

# Reducing youth alcohol drinking through a parent-targeted intervention: the Örebro Prevention Program

Nikolaus Koutakis, Håkan Stattin & Margaret Kerr

Center for Developmental Research, Örebro University, Örebro, Sweden

## ABSTRACT

**Aims** To evaluate a 2.5-year prevention programme working through parents, targeting drinking among 13–16-year-olds. **Design** Quasi-experimental using matched controls with a pre–post, intention-to-treat design. **Setting** Schools located in inner city, public housing and small town areas. **Participants** A total of 900 pupils entering junior high school and their parents, followed longitudinally. **Intervention** Parents received information by mail and during parent meetings in schools urging them to: (i) maintain strict attitudes against youth alcohol use and (ii) encourage their youth's involvement in adult-led, organized activities. **Measurements** Evaluation of the implementation used measures of parental attitudes against underage drinking and youths' participation in organized activities. Outcomes were youths' drunkenness and delinquency. **Findings** The implementation successfully influenced parents' attitudes against underage drinking, but not youth participation in organized activities. At post-test, youths in the intervention group reported less drunkenness and delinquency. Effect sizes were 0.35 for drunkenness and 0.38 for delinquency. Findings were similar for boys and girls and for early starters. Effects were not moderated by community type. **Conclusions** Working via parents proved to be an effective way to reduce underage drinking as well as delinquency.

**Keywords** Adolescents, adolescent drinking, alcohol, delinquency, evaluation, intervention, longitudinal, parental attitudes, prevention.

Correspondence to: Håkan Stattin, Center for Developmental Research, BSR: Psychology, Örebro University, 701 82 Örebro, Sweden.

E-mail: hakan.stattin@bsr.oru.se

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## INTRODUCTION

Underage alcohol drinking endangers adolescents' health and wellbeing. It is linked to traffic accidents [1,2], trouble with the law [3,4], risky sexual behaviour [5,6] and later alcohol dependence or abuse [7]. The prevention or delay of youth alcohol drinking is, therefore, a public health concern.

Societal or political changes can sometimes intensify public health risks, as happened in Sweden during the late 1990s. Sweden joined the European Union in 1995 and had to change its former policies limiting availability and affordability of alcohol. The effects on youth alcohol drinking were clear. From 1995 to 1998, alcohol drinking among 9th graders increased by 30% for boys and 21% for girls [8]. In response, the Swedish National Institute of Public Health issued a call for universal youth

alcohol prevention programmes. The Institute wanted programmes to: (i) be implemented community-wide; (ii) target youths at the ages when drinking increases; (iii) work equally well in urban and rural communities; (iv) use existing community resources; (v) require little or no additional cost to the communities involved; and (vi) bring together different agencies and interested parties. The present programme was funded under this initiative and designed to fit these criteria.

Prevention programmes targeting the family are particularly efficient to reduce underage drinking, as has now been confirmed in a recent Cochran review [9]. In the present programme, parents were the main targets. To meet the specific criteria above, we targeted parents through school meetings and mailings. The programme rested on empirical findings linking lower levels of youth alcohol drinking with: (i) strict parental attitudes against

youth alcohol use and (ii) involvement in structured, adult-led activities.

Concerning parents' attitudes, studies had shown that the more lenient were parents' attitudes, the more children drank [10,11]. These attitudes seemed to be even more important than parents' own drinking habits [12]. Assuming that parents become more lenient about alcohol use as youths mature, which has now been shown empirically [13], we reasoned that if parents could be convinced to maintain their strict attitudes, drinking could be delayed or reduced.

Concerning organized activities, studies had shown that youths involved in organized leisure activities, such as sports, hobbies, religious activities, music, theatre, art and politics, used alcohol and drugs less [14] and had lower levels of delinquency and externalizing problems [15,16] than those not involved. Scholars attributed this to reduced time spent with peers unsupervised [17], exposure to competent adults and peers and increased feelings of competence and acceptance [18]. Recent studies show conflicting findings concerning team sports, with some studies showing more alcohol drinking [13,19] and others less [20]. At the time, however, a sizeable literature with robust findings had given empirical and theoretical reasons to believe that increasing youths' involvement in organized activities might reduce alcohol use, and this is still true concerning activities other than team sports. We believed that parents might help to increase involvement in organized activities by encouraging youths to join activities and providing transportation.

