpose of this study was to investigate the drinking behaviours of male and female ninth grade students in Taiwan, and the association of these behaviours with parental drinking behaviours and attitudes, simultaneously.

## METHODS

### Study population

The data used in this study were obtained from the Child and Adolescent Behaviours in Long-term Evolution (CABLE) project.<sup>27</sup> The present study included two cohorts: cohort 1 consisted of 2719 students who were in the first grade in 2002 (when the study began) and were in the ninth grade (14–15 years old) in 2009; and cohort 2 consisted of 2499 students who were in the fifth grade (10–11 years old) in 2002 and were in the ninth grade (14–15 years old) in 2006. Participants with missing data were excluded, resulting in a final sample of 1961 students in cohort 1 (72.12%) and 2011 students in cohort 2 (80.47%). The  $\chi^2$  test was used to assess differences from baseline with regard to sex and residential area. No significant differences were found between the samples.

Since the CABLE project is school based, clustering effects on adolescent drinking behaviour had to be taken into account. Therefore, we used a general estimating equation with an exchangeable working correlation matrix to investigate the presence of clustering effects. The obtained correlation coefficients of  $-0.002$  for cohort 1 and  $-0.003$  for cohort 2 for both models indicated that the correlation of current drinking behaviours among adolescents within each school was low. Therefore, we ignored clustering effects and analysed the data as an independent sample.

## Measures

### Student drinking behaviour

Students reported the frequency of their alcohol use by answering the question 'Have you ever used alcohol?' using a six-point scale: 1=never used; 2=not over the last year, but have used before; 3=not over the last month, but have used before; 4=used once or twice over the last month; 5=have used many times over the last month and 6=have used every day over the last month. On the basis of their responses, the students were combined into two groups as follows: scores of 1–3 were recoded as 1=non-drinking and scores of 4–6 were recoded as 2=used over the last month.

### Student-reported paternal and maternal drinking behaviours and attitudes

Students reported their perceptions of the drinking frequencies of their fathers and mothers by using a six-point scale in response to the questions 'Does your father use alcohol?' and 'Does your mother use alcohol?': 1=never; 2=not over the last year, but has used before; 3=not over the last month, but has used before; 4=has used once or twice over the last month; 5=has used several times over the last month and 6=has used every day over the last month. Scores of 1–4 were recoded as 1=used infrequently and scores of 5–6 were recoded as 2=used frequently.

Students also reported their perceptions of the attitudes of their parents towards underage drinking on a five-point scale in response to the prompts 'Your father's attitude towards your alcohol use' and 'Your mother's attitude towards your alcohol use': 1=very against, 2=against, 3=no opinion, 4=favourable, and 5=very favourable. Scores of 1–2 were recoded as 0=against and scores of 3–5 were recoded as 1=favourable.

Finally, perceived paternal drinking frequencies and attitudes were combined into four categories, and recoded as follows: (1) NDA, non-drinking and against underage drinking; (2) NDF, non-drinking but favourable towards underage drinking; (3) DA, drinking frequently but against underage drinking and (4) DF, drinking frequently and favourable towards underage drinking. Maternal drinking behaviours and attitudes were categorised, and coded in the same way.

### Background variables

Relevant background variables with regard to underage drinking based on previous studies were controlled,<sup>6 14 28–33</sup> including cohort factors, age at first alcohol use, residential area, parental marital status, parental education level, parenting behaviour (ie, degrees of emotional support and behaviour supervision), peer alcohol use, peer pressure with regard to alcohol use, alcohol expectancies and alcohol refusal efficacy.

### Statistical analysis

We first used SAS V.9.1 to perform a descriptive statistical analysis on the data across gender using the distribution

of the mean, percentages, and SDs for the independent and the dependent variables. Next, we compared the independent and dependent variables, for males and females, using  $\chi^2$  and analysis of variance, to determine differences. Finally, we constructed models of the total sample, as well as male and female student samples, and analysed the factors that influenced the drinking behaviour of the adolescents by using logistic regression.

