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## Effectiveness of Fresh Start: A Randomized Study of a School-Based Program to Retain a Negative Attitude Toward Substance Use in Secondary School Freshmen

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### ABSTRACT

*Background:* The transition to secondary school is linked to more positive attitudes toward substance use, which prelude the moment of first use. Fresh Start is a school-based prevention program for secondary school freshmen (12–13 years old) to retain negative attitudes. *Objectives:* This study evaluates the effectiveness of Fresh Start on the attitudes toward smoking, alcohol use, and cannabis use, and on multiple secondary outcome measures. In addition, the effect of timing of the program within the schoolyear was examined. *Methods:* A cluster randomized trial was conducted. 48 classes, containing 1083 secondary school freshmen, were randomly allocated to the experimental or waiting list control condition. Experimental classes completed Fresh Start between October 2015 and January 2016 and waiting list control classes completed Fresh Start between March 2016 and May 2016. Measurements were scheduled at three points in time (September 2015, February 2016, and June 2016). Data were analyzed by means of multilevel analyses. *Results:* Fresh Start had small but significant effects on the attitudes toward smoking, alcohol use and cannabis use. The majority of secondary outcome measures were not influenced by Fresh Start, although a small, adverse effect was found on the perceived social acceptance of cannabis use by friends. Timing of the intervention within the schoolyear did not influence its effectiveness. *Conclusions/Importance:* Fresh Start can help to delay the development of positive attitudes toward substance use in secondary school freshmen. Strengths and limitations, implications for practice and suggestions for future research are discussed.

### KEYWORDS

Adolescence; alcohol; attitude; cannabis; cluster randomized trial; smoking; substance use

### Introduction

Adolescence is a period of rapid physical, cognitive, social and emotional changes. For successful negotiation of the developmental transition from childhood to adulthood, adolescents must attain the necessary skills of independence. These skills are acquired by the exploration of new behaviors, and situations. Adolescents prefer new and exciting experiences, and demonstrate increasing risk taking behavior (Varlinskaya, Vetter-O'Hagen, & Spear, 2013). Although some experimentation with substance use may be normative for this developmental period, substance use at a young age can lead to a variety of health risks both immediately and later in life (Behrendt et al., 2008; Hanna, Yi, Dufour, & Whitmore, 2001; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014). It is therefore of great importance to protect adolescents from these adverse consequences. Several meta-analyses and systematic reviews indicate that school-based prevention programs can prevent substance use and related substance use

problems (Faggiano et al., 2005; Foxcroft & Tsertsvadze, 2011; Norberg, Kezelman, & Lim-Howe, 2013). In addition, it is suggested that school-based prevention programs are most effective if the selected prevention strategies fit in with the developmental needs of the target population (Onrust, Otten, Lammers, & Smit, 2016).

### Fresh start

Fresh Start is a school-based prevention program for secondary school freshmen, which is especially designed to attune to the developmental needs of these students. As the theory of planned behavior describes, attitude develops by the existing notions of certain behavior (Ajzen, 1991). In primary school, substance use is rare and attitudes toward substance use are predominantly negative (Masten, Faden, Zucker, & Spear, 2008). The transition to secondary school is associated with profound environmental changes, which augment the cognitive, social and emotional development of early adolescents. Early adolescents begin to develop the capacity to think abstractly, which allows hypothetical

thinking and the evaluation of multiple outcomes (Christie & Viner, 2005). Early adolescents spend significantly more time with peers and become increasingly concerned with peer-relationships and social acceptance, although parents remain an important source of reinforcement (Forehand & Wierson, 1993). For example, when parents disapprove of substance use, their children are more likely to copy this attitude (Bahr, Hoffmann, & Yang, 2005). Early adolescents start to reappraise themselves and the world around them, and this process is linked to shifting expectancies about the effect of substances and more positive attitudes toward substance use (Masten et al., 2008). It is suggested that this could be delayed by several prevention strategies, such as practicing problem solving or decision making skills, techniques from cognitive behavioral therapy such as the correction of erroneous assumptions, and various methods to establish social norms such as norm-focused discussions and instructions for parents to communicate clear rules regarding substance use (Onrust et al., 2016).

In the past decade, following increased policy attention on the harmful effects of substance use among adolescents and the implementation of various prevention programs, parental attitudes regarding substance use by early adolescents have become more negative, and specific parenting practices have become stricter (de Looze et al., 2014a; 2014b). Concurrently, prevalence rates of substance use among early adolescents dropped dramatically (van Dorsselaer et al., 2016). In 2003, 5.6% of Dutch 12-year-old secondary school freshmen reported having smoked in the past four weeks, 30.9% reported using alcohol, and 0.7% reported using cannabis. Whereas in 2015, only 1.8% of the 12-year-old students reported having smoked, 4.3% reported using alcohol, and 0.1 reported using cannabis in the past four weeks (van Dorsselaer et al., 2016). Reductions in tobacco use and alcohol use are not restricted to the Dutch population. The European School Survey Project on Alcohol and Other Drugs demonstrates that, although there were marked differences between European Countries, overall tobacco and alcohol use rates have decreased between 2003 and 2015 (EMCDDA, 2016).

