

## 'I DRINK SPIRITS TO GET DRUNK AND BLOCK OUT MY PROBLEMS...' BEVERAGE PREFERENCE, DRINKING MOTIVES AND ALCOHOL USE IN ADOLESCENCE

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**Abstract — Aims:** To investigate among adolescents whether (i) drinking motives are related to beverage preference; (ii) beverage preference is related to alcohol use (drinking levels and risky drinking occasions); (iii) the association between beverage preference and alcohol use is moderated or mediated by drinking motives. **Method:** Data from a national representative sample of 5379 8th–10th graders in Switzerland (mean age 15.1, SD = 0.95) were analysed using multiple regression analyses. Beverage preference was based on the proportion of a specific beverage in the total amount of drinks consumed at the last drinking occasion. Drinking motives were assessed by the drinking motive questionnaire revised (DMQ-R). **Results:** A significant positive association was found between enhancement motives and a preference for beer and spirits; the association was negative with regard to a preference for wine and alcopops. Conformity motives were positively related to a wine preference but negatively to a beer preference. Only a preference for beer and spirits was significantly associated with alcohol use in models that exclude motives. However, the association between beer preference and adolescent alcohol use was mediated by drinking motives. A preference for alcopops and spirits was moderated by motives: social drinkers who preferred alcopops drank less than those who did not prefer alcopops. Coping drinkers who preferred spirits drank more than those who preferred other alcoholic drinks. **Conclusions:** Drinking motives are potential explanatory factors for the association between beverage preference and alcohol use. Prevention approaches should target coping motives, particularly for adolescents who show a preference for spirits.

It is well documented in the literature that a preference for particular alcoholic beverages is associated with different drinking patterns. Drinkers of beer and spirits, for example, tend to have a higher alcohol intake and have more alcohol-related problems than people who mainly drink other beverages (e.g. Klein and Pittman, 1990; Gmel *et al.*, 1999; Jensen *et al.*, 2002; Gronbaek *et al.*, 2004). Some individuals may prefer spirits because the consumption of spirits raises alcohol concentration in the blood more rapidly than beverages such as beer, wine, or alcopops (for a review see Smart and Walsh, 1995). Consequently, the drinker will experience the effects of alcohol more rapidly. Apart from spirits, the consumption of beer was also found to be associated with risky drinking among adolescents and young adults (e.g. binge drinking or heavy episodic drinking, Clapp and Shillington, 2001; Kuntsche, 2001). Beer is rather cheap due to low taxes and advanced brewing technologies, which enable it to be produced in large quantities (World Health Organization, 1999, 2001). Therefore, it is assumed that beer is the beverage of choice for adolescents who like to get drunk but are on a restricted budget (Edwards *et al.*, 1994).

In contrast to mainly spirits' or beer drinkers, wine drinkers were described as better educated and relatively free of symptoms or risks of psychophysical illness; they also drink temperately (e.g. Klatsky *et al.*, 1990; Gronbaek *et al.*, 1999). Wine drinkers have a far lower risk of becoming heavy and excessive drinkers than beer or spirits' drinkers have (Jensen *et al.*, 2002; Gronbaek *et al.*, 2004). Furthermore, among 13- to 18-year-olds from different countries, wine, if taken exclusively, appears to be the beverage of moderation (Smart and Walsh, 1995; Kuntsche, 2001). Wine is considered a social habit (Alvarez and del Rio, 1994) and usually drunk in

normative settings, e.g. in the company of others and to accompany meals (Smart, 1996; Smart and Walsh, 1999).

Alcopops, defined as premixed drinks that are carbonated and contain high levels of sweeteners, colouring, and flavouring (e.g. McKeganey *et al.*, 1996; McKeganey, 1998), were introduced in the late 1990s and rapidly penetrated the youth market in most western societies. Youth surveys indicate that alcopops have a positive and attractive image among adolescents (Hughes *et al.*, 1997; Leeming *et al.*, 2002) and have become one of the most popular alcoholic beverages among this age group in many European countries (for a review see Wicki *et al.*, 2006). Research found that, like all alcoholic beverages, alcopops add to drinking levels and alcohol problems and seem to be consumed in addition to, rather than as a substitute for conventional alcoholic beverages (Wicki *et al.*, 2006). Although the evidence is scarce, it appears that alcopops occupy the middle ground between wine that is usually not consumed excessively at single occasions and beer and spirits that are often used to get drunk.

However, not much is known about the motivation behind adolescents' preferences for a particular alcoholic beverage and whether the motivation modifies the relation between beverage preference and drinking patterns. Drinking motives are defined as the final decision to consume alcohol, i.e. the gateway through which more distal influences, such as personality factors or alcohol expectancies, are mediated (e.g. Catanzaro and Laurent, 2004; Cox and Klinger, 1988). The concept of drinking motives further assumes that people drink in order to attain certain valued outcomes (Cox and Klinger, 1988; Cooper, 1994; Carpenter and Hasin, 1988).

The present study investigates whether a particular beverage is better suited to achieve valued outcomes, e.g. drinking to celebrate special occasions with friends or to become intoxicated, and how this is related to alcohol

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use. More precisely, the present study tests whether the association between beverage (beer, spirits, wine, and alcopops) preference and adolescent alcohol use (drinking levels and risky drinking occasions) is mediated or moderated by drinking motives (enhancement, social, conformity, and coping). Mediation implies that drinking motives are the explanatory mechanism underlying the association between the beverage of choice and alcohol use. Hence, a significant association between beverage preference and alcohol-use variables is reduced or disappears after inclusion of motives in the model (cf. Baron and Kenny, 1986). Moderation would imply that particularly high drinking levels and risky drinking occasions are expected among those who preferred a certain beverage and score high on a given drinking motive.