## RESULTS

The study population comprised 3972 students (1999 males and 1973 females; [tables 1 and 2](#)). Of these students, 679 reported having consumed alcohol over the last month. More males than females consumed alcohol over the last month. Adolescents with fathers who were non-drinkers and against underage drinking comprised the majority of the sample (55.74%), followed by adolescents with fathers who were non-drinkers but favoured underage drinking (29.51%); the corresponding percentages for the mothers were 68.05% and 29.68%, respectively. Paternal drinking behaviour and attitude differed significantly by gender: more females than males had fathers who were NDA (57.78% vs 53.73%) or DA (8.01% vs 7.15%). Conversely, more males than females had fathers who were NDF (31.62% vs 27.37%) or DF (7.50% vs 6.84%). In other words, fathers were more against alcohol use by their daughters than by their sons. The effects of maternal drinking behaviour and attitude did not significantly differ by offspring gender.

We conducted logistic regression analysis of the drinking behaviour-related factors across all participants and observed the following results with regard to the factors related to adolescent alcohol consumption over the last month ([table 3](#)). Comparison between adolescents whose fathers were DF and adolescents whose fathers were NDA, NDF and DA resulted in ORs and 95% CIs of 0.36 (0.25 to 0.52), 0.57 (0.41 to 0.78) and 0.46 (0.28 to 0.75), respectively. Compared with adolescents whose mothers were DF, those whose mothers were NDA (OR=0.33; 95% CI 0.17 to 0.65) or NDF (OR=0.49; 95% CI 0.25 to 0.94) were significantly less likely to consume alcohol.

The results of logistic regression analysis of the drinking behaviour-related factors across gender showed that male adolescents whose fathers were NDA (OR=0.27; 95% CI 0.16 to 0.46), NDF (OR=0.61; 95% CI 0.39 to 0.94) or DA (OR=0.44; 95% CI 0.23 to 0.85) were significantly less likely to consume alcohol than those whose fathers were DF. Paternal drinking behaviour and attitude influenced male adolescent drinking behaviour, whereas maternal drinking behaviour and attitude did not. In addition, cohort 2 was more likely to consume alcohol than cohort 1 (OR=1.51; 95% CI 1.15 to 1.98). Male adolescents were more likely to have used alcohol over the last month when the first alcohol use occurred before age 13 (OR=2.16; 95% CI 1.63 to 2.88), when perceived positive alcohol expectancies increased one

**Table 1** Distribution of variables by adolescent gender

Variable	Total sample Number of people (%)	Males Number of people (%)	Females Number of people (%)	$\chi^2/F$
Drinking over the last month				
No	3293 (82.91)	1630 (81.54)	1663 (84.29)	5.29*
Yes	679 (17.09)	369 (18.46)	310 (15.71)	
Perceived paternal drinking behaviour/attitude				10.56*
NDA	2214 (55.74)	1074 (53.73)	1140 (57.78)	
NDF	1172 (29.51)	632 (31.62)	540 (27.37)	
DA	301 (7.58)	143 (7.15)	158 (8.01)	
DF	285 (7.18)	150 (7.50)	135 (6.84)	
Perceived maternal drinking behaviour/attitude				0.62
NDA	2703 (68.05)	1354 (67.73)	2703 (68.37)	
NDF	1179 (29.68)	602 (30.12)	1179 (29.24)	
DA	39 (0.98)	18 (0.90)	39 (1.06)	
DF	51 (1.28)	25 (1.25)	51 (1.32)	
Cohort				
Cohort 1	1961 (49.37)	976 (48.82)	985 (49.92)	0.48
Cohort 2	2011 (50.63)	1023 (51.18)	988 (50.08)	
Age at first alcohol use (years)				
<13	917 (23.09)	443 (22.16)	474 (24.02)	1.94
≥13	3055 (76.91)	1556 (77.84)	1499 (75.98)	

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

DA, drinking frequently but against underage drinking; DF, drinking frequently and favourable towards underage drinking; NDA, non-drinking and against underage drinking; NDF, non-drinking but favourable towards underage drinking.