With this conceptual and empirical background, we designed the Örebro Prevention Programme. In the present study we describe the prevention programme and report on the implementation and outcomes. We examine effects on youth drunkenness after 1.5 and 2.5 years. We focus upon drunkenness because it represents problematic alcohol use. Because delinquent acts often take place while youths are under the influence of alcohol [21,22] and are less common among those involved in organized activities [15,16], we examine possible effects on delinquency as well. We also examine gender differences and the possible moderating role of community type. Some scholars maintain that, at best, universal programmes affect only the average group [23], not those at risk [24,25]. Thus, we look at effects for early starters in drinking and delinquency.

## METHOD

### The Örebro Prevention Programme

Because the programme should be applicable in urban and rural areas, three types of communities—inner city, public housing and small town—were selected for this

initial test. The intervention targeted parents, and we contacted them primarily through the schools. Junior high schools, which include grades 7–9 (ages 13–16 years), were used. A baseline assessment was conducted at the beginning of 7th grade, and follow-ups during implementation were conducted near the end of the spring terms, when youths were in 8th and 9th grades.

### Selection of intervention schools and matched controls

Just prior to the start of this project, the Social Medicine Unit of the County Hospital surveyed all 9th graders in Örebro County ( $n = 3094$ ) about alcohol use and other health-related behaviours. We used data from this survey in the selection of schools. Because the intervention was supposed to work in different types of communities, we first selected and approached intervention schools in the three types of communities mentioned above. All these schools agreed to participate. Then, we selected matched control schools that were similar on community type, size of school, alcohol use and delinquency, but distinct enough geographically to minimize the potential for cross-over effects. In each of the small towns (one intervention and one matched control) there were two schools. In each of the other community types there was one intervention or one matched control school per community. None declined participation.

Participation rates are shown in Table 1. For youths, participation was high, and rates did not differ between intervention and control schools. For parents, there were some unsystematic differences in participation between the intervention and control schools. The major reason for youth non-participation was absence from school due to sickness. Parents could disallow youths' participation and youths could decline participation, even if their parents did not object. In total, 60 parents or youths (6.7%) denied youth participation in grade 7, 129 (14%) did so in grade 8 and 92 (10.2%) did in grade 9. Parents who refused to participate themselves were distributed evenly across schools and conditions.

### Implementation

The intervention involved primarily information to parents delivered through the schools. It was described to teachers during regular teachers' meetings. Teachers were asked to support the programme publicly and allocate time at parent meetings for parents to learn about the programme.

#### *Parent meetings*

In Swedish schools, teachers hold parent information meetings at the start of each semester. This project

**Table 1** Numbers (percentages) of youths and parents participating over three assessment waves and tests of participation differences between intervention and control groups.

	Youths			Parents		
	Intervention	Control	$\chi^2$	Intervention	Control	$\chi^2$
Grade 7						
Official <i>n</i> <sup>a</sup>	437	458				
Participation <sup>b</sup>	393 (89) <sup>c</sup>	418 (91)	0.41	339 (77)	312 (68)	7.26*
Grade 8						
Official <i>n</i>	445	464				
Participation	382 (86)	386 (83)	0.82	316 (72)	346 (76)	1.15
Longitudinal participation <sup>d</sup>	317 (81) <sup>e</sup>	336 (80)	0.01	256 (75)	268 (86)	10.59***
Grade 9						
Official <i>n</i>	450	450				
Participation	408 (91)	421 (93)	0.14	367 (84)	341 (74)	8.06**
Longitudinal participation	339 (86)	366 (87)	0.3	264 (78)	242 (76)	0.01

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ . <sup>a</sup>Students registered in the grade. <sup>b</sup>Registered students and their parents to participate in the study. <sup>c</sup>Percentage of official *n*. <sup>d</sup>baseline participants still in the study. <sup>e</sup>Percentage of baseline participants.