To our knowledge, the impact of drinking motives on the association between beverage preference and alcohol use has not yet been addressed directly. There is, however, some research that indirectly suggests such a link. We expect beer and spirits' consumption to be related to higher drinking levels and a high frequency of risky drinking occasions. Additionally, we expect that adolescents who like the effects of alcohol and drink to get drunk (enhancement drinkers) are most likely to choose beer or spirits to achieve the desired effects. Moreover, sensation-seeking, impulsive, and aggressive adolescents were found to drink for enhancement motives (Cooper *et al.*, 1995; Comeau *et al.*, 2001) and to prefer beer and spirits when they drink (Snortum *et al.*, 1987; Smart and Walsh, 1995; Smart, 1996).

Since wine drinkers were found to drink moderately, we expect a wine preference to be negatively related to drinking levels and to the frequency of risky drinking occasions. Since drinking for conformity motives was also found to be related to moderate drinking habits (e.g. Cooper, 1994; Kuntsche *et al.*, 2006), we expect adolescents who prefer wine to drink for conformity motives (Cooper, 1994).

Owing to the positive and attractive image of alcopops among adolescents (Hughes *et al.*, 1997; Leeming *et al.*, 2002), we expect that adolescents consume alcopops for social motives, e.g. at social gatherings, celebrations, or parties in order to demonstrate that they subscribe to the positive and attractive image this alcoholic beverage has among their peers.

## METHODS

### Study design

Data from Swiss participation in the 'European School Survey Project on Alcohol and Drugs' (ESPAD: Hibell *et al.*, 2004), which has been conducted every 4 years since 1995 in European countries, were used for the present analysis. In

2003, the Swiss Institute for Prevention of Alcohol and Drug Problems (SIPA) and the Addiction Research Institute (ARI) for the first time conducted the survey for Switzerland together with 34 other European countries.

Present data were collected by means of a paper-pencil questionnaire which was administered in class between the end of April and the end of June 2003. To avoid systematic dropouts, the exact date of the distribution of the questionnaires was not communicated to the school boards ahead of time. Teachers who administered the questionnaires in the classroom were advised only to respond to adolescents' queries about the procedure and to guarantee the independent completion of the questionnaire without interference from classmates. The time frame for filling out the questionnaires was one school lesson (~45 min). According to the Helsinki Declaration (World Medical Association, 2002), the students could freely choose to participate and confidentiality was ensured at all stages of the study. More information about the ESPAD survey in Switzerland can be found in Gmel *et al.* (2004) or in the according chapter of the international report (Hibell *et al.*, 2004).

### Measures

Table 1 provides an overview of the variables used in the study.

*Beverage preference defined as the proportion of a specific beverage on the total amount of drinks consumed at the last drinking occasion.* The adolescents were asked, 'The last time you had an alcoholic drink, did you drink any alcopops? If so, how much?'. The possible answers were 'I never drink alcopops', 'I did not drink alcopops on my last drinking occasion', 'Less than 2 regular bottles or cans (<55 cl)', '2-4 regular bottles or cans (55-110 cl)', '5-8 regular bottles or cans (137.5-220 cl)', and '9 or more regular bottles or cans (>247.5 cl)'. Similarly structured questions and answers were used for the quantity of 'beer', 'wine', 'cider', and 'spirits' consumed during the previous drinking occasion. All amounts were converted into drinks of 15 g of pure ethanol, thus reflecting the average drink size of ESPAD measures. Finally, the beverage-specific proportion sum for each beverage was obtained by dividing the amount of each single beverage by the total amount of drinks consumed at the last occasion (sum of consumed quantities of alcopops, beer, cider, wine, and spirits). Detailed information about these questions can be found in Wicki *et al.* (2006), as well as in Hibell *et al.* (2004).

*Drinking motives.* The Drinking Motive Questionnaire Revised (DMQ-R: Cooper, 1994) is a 20-item self-report measure that includes the four conceptually and empirically distinct dimensions of enhancement motives, e.g. drinking because it is fun or to get high; social motives, e.g. drinking to celebrate a special occasion with friends or because it

Table 1. Overview of the variables used in the study

Concept	Beverage preference	Drinking motives	Adolescent alcohol use	
Variables	Beer, wine, alcopops, spirits	Enhancement, social, conformity, coping	Quantity-Frequency	RSOD (5+-drinking)
Answer categories	Share of a particular beverage on the total amount consumed at the last drinking occasion	Never (1), almost never, some of the time, about half of the time, most of the time, almost always (6)	Mean amount of drinks in the past 30 days	Frequency of RSOD in the past 30 days
Range	0.00-1.00 (in percent: 1.00 = 100%)	1-6	0-247.5 drinks	0-11.25 occasions

makes social gatherings more fun; conformity motives, e.g. drinking to fit in with a group or because your friends pressure you to drink; and finally coping motives, e.g. drinking to cheer up or to forget your worries. Participants were instructed to consider all the times they have drunk alcohol and to indicate how many of these occasions they have drunk for the particular motive. Each scale consisting of five items had to be rated on a relative frequency scale ranging from 'Never' (coded as 1) to 'Almost always' (coded as 6). The exact wording of all items is given in Cooper (1994) as well as in Kuntsche *et al.* (2006). Because of high internal consistencies (internal consistencies:  $\alpha_{\text{enhancement}} = 0.85$ ,  $\alpha_{\text{social}} = 0.82$ ,  $\alpha_{\text{conformity}} = 0.87$ ,  $\alpha_{\text{coping}} = 0.88$ ; note that values above 0.7 are considered as satisfactory; e.g. Bland and Altman, 1997; Crichton, 1999; George and Mallery, 2003), the items of each motive dimension were added up to summary scales, as originally suggested by Cooper (1994).