**Table 2** Distribution of variables by gender

Variable	Total sample Number of people (%) or mean (SD)	Males Number of people (%) or mean (SD)	Females Number of people (%) or mean (SD)	$\chi^2/F$
Residential area				
Taipei	2052 (51.66)	1010 (50.53)	1042 (52.81)	2.08
Hsinchu county	1920 (48.34)	989 (49.47)	931 (47.19)	
Parental marital status				
Married, living together	3650 (91.89)	1847 (92.40)	1803 (91.38)	1.37
Other	322 (8.11)	152 (7.60)	170 (8.62)	
Paternal education level				
Middle school or lower	589 (14.83)	305 (15.26)	284 (14.39)	2.84
High school	1407 (35.42)	683 (34.17)	724 (36.70)	
College or higher	1976 (49.75)	1011 (50.58)	965 (48.91)	
Maternal education level				
Middle school or lower	571 (14.38)	292 (14.61)	279 (14.14)	5.94
High school	1797 (45.24)	867 (43.37)	930 (47.14)	
College or higher	1604 (40.38)	840 (42.02)	764 (38.12)	
Parenting behaviour				
Degree of emotional support (6–24 points)	17.06 (4.81)	16.74 (4.81)	17.38 (4.78)	17.56***
Degree of behavioural supervision (4–16 points)	13.37 (2.89)	13.21 (2.96)	13.52 (2.81)	12.29**
Positive alcohol expectancies (5–20 points)	9.72 (3.26)	13.04 (3.98)	14.13 (3.34)	8.16**
Negative alcohol expectancies (5–20 points)	13.58 (3.72)	20.99 (5.68)	21.50 (4.75)	88.48***
Alcohol refusal efficacy (5–25 points)	21.25 (5.24)	1.84 (0.87)	1.77 (0.82)	9.31**
Peer alcohol use (2–10 points)	1.82 (0.85)	1.84 (0.87)	1.77 (0.82)	7.38**
Alcohol use peer pressure (2–12 points)	1.23 (0.75)	9.87 (3.47)	9.57 (3.02)	6.03*

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

**Table 3** Logistic regression analysis of drinking behaviour of all participants with regard to parental drinking behaviours and attitudes as well as others factors

Variable	OR	95% CI	p Value
Perceived paternal drinking behaviour/attitude			
NDA vs DF	0.36	0.25 to 0.52	***
NDF vs DF	0.57	0.41 to 0.78	***
DA vs DF	0.46	0.28 to 0.75	**
Maternal drinking behaviour/attitude			
NDA vs DF	0.33	0.17 to 0.65	**
NDF vs DF	0.49	0.25 to 0.94	*
DA vs DF	0.64	0.22 to 1.84	
Cohort			
1 vs 2	1.65	1.36 to 2.00	***
Gender			
Male vs female	1.03	0.85 to 1.25	
Age at first alcohol use			
<13 vs ≥13 years	2.27	1.85 to 2.77	***
Residential area			
Hsinchu county vs Taipei	1.01	0.82 to 1.24	
Parental marital status			
Married, living together vs other	0.89	0.64 to 1.24	
Paternal education level			
Middle school or below vs college or above	1.28	0.90 to 1.82	
High school vs college or above	1.25	0.97 to 1.61	
Maternal education level			
Middle school or below vs college or above	0.84	0.58 to 1.21	
High school vs college or above	0.82	0.64 to 1.06	
Parenting behaviour			
Degree of emotional support (6–24 points)	1.01	0.99 to 1.04	
Degree of behavioural supervision (4–16 points)	0.98	0.95 to 1.02	
Cognitive factors			
Positive alcohol expectancies (5–20 points)	1.07	1.04 to 1.11	***
Negative alcohol expectancies (5–20 points)	0.92	0.89 to 0.95	***
Alcohol refusal efficacy (5–25 points)	0.95	0.93 to 0.97	***
Peer factors			
Peer alcohol use (2–10 points)	1.66	1.49 to 1.85	***
Alcohol use peer pressure (2–12 points)	1.36	1.22 to 1.51	***