At the beginning of secondary school, most students do not use substances, nor do they intend to. This does not imply, however, that there are no opportunities for substance use prevention at this stage. Attitudes regarding substance use tend to become more positive in early adolescents, and attitudes are considered to be the early precursors of intention and use (Ajzen, 1991; Andrews & Duncan, 1998; Vadrucci et al., 2016). Therefore, the first step in substance use prevention, is to retain the existing negative attitudes toward substance use during the first year of secondary school. The Fresh Start program focuses on attitudes toward substance use and consists of four

lessons for freshmen, and a lecture for parents on parenting early adolescents, in which the abovementioned prevention strategies are incorporated. In the present study, Fresh Start was tested to examine both the effectiveness of the program and the best timing to deliver the program.

### **Aims and hypotheses**

The first objective of this study was to evaluate the effectiveness of Fresh Start on the attitudes of secondary school freshmen toward substance use. We expected that secondary school freshmen maintain a more negative attitude toward substance use after participation in Fresh Start than freshmen in the waiting list control condition. We did not expect Fresh Start to influence the intention to use substances or actual substance use, as substance among secondary school freshmen is still rare. The second objective was to examine the impact of the timing of the program. We expected Fresh Start to be more effective when implemented at the beginning of the first year of secondary school (experimental group) than when implemented at the end of the school year (waiting list control condition).

### **Methods**

#### **Study design**

We conducted a cluster randomized trial. 48 classes of first-year secondary school students were randomly allocated to either the experimental or waiting list control condition. There were three measurements (September 2015, February 2016, and June 2016). Experimental classes completed Fresh Start between October 2015 and January 2016 and waiting list classes completed Fresh Start between March 2016 and May 2016. The study was approved by the Trimbos Ethics Committee (TET201508\_2) and is registered in The Netherlands Trial Register (NRT5925).

#### **Procedure**

Schools were invited to participate by institutes for health and addiction that cooperate with The Healthy School & Drugs, a program that is funded by the Dutch Ministry of Health, Welfare and Sport. Schools were eligible for participation if there were multiple first year classes that could be randomized to the research conditions. This resulted in six schools with 48 participating classes, containing 1083 first-year secondary school students in total. Classes were randomly allocated to the experimental or control condition by means of repeated coin tossing. All participating teachers were required to participate in a

three hour training session before they were allowed to teach the curriculum. Parents were informed of the study through an e-mail sent by the school, and were given the opportunity to refuse consent (passive informed consent).

### **The fresh start program**

Fresh Start aims to maintain a negative attitude toward substance use among secondary school freshmen for as long as possible. The program is based on theories commonly used in health promotion, i.e., Health Belief Model (Abraham & Sheeran, 2005; Champion & Skinner, 2008), Theory of Planned Behavior (Ajzen, 1991), and Transtheoretical Model of Behavior Change (Prochaska & DiClemente, 1982). In addition, specific developmental needs of the target population were taken into account for the selection of prevention strategies, based on Onrust et al. (2016).

The program consists of four weekly lessons of 50 minutes each. In the first lesson, the students discuss the transition to secondary school and Dutch legislation regarding substance use (youngsters under the age of 18 are not allowed to buy alcohol, cigarettes or cannabis). Students receive a homework assignment to interview their parents about substance use. The second lesson consists of a social norm discussion on substance use, which is triggered by an interactive digital quiz, the Smartquiz (Janssen, 2014). Students log in with their phone and answer each question individually and anonymously. All answers are discussed, in order to influence attitudes. In the third lesson, students practice their decision making skills by weighing pros and cons of various decisions. Students are presented with several scenarios, some of which regard substance use. In the final lesson, erroneous assumptions regarding substance use are discussed. The students watch a video on perceived peer pressure to smoke. It is discussed that youngsters might expect that refusing substances is not socially accepted by their peers, while this is actually not the case. The lessons are preceded by a parent conference on parenting early adolescents. Parents are advised to set clear boundaries regarding substance use.