covered five semesters, and project workers attended a parent meeting each semester. At the first of these meetings, they gave 30-minute descriptions of the programme. They advised parents to adopt or maintain a zero-tolerance position toward youth drinking and communicate clear rules to their children. The project workers suggested that parents in attendance formulate and sign agreements about their positions concerning youth drinking (and other issues they deemed important); in most cases, parents did so. These agreements were mailed to all parents, including those who had not attended. Altogether, the project workers attended five parent meetings: one in grade 7 and two each in grades 8 and 9. At each meeting they emphasized the key message of strict rules.

#### Postal information

Parents received at least three mailings each semester, including letters describing the parent meetings. Most letters were signed jointly by project workers and principals or teachers. Letters concerned parents' roles in reducing youth drinking and promoting leisure activities. They stressed the importance of formulating and communicating family rules against alcohol and drug use and gave information that was tailored to the particular communities about the availability of organized leisure activities.

#### Activity catalogues

Parents received catalogues by mail describing all organized activities in the communities. The clubs and

organizations provided information, and the catalogues included almost all the organized activities that existed in the communities. They were designed attractively, and listed contact information for activities in the respective neighbourhoods. Parents were asked to read these through together with their adolescents.

#### Assessment procedure

Parents and youths in the control group did not receive any treatment, but they participated in the longitudinal assessments along with those in the intervention group. Youths answered questionnaires in their classrooms; parents answered postal questionnaires at home every year about 2 weeks after the youth surveys took place. Neither parents nor youths were paid. Before each data collection, parents received information. They were told that participation was voluntary. They could disallow their child's participation by returning a postage-paid card or decline themselves by not returning the questionnaire. Youths were informed that participation was voluntary and their answers would be treated confidentially. The Ethics Committee at the University Hospital in Örebro approved the design and content of the intervention and all procedures.

#### Measures

##### Parents' attitudes

Parents were asked which of four attitude descriptions fitted them most accurately. They ranged from very lenient: 'It is natural for children our son or daughter's

age to be curious about trying alcohol. We trust that our son/daughter drinks in a responsible way' (1) to very strict: 'A child our son or daughter's age is way too young to drink alcohol at all. We think it is obvious that adolescents under 18 years should not concern themselves with alcohol' (4).

#### *Organized activity involvement*

Youths were asked about their involvement in activities that took place in groups, had adult leaders and met at least once a week. They indicated which of seven specific activities they were involved in and how many nights per week they attended each activity.

#### *Adolescent drunkenness*

At all three assessments, adolescents answered the question: 'How many times during the last 4 weeks have you drunk beer, wine, or spirits to the point that you felt drunk?'. They reported by writing a number on a blank line.

#### *Delinquency*

At each assessment, adolescents reported whether they had performed any of 20 delinquent acts during the last year (e.g. breaking into stores or cars, hurting someone with a weapon, painting graffiti, shoplifting, stealing a bike, vandalism). Items were rated on a three-point scale from 'never' (1) to 'several times' (3). Alpha reliabilities ranged from 0.83 to 0.94.

#### *Parents' education*

Parents indicated the highest level of education achieved by mother and father. The response alternatives ranged from 'compulsory school' (1) to 'university' (4). We used the higher of the two.

#### *Parental ethnicity*

Parents reported the birth countries of mother and father. If one parent was born outside Scandinavia, parents were considered non-Swedish.