### Alcohol use

**Quantity-frequency index (QF).** For the frequency of alcohol use, the question dealt with the number of drinking occasions in the last 30 days with answer categories '0', '1–2', '3–5', '6–9', '10–19', '20–39', and '40 or more'. Midpoints of categories were used and 45 occasions for the highest category [highest category plus half range to mid-point of adjacent category (Wicki *et al.*, 2006):  $40 - 30 = 10/2 = 5$ ]. The usual quantity question assessed the total amount of standard drinks of any alcoholic beverage (beer, wine, spirits, and alcopops as examples) consumed on a typical occasion. The answer categories were '<1 drink', '1 drink', '2 drinks', '3 drinks', '4 drinks', and '5 or more drinks'. Midpoints of categories were used, with 0.5 drinks for the lowest and 5.25 drinks for the highest quantity category (highest category plus half range to mid-point of adjacent category:  $5 - 4.5 = 0.5/2 = 0.25$ ). The quantity–frequency index was obtained by multiplying these two measures.

**Risky single occasion drinking (RSOD).** The question was 'Think back once more over the last 30 days. How many times (if any) have you had five or more drinks in a row?' with the answer categories 'none', '1', '2', '3–5', '6–9', and '10 or more times'. Midpoints of categories were used and 11.25 occasions for the upper category (highest category plus half range to mid-point of adjacent category:  $10 - 7.5 = 2.5/2 = 1.25$ ).

### Sample and missing value imputation

Random cluster sampling was used, where classes served as the primary sampling unit. An overall response rate of 83.1% could be achieved. The sample can be considered as representative for all 8th, 9th, and 10th graders in public schools in the German, French, and Italian speaking regions in Switzerland. Since drinking motives were exclusively assessed among drinkers, those who did not indicate at least one drinking occasion in the last 12 months ( $n = 1415$ , 19.7%) were excluded. Students who failed to answer three or more questions on drinking motives ( $n = 71$ ; 1.2%) were equally excluded. When a student did not answer one or two items of the drinking motive scales, the missing values were replaced by Markov Chain Monte Carlo (MCMC) estimates (Hox, 2002; Congdon, 2003). The advantage of this imputation method is that it uses the maximum available

information for an individual from other items of the same concept (cf. Kuntsche *et al.*, 2006). The LISREL 8.51 program (Jöreskog and Sörbom, 2001) was used to impute missing values.

Students who failed to answer questions about alcohol use ( $n = 58$ ; 1.0%) were excluded from the analysis. Since the ESPAD questionnaire assessed beverage preference solely on the last drinking occasion, all students who did not indicate drinking on the last drinking occasion were equally excluded ( $n = 270$ ; 4.8%). However, no differences in terms of sex ( $\chi^2 = 3.0$ ,  $df = 1$ ,  $P > 0.05$ ) and age ( $t = 1.3$ ;  $df = 5705$ ;  $P > 0.05$ ) were found between the excluded adolescents and the remaining participants. The final sample consists of 5379 12- to 18-year-old students of which 49.6% were boys; 71.2% of the total sample came from the German speaking part (22.8% French and 7.0% Italian speaking). The total mean age was 15.1 years ( $SD = 0.95$ ).

### Statistical analysis

The present study tests whether the association between beverage (beer, spirits, wine, and alcopops) preference and adolescents' alcohol use (drinking levels and risky drinking occasions) is mediated or moderated by drinking motives (enhancement, social, conformity, and coping). Figure 1 provides an illustration of moderation and mediation effects in the link between beverage preference, drinking motives, and adolescent alcohol use. First, for mediation, beverage preference was regressed on drinking motives (Step 1 in Figure 1). Second, in a first hierarchical multiple regression model, only beverage preferences were included as independent variables (Step 2 in Figure 1) to determine quantity–frequency and frequency of risky drinking occasions. In the second model, drinking motives were added (Step 3 in Figure 1). If a significant association between beverage preference and alcohol use occurs in the first model but was reduced or disappeared after

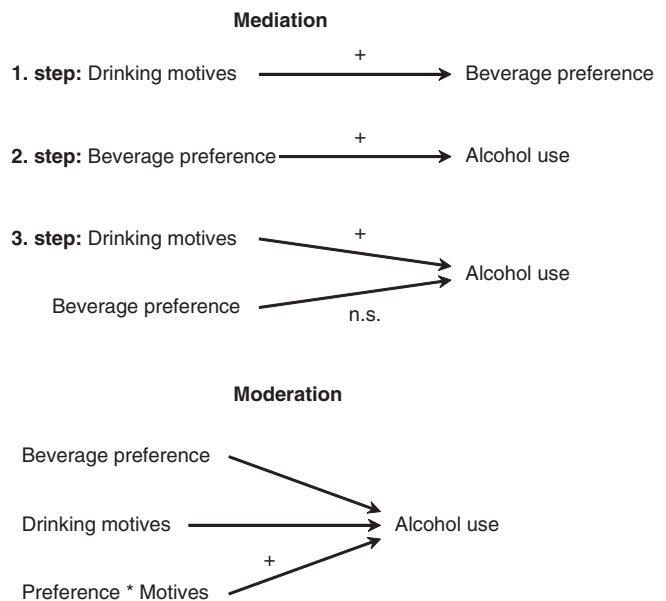


Fig. 1. Illustration of moderation and mediation effects in the link between beverage preference, drinking motives, and adolescent alcohol use.

inclusion of motives in the second model, this would provide evidence of mediation (cf. Baron and Kenny, 1986).

