Author’s response to reviews

Title: Depressive symptoms and clustering of risk behaviours among adolescents and young adults attending vocational education: a cross-sectional study

Authors:

  Rienke Bannink (r.bannink@erasusmc.nl)
  Suzanne Broeren (s.broeren@erasusmc.nl)
  Jurriën Heydelberg (jfp.heydelberg@rotterdam.nl)
  Els van ’t Klooster (e.vant.klooster@cjgrijnmond.nl)
  Hein Raat (h.raat@erasusmc.nl)

Version: 2
Date: 12 February 2015

Author’s response to reviews: see over
February 12th, 2015

Dear Editor,

Thank you for the opportunity to revise and resubmit our manuscript entitled “Depressive symptoms and clustering of risk behaviours among adolescents attending senior vocational education: a cross-sectional study” (MS: 2114750842143910).

The reviewer’s comments were constructive and helpful, and we have amended the manuscript accordingly. Below we respond to the comments and describe how we have adjusted the manuscript.

Kind regards, on behalf of all co-authors,

Rienke Bannink

Contact information:
Email: r.bannink@erasmusmc.nl
Telephone: +31 107044634
Affiliation: Department of Public Health, Erasmus University Medical Center Rotterdam, P.O. Box 2040, 3000 CA, Rotterdam, the Netherlands
We edited the manuscript with track changes.

**Additional Editorial Request:**

1. Please provide the email address of all authors in the Title page.

**Response comment 1:**
We have now provided the email address of all authors in the Title page.

2.) Copyediting
We recommend that you copyedit the paper to improve the style of written English. If this is not possible, you may need to use a professional language editing service. For authors who wish to have the language in their manuscript edited by a native-English speaker with scientific expertise, BioMed Central recommends Edanz (www.edanzediting.com/bmc1). BioMed Central has negotiated a 10% discount to the fee charged to BioMed Central authors by Edanz. Use of an editing service is neither a requirement nor a guarantee of acceptance for publication. For more information, see our FAQ on language editing services at http://www.biomedcentral.com/authors/authorfaq/editing.

**Response comment 2:**
The manuscript is carefully read and checked for typos. Furthermore, the manuscript is checked by a professional language editing service.
Reviewer's report (Reviewer 1)
Title: Depressive symptoms and clustering of risk behaviours among adolescents attending senior vocational education: a cross-sectional study

Version: 1 Date: 9 December 2014
Reviewer: Yuyan Shi

Reviewer's report:
This study focuses on an interesting research question and is well written. However, some limitations and clarifications need be addressed before considering for publication.

Major compulsory revisions:
1. As the study uses senior vocational education (SVE) population for the analysis, providing a context of this population will help readers outside of Netherlands understand the general characteristics of this population in the country, and the importance of studying this population.

Response comment 1:
We want to thank the reviewer for this comment. We have decided to change the term ‘senior vocational education’ into ‘vocational education’ throughout the manuscript as this term is more commonly-known. Furthermore, we now explain more about the population attending vocational education in the Netherlands, and the importance of studying this population.

Old text (Introduction):
“Furthermore, adolescents experiencing depressive symptoms or displaying risk behaviours are at increased risk of school dropout [4-8]. This seems especially true for students attending vocational education. For example, in the Netherlands, 75% of school dropout occurs in senior vocational education (SVE) [9]. As the senior continuation of the vocational track in Dutch secondary education, SVE provides specialized vocational training to students aged 15 years and older.”

New text (Introduction):
“Furthermore, adolescents and young adults experiencing depressive symptoms or displaying risk behaviours are at increased risk of school dropout [5-9]. This phenomenon seems especially true for students attending vocational education. For example, in the Netherlands, 75% of school dropouts occur in vocational education [10]. As the senior level of the vocational track in Dutch secondary education, vocational education provides specialised vocational training to students aged 15 years and older.”

Old text (Methods):
“A total of 44 first-grade classes with students attending SVE in the region of the Dutch city of Rotterdam participated. In the Netherlands, distinction is made in four levels of SVE. In this study, students from the lowest two levels of SVE were participating.”

New text (Methods):
“A total of 44 first-year classes of students in vocational education in the Rotterdam region of the Netherlands participated. There are four levels of vocational education in the Netherlands. In this study, students from the two lowest levels of vocational education (the easiest levels) participated. The two lowest levels of vocational education last one to three years and focus on basic practical tasks. Only students from the two lowest levels were included, since studies have shown that the prevalence of risk
behaviours among these students is high and school dropout rates are the highest of any group [6, 7, 29, 30].”

2. As the study drew on a sample from a randomized controlled trial, please provide information to explain to what extent the study population is representative of Netherlands SVE population.

Response comment 2:
In the discussion section we have now added information about the representative of the sample used in the study. Our population reflects the average student population in vocational schools in the Netherlands as regards age, gender, and ethnicity.

Old text (Discussion):
“Furthermore, this study was only conducted among Dutch adolescents and therefore generalization to other countries should be done with caution.”

New text (Discussion):
“Although our population reflects the average population in vocational schools in the Netherlands as regards age, gender, and ethnicity [29, 30, 39], this study was only conducted among students in the Netherlands in the two lowest levels of vocational education. Therefore, generalization to other education levels and countries should be done with caution.”

3. The study used CES-D summary scores, which is a continuous variable. Because the association between clinical outcomes and summary scores from questionnaires is often non-linear, please also run logistics regression of a binary outcome of the scores (you use 16 as the cutoff in the study).

Response comment 3:
We want to thank the reviewer for this comment. As is often the case with data on depressive symptoms, CES-D data in our study were skewed. Therefore, we have decided to use a bootstrapping method for the linear regression analyses. This method deals with data that are skewed, as is often the case with data on depressive symptoms, and in this study. Furthermore, we have also run logistic regressions with CES-D as a binary outcome (16 as the cutoff). This information will be given in an Appendix. The results that were found with logistic regressions were in line with the linear analyses.

Old text (Methods, statistical analyses):
“Linear regression analyses were performed to explore associations between: clustering of risk behaviours and depressive symptoms, demographics and depressive symptoms, and demographics and clustering of risk behaviours. Any P values of < .05 were considered statistically significant.”