### **Power calculation and sample size**

In order to reliably detect a small-sized effect ( $d = 0.2$ ) (Cohen, 1992) in a two-sided test with a conventional significance threshold of  $\alpha = 0.05$  and a power of  $(1 - \beta) = 0.80$ , 393 students per condition would have been required. However, as students are nested in classes and the program is delivered to classes of students, observations of students in the same class are not independent. Therefore, the required sample size should be corrected

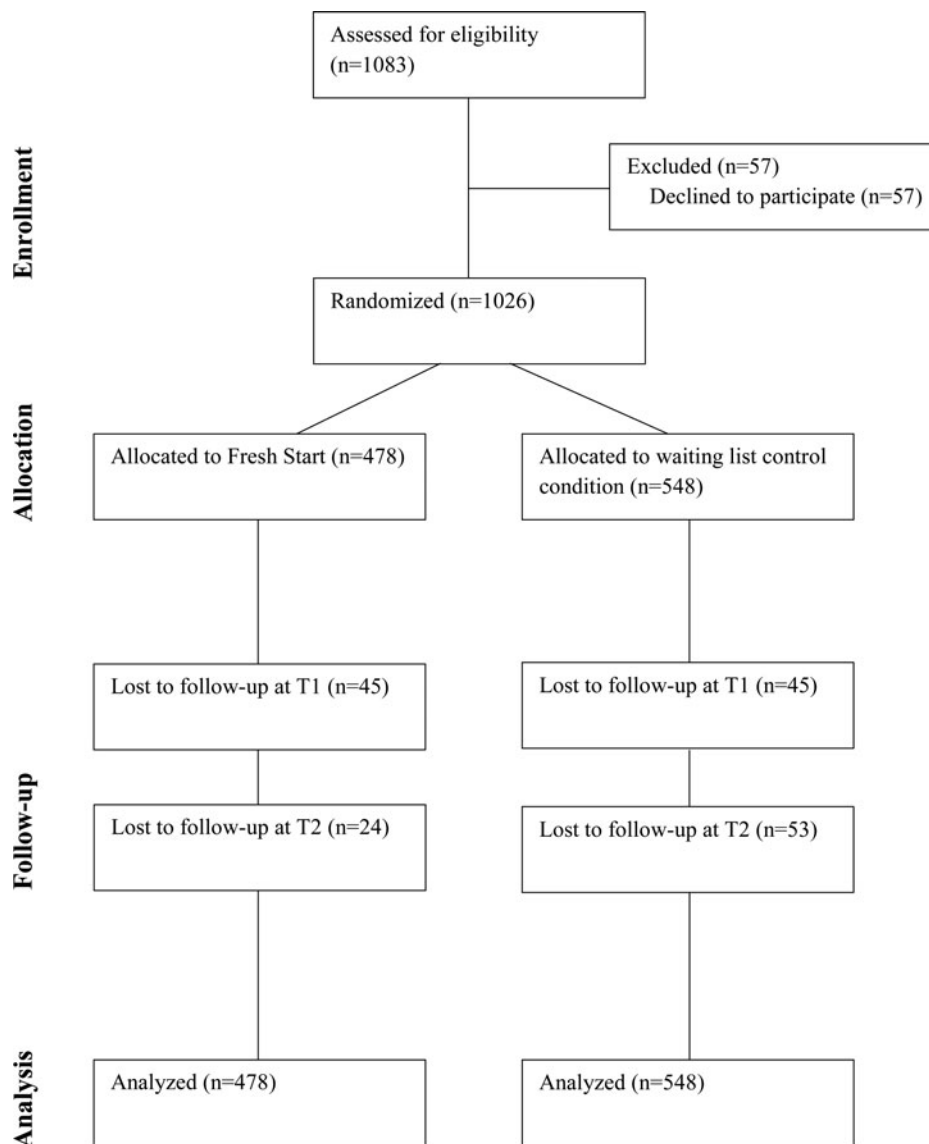
for clustering. Assuming an ICC of 0.03 (Koning et al., 2009), an average class size of 20 students, with a minimum of 15 students and a maximum of 30 students, results in a coefficient of variation ( $cv$ ) of  $((30-15)/15)/20 = 0.05$  (Eldridge, Ashby, & Kerry, 2006). With these parameters, the required number of students per condition, calculated using the downloadable procedure “clustersamps” from Stata, increased to 640. Unfortunately, the number of secondary school freshmen in the participating schools was considerably lower than the required sample size. The reduced sample size resulted in insufficient power to detect small-sized effects in a two-sided test with a conventional significance threshold of  $\alpha = 0.05$ , which increased the chances of type II errors (false negatives). Therefore, instead of a conventional significance threshold of  $\alpha = 0.05$ , a less conservative threshold of  $\alpha = 0.10$  was used. Leaving all other parameters unchanged, 520 students per condition are required to detect small-sized effects.

### **Participants**

Figure 1 presents the participant flow through the study. At baseline (T0), 1026 students participated. Of these students, 46.6% were allocated to the experimental group, 44.6% were male, 54.1% were in community college, and 85.2% of the students were of Western origin. At T1, 936 students participated and at T2, 859 students participated. Loss to follow-up at T1 was completely at random. At T2, students dropping out of the study differed significantly from the students who completed the last questionnaire. Students who completed the last questionnaire were more likely to be of Western origin ( $\chi^2 = 13.63, p < 0.01$ ), perceive their friends as more accepting of alcohol use ( $t = -2.25, p = 0.03$ ) and cannabis use ( $t = -2.35, p = 0.02$ ), and perceive the use of alcohol as more harmful ( $t = -2.57, p = 0.01$ ).

