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Secondary effects of an alcohol prevention program targeting students and/or parents

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ABSTRACT

The secondary effects of an alcohol prevention program (PAS) on onset of weekly smoking and monthly cannabis use are examined among >3000 Dutch early adolescents (M age = 12.64) randomized over four conditions: 1) parent intervention (PI), 2) student intervention (SI), 3) combined intervention (CI) and 4) control condition (CC). Rules about alcohol, alcohol use, and adolescents' self-control were investigated as possible mediators. PI had a marginal aversive effect, slightly increasing the risk of beginning to smoke at T1, and increased the likelihood of beginning to use cannabis use at T1 and T2. SI delayed the onset of monthly cannabis use at T3. CI increased the risk to use cannabis at T3. No mediational processes were found. In conclusion, though this study show mixed results, negative side effects of the PI were found, particularly at earlier ages. Moreover, these results indicate the need for multi-target interventions.

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1. Secondary effects of an alcohol prevention program targeting students and/or parents

Alcohol is the most prevalent drug among adolescents followed by cigarettes and cannabis. In the Netherlands, at age sixteen more than 90% of the adolescents have consumed alcohol, nearly 60% have smoked a cigarette and about 30% have tried cannabis (Verdurmen et al., 2012). Alcohol use is highly related to the use of other drugs including cigarettes, marihuana and hard drugs (Kandel, Yamaguchi, & Klein, 2006). In fact, early initiation of alcohol use increases the likelihood of use of other substances, particularly cigarettes and cannabis (Duncan, Duncan, & Hops, 1998; Komro, Tobler, Maldonado-Molina, & Perry, 2010). The combined parent–student intervention program 'Prevention of Alcohol use in Students' (PAS) effectively postponed the onset of (heavy) weekly drinking in underage adolescents (Koning et al., 2009; Koning, Van den Eijnden, Engels, Verdurmen, & Vollebergh, 2011a; Koning, van den Eijnden, Verdurmen, Engels, & Vollebergh, 2013). This study extends an earlier investigation of the effectiveness of the PAS program by examining whether the intervention also impacts smoking and cannabis use.

1.1. Early onset of alcohol use as a risk factor

Several studies state that an early age of onset of drinking may increase the likelihood of getting involved in other forms of drug use (Duncan et al., 1998; Kandel et al., 2006; Reich, Dietrich, & Martin, 2011), most probably due to an increased exposure to opportunity (Wagner & Anthony, 2002). Further, adolescents who initiate the use of alcohol at later ages may be more equipped to refrain from substance use and are also more capable to withhold from involvement in other risky behaviors, due to so-called shared underlying processes (i.e. common processes that underlie the use of different substances; Chung & Elias, 1996; Degenhardt, Dierker, & Chiu, 2010). So, as alcohol use is a risk factor for other substances, delaying the onset of drinking is expected to prevent other substance use as well. The increased risk of early alcohol use for involvement in subsequent use of other drugs underlines the importance of investigating whether alcohol prevention programs impact the onset of other types of drug use as well, i.e. the secondary effects.

1.2. Secondary effects of alcohol interventions

Effects of an alcohol intervention program on other substances not targeted by the intervention itself are referred to as secondary effects. By examining secondary effects, insight is gained on the importance of delaying the onset of drinking and also on the full impact of intervention programs. Yet, the number of studies examining secondary effects is limited. Most, yet not all (Grossbard et al., 2010), intervention studies have found favorable secondary effects of an alcohol intervention on

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smoking (Forsberg, Ekman, Halldin, & Ronnberg, 2000;) and/or cannabis (Grossbard et al., 2010; Magill, Barnett, Apodaca, Rohsenow, & Monti, 2009; Perry et al., 1996). For example, Grossbard et al. (2010) demonstrated that high school athletes receiving a combined parent–student alcohol intervention also less frequently used marihuana ten months later compared to the student only and control group; no secondary effects were reported for 30-day monthly cigarette use. The review study of McCambridge and Jenkins (2008) of 41 brief alcohol intervention studies demonstrated no favorable secondary effects on smoking behavior. However, this review was of adult-only programs on responsible drinking and only 7 of these included smoking data. Furthermore, a recent review on the secondary effects of brief alcohol interventions also concluded that these types of programs were effective in reducing alcohol use, but had negligible effects on untargeted illicit drug use (Tanner-Smith, Steinka-Fry, Hennessy, Lipsey, & Winters, 2015). However, the number of alcohol intervention studies reporting effects on other substances included in the study was low ($k = 7$) and had relatively short follow-up measurements (M = 30.5 weeks, SD = 16.8). Moreover, the lack of family-based alcohol interventions included in this review should be taken into account. Particularly as it is known that in adolescence, a combined parent–student approach is more effective than either approach alone (Smit, Verdurmen, Monshouwer, & Smit, 2008). The current state of knowledge makes it impossible to draw conclusions on the potential effect of an alcohol prevention program targeting adolescents and their parents on untargeted substance use. Thus, though the empirical evidence is scarce, we may hypothesize that parent–student interventions targeting alcohol use may also impact involvement in other forms of drugs favorably in two potential ways: 1) the delay in onset of alcohol use also delays the onset of cigarette and cannabis use (cf. Gateway theory), and 2) a higher level of self-control in adolescents and strict parental rules regarding alcohol that have resulted in a delayed alcohol initiation also delay the onset of cigarette and cannabis use.