#### **Attrition analyses**

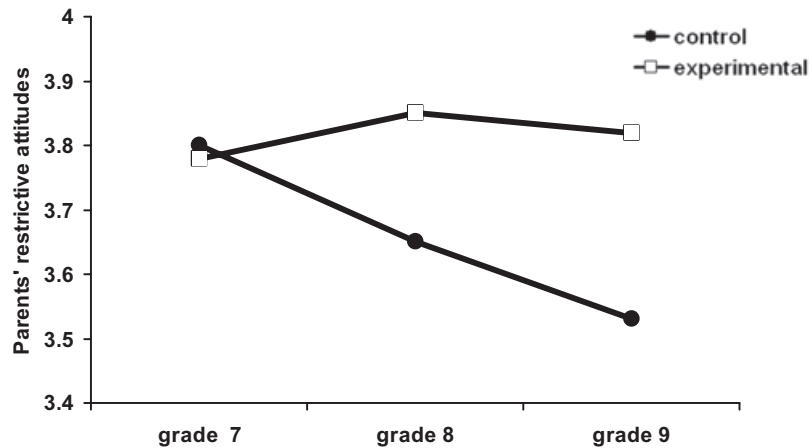
In attrition analyses, we used logistic regression to examine whether gender, parental divorce, parents' and youths' places of birth, parental education or any measures under study at baseline predicted leaving the longitudinal sample. We selected those who reported on drunkenness and delinquency at baseline (grade 7), which amounted to 99% of those who responded to the questionnaire at all. Then, we compared those who reported again at post-test (grade 9) with those who did

not. Separate analyses were conducted for: (i) adolescents in the control group; (ii) adolescents in the intervention group; (iii) parents in the control group; and (iv) parents in the intervention group. In the control group, youths who dropped out of the study reported more frequent drunkenness at baseline than those who stayed in the study ( $b = 2.06$ ,  $P < 0.05$ ). As described below, we conducted additional analyses to determine whether this affected the results. In both the intervention and control groups, parents who dropped out had more lenient attitudes towards youth drinking than those who stayed in ( $bs = -0.97$  and  $-0.98$ ,  $Ps < 0.05$  for intervention- and control-group parents, respectively). This should result in over-reporting of strictness in both groups, but should not affect the difference between groups.

#### **Statistical analyses**

We examined baseline equivalence between the intervention and control groups using *t*-tests for independent groups. To analyse changes in drunkenness and delinquency over time (grades 7–9) for the intervention and control groups, we used general linear model (GLM) analysis for repeated measures. To examine gender effects, we included interactions between gender and time and gender, time and drunkenness (or delinquency). When Mauchly's test of sphericity was significant, we used the Greenhouse–Geisser adjustment. When multivariate effects were significant, we followed up with univariate analyses of covariance (ANCOVAs) examining post-test (grade 9) differences, controlling for baseline (grade 7) measures. To test for group differences in sporadic and frequent drunkenness we used  $\chi^2$  analyses. We used two measures of effect size. One, Cohen's *d*, measures the standardized difference between the means of the intervention and control groups divided by the pooled standard deviations of the groups, and the numbers needed to treat (NNT), which is a measure of how many people would have to be treated in order to prevent one additional negative outcome. Finally, to determine whether the results might have been affected by differential attrition in the control and intervention groups, we conducted the post-test ANCOVAs again after applying two separate data treatment strategies. First, we limited the sample to those with data at both baseline and post-test and then deleted some cases randomly in order to match the numbers of heavy drinkers in the intervention and control groups at baseline. Secondly, we used the expectation-maximization function in SPSS to estimate post-test values for those who had participated at baseline but not post-test. The post-test values were estimated from information on all variables in the study at baseline.

**Figure 1** Means for parent-reported restrictive attitudes toward underage drinking at grades 7, 8 and 9 for parents in the intervention and control groups (the longitudinal sample)



## RESULTS

### Comparisons at baseline

Parents in the intervention group were significantly less strict than those in the control group, means = 3.65 and 3.78, respectively,  $t_{(649)} = 3.07$ ,  $P < 0.01$ . Because the point of the intervention was to maintain strictness in the intervention group, this made the intervention more challenging. There were no differences between the groups on drunkenness, organized activity participation, delinquency or parent-reported education or ethnicity.