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

DA, drinking frequently but against underage drinking; DF, drinking frequently and favourable towards underage drinking; NDA, non-drinking and against underage drinking; NDF, non-drinking but favourable towards underage drinking.

point (OR=1.10; 95% CI 1.05 to 1.16), when negative alcohol expectancies decreased one point (OR=0.92; 95% CI 0.88 to 0.96), when alcohol refusal efficacies decreased one point (OR=0.96; 95% CI 0.94 to 0.98), when more peers were perceived as using alcohol (OR=1.81; 95% CI 1.57 to 2.10) and when peer pressure regarding alcohol use was stronger (OR=1.45; 95% CI 1.26 to 1.66).

Table 4 also shows the results from the analysis of the drinking behaviour-related factors with regard to female adolescents. Compared with females whose fathers were DF, those whose fathers were NDA (OR=0.52; 95% CI 0.30 to 0.91) or NDF (OR=0.51; 95% CI 0.32 to 0.83) were less likely to consume alcohol. Compared with females whose mothers were DF, those whose mothers were NDA (OR=0.23; 95% CI 0.09 to 0.60) were less likely to consume alcohol. For females, parental drinking behaviours had a greater influence on drinking

behaviours than did parental attitudes. In addition, cohort 2 was more likely to consume alcohol than cohort 1 (OR=1.84; 95% CI 1.38 to 2.56). Female students were more likely to have consumed alcohol over the last month when their first alcohol use occurred before age 13 (OR=2.26; 95% CI 1.69 to 3.03), when perceived negative alcohol expectancies increased one point (OR=0.93; 95% CI 0.89 to 0.97), when alcohol refusal efficacies were one point lower (OR=0.93; 95% CI 0.90 to 0.95), when the perceived number of peers who used alcohol was greater (OR=1.49; 95% CI 1.27 to 1.76) and peer pressure with regard to alcohol use by peers was stronger (OR=1.24; 95% CI 1.05 to 1.48).

## DISCUSSION

In this study, we found that although the percentage of students who had used alcohol in the last month did not

**Table 4** Logistic regression analysis of adolescent drinking behaviour across gender with regard to parental drinking behaviours and attitudes as well as others factors

Variable	Males			Females		
	OR	95% CI	p Value	OR	95% CI	p Value
Perceived paternal drinking behaviour/attitude						
NDA vs DF	0.27	0.16 to 0.46	***	0.52	0.30 to 0.91	*
NDF vs DF	0.61	0.39 to 0.94	*	0.51	0.32 to 0.83	**
DA vs DF	0.44	0.23 to 0.85	*	0.47	0.22 to 1.01	
Perceived maternal drinking behaviour/attitude						
NDA vs DF	0.43	0.16 to 1.17		0.23	0.09 to 0.60	**
NDF vs DF	0.47	0.18 to 1.25		0.49	0.20 to 1.25	
DA vs DF	0.72	0.15 to 3.41		0.58	0.13 to 2.50	
Cohort						
2 vs 1	1.51	1.15 to 1.98	**	1.84	1.38 to 2.56	***
Age at first alcohol use						
<13 vs ≥13 years	2.16	1.63 to 2.88	***	2.26	1.69 to 3.03	***
Residential area						
Hsinchu county vs Taipei	1.01	0.76 to 1.35		1.07	0.80 to 1.44	
Parental marital status						
Married, living together vs other	1.19	0.72 to 1.98		0.66	0.43 to 1.03	
Paternal education level						
Middle school or below vs college or above	1.28	0.79 to 2.08		1.40	0.83 to 2.36	
High school vs college or above	1.30	0.91 to 1.85		1.27	0.87 to 1.84	
Maternal education level						
Middle school or below vs college or above	0.95	0.58 to 1.58		0.72	0.41 to 1.25	
High school vs college or above	0.91	0.64 to 1.29		0.71	0.49 to 1.03	
Parenting behaviour						
Degree of emotional support (6–24 points)	1.01	0.97 to 1.04		1.02	0.99 to 1.06	
Degree of behavioural supervision (4–16 points)	1.01	0.96 to 1.07		0.96	0.91 to 1.01	
Cognitive factors						
Positive alcohol expectancies (5–20 points)	1.10	1.05 to 1.16	***	1.02	0.97 to 1.08	
Negative alcohol expectancies (5–20 points)	0.92	0.88 to 0.96	***	0.93	0.89 to 0.97	***
Alcohol refusal efficacy (5–25 points)	0.96	0.94 to 0.98	***	0.93	0.90 to 0.95	***
Peer factors						
Peer alcohol use (2–10 points)	1.81	1.57 to 2.10	***	1.49	1.27 to 1.76	***
Alcohol use peer pressure (2–12 points)	1.45	1.26 to 1.66	***	1.24	1.05 to 1.48	*