New text (Methods, statistical analyses):
“Linear regression analyses were performed to explore associations between: clustering of risk behaviours and depressive symptoms, demographics and depressive symptoms, and demographics and clustering of risk behaviours. For the linear regression analyses, a bootstrapping method was used [38]. This method deals with data that are skewed, as is often the case with data on depressive symptoms, and in this study. Additional logistic regression analyses treating depressive symptoms as binary outcome, instead of as continuous outcome, were also conducted (see Appendix 1 and 2). Any P values of < .05 were considered statistically significant.”
Appendix 1.

**Appendix 1.** Associations between clusters of risk behaviours and depressive symptoms (as binary outcome) (N=424)

<table>
<thead>
<tr>
<th>Depressive symptoms</th>
<th>Model 1a</th>
<th>Model 1b</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
<td></td>
</tr>
<tr>
<td>Substance use</td>
<td>1.37 (1.10 – 1.70)</td>
<td></td>
<td>1.31 (1.05 – 1.63)</td>
</tr>
<tr>
<td>Problem behaviours</td>
<td></td>
<td>1.45 (1.13 – 1.85)</td>
<td>1.38 (1.08 – 1.77)</td>
</tr>
</tbody>
</table>

*Note: Bold numbers indicate significant results at $P < .05$.

*a* Logistic regression analyses.

Model 1a is adjusted for age, gender, ethnicity, being a parent and substance use.

Model 1b is adjusted for age, gender, ethnicity, being a parent and problem behaviours.

Model 2 is adjusted for age, gender, ethnicity, being a parent, substance use and problem behaviours.
Appendix 2. Associations between demographics and depressive symptoms (as binary outcome) (N=534)*

<table>
<thead>
<tr>
<th>Depressive symptoms*</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.14 (1.05 – 1.24)</td>
</tr>
<tr>
<td>Gender (ref. = boys)</td>
<td>2.39 (1.56 – 3.67)</td>
</tr>
<tr>
<td>Ethnicity (ref. = Dutch)</td>
<td>1.15 (0.75 – 1.78)</td>
</tr>
<tr>
<td>Being a parent (ref. = No)</td>
<td>0.56 (0.27 – 1.18)</td>
</tr>
</tbody>
</table>

Note: Bold numbers indicate significant results at P < .05.

a Logistic regression analyses.

b Age, gender, ethnicity and being a parent are included at the same time.

4. Truancy data has missing values, then why did you use full sample (N=584) in regressions? How did you handle the missing values?

Response comment 4:
The full sample was not used in the regression analyses. We acknowledge that ‘(N=584)’ in the title of table 4 and 5 creates confusion. Therefore, we have removed this from the title. The specific sample sizes (n) per analysis can be found in the tables.

Minor essential revisions:
5. “Problem behaviors” is not a very good name for delinquency, truancy and debts, as substance use is also problem behaviors. Please rename this cluster to distinguish itself from substance use.

Response comment 5:
After careful consideration of alternative names, we have decided not to rename the cluster “Problem behaviours”. We acknowledge that this name does not exclude substance use. However, we think that another name (e.g. Behavioural problems, Externalizing problems), that excludes substance use (slightly more), will be even less able to summarize the three behaviours (delinquency, truancy, debts). Furthermore, in the results and discussion section we have described that the cluster ‘problem behaviours’ consist of delinquency, truancy and debts. In the first paragraph of the discussion we have added this information to remind the reader.

6. Please remove table 3, and provide information in texts only.
Response comment 6:
We have removed table 3, and now provide the information in the text.

Old text (results):
“Of the adolescents, 29.1% reported the use of two or three substances, whereas 21.6% of adolescents reported two or three problem behaviours (Table 3).”

New text (results):
“Of the students, 33.2% reported the use of one substance, 18.1% the use of two substances, and 11.0% the use of three substances. Furthermore, 48.8% reported one problem behaviour, 19.3% two problem behaviours, and 2.3% three problem behaviours.”

7. Please combine table 4-5, and add logistic model results.

Response comment 7:
We have decided not to combine table 4 and 5. In our opinion combining these tables would make our results more difficult to read/interpret. There is a clear distinction between the tables: Table 4 focuses on the association between clusters of risk behaviours and depressive symptoms, whereas Table 5 focuses on demographics and their association with clusters of risk behaviours, and their association with depressive symptoms. In Appendix 1 and 2 we have added the logistic models (see Reviewer 1, response comment 3).

8. Beta coefficients are not very intuitive. Please provide interpretations.

Response comment 8:
We agree with the reviewer that beta coefficients are not very intuitive. Therefore, we have provided interpretations in the text.

Old text (results):
“The clusters substance use and problem behaviours were significantly associated with depressive symptoms (Table 4). After adjusting for the other cluster, the beta coefficients remained significant (substance use: B 1.45, 95% CI 0.57-2.34; problem behaviour: B 1.31, 95% CI 0.07-2.57).”

New text (results):
“The substance use and problem behaviours clusters were significantly associated with depressive symptoms (Table 3). A higher score on the substance use cluster was associated with more depressive symptoms (B 1.61, 95% CI 0.49 – 2.55). A higher score on the problem behaviours cluster was also associated with more depressive symptoms (B 1.30, 95% CI 0.23 – 2.47). After adjusting for the other cluster, the beta coefficients remained significant (substance use: B 1.45, 95% CI 0.48-2.46; problem behaviour: B 1.04, 95% CI 0.04-2.16).”

Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable
Statistical review: Yes, and I have assessed the statistics in my report.
Declaration of competing interests: I declare that I have no competing interests.
Reviewer's report (Reviewer 2)
Title: Depressive symptoms and clustering of risk behaviours among adolescents attending senior vocational education: a cross-sectional study

Version: 1   Date: 21 December 2014
Reviewer: Stéphanie Baggio

Reviewer's report:
This study focused on the association of depressive symptoms and risk behaviors among Dutch adolescents. There are several weaknesses that prevent this article for potential publication.

Introduction & aims
1. We do not really understand what is SVE. Please provide more information for foreigner readers who do not know the Dutch educational system.

Response comment 1:
We want to thank the reviewer for this comment. We acknowledge that information about the educational system was not clearly described. We have adjusted the manuscript. See reviewer 1, response comment 1, for more information and the specific adjustments made.

2. The aim of the study was not clearly explained and did not seem original. First, the focus on depression was not explained. Why is it important to study the relationship between risk behaviors and depression? No reference to the huge literature on depression was given. Second, there are also several studies on relationships between risk behaviors and socio-demographic variables. The manuscript did not mention these references and did not explain the originality of the study’s aim. Polydrug use and multiple risk behaviors are also well-investigated topic. Please provide information about these topics and indicate what this study added to the current literature.