### Success of the implementation

The implementation targeted parents' attitudes about youth drinking and youth participation in organized activities. The repeated-measures GLM showed a significant effect of time for parental attitudes,  $F_{(2,428)} = 4.46$ ,  $P < 0.05$ , indicating more permissiveness of underage drinking over the 3 years. There was a highly significant group (intervention versus control)  $\times$  time interaction,  $F_{(2,428)} = 13.54$ ,  $P < 0.001$ . As shown in Fig. 1, parents in the intervention group kept their strict attitudes over time, while those in the control group became more permissive. The repeated-measures model did not reveal any gender  $\times$  time or gender  $\times$  group  $\times$  time interactions. Because comparisons at baseline had indicated significant differences between the two groups of parents, we tested the success of the implementation with an ANCOVA comparing the intervention and the control groups on parents' attitudes at post-test with the baseline measure as the covariate. These analyses revealed that parents in the intervention group were significantly more restrictive than parents in the control group ( $F_{(1,503)} = 35.78$ ,  $P < 0.001$ ). Concerning participation in organized activities, the repeated-measures GLM showed a decrease in participation over time,  $F_{(2,550)} = 9.61$ ,  $P < 0.001$ . This change was more pronounced for

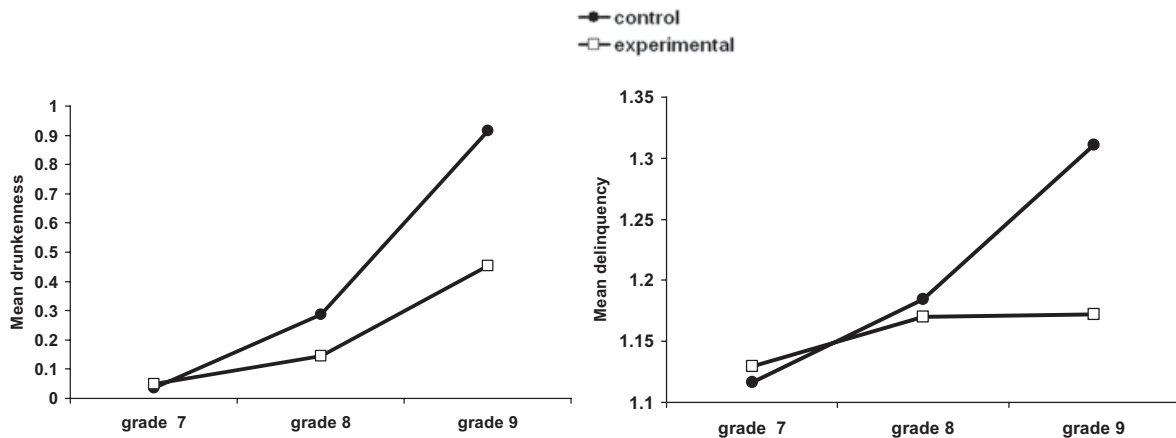
females,  $F_{(2,550)} = 10.06$ ,  $P < 0.001$ . However, there were no differences between the intervention and control groups. Thus, the implementation successfully influenced parents' attitudes against underage drinking, but not youth participation in organized activities.