To test moderation, interactions between beverage preference and drinking motives were included in the third model of the hierarchical regression, and a backward stepwise selection strategy on all possible interactions was applied to identify significant interactions. The interaction terms were obtained by multiplying each drinking motive with each beverage preference as standard procedure for including interactions in multiple regressions (Jaccard *et al.*, 1990). If a significant interaction occurs in the third model this provide evidence of moderation (cf. Baron and Kenny, 1986).

All regression models were adjusted for sex and age. Since the participating students were selected by means of cluster sampling, all regression analyses were adjusted for design effects of clusters (school classes) by using the Huber–White sandwich estimator for standard errors in the statistical software package STATA 7.0 (StataCorp., 2001).

RESULTS

*Beverage preference and drinking motives*

About two-thirds of the boys and one-third of the girls drank at least one beer at the last drinking occasion; about one-third of the boys and one-fourth of the girls had at least one glass of wine; more than one-third of the boys and one-third of the girls had at least one glass of spirits (Table 2). Nearly one-third of the boys and more than half of the girls drank more alcopops on the last drinking occasion than any other alcoholic beverage.

Multiple regression analyses revealed that enhancement motives were positively related to the consumption of beer and spirits and negatively to the consumption of wine and alcopops (Table 3). For example, as regards enhancement motives and beer preferences, the coefficient of 0.026 can be interpreted to mean that for each increase of one point on the

6-point enhancement scale, the share of beer in adolescents' total alcohol consumption at the last drinking occasion increased on average by 2.6%. Social motives were positively related to the consumption of alcopops and negatively to wine consumption. Conformity motives were positively related to wine consumption and negatively to beer consumption.

*Beverage preference and alcohol use*

The preference for beer or spirits was related to high quantity–frequency drinking and to a high frequency of RSOD (Table 4). No associations emerged between a wine and alcopops' preference and adolescent alcohol use. However, additional analyses reveal that adolescents who drank more wine than any other beverage had significantly lower drinking levels in terms of QF (mean difference = 11.1, SE = 1.2, *t* = 9.2, *P* < 0.001) and RSOD (mean difference = 0.81, SE = 0.10, *t* = 8.2, *P* < 0.001). The same was true for alcopops (QF mean difference = 10.8, SE = 1.0, *t* = 10.7, *P* < 0.001; RSOD mean difference = 0.78, SE = 0.07, *t* = 11.7, *P* < 0.001). The opposite, however, was not the case because those who had the highest drinking levels preferred beer and spirits, but also drank wine and alcopops, albeit to a lesser extent.

*Mediation*

The second model reveals that, independently from beverage preference, all drinking motives were significantly associated with adolescent alcohol use (Table 4). However, compared with the inclusion of beverage preference only, both the coefficients of a beer and spirits' preference were reduced and only a spirits' preference remained significant for both quantity–frequency and RSOD when drinking motives were added in the second model. Moreover, the inclusion of drinking motives considerably increased the explained variance from ~5% in the first model to ~20% in the second model.

*Moderation*

In addition to the main effects of beverage preference and drinking motives, their interactions were included in the third model. Two interactions emerged from the backward selection method in this model. To reach a better understanding of these interactions, the relation between the proportion of a particular beverage and the frequency of having five drinks or more at single occasions according to a particular drinking motive was plotted on a graph. This was done using the results of the third model and the lowest and highest category of the particular beverage preference and drinking motive.

Figure 2 shows a slight (and non-significant) decrease in the frequency of RSOD, with an increasing percentage of alcopops in the total amount consumed at the last drinking

Table 2. Share of adolescents with a given proportion of a particular beverage at last drinking occasion

	Beer (%)	Wine (%)	Alcopops (%)	Spirits (%)
Share among boys				
Zero	37.3	68.7	39.0	57.6
Half and less	28.0	23.7	30.5	33.1
More than half	34.7	7.6	30.4	9.3
Share among girls				
Zero	65.5	73.4	26.7	66.0
Half and less	18.6	17.7	20.0	23.7
More than half	15.9	8.9	53.3	10.3

For presentation purposes, proportions were recoded in three categories.

Table 3. Drinking motives as predictors in multiple regression analyses (unstandardized regression coefficients and standard errors and *t*-values in brackets)

	Beer	Wine	Alcopops	Spirits
Enhancement	0.026*** (0.007, 3.55)	-0.015*** (0.004, -3.32)	-0.025*** (0.007, -3.40)	0.014*** (0.005, 2.99)
Social	-0.005 (0.008, -0.65)	-0.022*** (0.005, -4.59)	0.034*** (0.008, 4.47)	-0.004 (0.005, -0.88)
Conformity	-0.019* (0.008, -2.53)	0.015* (0.006, 2.55)	-0.003 (0.008, -0.45)	0.000 (0.005, 0.02)
Coping	0.003 (0.005, 0.55)	-0.005 (0.003, -1.74)	0.010 (0.005, 1.87)	-0.005 (0.004, -1.45)
<i>R</i> <sup>2</sup>	7.4%	3.6%	7.7%	5.6%

All regression models were adjusted for sex, age, and the total amount of drinks consumed at the last occasion; \**P* < 0.05; \*\*\**P* < 0.001.