Response comment 2:
As the reviewer suggested, we have decided to more explicitly explain or study aims. First, we now explain why we also focused on depression in our manuscript and have referred to studies that have already examined the association between depression and risk behaviours. Although previous research has suggested an association between depressive symptoms and substance use, studies on the associations between depressive symptoms and other clusters of behaviours including delinquency, truancy, and having debts is scare. It is important to examine this association between depressive symptoms and other clusters of behaviours as well to (amongst others) further improve intervention programs and especially to improve the early identification of those at risk of multiple risk behaviours and/or depressive symptoms.
Second, we now explain the originality of our study aim with regard to examining the relation between clusters of risk behaviours and demographic variables. Although research suggests that demographics can be used to identify adolescents displaying single risk behaviours or experiencing depressive symptoms, research on whether demographics can be used to identify adolescents and young adults at risk of multiple, clustered risk behaviours, especially those including delinquency, truancy, and debts, is rare.
Thus, although polydrug use and its relationship with various behaviours (e.g. sexual behaviour, physical activity, sedentary behaviours, diet) is a well-investigated topic, research on the relationship between...
substance use and behaviours such as delinquency, truancy and debts (behaviours that are highly prevalent among students attending vocational education), is limited.

Old text (introduction):
“Since dropping out of school is often preceded by problems and risk behaviours that started earlier, more insight in these problems and behaviours is essential to improve prevention of dropout and associated problems later in life. However, little is known about the prevalence of risk behaviours among adolescents in SVE.

Furthermore, depressive symptoms and risk behaviours often do not occur in isolation among adolescents, but accumulate [5]. However, most studies fail to examine the clustering of a range of risk behaviours, and the relationship between these clustered behaviours and depressive symptoms. In order to improve intervention programs for reducing multiple risk behaviors simultaneously, it is important to examine the clustering of a wide range of risk behaviors, including, for example, delinquency, truancy, and having debts. Among adolescents attending SVE, to the best of our knowledge, only Vogel et al. [10] studied the co-occurrence of risk behaviours. They showed an association between binge drinking, cannabis use and cigarette smoking. Among adolescents in general, previous research has already shown that substance-use related risk behaviours (i.e. alcohol use, drug use and cigarette smoking) often cluster [11-13]. This co-occurrence of risk behaviours suggests that interventions should preferably address multiple risk behaviours simultaneously [11].

To further improve intervention programs, it is also important to examine if demographic characteristics can be used to identify adolescents at risk. Although research suggests that demographics can be used to identify adolescents displaying single risk behaviours or experiencing depressive symptoms, research on whether demographics can be used to identify adolescents at risk of multiple, clustered risk behaviours is rare [14, 15].”

New text (introduction):
“According to studies, dropping out of school results in substantially lower earnings over the course of life [11], considerably more dependence on public assistance [12], and a substantially higher likelihood of involvement in crime and incarceration [13]. Since dropout often experience problems and exhibit risk behaviours earlier on, it is essential to gain a greater understanding of these problems and behaviours in order to prevent dropout and the associated problems later in life. However, little is known about the prevalence of risk behaviours among students in vocational education, especially delinquency, truancy and incurring debts.

According to Jessor’s problem behaviour theory, risk behaviours (e.g. drinking alcohol, delinquent behaviour) tend to co-occur in youth [14]. In previous research it was also shown, for example, that risk behaviours related to substance use (i.e. alcohol use, drug use and cigarette smoking) often cluster in adolescents [15,16]. However, most studies on health behavioural clustering have focused on a relatively small range of health behaviours and fail to examine the clustering of a wide range of risk behaviours such as delinquency, truancy and incurring debts [15, 17]. Investigating the clustering of health risk behaviours is important because individuals with multiple health risk behaviours are at the greatest risk of developing chronic diseases and disabilities [15, 18-20]. Understanding the prevalence of these behavioural clusters may inform health improvement planning efforts [20]. In addition, if risk behaviours cluster, prevention programmes aimed at changing clusters of risk behaviours, rather than separate risk behaviours, could lessen the burden on public health services. Therefore, the development of a prevention strategy to target multiple health risk behaviours simultaneously could be useful when behaviours cluster and have an underlying basis and similar predictors [17]. Although many public health intervention strategies still focus on behaviours in isolation, research has shown that risk behaviours related to substance use are responsive to such an integrated approach [21]. Furthermore, the World
Health Organization (WHO) has adopted a holistic approach to health that emphasises prevention by tackling combinations of risk factors [19]. Additionally, previous research has suggested an association between depressive symptoms and substance use [22-25]. However, knowledge about relationships between depressive symptoms and other clusters of behaviours including delinquency, truancy and incurring debts is scarce. It is important to examine the association between different clusters of behaviours and depressive symptoms to further improve intervention programmes, and especially to improve the early identification of those at risk of multiple risk behaviours and/or depressive symptoms. Furthermore, to further improve intervention programmes, it is also important to examine if demographic characteristics can be used to identify adolescents and young adults at risk. Although research suggests that demographics can be used to identify adolescents displaying single risk behaviours or experiencing depressive symptoms, research on whether demographics can be used to identify adolescents and young adults at risk of multiple, clustered risk behaviours, especially clusters including delinquency, truancy and debts, is rare [26, 27].

3. Information about the study’s design should be given, so that readers do not have to read another article to get the basic information.

Response comment 3:
It seems that the use of ‘as described in detail elsewhere’ causes confusion. The basic information about the study is provided in the method section of our manuscript. We refer to another article if the reader wants to get more information about the intervention that we have conducted. However, in the current article we have focused on the data at enrolment in the Your Health study (before the intervention has taken place), and not on the intervention itself. All necessary information about this data point was provided in the manuscript. In our view, providing information on the data points that we haven’t included data from would potentially confuse readers. We have therefore decided not to provide more information about the intervention itself in this article. To clarify this, we have further clarified that information about the intervention study can be found in detail elsewhere.

The following adjustments are made:
Old text (methods):
“This study used data obtained at enrolment in the Your Health study, a cluster randomised controlled trial, as described in detail elsewhere [16].”

New text (methods):
“This study used data obtained upon enrolment (pre-test measure) in the Your Health study, a cluster randomised controlled trial. The pre-test measure that was used in this study was conducted in 2012 and before randomisation had taken place. The intervention study is described in detail elsewhere [28].”