### Evaluation of programme outcomes

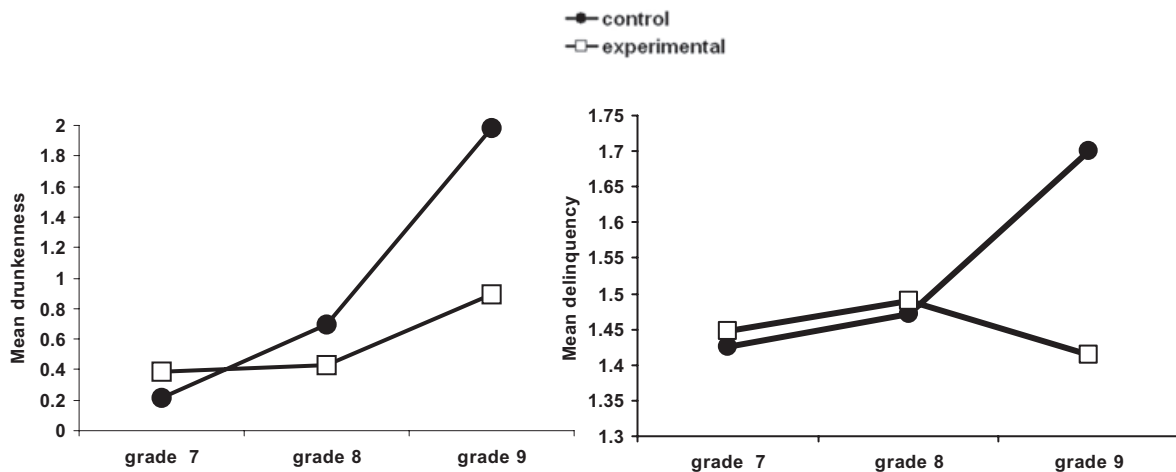
Did the programme change youths' drinking behaviour? The repeated-measures GLM showed that youth drinking increased over time,  $F_{(1,35,791.85)} = 86.50$ ,  $P < 0.001$ . As shown in Fig. 2a, this increase was steeper in the control group than in the intervention group,  $F_{(1,35,791.85)} = 12.00$ ,  $P < 0.001$ . There were no time  $\times$  gender or time  $\times$  group  $\times$  gender effects. Univariate analyses showed more drunkenness in the control group than in the intervention group at post-test, controlling for baseline levels, means = 0.45 and 0.96, respectively,  $F_{(1,691)} = 21.38$ ,  $P < 0.001$ . Furthermore, the proportion of participants who had been drunk several times during the last month was twice as high in the control group as in the intervention group (27.0% versus 12.6%,  $\chi^2_{(1,63)} = 2.58$ ,  $P < 0.001$ ). Thus, the intervention seemed to reduce drunkenness and frequent drunkenness for both boys and girls.

### Spreading effects

The repeated-measures GLM showed an increase in delinquency over time,  $F_{(1,28,743.15)} = 44.37$ ,  $P < 0.001$ . This increase was steeper in the control group than in the intervention group,  $F_{(1,28,743.15)} = 19.11$ ,  $P < 0.001$  (see Fig. 2b). Although there was a significant between-groups effect of gender,  $F_{(1,583)} = 12.92$ ,  $P < 0.001$ , there were no gender  $\times$  time or gender  $\times$  group  $\times$  time interactions. Univariate analyses showed higher levels of delinquency in the control group than the intervention group at post-test, controlling for baseline levels, means = 1.20 and 1.36, respectively,  $F_{(1,690)} = 24.98$ ,  $P < 0.001$ . Thus,



**Figure 2** Repeated-measures analysis of variance displaying self-reported drunkenness (a) and delinquency (b) separately for youths in the intervention and control conditions



**Figure 3** Repeated-measures analysis of variance for a subsample of early starters in drunkenness and delinquency displaying self-reported drunkenness (a) and delinquency (b) separately for youths in the intervention and control conditions

there is evidence that the effect of the intervention spread from alcohol use to delinquency.

#### Effect sizes

Cohen's *d* effect sizes were 0.35 for drunkenness and 0.38 for delinquency. Within-groups effect sizes given in the GLM results were 0.45 for drunkenness and 0.42 for delinquency. All these effects can be considered low-medium to medium. The NNT was 7.7 for being drunk during the last month and 7.1 for being drunk frequently.

#### Early starters

Early starters were defined as having been drunk at least once at baseline ( $n = 148$ ) or being higher than the 80th percentile on delinquency at baseline ( $n = 159$ ). As shown in Fig. 3a, drunkenness increased over time for early starters,  $F_{(1,41,118,41)} = 20.90$ ,  $P < 0.001$ . The

increase was steeper in the control group than in the intervention group,  $F_{(1,41,118,41)} = 5.93$ ,  $P < 0.01$ . There were no gender  $\times$  time or gender  $\times$  group  $\times$  time interactions. Cohen's *d* was 0.52 for drunkenness at post-test. Univariate analyses showed more drunkenness in the control group than in the intervention group at post-test, controlling for baseline levels, means = 1.97 and 0.95, respectively,  $F_{(1,120)} = 7.69$ ,  $P < 0.01$ . In short, the intervention seemed to reduce drunkenness for early starters in drinking.