### **Primary outcome measures**

The primary outcome measures consisted of the attitude toward smoking, alcohol use, and cannabis use. Attitudes were measured with multiple propositions using a five-point Likert scale, ranging from “totally disagree” to “totally agree,” based on Mathijssen, Janssen, Van Bon-Martens, and Van de Goor (2012). The original questionnaire consisted of 28 items concerning both general values and attitudes and specific values and attitudes relating to alcohol, and has been used successfully to discriminate between adolescents with different attitudes. We used a selection of the propositions addressing alcohol, leaving out the items referring to more general values and attitudes, and created similar items for smoking and cannabis use.



**Figure 1.** Participant flow through the study.

A high score represented a negative attitude. After reverse-scoring items that represented a positive attitude, Cronbach's alpha was calculated to determine scale reliability. The attitude toward smoking was measured with nine items and reached acceptable scale reliability at T0 ( $\alpha = 0.710$ ), T1 ( $\alpha = 0.709$ ), and T2 ( $\alpha = 0.757$ ). An example of an item measuring attitude toward smoking is "smoking makes me think of relaxing." Attitude toward alcohol use reached high scale reliability at T0 ( $\alpha = 0.817$ ), T1 ( $\alpha = 0.842$ ), and T2 ( $\alpha = 0.854$ ) and was measured with twelve items. An example of such an item is "I would be embarrassed if I got drunk myself." Ten items measured the attitude toward cannabis use and reached acceptable scale reliability at T0 ( $\alpha = 0.751$ ), T1 ( $\alpha = 0.769$ ), and T2 ( $\alpha = 0.800$ ). Attitude toward cannabis use was measured with items such as "cannabis use makes me think of having fun."

### **Secondary outcome measures**

Secondary outcome measures consisted of the intention to use substances in the future, the frequency of substance use in the past 4 weeks, risk perception, experienced social norms, and refusal self-efficacy. The formulation of all items was based on the Dutch National School Survey on Substance Use. This national survey is repeated every four years to monitor trends in substance use over time (van Dorsselaer et al., 2016).

The intention to use substances in the future was measured with one item for each substance. Students were asked "do you think you will ever smoke/drink alcohol/use cannabis." Response categories were: "I already smoke/drink alcohol/use cannabis," "definitely yes," "maybe," "I don't know," "probably not," and "definitely not."

Frequency of substance use was measured with one item for each substance. Students were asked “On how many days did you smoke/drink alcohol/use cannabis during the last 4 weeks?” There were seven options to answer, ranging from “never” to “30 days or more.”

Three different aspects of experienced social norms were measured for each substance: descriptive norms, and social acceptance of substance use by both parents and friends (injunctive norms). Descriptive norms toward substance use were measured with one item for each substance, formulated as “how many 13-year-old youngsters do you think have ever smoked/used alcohol/used cannabis?”. Students were asked to select one out of five answers, representing a different percentage of substance using youngsters. High scores indicate that substance use is perceived as rare. Social acceptability of substance use was measured with fourteen items. Students were asked to indicate whether their parents and friends would accept different substance use behaviors on a five-point Likert scale ranging from “definitely not” to “definitely yes.” Three items measured the perceived acceptance of smoking by parents. Cronbach’s alpha at T0 ( $\alpha = 0.759$ ), T1 ( $\alpha = 0.833$ ), and T2 ( $\alpha = 0.843$ ). Perceived acceptance of alcohol use by parents was measured by four items, with high internal consistency at T0 ( $\alpha = 0.882$ ), T1 ( $\alpha = 0.883$ ), and T2 ( $\alpha = 0.905$ ). Internal consistency for the three items measuring the perceived acceptance of cannabis use by parents was high as well at T0 ( $\alpha = 0.930$ ), T1 ( $\alpha = 0.904$ ), and T2 ( $\alpha = 0.920$ ). Perceived acceptance of substance use by friends was measured with one item for each substance, using the proposition “most of my friends approve if I smoke/drink alcohol/use cannabis.”

Risk perception was measured separately for each substance. Students were asked to indicate the risk of different substance use behaviors on a four-point Likert scale ranging from “not damaging” to “very damaging.” Four items measured risk perception toward smoking, with acceptable reliability at T0 ( $\alpha = 0.688$ ), T1 ( $\alpha = 0.744$ ), and T2 ( $\alpha = 0.740$ ). Three items measured risk perception regarding alcohol use, with acceptable reliability at T0 ( $\alpha = 0.741$ ), T1 ( $\alpha = 0.741$ ), and T2 ( $\alpha = 0.717$ ). Risk perception toward cannabis use was measured with two items, with insufficient internal consistency at T0 ( $\alpha = 0.440$ ), T1 ( $\alpha = 0.583$ ), and T2 ( $\alpha = 0.539$ ). Because of this, risk perception toward cannabis use was excluded from further analysis.