Table 4. Drinking motives, beverage preference, and their interactions as predictors (unstandardized regression coefficients and standard errors and *t*-values in brackets) of adolescent alcohol use (quantity–frequency and risky single occasion drinking)

	QF	RSOD
1st model		
Beverages only		
Beer	10.76*** (2.61, 4.13)	0.853*** (0.199, 4.29)
Wine	-1.53 (2.71, -0.57)	0.218 (0.181, 1.21)
Alcopops	1.75 (2.26, 0.77)	-0.008 (0.207, -0.04)
Spirits	17.52*** (2.97, 5.89)	1.647*** (0.213, 7.72)
R <sup>2</sup>	4.9%	5.4%
2nd model		
Beverages		
Beer	4.41 (2.41, 1.83)	0.367*** (0.174, 2.11)
Wine	1.95 (2.57, 0.76)	0.269 (0.188, 1.43)
Alcopops	-1.69 (2.15, -0.79)	-0.037 (0.163, -0.23)
Spirits	7.74** (2.77, 2.79)	0.889*** (0.191, 4.65)
Drinking motives		
Enhancement	5.82*** (0.76, 7.62)	0.497*** (0.048, 10.45)
Social	3.74*** (0.76, 4.89)	0.181*** (0.046, 3.96)
Conformity	-1.07** (1.14, -2.70)	-0.163** (0.062, -2.61)
Coping	3.25*** (0.67, 4.85)	0.336*** (0.045, 7.43)
R <sup>2</sup>	16.3%	22.5%
3rd model		
Beverages		
Beer	3.58 (2.45, 1.47)	0.315 (0.175, 1.80)
Wine	2.11 (2.62, 0.80)	0.273 (0.191, 1.44)
Alcopops	-3.26 (2.30, -1.42)	-0.142 (0.171, -0.83)
Spirits	7.42* (2.92, 2.54)	0.882*** (0.197, 4.48)
Drinking motives		
Enhancement	5.69*** (0.76, 7.46)	0.488*** (0.048, 10.25)
Social	3.78*** (0.76, 4.98)	0.185*** (0.045, 4.08)
Conformity	-3.15** (1.12, -2.80)	-0.169** (0.062, -2.73)
Coping	3.21*** (0.66, 4.86)	0.331*** (0.045, 7.35)
Interactions		
Social × Alcopops	-2.15*** (0.55, -3.88)	-0.144*** (0.032, -4.51)
Coping × Spirits	1.49* (0.68, 2.20)	0.143* (0.041, 3.50)
R <sup>2</sup>	16.9%	23.3%

All models were adjusted for sex and age; \**P* < 0.001; \*\**P* < 0.01; \*\*\**P* < 0.05.

occasion. The decrease, however, was steeper among those who indicated drinking almost always for social motives than among those who indicated that they never drank for social motives. The increase in the frequency of RSOD with a higher percentage of spirits in the total amount consumed at the last drinking occasion was steeper among those who indicated almost always drinking for coping or enhancement motives than among those who indicated that they never drank for coping or enhancement motives (Figure 2).

## DISCUSSION

Apart from associations between beverage preference and alcohol use, the present study investigated the motives behind adolescents' preference for a particular beverage, i.e. whether a particular beverage is better suited to achieve valued outcomes.

It appears that certain adolescents, particularly those who preferred beer and spirits but not wine and alcopops like to have fun, to feel the effects of alcohol, and to get drunk. It might be the case that these adolescents consider spirits as the most effective way and beer as the cheapest way to achieve

the desired effects (Edwards *et al.*, 1994; Smart and Walsh, 1995; World Health Organization (WHO), 1999, 2001). Adolescents who prefer wine tend not to drink excessively. If they drink, they seem to do so in order to conform to the drinking group norm, i.e. not to feel left out and so that others will not make fun of them for not drinking. This might also be related to the rather normative use of wine in the adult drinking culture (Smart, 1996; Smart and Walsh, 1999) and because it is a social habit (Alvarez and del Rio, 1994). Furthermore, adolescents consume alcopops particularly together with peers at social gatherings, celebrations, or parties apparently due to the positive and attractive image of this alcoholic beverage (Hughes *et al.*, 1997; Leeming *et al.*, 2002). The popularity of alcopops (Roberts *et al.*, 1999; Boreham and McManus, 2003) mirrors the popularity of social motives as the most prevalent drinking motive among adolescents (for a review see Kuntsche *et al.*, 2005, 2006).

The results also confirm that both beer and spirit consumption is related to high drinking levels and an increased frequency of risky drinking occasions (e.g. Klein and Pittman, 1990; Clapp and Shillington, 2001; Kuntsche, 2001; Jensen *et al.*, 2002; Gronbaek *et al.*, 2004), but only in the first regression model, which excludes drinking motives. When the latter were included in the second model, the effects of a preference for beer and spirits were markedly reduced and in the third model, the effects of a beer preference became non-significant for both quantity–frequency and RSOD. Thus, the results revealed that the link between beer preference and adolescent alcohol use was mediated by drinking motives. Thus, beer preference appears to be only indirectly associated with high drinking levels and an increased frequency of risky drinking occasions. However, enhancement drinkers prefer beer (and spirits) to achieve the desired effect of having fun, feeling the effects of alcohol, and to get drunk.