4. A total of 30% of the population did not give written consent and were absent at the time of assessment. It appeared as a major bias, since adolescents who were not at school may be those with high levels of risky behaviors. It should at least be mentioned in the limitation section. There was also a major problem, since n=144 (24.7%) of the participants had information for “problem behaviors” (table 5). No information is given about these non-response issues, except for the 73 participants for which there were no truancy data. More information about non-response is needed.
Response comment 4:
We agree with the reviewer that we have to mention that a total of 30% of the population did not give written consent and were absent at the time of assessment in the limitation section. Therefore, we have added this information to the limitation section.

Furthermore, in Table 5, we had made a typo. That should have been n = 444 (instead of 144). However, these analyses are adapted (see Reviewer 2, response comment 5 and 6). Therefore, the population sample in this analyses consists now of 432 adolescents.

Old text (discussion):
“Furthermore, this study was only conducted among Dutch adolescents and therefore generalization to other countries should be done with caution. Moreover, adolescents from whom truancy information was not available more often displayed risk behaviours and depressive symptoms compared to adolescents from whom truancy information was available. This could have affected the generalizability of the results since these adolescents were not included in the calculation of the prevalence of clusters of risk behaviours. This probably led to an underestimation of the prevalence of clusters of risk behaviours. Furthermore, it is possible that this potential underestimation of clusters of risk behaviours has also led to an underestimation of the association between clusters of risk behaviours and depressive symptoms.”

New text (discussion):
“Although our population reflects the average population in vocational schools in the Netherlands as regards age, gender, and ethnicity [29, 30, 39], this study was only conducted among students in the Netherlands in the two lowest levels of vocational education. Therefore, generalization to other education levels and countries should be done with caution. Moreover, almost 30% of students did not provide written consent, mainly because they were absent during the assessment and participating students for whom truancy information was not available were more likely to display risk behaviours and depressive symptoms than students for whom truancy information was available. This could have affected the generalisability of the results since non-participating students were not included in the analyses and students for whom truancy information was missing were not included when calculating prevalence of risk behaviour clusters. This limitation probably means that the prevalence of risk behaviour clusters has been underestimated. Furthermore, potential underestimation of risk behaviours clusters may have also led to underestimation of the association between risk behaviours clusters and depressive symptoms.”

5. There is confusion between clustering and PCA. Both of them are unsupervised dimension reduction, but clustering consists in creating discrete subgroups and PCA continuous components. The authors counted the number of risky behaviors on each component, and this was not clustering either. Moreover, we did not understand why the analyses were not performed on the components themselves. The title of the manuscript, its aims and conclusion did not correspond to the analyses actually performed.

Response comment 5:
Statistically spoken we did not conduct ‘cluster analyses’. However, PCA is a commonly used statistical method to identify clusters. Below we have added some examples of recent articles that have used PCA to identify clusters.

Furthermore, the term ‘cluster’ or ‘clustering’, as it is also used in our article, only indicates that behaviours occur simultaneously/together. The term does not capture the actually statistical analysis
that is performed. For example, other studies calculate the sum of behaviours that someone has reported (no cluster analyse, no PCA) and describe it as ‘clustering’ (see below for examples of articles). In line with other recent articles, we decided to keep using the term ‘clustering’ throughout our manuscript.

Moreover, as suggested by the reviewer, we have now performed the analyses on the components themselves. We have adjusted the tables and results. Adjustments in the text are described below. The adjusted tables can be found on the last pages of this document (pp 27, 28).

**Examples of other recent articles that use PCA to identify clusters:**
- Clustering of diet- and activity-related parenting practices: cross-sectional findings of the INPACT study. Rodenburg G, Oenema A, Kremers SP, van de Mheen D.

**Examples of other articles using the term ‘clustering’ without performing ‘cluster analyses’:**
- Meeting recommendations for multiple health lifestyle factors. Prevalence, clustering, and predictors among adolescent, adult, and senior health plan members. Pronk NP, Anderson LH, Cran AL, Martinson BC, O’Connor PJ, Sherwood NE, Whitebird RR.
- Behavioral risk factors and mental health: single and cluster associations in Spanish adolescents. Padrón A, Galán I, Rodríguez-Artalejo F.
- Adolescents in high-risk trajectory: clustering of risky behavior and the origins of socioeconomic health differentials. Petridou E, Zavitsanos X, Dessypris N, Frangakis C, Mandyla M, Doxiadis S, Trichopoulos D.

**The following adjustments are made in the text:**
Old text (methods, statistical analyses):
“Furthermore, it was checked whether no substantial secondary factor loadings (i.e., >0.40) emerged [21]. Subsequently, for every cluster, the total number of risk behaviours that the adolescent reported, was calculated by summing up the dichotomized items scores of the risk behaviours belonging to that specific cluster. Linear regression analyses were performed to explore associations between: clustering of risk behaviours and depressive symptoms, demographics and depressive symptoms, and demographics and clustering of risk behaviours.”

New text (methods, statistical analyses):
“Furthermore, it was checked whether no substantial secondary factor loadings (i.e., >0.40) emerged [36]. Subsequently, factor scores according to cluster were computed for each student by adding up all of the risk behaviour score weights by their factor loading [37]. The factor scores were then used as separate variables in linear regression analyses. Linear regression analyses were performed to explore associations between: clustering of risk behaviours and depressive symptoms, demographics and depressive symptoms, and demographics and clustering of risk behaviours. For the linear regression analyses, a bootstrapping method was used [38]. This method deals with data that are skewed, as is often the case with data on depressive symptoms, and in this study. Additional logistic regression analyses treating depressive symptoms as binary outcome, instead of as continuous outcome, were also conducted (see Appendix 1 and 2). Any P values of <.05 were considered statistically significant.”
6. Linear regression were not adapted to these count outcomes with only four levels and a skewed distribution.

Response comment 6:
We thank the reviewer for this comment. Although, we do not use count outcomes anymore in our revised manuscript (see Reviewer 2, Response comment 5), cluster score data (i.e. components themselves) were skewed. Therefore, we have decided to use a bootstrapping method for the linear regression analyses. This method deals with data that are skewed.

The adjusted tables can be found on the last pages of this document.

Adjustments that are made in the text:

Old text (Methods, statistical analyses):
“Linear regression analyses were performed to explore associations between: clustering of risk behaviours and depressive symptoms, demographics and depressive symptoms, and demographics and clustering of risk behaviours. Any P values of <.05 were considered statistically significant.”