Refusal self-efficacy was measured with a single item for each substance. Students were asked to indicate how hard it is for them to refuse substances when offered, by asking “is it difficult for you to say no when someone offers you one of the following substances?”. The answer scale consisted of a four-point Likert scale ranging from “not difficult at all” to “very difficult.”

### Program integrity

Program integrity was measured by means of a journal completed by teachers after each lesson. The teacher reported to what extent the lesson was delivered in accordance with the teacher’s guide, the objectives of the lessons were reached, and the assignments were completed by the class. We scored the integrity of lessons with a maximum of 5 points if the lessons were completely in accordance with the teacher’s guide, a maximum of 10 points if all objectives were completely reached, and a maximum of 10 points if all assignments were completed, resulting in a maximum of 100 points in case of complete program integrity. Because the effect of program integrity was analyzed at the first posttest, treatment integrity in the waiting list control condition was scored as 0. We observed four random lessons in the experimental condition, and the results of the observations corresponded to the reported program integrity by teachers.

### Analyses

All analyses were conducted according to the intention-to-treat principle. Missing values were imputed by means of the regression imputation procedure as implemented in Stata (version 12). For each outcome measure, we first determined the best combination of predictors by means of a stepwise regression analysis. Subsequently, these predictors were used to impute our missing data. We performed multilevel analyses to analyze our data, to correct for the violation of the assumption of independence (students were nested in classes which were nested in schools). For each outcome measure, we estimated different random-intercept models using the Stata “xtmixed” command. We first fitted a ‘null’ model, which allowed for class effects and school effects on the outcome measure without any explanatory variables. In this model the data structure (students nested in classes, which are nested in schools) was specified. The “null” model was used to calculate the intraclass correlations. Afterwards, a second model was fitted including the treatment dummy as fixed effect in order to determine: (a) the effectiveness of Fresh Start using data from the second measurement (February 2016), (b) the effect of the timing of Fresh Start using data from the third measurement (June 2016). In the first analysis, Fresh Start was compared to a genuine control condition, as the students in the waitlist control condition did not participate in the program at this point in time. In the second analysis, the students in both conditions had participated in Fresh Start (either at the beginning or at the end of the school year). Therefore, this analysis did not report on the effects of Fresh Start, but merely on the effect of timing. Likelihood ratio tests indicated that the

fit of these models was improved by including the pretest score as a covariate. We also fitted random-slope models for all outcome measures, which did not further improve the fit of the models. Therefore, the random-intercept models with pretest scores as covariates are presented. Results were converted to Cohen's  $d$ , by dividing the regression coefficient of the treatment dummy in the random-intercept models by the standard deviation of the raw outcome score ( $d = b/SD$ ) following Feingold (2013).

Additional analyses were performed, to examine the effect of program integrity. In these analyses, the treatment dummy was replaced by a variable representing the dosage of Fresh Start. In addition, we tested whether differences in attitudes between experimental and control students were due to the development of less positive attitudes in the Fresh Start condition or the development of more positive attitudes in the waiting list control group by means of paired sample  $t$ -tests for each research condition separately.

## Results

### Sample characteristics

In Table 1, means and standard deviations of all outcomes in the experimental and waiting list control condition are presented. At pretest, the attitudes toward substance use were negative (mean scores between 3.69 and 4.29 on a scale ranging from 1 to 5, with a higher score representing a more negative attitude), and scores on the secondary outcome measures were all in the desired direction. The experimental group did not significantly differ from the waiting list control group on any of the outcome measures at pretest (results not shown).

### Effectiveness of fresh start

The effects of Fresh Start on both primary and secondary outcome measures are presented in Table 2. Fresh Start had a significant effect on the attitudes toward smoking ( $d = 0.19$ ,  $p = 0.003$ ), alcohol use ( $d = 0.09$ ,  $p = 0.079$ ), and cannabis use ( $d = 0.16$ ,  $p = 0.003$ ). All effects were in the hypothesized direction. The majority of secondary outcome measures was not influenced by Fresh Start. We found two effects on the intention to smoke ( $d = 0.11$ ,  $p = 0.089$ ) and the risk perception of smoking ( $d = 0.11$ ,  $p = 0.090$ ) in the desired direction, and one adverse effect on the perceived social acceptance of cannabis use by friends ( $d = -0.13$ ,  $p = 0.047$ ).