Furthermore, two moderating effects emerged in the second regression model. First, adolescents who reported drinking for social motives have higher drinking levels and a higher frequency of risky drinking occasions than those who scored low on social motives. This difference, however, was less pronounced among those who had a strong preference for alcopops. It appears that there are two groups of socially motivated drinkers. First, there are adolescents who like drinking alcopops at social gatherings and parties probably due to the positive and attractive image of this alcoholic beverage (Hughes *et al.*, 1997; Leeming *et al.*, 2002). These adolescents, however, tend to drink moderately, probably because of the higher price of alcopops. Second, adolescents who like to have fun and to get drunk tend also to drink at social gatherings and parties (for a review see Kuntsche *et al.*, 2005, 2006). Additional analyses reveal that adolescents who score high on social motives but do not prefer alcopops score far higher on enhancement motives (median split; *M* = 3.41) than those who score high on social motives but prefer alcopops (*M* = 2.15; *t* = 39.3; *P* < 0.001). Thus, the results of the present study do not add to concerns that alcopops seduce adolescents to drink heavily (e.g. Glenewinkel *et al.*, 1998; Romanus, 2000) due to the ethanol-masking effects of sweeteners (McKeganey, 1998; Confederatio Helvetica, 2003) but encourage socially motivated adolescents who prefer alcopops to drink moderately. This might be due to the higher price of alcopops compared to beer, which contains

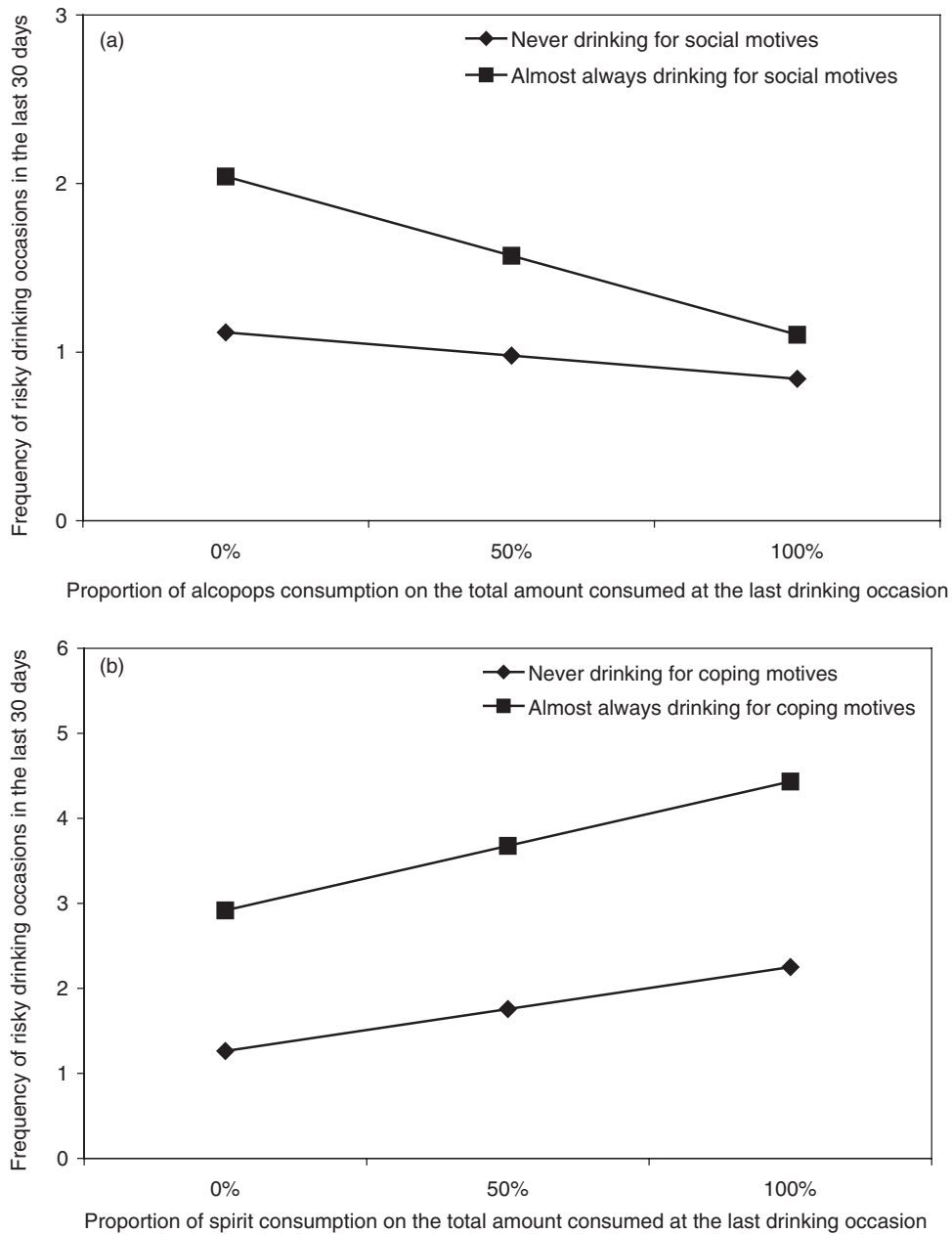


Fig. 2. Illustration of the interaction between beverage preference and drinking motives in predicting the frequency of risky single occasion drinking.

the same amount of pure ethanol (Confederatio Helvetica, 2003).

The second moderation effect concerns the result that drinking to cope with problems was related to high drinking levels and a high frequency of risky drinking occasions (e.g. Cooper *et al.*, 1995; Kuntsche *et al.*, 2005). However, those coping drinkers who had a strong preference for spirits had even higher drinking levels and a higher frequency of risky drinking occasions than those with a low preference for spirits' consumption. There might be adolescents who consider drinking spirits as a more effective way to forget about their problems and worries than if they consume other alcoholic beverages. This is particularly worrisome since coping drinkers were found to be at risk of adverse long-term consequences because

the difficulties that foster negative affects have never been adequately addressed (Cooper *et al.*, 1995; Kassel *et al.*, 2000).

*Limitations and future research directions*

The results might be biased due to the different legal drinking ages in this study. In fact, Switzerland has no legal drinking age but only legal restrictions for selling alcohol to minors (16 years for beer and wine and 18 years for alcopops and spirits), thus consumption is legal at all ages. Results were similar for types of beverages, although these varied according to the different restrictions on purchasing ages. This makes legal ages for alcohol purchases a less likely explanation for our findings. In addition, despite the legal purchasing age

of 18, about two-thirds of adolescents consumed at least one bottle of alcopops at the last drinking occasion. Thus, it would appear that the minors in the present study (99.7%) have no problems buying alcopops or obtaining them from adults.