New text (Methods, statistical analyses):
“Linear regression analyses were performed to explore associations between: clustering of risk behaviours and depressive symptoms, demographics and depressive symptoms, and demographics and clustering of risk behaviours. For the linear regression analyses, a bootstrapping method was used [38]. This method deals with data that are skewed, as is often the case with data on depressive symptoms, and in this study. Additional logistic regression analyses treating depressive symptoms as binary outcome, instead of as continuous outcome, were also conducted (see Appendix 1 and 2). Any P values of <.05 were considered statistically significant.”

Discussion
7. The fact that substance use should not be considered as “single substance use” but take into account concurrent and simultaneous polydrug use is well known. Multiple risk behaviors is also a well-investigated topic, thus these findings were not novel ones.

Response comment 7:
Although concurrent and simultaneous polydrug use and their relationship or clustering with other behaviours (e.g. sexual behaviour, physical activity, sedentary behaviours, diet) are (well-)investigated topics, research on (the relationship or clustering with) behaviours as delinquency, truancy and debts (behaviours that are highly prevalent among students attending vocational education), is limited. This study add more information to the current literature about these less investigated behaviours.

Overall
8. The manuscript needs English proofreading.

Response comment 8:
The manuscript is carefully read and checked for typos. Furthermore, the manuscript is checked by a professional language editing service.
Response comment 9:
In the abstract we have now described that the study is conducted in the Netherlands and we have described the average age of the adolescents in this study (18.3 years). Furthermore, we have now described the age of the sample in greater detail in the results section.

Old text (abstract):
“This study included 584 adolescents in SVE.”

New text (abstract):
“This study included 584 students (mean age 18.3 years) attending vocational education in the Netherlands.”

Old text (results section):
“The average age of the adolescents in this study was 18.3 years (SD=2.59), 38.9% were male, and 10.6% was a parent (Table 1). The majority (62.1%) was of non-Dutch ethnicity.”

New text (results section):
“The average age of the students in this study was 18.3 years (SD=2.59). The majority (52.6%) of the students was under the age of 18, 43.0% was between 18 and 24 years old and 4.5% was 25 years or older. Of the students in this study, 38.9% was male and 10.6% was a parent (Table 1). The majority (62.1%) was of non-Dutch ethnicity.”

Level of interest: An article of insufficient interest to warrant publication in a scientific/medical journal
Quality of written English: Not suitable for publication unless extensively edited
Statistical review: Yes, and I have assessed the statistics in my report.
Declaration of competing interests: I declare that I have no competing interests.
Reviewer's report (Reviewer 3)
Title: Depressive symptoms and clustering of risk behaviours among adolescents attending senior vocational education: a cross-sectional study

Version: 1    Date: 6 January 2015    Reviewer: Marie Yap

Reviewer's report:
- Major Compulsory Revisions
The author must respond to these before a decision on publication can be reached. For example, additional necessary experiments or controls, statistical mistakes, errors in interpretation.
1. I have some concerns about reference to the sample throughout the manuscript as adolescents; as while the mean age of the participants was 18.3 years, the range was 15-30 years. Perhaps it would be more accurate to describe the sample as comprising young people, adolescents and young adults, or simply use the term students. These concerns extend to the comparisons that are drawn in the discussion with other adolescent samples, when the sample in the present study comprises individuals likely to be older, and with potentially quite different life circumstances (i.e., living away from home) to those utilizing adolescent samples. It might be illuminating to describe the age of the sample in greater detail, by providing the reader with a breakdown of the number of students who were under the age of 18 (traditionally conceptualised as adolescence), aged 18-25 (traditionally conceptualised as young adults), and 25-30.

Response comment 1:
We agree with the reviewer that it would me more accurate to describe the sample as comprising young people, young adults or emerging adults. Therefore, we have decided to describe the sample as comprising “adolescents and young adults”. Furthermore, the simple term “students’ will be used in the manuscript. Moreover, we have now described the age of the sample in greater detail in the results section.

Old text (results section):
“The average age of the adolescents in this study was 18.3 years (SD=2.59), 38.9% were male, and 10.6% was a parent (Table 1). The majority (62.1%) was of non-Dutch ethnicity.”

New text (results section):
“The average age of the students in this study was 18.3 years (SD=2.59). The majority (52.6%) of the students was under the age of 18, 43.0% was between 18 and 24 years old and 4.5% was 25 years or older. Of the students in this study, 38.9% was male and 10.6% was a parent (Table 1). The majority (62.1%) was of non-Dutch ethnicity.”

2. The choice of cut-off value used for CES-D should be mentioned in the methods section, along with a justification and/or reference for this.

Response comment 2:
We have added information about the choice of cut-off value used for CES-D in the methods section, along with justification and a reference for this.

Old text (Methods):
“Symptoms of depression were assessed by the Center for Epidemiologic Studies Depression Scale (CES-D) [19]. The CES-D consists of 20 items. The frequency of symptoms is rated on a 4-point scale. Items scores are summed (range from 0-60), with higher scores indicating higher levels of depressive symptoms (current study α=0.89).”

New text (Methods):
“Symptoms of depression were assessed by the Center for Epidemiologic Studies Depression Scale (CES-D) [33]. The CES-D consists of 20 items. The frequency of symptoms is rated on a 4-point scale. Items scores are summed (range from 0-60), with higher scores indicating higher levels of depressive symptoms (current study α=0.89). A cut-off point of 16 is used to indicate clinically significant depressive symptoms. This cut-off score corresponds with the 80th percentile in community samples [34]. This cut-off point was used to determine the percentage of students with clinically significant depressive symptoms. For the remaining analyses, the (continuous) total CES-D score was used.”

3. Reference 11 is a review of prevention programs, but is mis-cited in support of the clustering of risky behaviours in the general adolescent population. There is a wealth of literature documenting the co-occurrence of risk behaviours within this population that could be used in lieu of this reference.

**Response comment 3:**
We now provide references to studies that have already examined the co-occurrence of risk behaviours within students.

See references:

4. In the Introduction and Discussion, it is noted that prevention interventions should address multiple problem behaviours simultaneously, but a rationale is not explicitly provided. This would strengthen the rationale for the paper and more clearly define its contribution.

Response comment 4:
We agree with the reviewer that a rationale for investigating the clustering of health risk behaviours and for prevention interventions to address multiple behaviours simultaneously would strengthen the paper. Therefore, we have decided to include information on this topic in the introduction and discussion.