### Program integrity

Program integrity was acceptable in all experimental classes, although there were marked differences between

participating teachers. Integrity scores ranged from 62 to 96, with a mean score of 83.68 ( $SD = 11.26$ ). Program integrity significantly predicted the attitude toward smoking ( $\beta = 0.09$ ,  $p = 0.006$ ), the attitude toward using cannabis ( $\beta = 0.10$ ,  $p = 0.003$ ), and the intention to smoke in the future ( $\beta = 0.03$ ,  $p = 0.032$ ). There was also an adverse effect on the perceived acceptance of cannabis use by friends ( $\beta = -0.06$ ,  $p = 0.077$ ).

### Timing of fresh start

At the end of the school year there were no significant differences in the attitudes toward smoking, alcohol use, and cannabis use of students who participated in Fresh Start in the beginning of the school year and students who participated in Fresh Start at the end of the school year. The majority of secondary outcomes were also not affected by the timing of Fresh Start. Only one significant difference was found: students who participated in Fresh Start in the beginning of the school year perceived their parents as less accepting of smoking at the end of the school year than students who participated in Fresh Start at the end of the school year ( $d = 0.13$ , 95%,  $CI = 0.00-0.27$ ,  $p = 0.05$ ).

### Development of attitudes over time in each research condition

During the first part of the school year, students in the experimental condition developed more negative attitudes toward smoking ( $t = -2.25$ ;  $p = 0.03$ ) and cannabis use ( $t = -3.10$ ;  $p = 0.02$ ), while attitudes toward alcohol use remained stable ( $t = 0.88$ ;  $p = 0.38$ ). In the waiting list control condition, the attitudes toward smoking ( $t = 2.47$ ;  $p = 0.01$ ) and alcohol use ( $t = 4.46$ ;  $p < 0.01$ ) became more positive, while attitudes toward cannabis did not change ( $t = 1.15$ ;  $p = 0.25$ ). During the second part of the school year, the attitudes toward smoking ( $t = 0.09$ ;  $p = 0.93$ ) and cannabis use ( $t = 1.03$ ;  $p = 0.31$ ) of students in the experimental condition returned to their baseline level. In the waiting list control condition, attitudes toward smoking ( $t = -0.47$ ;  $p = 0.64$ ) and cannabis use ( $t = -0.22$ ;  $p = 0.82$ ) remained stable after participation in Fresh Start.

## Discussion

The transition to secondary school is linked to shifting expectancies about the effect of substances and more positive attitudes toward substance use (Masten et al., 2008). Our findings indicate that Fresh Start can help to delay this process. Small, but significant effects were found for the attitudes toward smoking, alcohol use and cannabis use. In addition, against our expectations, we also found a small effect on the intention to smoke.