Another shortcoming might be that the study was based exclusively on adolescent self-reports. However, self-reports of adolescent alcohol consumption and other drug use were found to be highly reliable and valid particularly in school surveys, in which anonymity and confidentiality were assured (for a review see Bener *et al.*, 2003), as is the case in the present study. Concerning the measurement of beer, wine, alcopops, and spirits' consumption in the ESPAD core questionnaire, only the amount of beer, wine, alcopops, and spirits consumed on the last occasion was assessed, but not the frequency and usual volume of beer, wine, alcopops, and spirits' consumption. Future research has to confirm if the present results can also be found among adolescents who generally prefer a specific beverage. Another limitation concerns the cross-sectional design of the study, in which it is impossible to determine if beverage preference forms a particular motive structure or if adolescents with a particular motive structure increasingly tend towards the consistent consumption of a particular beverage to obtain a specific valued outcome. The analysis of such questions requires longitudinal data and remains a task for future research.

## CONCLUSIONS

Adolescents who like to have fun and to get drunk tend to drink beer or spirits to become intoxicated—some might also use parties and celebrations to have fun and to get drunk—while other adolescents who like drinking alcopops at these parties drink rather moderately. Adolescent wine drinkers like to conform and tend to drink moderately.

Adolescents who prefer spirits and drink to forget problems and worries tend to drink excessively. They should be targeted by life skills training (for a review see Botvin, 2000), to enhance self-esteem and coping strategies for managing stress and anxiety. It appears in addition, that there should be restricted access to spirits. For example, the legal age limit of 18 years to sell distilled alcoholic beverages should be better controlled and reinforced. It is also important to sensitize parents to restrict access of alcoholic beverages at home, particularly spirits.

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## REFERENCES

Alvarez, F. J. and del Rio, M. C. (1994) Gender differences in patterns of alcohol consumption in Spain. *Alcoholism, Clinical and Experimental Research* **18**, 1342–1347.

- Baron, R. M. and Kenny, D. A. (1986) The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* **51**, 1173–1182.
- Bland, J. M. and Altman, D. G. (1997) Cronbach's alpha. *British Medical Journal* **314**, 572.
- Boreham, J. and McManus, S. (2003) *Smoking, Drinking and Drug Use Among Young People in England in 2002*. The Stationery Office [TSO], London.
- Botvin, G. J. (2000) Preventing drug abuse in schools: social and competence enhancement approaches targeting individual-level etiologic factors. *Addictive Behaviors* **25**, 887–897.
- Carpenter, K. M. and Hasin, D. S. (1998) A prospective evaluation of the relationship between reasons for drinking and DSM-IV alcohol-use disorders. *Addictive Behaviors* **23**, 41–46.
- Catanzaro, S. J. and Laurent, J. (2004) Perceived family support, negative mood regulation expectancies, coping, and adolescent alcohol use: evidence of mediation and moderation effects. *Addictive Behaviors* **29**, 1779–1797.
- Clapp, J. D. and Shillington, A. M. (2001) Environmental predictors of heavy episodic drinking. *American Journal of Drug Abuse* **27**, 301–313.
- Comeau, N., Stewart, S. H. and Loba, P. (2001) The relations of trait anxiety, anxiety sensitivity, and sensation seeking to adolescents' motivations for alcohol, cigarette, and marijuana use. *Addictive Behaviors* **26**, 803–825.
- Confederatio Helvetica (2003) Botschaft betreffend die Einführung einer Sondersteuer auf Alcopops. Bundesblatt Nr. 10, Kompetenzzentrum Amtliche Veröffentlichungen [KAF], Bern; [http://www.admin.ch/ch/d/ff/2003/index0\\_10.html](http://www.admin.ch/ch/d/ff/2003/index0_10.html) (accessed March 23, 2006).
- Congdon, P. (2003) *Applied Bayesian Modelling*. John Wiley & Sons, Ltd, Chichester, UK.
- Cooper, M. L. (1994) Motivations for alcohol use among adolescents: development and validation of a four-factor-model. *Psychological Assessment* **6**, 117–128.
- Cooper, M. L., Frone, M. R., Russell, M. *et al.* (1995) Drinking to regulate positive and negative emotions: a motivational model of alcohol use. *Journal of Personality and Social Psychology* **69**, 990–1005.
- Cox, W. M. and Klinger, E. (1988) A motivational model of alcohol use. *Journal of Abnormal Psychology* **97**, 168–180.
- Crichton, N. (1999) Information point: coefficient alpha. *Journal of Clinical Nursing* **8**, 283.
- Edwards, G., Anderson, P., Babor, T. F. *et al.* (1994) *Alcohol Policy and the Public Good*. Oxford University Press, New York, NY.
- George, D. and Mallery, P. (2003) *SPSS for Windows Step by Step: A Simple Guide and Reference. 11.0 Update*. Allyn & Bacon, Boston, MA.
- Glenewinkel, F., Iffland, R. and Grellner, W. (1998) Designerdrinks und Homegetränke. *Blutalkohol* **35**, 36–47.
- Gmel, G., Truan, P. and François, Y. (1999) Alcoholic beverage preferences and self-reported problems in Switzerland. *Substance Use and Misuse* **34**, 1619–1645.
- Gmel, G., Rehm, J., Kuntsche, E. N. *et al.* (2004) Das European School Survey Project on Alcohol and Other Drugs (ESPAD) in der Schweiz. Wichtigste Ergebnisse 2003 und aktuelle Empfehlungen. Schweizerische Fachstelle für Alkohol- und andere Drogenprobleme/Institut für Suchtforschung. Available at <http://www.sfa-isp.ch/DocUpload/ESPAD.pdf>, Lausanne/Zürich.
- Gronbaek, M., Mortensen, E. L., Mygind, K. *et al.* (1999) Beer, wine, spirits and subjective health. *Journal of Epidemiology and Community Health* **53**, 721–724.
- Gronbaek, M., Jensen, M. K., Johansen, D. *et al.* (2004) Intake of beer, wine and spirits and risk of heavy drinking and alcoholic cirrhosis. *Biological Research* **37**, 195–200.
- Hibell, B., Andersson, B., Bjarnason, T. *et al.* (2004) *The ESPAD Report 2003—Alcohol and Other Drug Use Among Students in 35 European Countries*. The Swedish Council for Information on Alcohol and Other Drugs, CAN Council of Europe, Co-operation Group to Combat Drug