1.3. Prevention of alcohol use in students (PAS)

In a cluster randomized trial, including three experimental conditions (parents only, students only, combined parent–student) and a control condition, more than 3000 adolescents and their parents participated in the PAS study. The parent intervention consists of three components: (i) a presentation at a general parents' meeting in high school, (ii) consensus building among a shared set of rules among parents of children of the same class, and iii) an information leaflet with a summary of the presentation and the outcome of the class meeting. In the student intervention, teachers conducted the intervention (four lessons) in all first-year classes. A booster session was provided one year later.

Previous work showed significant effects of the combined parent–student intervention on the onset of (heavy) weekly drinking at the 10, 22 (Koning et al., 2009), 34 (Koning et al., 2011a) and 50-month (Koning et al., 2013) follow-up measurements. Furthermore, the combined intervention increased the intervention-targeted behaviors; that is, the parents increased their strict rule setting, and adolescents increased their level of self-control (Koning, van den Eijnden, Engels, Verdurmen, & Vollebergh, 2011b). Therefore, the delayed onset of regular drinking, and the increase in effective parenting and adolescents' self-control due to the PAS intervention may also curb its subsequent use of other drugs (based on Komro et al., 2010; Welte & Barnes, 1985).

1.4. Current study

In the current study, we examined the secondary effects of an effective alcohol prevention program (PAS) targeting early adolescents and/or their parents. The pattern of earlier results set the stage to address whether the favorable effects on onset of drinking also impact engagement in other substance use behaviors, such as onset of cigarette and cannabis use. Given the likelihood that students in the combined parent–student intervention received greater exposure to strategies postponing the onset of drinking and actually initiated drinking at a later age, it is posited that the combined PAS intervention effectively postpones the onset of cigarette and cannabis use. In addition, this direct effect is hypothesized to be caused by an increase in adolescents' self–control, strict parental rule setting and a later onset of alcohol use. No (in)direct effects of the separate parent and student intervention conditions on substance use are expected.

2. Method

2.1. Design and procedure

From a list of Dutch public secondary schools (650 registered schools), 80 schools were randomly selected and invited to participate as part of an original alcohol intervention study if the following inclusion criteria were met: (i) at least 100 first-year students, (ii) <25% students from migrant populations and (iii) not offering special education. Five schools, including 696 students per condition, were needed to achieve the necessary power for the original intervention study. An independent statistician assigned nineteen secondary schools randomly to one of the four conditions: (1) parent intervention, (2) student intervention, (3) combined student–parent intervention, and (4) control condition (business as usual). Randomization was carried out centrally, using a blocked randomization scheme (block size 5) stratified by level of education, with the schools as units of randomization. Within each participating school, all first-year students participated in the intervention. One school originally assigned to the control condition withdrew from participation for reasons not relating to the study.

The baseline data were collected at the beginning of the first year in high school (September/October 2006) before any intervention was carried out, and again 10 (T1: 2007), 22 (T2: 2008) and 34 (T3: 2009) months later. Adolescent data were collected by means of digital questionnaires administrated in the classroom by trained research assistants. Parents were sent a letter of consent at baseline and a letter that informed parents about the participation of the school in the project, and they were given the opportunity to refuse participation of their child (0.01% refusal). The trial protocol (NTR649) was approved by the Medical Ethical Committee.

2.2. Participants

Nineteen schools with a total of 3490 adolescents were selected to participate in the study. Due to non-response at all measurements (n = 122), 3368 respondents were initially included. Of these, 103 adolescents were excluded because they had experienced onset of smoking, and 55 for cannabis at or before the baseline measurement. The final sample comprised 3265 and 3313 adolescents eligible for analyses of the onset of smoking and cannabis respectively.

At baseline (T0), the intervention conditions differed significantly from the control condition with respect to gender ($F(3,2450) = 9.893$, $p < .01$) and adolescents' level of education ($F(3,2450) = 36.91$, $p < .01$). We expect these school-level differences to be caused by chance in the selection procedure (see Koning et al., 2009 for more details on the composition of the study).

The final total student sample had a mean age of 12.64 (SD = 0.48), consisting of 49% boys, and 38% in lower secondary education.

2.3. Loss to follow-up

3085 adolescents completed the questionnaire on smoking at T1. At subsequent waves, some adolescents dropped out, leading to smaller sample sizes (T2: n = 2846, T3: n = 2617).

3123 adolescents completed the questionnaire on cannabis use at T1. At subsequent measurements, some adolescents dropped out, leading to smaller sample sizes (T2: n = 2886, T3: n = 2685). Attrition at T2

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