New text (Introduction):
“Investigating the clustering of health risk behaviours is important because individuals with multiple health risk behaviours are at the greatest risk of developing chronic diseases and disabilities [15, 18-20]. Understanding the prevalence of these behavioural clusters may inform health improvement planning efforts [20]. In addition, if risk behaviours cluster, prevention programmes aimed at changing clusters of risk behaviours, rather than separate risk behaviours, could lessen the burden on public health services. Therefore, the development of a prevention strategy to target multiple health risk behaviours simultaneously could be useful when behaviours cluster and have an underlying basis and similar predictors [17]. Although many public health intervention strategies still focus on behaviours in isolation, research has shown that risk behaviours related to substance use are responsive to such an integrated approach [21]. Furthermore, the World Health Organization (WHO) has adopted a holistic approach to health that emphasises prevention by tackling combinations of risk factors [19].”

New text (discussion):
“The clustering of risk behaviours suggests that interventions should preferably focus on multiple risk behaviours simultaneously rather than on separate risk behaviours in order to lessen the burden on public health services [17, 18]. Because multiple risk behaviours were relatively common in the study population, preventive interventions targeting students attending vocational education and focusing on multiple behaviours simultaneously could be especially beneficial.”

5. In the Introduction, the co-occurrence of these risk behaviours is noted to impact on school drop-out and health and wellbeing in general; some examples of the pathways to poorer health may be illuminating for a reader unfamiliar with the research area.

Response comment 5:
In the introduction we have added some examples of how risk behaviours can impact health, wellbeing, and how school dropout can have an impact on health.
By increasing the risk of developing major diseases such as cancer, cardiovascular disease, and psychiatric and psychosocial disorder, depressive symptoms and risk behaviours contribute to the public health burden [2, 3]. Furthermore, depressive symptoms and risk behaviours often persist into adulthood, thereby affecting not only current health but also health later in life [2, 4].

According to studies, dropping out of school results in substantially lower earnings over the course of life [11], considerably more dependence on public assistance [12], and a substantially higher likelihood of involvement in crime and incarceration [13].

Although the study was cross-sectional in design, it is worth discussing in the Introduction and Discussion, with reference to prior prospective studies and relevant theoretical models/frameworks, the possible directionality of the noted association between depression and risk behaviours/substance use variables.

In the discussion we have added information on the possible directionality of the associations between depression and behaviours with references to relevant literature.

As this is a cross-sectional study, we cannot determine the direction of association between risk behaviours and depressive symptoms. While earlier research has identified depression as a predictor of risk behaviours, research has also shown that risk behaviours can be predictors of depression. Furthermore, a third factor may make youth susceptible to both depression and a wide range of behaviours [48-50].

The author can be trusted to make these. For example, missing labels on figures, the wrong use of a term, spelling mistakes.

7. Abstract Background—this reads more like a summary of the study’s research aims rather than the background and rationale for the study.

We have adjusted the information in the abstract about the background. The information that is given now provides information about the background and rationale for the study.

The prevalence of depressive symptoms and risk behaviours among adolescents in senior vocational education (SVE) was examined. Furthermore, the clustering of risk behaviours, the association with depressive symptoms, and demographic variables was examined.

The prevalence of depressive symptoms and risk behaviours among adolescents in senior vocational education (SVE) was examined. Furthermore, the clustering of risk behaviours, the association with depressive symptoms, and demographic variables was examined.

The prevalence of depressive symptoms and risk behaviours among adolescents in senior vocational education (SVE) was examined. Furthermore, the clustering of risk behaviours, the association with depressive symptoms, and demographic variables was examined.
Depressive symptoms and risk behaviours often do not occur in isolation among adolescents and young adults. In order to improve intervention programmes, more research is needed to elucidate the clustering of risk behaviours, the association with depressive symptoms, and demographic variables. Therefore, this study examined the clustering of risk behaviours, the association with depressive symptoms, and demographic variables among adolescents and young adults in vocational education. Furthermore, the prevalence of depressive symptoms and risk behaviours was examined.

8. Please provide some contextualisation or comparison to other data if available about the measure of truancy. How often are students in other educational levels/sectors absent for 2 hours without notification or valid reason in the past 2 months? Does it include unintentionally neglecting to account for absence from school (e.g. forgetting to provide a medical certificate)?

Response comment 8:
Unfortunately, we do not have truancy data of students attending other educational levels. The truancy data does include unintentionally neglecting to account for absence from school. However, it is possible for a student to provide a medical certificate later on/afterwards.

9. The statements “In the Netherlands, distinction is made in four levels of SVE. In this study, students from the lowest two levels of SVE were participating.” Are unclear—what does ‘distinction’ refer to—student grades? Why were the ‘lowest 2 levels’ selected for this study? What might be the implications on the study findings, by including only these 2 levels in the study?

Response comment 9:
Distinction does not refer to ‘student grades’, but to different levels of education. In the Netherlands there are four levels of vocational education offered to students. Level one is the most simple or easiest, and level four is the most difficult. These levels can be followed independently from each other. Vocational education lasts one to three years at the lowest two levels and focuses on teaching students basic executive tasks.

In this study, students from the lowest two levels (easiest) were participating, since studies have shown that these students have high prevalences of risk behaviours and the highest percentage of school dropout. Because this study was only conducted among students in the Netherlands attending the lowest two levels of vocational education, generalization to other education levels should be done with caution.

Adjustments are made in the manuscript to give more information about the school system (vocational education) in the Netherlands.

Adjustments that are made:
Old text (Methods):
“A total of 44 first-grade classes with students attending SVE in the region of the Dutch city of Rotterdam participated. In the Netherlands, distinction is made in four levels of SVE. In this study, students from the lowest two levels of SVE were participating.”

New text (Methods):
“A total of 44 first-year classes of students in vocational education in the Rotterdam region of the Netherlands participated. There are four levels of vocational education in the Netherlands. In this study, students from the two lowest levels of vocational education (the easiest levels) participated. The two lowest levels of vocational education last one to three years and focus on basic practical tasks. Only students from the two lowest levels were included, since studies have shown that the prevalence of risk behaviours among these students is high and school dropout rates are the highest of any group [6, 7, 29, 30].”

Old text (discussion):
“Furthermore, this study was only conducted among Dutch adolescents and therefore generalization to other countries should be done with caution.”

New text (discussion):
“Although our population reflects the average population in vocational schools in the Netherlands as regards age, gender, and ethnicity [29, 30, 39], this study was only conducted among students in the Netherlands in the two lowest levels of vocational education. Therefore, generalization to other education levels and countries should be done with caution.”