For early starters in delinquency, there was no significant effect of time, but there was a significant group  $\times$  time interaction. As shown in Fig. 3b, adolescents in the control group increased more over time than those in the intervention group,  $F_{(1,25,114,77)} = 5.83$ ,  $P < 0.05$ . Univariate analyses showed more delinquency in the control group than in the intervention group at post-test, controlling for baseline levels, means = 0.87

**Table 2** Means for intervention and control groups at post-test and analysis of covariance results controlling for baseline in the longitudinal sample and in the sample after applying data treatments to overcome differential attrition.

	<i>F</i>	<i>df</i>	<i>Unadjusted group means</i>	
			<i>Intervention</i>	<i>Control</i>
<b>Longitudinal sample</b>				
Parents' restrictive attitudes	35.78***	(1,503)	3.81	3.46
Drunkenness	21.39***	(1,691)	0.45	0.97
Drunkenness: early starters	7.69**	(1,120)	0.95	1.97
Delinquency	24.98***	(1,690)	1.21	1.36
Delinquency: early starters	3.22*	(1,126)	1.55	1.81
<b>Matched sample<sup>a</sup></b>				
Parents' restrictive attitudes	34.31***	1,497	3.81	3.47
Drunkenness	21.23***	(1,687)	0.45	0.95
Drunkenness: early starters	7.48**	(1,116)	0.96	1.96
Delinquency	24.37***	(1,681)	1.2	1.35
Delinquency: early starters	2.68	(1,121)	1.53	1.77
<b>Longitudinal sample with missing post-test measures imputed<sup>b</sup></b>				
Parents' restrictive attitudes	35.96***	1,650	3.74	3.47
Drunkenness	19.04***	(1,810)	0.53	0.95
Drunkenness: early starters	7.15**	(1,146)	1.13	1.94
Delinquency	22.18***	(1,808)	1.24	1.36
Delinquency: early starters	2.33	(1,151)	1.61	1.8

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ . <sup>a</sup>Sample restricted to those participating at both baseline and post-test and then matched on numbers of frequent drinkers at baseline. <sup>b</sup>Sample including all baseline participants and with imputed values for those who had missing post-test measures.

and 0.65, respectively,  $F_{(1,126)} = 3.22$ ,  $P < 0.05$ . Cohen's  $d$  was 0.32 for delinquency at post-test. In short, the intervention seemed to reduce delinquency for early starters in delinquency.

### Community type as a moderator

To test whether the intervention effects were moderated by community type (inner city, small town, housing project), we conducted an ANCOVA with post-test drunkenness as the dependent variable. Group, community type (coded as two dummy variables) and the group  $\times$  community type interactions were predictors, and drunkenness was controlled at baseline. The intervention effect was still highly significant ( $F_{(1,687)} = 12.95$ ,  $P < 0.001$ ). There were no significant effects of community type and no significant interactions, suggesting that the programme worked similarly in the three community types. A similar ANCOVA with post-test delinquency as the dependent variable also produced a significant intervention effect ( $F_{(1,686)} = 10.93$ ,  $P < 0.001$ ). There were no effects of community type and no interaction effects. Hence, the intervention effects on drunkenness and delinquency were not moderated by community type.

### Tests for bias due to attrition

Table 2 shows results from both sets of analyses testing for bias due to attrition. The ANCOVA results on the

longitudinal sample are included for comparison. As shown in the table, regardless of the method used to correct for attrition the results differed little from the original. Only the group difference in delinquency for early starters fell below significance. Thus, the results do not seem to be affected by differential attrition in the two groups.

## DISCUSSION

In this programme, we encouraged parents of 13-year-olds to maintain and communicate strict attitudes against youth drinking and to urge youths to become involved in organized, adult-led activities. We succeeded in bolstering parents' strict attitudes, but we did not increase activity participation. None the less, the intervention seemed to affect youth drinking. At the end of the programme, drunkenness and frequent drunkenness were lower in the intervention group than in the control group.