- Abuse and Illicit Trafficking in Drugs (Pompidou Group), Stockholm.
- Hox, J. J. ed (2002) *Multilevel Analysis: Techniques and Applications*. Lawrence Erlbaum Associates, Mahwah, NJ.
- Hughes, K., MacKintosh, A. M., Hastings, G. *et al.* (1997) Young people, alcohol, and designer drinks: quantitative and qualitative study. *British Medical Journal* **314**, 414–418.
- Jaccard, J., Turrisi, R. and Wan, C. K. (1990) *Interaction Effects in Multiple Regression*. Sage, Newbury Park, CA.
- Jensen, M. K., Andersen, A. T., Sorensen, T. I. *et al.* (2002) Alcoholic beverage preference and risk of becoming a heavy drinker. *Epidemiology and Community Health* **13**, 127–132.
- Jöreskog, K. G. and Sörbom, D. (2001) *LISREL Software Version 8.51*. Scientific Software International, Inc., Chicago, IL.
- Kassel, J. D., Jackson, S. I. and Unrod, M. (2000) Generalized expectancies for negative mood regulation and problem drinking among college students. *Journal of Studies on Alcohol* **61**, 332–340.
- Klatsky, A. L., Armstrong, M. A. and Kipp, H. (1990) Correlates of alcoholic beverage preference: traits of persons who choose wine, liquor or beer. *British Journal of Addiction* **85**, 1279–1289.
- Klein, H. and Pittman, D. J. (1990) Drinker prototypes in American society. *Journal of Substance Abuse* **2**, 299–316.
- Kuntsche, E. N. (2001) Radikalisierung? Ein Interpretationsmodell jugendlichen Alkoholkonsums von 1986 bis 1998 in der Schweiz [Radicalisation? An interpretation model of adolescent alcohol use from 1986 to 1998 in Switzerland]. *Sucht* **47**, 393–403.
- Kuntsche, E. N., Knibbe, R., Gmel, G. *et al.* (2005) Why do young people drink? A review of drinking motives. *Clinical Psychology Review* **25**, 841–861.
- Kuntsche, E. N., Knibbe, R., Gmel, G. *et al.* (2006) Replication and validation of the Drinking Motive Questionnaire Revised (DMQ-R, Cooper, 1994) among adolescents in Switzerland. *European Addiction Research*.
- Leeming, D., Hanley, M. and Lyttle, S. (2002) Young people's images of cigarettes, alcohol and drugs. *Drugs: Education, Prevention and Policy* **9**, 169–185.
- McKeganey, N. (1998) Alcopops and young people: a suitable cause for concern. *Addiction* **93**, 471–473.
- McKeganey, N., Forsyth, A. J. M., Barnard, M. *et al.* (1996) Designer drinks and drunkenness amongst a sample of Scottish school children. *British Medical Journal* **313**, 401.
- Roberts, C., Blakey, V. and Tudor-Smith, C. (1999) Impact of 'Alcopops' on regular drinking by young people in Wales. *Drugs: Education, Prevention and Policy* **6**, 7–15.
- Romanus, G. (2000) Alcopops in Sweden—a supply side initiative. *Addiction* **95**, S609–19.
- Smart, R. G. (1996) Behavioral and social consequences related to the consumption of different beverage types. *Journal of Studies on Alcohol* **57**, 77–84.
- Smart, R. G. and Walsh, G. W. (1995) Do some type of alcoholic beverages lead to more problems for adolescents? *Journal of Studies on Alcohol* **56**, 35–38.
- Smart, R. G. and Walsh, G. W. (1999) Heavy drinking and problems among wine drinkers. *Journal of Studies on Alcohol* **60**, 467–471.
- Snortum, J. R., Kremer, L. K. and Berger, D. E. (1987) Alcoholic beverage preference as a public statement: self-concept and social image of college drinkers. *Journal of Studies on Alcohol* **48**, 243–251.
- StataCorp. (2001) *Stata Statistical Software: Release 7.0*. Stata Corporation, College Station, TX.
- Wicki, M., Gmel, G., Kuntsche, E. N. *et al.* (2006) Is alcopop consumption in Switzerland associated with riskier drinking patterns and more alcohol-related problems? *Addiction* **101**, 522–533.
- World Health Organization (WHO) (1999) *Global Status Report on Alcohol*. WHO, Substance Abuse Department, Geneva.
- World Health Organization (WHO) (2001) *Highlights on Health in Switzerland*. WHO Regional Office for Europe, Copenhagen.
- World Medical Association (2002) *World Medical Association Declaration of Helsinki. Ethical Principles for Medical Research Involving Human Subjects*. Author, Ferney-Voltaire.