**Table 1.** Means and standard deviations of primary and secondary outcome measures.

Primary outcome measures	Scale range	Desired direction	Experimental group			Waiting list control group		
			T0	T1	T2	T0	T1	T2
Attitude smoking	1-5	↑	4.16 (0.68)	4.23 (0.61)	4.16 (0.62)	4.19 (0.64)	4.13 (0.64)	4.14 (0.66)
Attitude alcohol use	1-5	↑	3.69 (0.77)	3.67 (0.77)	3.55 (0.78)	3.75 (0.76)	3.63 (0.78)	3.57 (0.76)
Attitude cannabis use	1-5	↑	4.25 (0.73)	4.34 (0.63)	4.22 (0.68)	4.29 (0.67)	4.26 (0.69)	4.27 (0.66)
Secondary outcome measures								
Intention to smoke	1-6	↑	5.29 (0.97)	5.34 (0.90)	5.32 (0.91)	5.40 (0.88)	5.33 (0.97)	5.37 (0.94)
Frequency of smoking	1-7	↓	1.05 (0.43)	1.01 (0.13)	1.01 (0.12)	1.06 (0.45)	1.03 (0.37)	1.02 (0.24)
Risk perception smoking	1-4	↑	2.91 (0.53)	2.94 (0.47)	2.93 (0.49)	2.86 (0.53)	2.87 (0.49)	2.89 (0.48)
Descriptive norm smoking	1-5	↑	3.21 (1.21)	3.28 (1.05)	3.31 (1.04)	3.27 (1.19)	3.28 (0.11)	3.34 (1.06)
Injunctive norm parents smoking	1-5	↓	1.12 (0.34)	1.13 (0.35)	1.12 (0.31)	1.15 (0.40)	1.13 (0.34)	1.18 (0.42)
Injunctive norm friends smoking	1-5	↓	1.50 (0.34)	1.59 (0.87)	1.62 (0.88)	1.55 (0.87)	1.55 (0.85)	1.58 (0.81)
Refusal self-efficacy smoking	1-4	↓	1.28 (0.66)	1.25 (0.63)	1.19 (0.46)	1.25 (0.61)	1.22 (0.56)	1.17 (0.46)
Intention to use alcohol	1-6	↑	3.46 (1.36)	3.43 (1.39)	3.33 (1.39)	3.54 (1.40)	3.42 (1.38)	3.40 (1.38)
Frequency of alcohol use	1-7	↓	1.07 (0.31)	1.08 (0.34)	1.11 (0.46)	1.06 (0.34)	1.09 (0.34)	1.11 (0.40)
Risk perception alcohol	1-4	↑	2.91 (0.65)	2.93 (0.59)	2.93 (0.54)	2.88 (0.66)	2.88 (0.61)	2.93 (0.56)
Descriptive norm alcohol	1-5	↑	2.83 (0.98)	2.79 (0.87)	2.66 (0.90)	2.74 (0.99)	2.76 (0.93)	2.65 (0.84)
Injunctive norm parents alcohol	1-5	↓	1.22 (0.55)	1.27 (0.58)	1.34 (0.65)	1.21 (0.50)	1.29 (0.57)	1.38 (0.67)
Injunctive norm friends alcohol	1-5	↓	1.65 (0.92)	1.78 (1.01)	1.89 (1.05)	1.66 (0.99)	1.77 (1.01)	1.93 (1.08)
Refusal self-efficacy alcohol	1-4	↓	1.40 (0.75)	1.37 (0.68)	1.38 (0.63)	1.39 (0.72)	1.41 (0.71)	1.41 (0.68)
Intention to use cannabis	1-6	↑	5.71 (0.70)	5.78 (0.64)	5.74 (0.62)	5.72 (0.69)	5.75 (0.71)	5.77 (0.64)
Frequency of cannabis use	1-7	↓	1.00 (0.05)	1.02 (0.28)	1.01 (0.17)	1.00 (0.00)	1.02 (0.20)	1.00 (0.05)
Descriptive norm cannabis	1-5	↑	2.94 (1.42)	2.94 (1.37)	2.96 (1.33)	2.81 (1.44)	2.89 (1.37)	3.10 (1.30)
Injunctive norm parents cannabis	1-5	↓	1.05 (0.29)	1.06 (0.29)	1.05 (0.22)	1.03 (0.17)	1.04 (0.26)	1.06 (0.30)
Injunctive norm friends cannabis	1-5	↓	1.28 (0.63)	1.34 (0.72)	1.33 (0.66)	1.30 (0.63)	1.27 (0.64)	1.34 (0.68)
Refusal self-efficacy cannabis	1-4	↓	1.21 (0.68)	1.20 (0.61)	1.13 (0.91)	1.18 (0.58)	1.19 (0.58)	1.12 (0.39)

T0 = September 2015; T1 = February 2016; T2 June 2016; desired direction ↑ = high score is desired; desired direction ↓ = low score is desired.

All effect sizes, ranging from  $d = 0.09$  (attitude toward alcohol use) to  $d = 0.19$ , are small. This is not unusual. Effects of universal prevention programs are generally small (Onrust et al., 2016), especially when there is little room for improvement, as was the case in our study.

The timing of Fresh Start did not influence the effectiveness of the program; at the end of the school year, both groups of students have similar results. This does not mean, however, that the development of the students' attitudes over the school year was similar. In the waiting list control condition, students developed more positive attitudes toward smoking and alcohol use in the first part of the schoolyear, while attitudes toward cannabis use remained stable. This development is mostly consistent with the literature (Masten et al., 2008). In the

experimental condition, the natural development toward more positive attitudes did not occur: attitudes toward smoking and cannabis use became even more negative, while attitudes toward alcohol use remained stable. During the second part of the school year, students in the experimental condition also developed more positive attitudes toward substances. However, the attitudes toward smoking and cannabis use were not significantly different from baseline, indicating that negative attitudes from the beginning of the school year were retained. In the waiting list control condition, attitudes toward smoking and cannabis use remained stable after participation in Fresh Start. Although Fresh Start had a small effect on the attitude toward alcohol use, the program could not prevent the development of a more positive attitude in both conditions.