The primary advantage of this programme is that it is administered easily through existing parent-teacher meetings. The costs are negligible, especially when compared with other parenting programmes. For instance, in a cost comparison reported by the Swedish National Institute of Public Health, the Strengthening Families Programme cost 80% more to implement than the present programme [26]. A further advantage is that this

programme can be administered with minimal training. Project workers do not have to be specialists, needing only a 2-day training course. Perhaps the key to the programme's success is that the focus was not upon changing parents' attitudes; assuming that most parents of 7th-graders are against youth drinking, we simply encouraged them to maintain their positions. Together, these qualities make the Örebro Prevention Programme one that can be used widely, mainly with existing resources.

Some limitations of this study should be mentioned. First, our analyses look at individual-level changes, not accounting for the school-level assignment to conditions and both class-level and individual treatment. The programme might have been more effective in some classes than others, and our analyses do not reveal these differences. On the other hand, our analyses and the intention-to-treat design avoid overestimating the intervention effect. Concerning attrition, parents with lenient attitudes towards underage drinking at pretest tended to drop out of the longitudinal sample to a greater degree in the intervention and control groups. Consequently, these findings may be relevant mainly for the vast majority of parents who have restrictive attitudes when their children are 13. We used a quasi-experimental design with matched control groups; we had a good match. Only one condition differed between the groups at pretest: parents' attitudes toward underage drinking. Hence, one condition out of five differed significantly, and for that condition the difference should work against the intervention. Because we do not have random assignment, however, we cannot rule out possible confounders. Finally, the measure of drunkenness was subjective, so we do not know how drunk the youths were when they reported having been drunk. These limitations suggest that some caution about the results is warranted.

How does this programme compare with other programmes targeting youth drinking? In Sweden, a previous intervention targeted all 13–16-year-old youths in a whole community [27]. They used both interventions at the local and the individual levels, and provided suggestive evidence that information to parents may be helpful in local alcohol prevention. A recent Cochrane review examined findings from 56 different studies [9]. A conclusion was that family-based programmes were most efficient, particularly the Iowa Strengthening Families Program (ISFP) [28,29]. Foxcroft and colleagues compared programmes with NNT measures; they calculated an NNT of nine for 4-year follow-up of the ISFP [29]. The NNTs for the ISFP were calculated on life-time behaviours, such as ever used alcohol without permission and ever been drunk. Our NNTs of 7.7 and 7.1 concerned drunkenness and frequent drunkenness the last month.

Therefore, the NNTs are not directly comparable. Furthermore, the ISFP NNTs were on outcomes 4 years after baseline measurements, with post-test being 6 months after baseline. Our results are based on data gathered almost 3 years after baseline measurements and the NNT is calculated precisely when the intervention ended. Our results convey nothing about longer-term effects. Both the ISFP and the present effect sizes, however, are considerably better than those reported for programmes such as life skills training. In all, this programme compares favourably with other programmes that have been evaluated.

When we began this programme, ideas about parents' strict attitudes affecting alcohol use did not have substantial support in the literature. Recently, however, parents' alcohol-specific rules have been linked to intensity and frequency of youth drinking [13], particularly for youths who have not already started drinking [30]. Other studies suggest that youths perceive their parents as having legitimate authority over safety issues such as alcohol drinking and going to a party where alcohol is served [31] and they judge these to be matters of joint decision, rather than personal choices [32]. This suggests that adolescents might be open to parents' rules about drinking. A question that remains unanswered, however, is how parents' strict attitudes were transformed into parenting behaviours. The implementation instructed parents explicitly to talk to their youths and clarify their views, but we cannot say how they did this or whether they also established and enforced alcohol-specific rules. These questions await testing.

A critical question is whether this programme can be implemented in other cultural contexts. In Sweden, it is illegal for those under 20 years of age to buy alcohol and for those under 18 to drink in restaurants. This is roughly similar to North America, but in European countries such as the Netherlands laws against youth alcohol use either do not exist or are not enforced. Recent studies conducted in the Netherlands suggest that many parents do have strict attitudes, however, and that they do influence youth drinking [13,30]. Nevertheless, it is an empirical question whether this programme would work in countries with weak restrictions on youth drinking. The programme seems promising, but replications in the same and different cultural contexts are needed.

#### **Declarations of interest**

None.

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