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

DA, drinking frequently but against underage drinking; DF, drinking frequently and favourable towards underage drinking; NDA, non-drinking and against underage drinking; NDF, non-drinking but favourable towards underage drinking.

differ by gender, the influence of parental drinking behaviours and attitudes on adolescent drinking behaviour depended on both parent and adolescent gender. Paternal, but not maternal, drinking behaviour and attitude influenced male adolescent drinking behaviour, and this influence was significant when fathers were against drinking. Paternal drinking behaviour, and maternal drinking behaviour and maternal attitude, influenced female adolescents' drinking behaviour; in particular, having a non-drinking father or a non-drinking mother significantly influenced the likelihood of adolescent drinking. Specific results are discussed below.

### Gender differences with regard to adolescent drinking behaviour

Compared with males, females have smaller body volumes, less body water content and lower alcohol dehydrogenase activity, and therefore are more likely to have adverse reactions to alcohol, and consequently

more likely to refuse alcohol.<sup>34 35</sup> Furthermore, people in Asian societies generally hold negative opinions of female alcohol use, which is more restricted in Asia than in western countries; as a result, Asian females are less likely to drink than Asian males.<sup>35</sup> Although the bivariate analysis conducted in this study showed that males were more likely to drink than females, the effect of gender disappeared after social learning factors associated with drinking behaviours were controlled for. These results suggest that gender differences in adolescent drinking behaviours operate through the influences of social and environmental variables, such as the behaviours and attitudes of parents and peers.

### Influences of parental drinking behaviours and attitudes on the drinking behaviours of children

Research on the relationship between drinking and health has generated conflicting results. The American Heart Association indicates that although consumption

of a small amount of alcohol may be beneficial for health, the advantages, disadvantages and risks associated with drinking demand careful assessment, and infrequent alcohol use is recommended.<sup>36</sup> Adult consumption of a small amount of alcohol is generally considered acceptable. The role of parents is complicated with regard to alcohol use among children.

To the best of our knowledge, no previous study has explored the simultaneous effects of parental drinking behaviours and attitudes on adolescent drinking behaviour. Most previous studies have indicated that parents who drink are less likely to establish rules against drinking for their children. In the current study, we found that drinking parents' negative attitudes towards underage drinking had a mitigating effect on adolescent drinking behaviour. These results indicate that parents' rules for their children's drinking have a stronger influence than their actual drinking behaviours.<sup>5 19</sup> Perceived parental attitudes towards adolescent drinking might reflect drinking rules parents set for themselves and the degree to which they communicate with adolescents about drinking. Previous studies have shown that parents who have more-relaxed attitudes towards drinking have fewer alcohol-related discussions than do parents who have strict attitudes towards drinking.<sup>18</sup> When the frequency of communication between parents and their children about alcohol use is high, children are less likely to exhibit problematic drinking behaviours.<sup>37</sup> In addition, strict restrictions on alcohol help to reduce its consumption by adolescents.<sup>38</sup> Therefore, the results of the current study regarding whether the anti-drinking attitudes of drinking fathers reduce the likelihood of adolescent alcohol use through the formulation of alcohol-use restrictions, through alcohol-related discussions with their children, or through enhanced supervision regarding the drinking behaviour of their children, are worthy of continued investigation. Regardless of whether parents consume alcohol, they must communicate their negative attitudes towards underage drinking to their children.