10. Relatedly, the authors stated that “Adolescents attending a lower educational level more often tend to drink large amounts of alcohol compared with higher-educated adolescents [24]”—please briefly explain why. It is also confusing to describe SVE students in their third or fourth level of SVE as ‘higher-educated’.

Response comment 10:
We now briefly explain why students with a low educational level (level 1 or 2) tend to drink more alcohol compared to students attending a higher level of education (level 3 or 4). The education that students attending the third or fourth level of vocational education are getting is more difficult than the education students attending the first or second level of vocational education are getting.

New text (discussion):
“Students at a lower education levels have a greater tendency to drink large amounts of alcohol compared to students at higher levels of education [40]. This difference is probably attributable to the fact that students at lower levels spend more time with their peers and are not supervised by their parents as much, both of which are associated with more drinking [27].”

11. Capital letters should be used for the first letter of the words ‘Strain Theory’. Please also provide a reference.

Response comment 11:
As suggested by the reviewer, we use capital letters for the first letter of the words ‘Strain Theory’. We have also provided a reference.

Reference:
12. Please clarify when the data for this study were collected (i.e., pre- or postchange in legislation).

Response comment 12:
Data for this study were collected in 2012 (pre-legislation). In the methods section we have now added information to clarify when data were collected.

The following adjustments are made:
Old text (methods):
“This study used data obtained at enrolment in the Your Health study, a cluster randomised controlled trial, as described in detail elsewhere [16].”

New text (methods):
“This study used data obtained upon enrolment (pre-test measure) in the Your Health study, a cluster randomised controlled trial. The pre-test measure that was used in this study was conducted in 2012 and before randomisation had taken place. The intervention study is described in detail elsewhere [28].”

13. Can the authors please clarify what ‘as previously described’ refers to in the statement “Moreover, it is of interest to examine whether the risk behaviours included in certain clusters have a shared determinant, such as personality trait (e.g. novelty seeking) or a specific family environment (e.g. an environment with a lot of violence), as previously described.”?

Response comment 13:
The statement ‘as previously described’ refers to line 265-269. However, this statement is removed now, since the statement was unnecessary and created confusion.

14. The phrase ‘Dutch adolescents’ in the statement “Furthermore, this study was only conducted among Dutch adolescents and therefore generalization to other countries should be done with caution” can be misread as referring to young people of Dutch ethnicity—can the authors please modify?

Response comment 14:
The statement is modified to avoid misreading.

Old text (Discussion):
“Furthermore, this study was only conducted among Dutch adolescents and therefore generalization to other countries should be done with caution.”

New text (Discussion):
“Although our population reflects the average population in vocational schools in the Netherlands as regards age, gender, and ethnicity [29, 30, 39], this study was only conducted among students in the Netherlands in the two lowest levels of vocational education. Therefore, generalization to other education levels and countries should be done with caution.”

15. For all tables, it will aid clarity to briefly specify the analytic models run (e.g. linear regression)
Response comment 15:
We have briefly specified the analytic models to a note under the tables.

16. It will increase clarity to label the factors in Table 2 as they are referred to in text (e.g., Factor one: Substance use and Factor two: Problem behaviours).

Response comment 16:
The factors in table 2 are now labeled as suggested by the reviewer.

17. There is an N value missing from Table 4 (Multivariate – problem behaviours).

Response comment 17:
We understand the confusion about the N value in Table 4. However, ‘N = 424’ that is given in the table belongs to the multivariate analyses that was conducted including substance use and problem behaviours in one model. Nevertheless, we have changed the layout of the Table and do not describe it as bi- and multivariate anymore. We have chosen to use ‘model 1’ and ‘model 2’ with an explanation. (See also reviewer 3, response comment 19). The ‘N’ is now displayed more clear.

See the last pages of this document for the adjusted tables.

18. The significance value should be added to the note around p values under Table 5.

Response comment 18:
We have added the significance value to the note under table 4 and 5.

Old text:
“Note: Bold numbers indicate significant P-values.”

New text:
“Note: Bold numbers indicate significant results at P <.05.”

19. Tables 4 and 5—it is unclear what bivariate and multivariate refer to. They also don’t seem to be the conventional way to present findings from regression analyses.

Response comment 19:
We agree with the reviewer that it is unclear what bivariate and multivariate refer to. Therefore, we have decided not to mention these words in the tables anymore. For table 4, we now explain in a note under the table (how adjustment has taken place in) the 2 models that are used (see below). For table 5, we also give a short description in a note how adjustment has taken place.

Subscription for table 4:
Model 1a is adjusted for age, gender, ethnicity, being a parent, and substance use.
Model 1b is adjusted for age, gender, ethnicity, being a parent, and problem behaviours.
Model 2 is adjusted for age, gender, ethnicity, being a parent, substance use, and problem behaviours.
Subscription for table 5:
Age, gender, ethnicity, and being a parent are included at the same time.

See the last pages of this document for the adjusted tables.

- Discretionary Revisions
These are recommendations for improvement which the author can choose to ignore. For example clarifications, data that would be useful but not essential.

20. International readers may not be familiar with the concept of SVE—can the authors please provide more information about SVE (or draw parallels/comparisons with more commonly-known educational sectors), along with a clearer rationale for focusing on this subpopulation? In particular, why might they be considered at elevated risk for the behaviors of interest and/or depression?

Response comment 20:
We want to thank the reviewer for this comment. We acknowledge that information about the educational system was not clearly described. We have adjusted the manuscript. See reviewer 1, response comment 1, for more information and the specific adjustments that are made. Furthermore, in this study, students from the lowest (easiest) two levels were participating, since studies have shown that these students have high prevalences of risk behaviours and the highest percentage of school dropout (Vogel et al, 2012; Mieloo et al, 2013; Wetenschappelijke Raad voor het Regeringsbeleid, 2009).

References:

21. There is evidence that both risky behaviours and depressive symptoms are more prevalent amongst lower socio economic groups (e.g., Goodman & Huang, 2002). Can the authors please comment on why a measure of socioeconomic status was not included in the study??