**Table 2.** Effects of Fresh Start on primary and secondary outcome measures.

	ICC level 1	ICC level 2	Cohen's <i>d</i>	95% CI	<i>p</i> value
<b>Primary outcome measures</b>					
Attitude smoking	0.08	0.12	<b>0.19</b>	<b>0.07 to 0.31</b>	<b>0.003</b>
Attitude alcohol use	0.04	0.05	<b>0.09</b>	<b>− 0.01 to 0.18</b>	<b>0.079</b>
Attitude cannabis use	0.05	0.07	<b>0.16</b>	<b>0.04 to 0.30</b>	<b>0.013</b>
<b>Secondary outcome measures</b>					
Intention to smoke	0.03	0.07	<b>0.11</b>	<b>− 0.02 to 0.24</b>	<b>0.089</b>
Frequency of smoking	0.01	0.01	0.01	− 0.08 to 0.10	0.826
Risk perception smoking	0.01	0.04	<b>0.11</b>	<b>− 0.02 to 0.23</b>	<b>0.090</b>
Descriptive norm smoking	0.05	0.05	0.03	− 0.08 to 0.15	0.554
Injunctive norm parents smoking	0.02	0.02	− 0.05	− 0.17 to 0.08	0.462
Injunctive norm friends smoking	0.01	0.02	− 0.08	− 0.21 to 0.04	0.196
Refusal self-efficacy smoking	0.02	0.04	− 0.03	− 0.17 to 0.10	0.641
Intention to use alcohol	0.09	0.11	0.04	− 0.06 to 0.13	0.470
Frequency of alcohol use	0.02	0.04	0.03	− 0.10 to 0.16	0.623
Risk perception alcohol	0.01	0.03	0.05	− 0.06 to 0.16	0.341
Descriptive norm alcohol	0.01	0.02	0.00	− 0.13 to 0.14	0.957
Injunctive norm parents alcohol	0.02	0.03	− 0.03	− 0.14 to 0.08	0.626
Injunctive norm friends alcohol	0.02	0.03	− 0.03	− 0.15 to 0.08	0.561
Refusal self-efficacy alcohol	0.01	0.02	− 0.06	− 0.19 to 0.08	0.407
Intention to use cannabis	0.02	0.04	0.07	− 0.06 to 0.19	0.316
Frequency of cannabis use	0.00	0.01	0.00	− 0.14 to 0.14	0.979
Descriptive norm cannabis	0.10	0.17	0.00	− 0.15 to 0.15	0.989
Injunctive norm parents cannabis	0.04	0.08	− 0.12	− 0.28 to 0.03	0.103
Injunctive norm friends cannabis	0.01	0.01	<b>− 0.13</b>	<b>− 0.25− 0.00</b>	<b>0.047</b>
Refusal self-efficacy cannabis	0.02	0.05	0.00	− 0.15 to 0.15	0.983

ICC level 1 = Intra Class Correlation for school level; ICC level 2 = Intra Class Correlation for class level; 95% CI = 95% Confidence Interval.

The finding that the attitude toward alcohol appeared less influenced by Fresh Start, could have multiple explanations. Alcohol use appears to be more socially accepted than smoking or the use of cannabis. Kosterman, Hawkins, Guo, Catalano, and Abbott (2000) argue that differences in parental influence on alcohol initiation and cannabis initiation in their children reflect differences in social norms regarding these substances. They suggest that youngsters are exposed to norms accepting of alcohol use, as alcohol use is accepted in adulthood and due to alcohol advertisements. Therefore, it is harder to counteract societal influences and maintain a negative attitude. In addition, observations of the Fresh Start lessons indicated that the teachers' attitudes were more positive toward alcohol than toward other substances, which may have contributed to this effect as well.

It appears contradictory that Fresh Start contains several elements to propagate the prevailing norm that underage substance use is not acceptable, while perceived social norms were not influenced by the program. Only one significant, but adverse, effect was found on the perceived social acceptance of cannabis use by friends, which changed from very negative to slightly less negative in students who participated in Fresh Start. Our findings, however, are more in line with expectations than it probably seems. Although social norm theory (Perkins & Berkowitz, 1986) suggests that interventions correcting misperceptions by revealing the actual, healthier norms have beneficial effects, these misperceptions are predominantly found in adolescents already using substances

(Helms et al., 2014; Henry, Kobus, & Schoeny, 2011). In our sample, perceived social norms were extremely negative. Therefore, these norms should not be adjusted but reinforced. Propagating the norm that underage substance use is not acceptable should be interpreted as one of the persuasive arguments to maintain a negative attitude toward substance use, which is in line with our findings.

This study has several strengths and limitations. Because of its experimental design, this study offers high evidential value and statements regarding causality are justified. Relatively few students were lost to follow-up, and loss to follow-up at T1 was completely at random. The Fresh Start program was acceptably or well executed in all classes. Accordingly, program integrity was acceptable or good. A limitation of this study is that it is slightly underpowered. Therefore, it is possible that some effects of the program (both desired and adverse) are overlooked. Because of this, a less conservative threshold of  $\alpha = 0.10$  was used in the analyses. Additionally, follow-up data of the waiting list control condition is lacking, making it impossible to determine long-term effects. Finally, the design of the study could have invoked contagion between experimental and control classes. However, contagion is not reflected in the results.

Although future research is needed to examine long-term effects of Fresh Start, this study indicates that Fresh Start could be used effectively to delay the development of a positive attitude toward substance use. Because the timing of the program did not yield differences in its

effectiveness, schools can conveniently implement the program at any time of the school year. The effects of the program, as can be expected from a brief universal program, are small and temporary. Therefore, preventive activities should be repeated in the following school years, in order to obtain lasting preventive effects. However, Fresh Start could be a good starting point for a preventive approach attuned to the developmental needs of secondary school students.

### Declaration of interest

Although SO, AH, and PS did not develop Fresh Start, they are employed by the same organization. AZ has no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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