We found that the influences of parental drinking behaviours and attitudes differed somewhat by gender. Male adolescents were influenced only by paternal drinking behaviours and attitudes, and the influence of paternal regulation factors was larger than that of their demonstration factors. However, the influence of these factors among mothers was not obvious. Fathers and mothers influenced their daughters, but only having non-drinking parents showed strong preventive effects against drinking behaviours, suggesting that females were more easily influenced by behaviour demonstrations. Overall, the influences of paternal drinking behaviours and attitudes on adolescent drinking behaviour were significant regardless of gender.

Although the number of female drinkers has recently increased in Taiwan, and societal attitudes towards female alcohol use have become more open, drinking is still considered a male activity, and male drinking is more acceptable to the public than female drinking.<sup>39 40</sup>

In Asian societies, more adult males drink than do adult females, and adult males consume more alcohol. Although mothers directly parent and nurture their children, the current study suggests that the role of fathers should not be ignored with regard to drinking behaviour in our society.

### Other factors affecting adolescent drinking behaviour

In addition to parental drinking behaviours and attitudes, alcohol expectancies, alcohol refusal efficacy, and peer alcohol use were found to be associated with adolescent drinking behaviour in this study. In addition, a cohort effect was also observed: cohort 2 consumed more alcohol than cohort 1. This result was likely due to differences between the educational materials provided to the two cohorts. In 2001, a new curriculum was introduced in elementary schools in Taiwan. Unlike the previous curriculum, the new one emphasises positive development, including self-awareness, self-efficacy and communication skills. Cohort 1 was taught the new curriculum starting in the first grade, whereas cohort 2 was taught the previous curriculum. Whether the new curriculum reduced the drinking behaviours of cohort 1 requires additional study.

The current study showed that the negative alcohol expectancies and alcohol refusal efficacies of male and female adolescents significantly predicted their drinking behaviours. However, positive alcohol expectancies were not associated with female drinking behaviour. Since their physiology predisposes females to adverse alcohol reactions,<sup>33 41</sup> females consume less alcohol than males. This fact might explain the current results.

This study also showed that the drinking behaviours of peers and peer pressure associated with alcohol significantly influenced underage drinking, regardless of gender, when all possible personal and environmental factors were controlled for. Peers who provide adverse support are the major social group from which adolescents learn and establish health-risk behaviours.<sup>15 31</sup>

This study has some limitations. First, it considered drinking behaviour only over the last month and did not consider the amount or frequency of alcohol use during that time. Second, we considered adolescents' perceptions of parental drinking behaviours and attitudes, rather than parent-reported parental drinking behaviours and attitudes. Nevertheless, the behaviours and attitudes as perceived by adolescents might better reflect the behaviours of adolescents. Finally, this study did not account for the influence of diverse family structures, such as single-parent families.

Despite the aforementioned limitations, this study nevertheless provides new knowledge regarding gender differences in adolescent drinking behaviour. In addition, the study has several strengths. First, the study used a large sample of students, and examined the influences of parental drinking behaviours and parental attitudes about underage drinking on adolescent drinking behaviours. Second, the study simultaneously controlled

for important variables that influence adolescent drinking behaviours. Third, the study discussed the association between the drinking behaviours of parents and that of their children in an area with a low prevalence of alcohol use. Our conclusions can support the prevention of early age drinking behaviours in other areas.

The results of the current study suggest that strategies for preventing underage drinking should be gender specific. In particular, family-based drinking prevention programmes should emphasise the different roles of fathers and mothers in the drinking behaviours of their sons and daughters.

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