Response comment 21:
We agree with the reviewer that it would have been interesting when SES was also measured. However, we have decided not to include SES in this study to reduce burden of students at measurement. Furthermore, measuring SES in students is difficult as students may be unwilling or unable to specify their parents’ economic status and educational achievement, leading to high levels of missing or unreliable data. Furthermore, it is unclear whether parental SES should be used as a proxy, and if so, which aspect of SES is most relevant. Moreover, educational level (of a student) is often used as a proxy of SES. In this study, students from the lowest level of vocational education were participating and research shows that relatively many students from lower socio economic groups attend these schools. Therefore, it is possible that the
relationships found in this study also apply to low socio economic groups. However, we have not studied this, and therefore, we have decided not to include this in our manuscript.

References

22. A discussion of whether the effects of multiple risk and problem behaviours are additive or multiplicative may be of interest. Did the authors investigate whether the association with depressive symptoms differed depending on whether there was, for example two vs three risk behaviours present?

Response comment 22:
Although it would have also been interesting to investigate whether the association with depressive symptoms differed depending on whether there was, for example two or three risk behaviours present, we have chosen for another focus of our article. Our focus of our study was to examine the clustering of risk behaviours, the association with depressive symptoms, and demographic variables among adolescents and young adults in vocational education.

23. It would be pertinent to more explicitly consider the implications of the findings for preventive interventions, specifically those that might be implemented within SVE settings.

Response comment 23:
We have now more explicitly consider the implications of the findings for preventive interventions.

New text (introduction):
“Investigating the clustering of health risk behaviours is important because individuals with multiple health risk behaviours are at the greatest risks for chronic disease and disability [15, 18-20]. Understanding the prevalence at which these behavioural clusters occur may inform health improvement planning efforts [20]. In addition, if risk behaviours are clustering, prevention programs that aim to change clusters of risk behaviours, rather than separate risk behaviours, could lighten the load of public health practice. Therefore, the development of a prevention strategy to target multiple health risk behaviours simultaneously could be useful when behaviours are clustering and have an underlying basis and similar predictors [17]. Although many public health intervention strategies still focus on behaviours in isolation, research has shown that substance use-related risk behaviours are prone to such an integrated approach [21]. Furthermore, the World Health Organization (WHO) has adopted a holistic approach to health which emphasizes prevention by tackling combinations of risk factors [19].”

New text (discussion):
” The clustering of risk behaviours suggests that interventions should preferably focus on multiple risk behaviours simultaneously rather than on separate risk behaviours in order to lessen the burden on
public health services [17, 18]. Because multiple risk behaviours were relatively common in the study population, preventive interventions targeting students attending vocational education and focusing on multiple behaviours simultaneously could be especially beneficial.”

24. Reference to the work of Jessor, problem behavior theory and related works may be relevant in the discussion.

**Response comment 24:**
In the introduction we now refer to work of Jessor.

New text (introduction):
“According to Jessor’s problem behaviour theory, risk behaviours (e.g. drinking alcohol, delinquent behaviour) tend to co-occur in youth [14].”

**Level of interest:** An article of limited interest
**Quality of written English:** Not suitable for publication unless extensively edited
**Statistical review:** No, the manuscript does not need to be seen by a statistician.
**Declaration of competing interests:** I declare that I have no competing interests.
Table 2. Factor structure and loadings of the risk behaviours

<table>
<thead>
<tr>
<th>Risk behaviours</th>
<th>Loadings</th>
<th></th>
<th>Loadings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Substance use</td>
<td>Problem behaviours</td>
<td></td>
</tr>
<tr>
<td>Binge drinking</td>
<td>0.74</td>
<td>-0.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cannabis use</td>
<td>0.74</td>
<td>0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette smoking</td>
<td>0.73</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delinquency</td>
<td>0.05</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Truancy</td>
<td>-0.002</td>
<td>0.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debts</td>
<td>0.05</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>1.77</td>
<td>1.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Explained variance</td>
<td>29.55</td>
<td>19.53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Principal Components Analysis.*
Table 3. Associations between clusters of risk behaviours and depressive symptoms (N=424)\textsuperscript{a}

<table>
<thead>
<tr>
<th></th>
<th>Depressive symptoms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1a</td>
<td>Model 1b</td>
</tr>
<tr>
<td></td>
<td>Beta coefficient (95% CI)</td>
<td>Beta coefficient (95% CI)</td>
</tr>
<tr>
<td>Substance use</td>
<td>1.61 (0.49– 2.55)</td>
<td></td>
</tr>
<tr>
<td>Problem behaviours</td>
<td>1.30 (0.23– 2.47)</td>
<td></td>
</tr>
</tbody>
</table>

\textit{Note:} Bold numbers indicate significant results at $P <.05$.

\textsuperscript{a}Linear regression analyses using a bootstrapping method.

Model 1a is adjusted for age, gender, ethnicity, being a parent and substance use.

Model 1b is adjusted for age, gender, ethnicity, being a parent and problem behaviours.

Model 2 is adjusted for age, gender, ethnicity, being a parent, substance use and problem behaviours.
Table 4. Associations between demographics, clusters of risk behaviours and depressive symptoms\(^a\)

<table>
<thead>
<tr>
<th></th>
<th>Substance use(^b)</th>
<th>Problem behaviours(^b)</th>
<th>Depressive symptoms(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta coefficient (95% CI)</td>
<td>Beta coefficient (95% CI)</td>
<td>Beta coefficient (95% CI)</td>
</tr>
<tr>
<td></td>
<td>N = 432</td>
<td>N = 432</td>
<td>N = 534</td>
</tr>
<tr>
<td>Age</td>
<td>0.04 (-0.02 – 0.09)</td>
<td>0.11 (0.05 – 0.16)</td>
<td>0.20 (-0.19 – 0.60)</td>
</tr>
<tr>
<td>Gender (ref. = boys)</td>
<td>-0.10 (-0.33 – 0.10)</td>
<td>-0.16 (-0.34 – 0.01)</td>
<td>3.56 (2.18 – 5.15)</td>
</tr>
<tr>
<td>Ethnicity (ref. = Dutch)</td>
<td>-0.51 (-0.72 – -0.29)</td>
<td>0.31 (0.11 – 0.53)</td>
<td>1.34 (-0.55 – 3.25)</td>
</tr>
<tr>
<td>Being a parent (ref. = No)</td>
<td>0.14 (-0.26 – 0.61)</td>
<td>0.56 (0.19 – 0.95)</td>
<td>-1.10 (-3.84 – 2.51)</td>
</tr>
</tbody>
</table>

\(^a\)Bold numbers indicate significant results at \(P < .05\).

\(^b\)Linear regression analyses using a bootstrapping method.

\(^b\)Age, gender, ethnicity and being a parent are included at the same time.