Author’s response to reviews

Title: Evaluation of drinking patterns and their impact on alcohol-related aggression: a national survey of adolescents behaviours

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Author’s response to reviews: see over
To the Executive Editor of BMC Public Health
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BMC-series Journals
BioMed Central
Floor 6, 236 Gray’s Inn Road
London, WC1X 8HL

Dear Editor,

Please find, attached, the revised version of the manuscript n. 2757554039614938 entitled "Evaluation of drinking patterns and their impact on alcohol-related aggression: a national survey of adolescent behaviours". Authors: Valeria Siciliano, Lorena Mezzasalma, Valentina Lorenzoni, Stefania Pieroni and Sabrina Molinaro.

First, we would like to thank the reviewers for their helpful suggestions that enable us to significantly improve the manuscript.

As can be seen, the text has been extensively modified, notably in the Introduction and Discussion sections. We recognize that the Introduction needed to be strengthened and, in fact, we have tried to meet and balance the reviewers' recommendations, one suggesting to insert a part on the link between alcohol and aggression, the other suggesting a restructuring of the Introduction, specifically addressing the measures used. Also, the Discussion section has been expanded, describing more broadly the drinking patterns and providing more attention to the correlates to alcohol-related aggression.

In addition, as suggested by the reviewers, one figure (old Fig. 1) has been deleted and a new table (current Table 1) has been added.

The reference list has been expanded with 10 new references (cited in the Introduction section, first paragraph, current references n. 3-5-6-7-8-9-10-11-12-13 and one reference in the Statistical Analysis (current reference n. 27). Citations and references have been renumbered as appropriate.

Finally, in addition to the points raised by the reviewers, other changes are included as well.

Below, you will find the specific responses to the reviewers' comments and point-by-point changes made to the paper to address these comments.

We look forward to hearing from you soon,

Sincerely yours,

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Reviewer 1

Major Compulsory Revisions

1. Introduction: This section consists of method, description of the measures used, as well as the study objective separately described in two different paragraphs. The authors need to structure the introduction and focus on the measures being used.

Introduction has been extensively modified as follows:
1) as required by Reviewer 3, a new paragraph (text and n. 10 new references, current references n. 3-5-6-7-8-9-10-11-12-13) about the link between alcohol use and aggression has been added (page 3, lines 3-25);
2) the sentence starting "Although the average amount of alcohol consumed..." has been completed with (... "and, notably, to alcohol-violence association [4]"). (page 3, line 28);
3) to better focus on the measures used, we have tried to strengthen two points:
   a. the choice of the composite measure to assess the impact of alcohol consumption on aggressive behaviour (we have rewritten a sentence, page 4, lines 6-10), and
   b. the description of the other variables (page 4, lines 16-24);
4) due to the general restructuring of the text, some sentences of the old version have been deleted:
   a. "Thus, the first aim of the study ... indicators of alcohol use." (page 3, lines 16-19 of the old version);
   b. "One of the main issues of adolescent drinking ... in alcohol-related aggression." (page 3, lines 22-27 of the old version)
   c. " For this reason, ... behaviour problems were also evaluated." (page 3, lines 29 and page 4 line 1 of the old version);
5) the aims of the study are now mentioned in the last paragraph of the Introduction section (page 4, lines 25-28).

2. It is unclear whether this is a pure validation study (comparing different consumption measures) or in fact a study on risk factors for alcohol and aggression.

Although it's true that we emphasize the importance of drinking patterns compared to single indicators of alcohol use, changes and integrations should have clarified that the study does not relate to a validation method but to the impact of drinking patterns and their added value on alcohol-related aggression.

3. Also, the certain risk and protective factors presented under “Other variables” are not mentioned; thus raising the question of why these specific factors were chosen. Furthermore, those particular factors have been extensively studied and are already well documented.

The other factors (“Other variables”) are now described in a more detailed way (text and related references, n. 13,18,23, page 4, lines 16-24).

4. Method: It is not clear how this measure was summarized, i.e., except for the binge-question, the authors only report questions on frequency- what about volume of alcohol having been consumed?

Indicators of alcohol consumption used to determine drinking patterns are reported as frequencies. In the Statistical Analysis the three indicators were not dichotomized, but analysed using the original frequency on 7-point scale for alcohol use and perceived intoxication (0, 1-2, 3-5, 6-9, 10-19, 20-39, 40+ occasions) and on 6-point scale for binge drinking (none, 1, 2, 3-5, 6-9, 10+ times), respectively.
In the text (Methods, Alcohol use indicators), the term "categorized responses" has been changed to "7 response categories" (page 5, line 26) and "6 response categories" (page 5, line 27), respectively.
We are aware that the volume of alcohol consumed could give a useful contribution in determining drinking patterns, but, in the ESPAD questionnaire, the question as to the volume of alcohol consumed refers to the latest drinking day whereas data of our study concern the last month. Thus, due to time discrepancy, it did not seem appropriate to include this variable.

5. The section about Alcohol-related aggression is unclear; is “experienced physical fighting” equal to having been in a fight or can it also compose those individuals who have been watching a fight?

"Experienced physical fighting" is equal to having been in a fight. We recognize that the interpretation may not be clear, even though this is exactly the question in the ESPAD questionnaire and is intended as direct personal involvement in a physical fight. In order to state this unequivocally, a sentence has been added in the appropriate section (page 6, line 10).
6. Considering the response categories being 0-40+ times, the dichotomization raises the question of distribution and mean?

The distribution of the variable was as follows: no occasion=88.2%; 1-2 occasions=8.1%; 3-5 occasions=1.9%; 6-9 occasions=0.7%; 10-19 occasions=0.4%; 20-39 occasions=0.2%; ≥40 occasions=0.5%.

Given the low number of observations reported in the upper ranges (in total 3.7%) we decided to dichotomize the variable (0 vs ≥1 occasion). This was appropriate to perform a logistic regression in order to test the association between alcohol-related aggression and the patterns of alcohol use.

In the text, this point is now clarified (page 6, line 8).

7. It is unclear how the “other variables” were categorized.

A detailed description on how the variables were categorized is now given (page 6, lines 16-27).

8. Results: Figure 1; the authors state that “Perception of intoxication occurred infrequently (2%) but increased to 16% when associated with binge drinking” – this could be clarified. When looking at the figure it seems that out of the 16% reporting perceived intoxication (a remarkably low number?), only 2% report this without binge-drinking? And; were there 27% or 41% who reported binge-drinking?

Figure 1 has been deleted and the descriptive statistics of drinking indicators put into different words (page 8, lines 15-18).

9. The section about “Drinking patterns”, as well as Figure 2, could be clarified; for example the authors state that “DI pattern exhibited 21% variance and also a negative correlation with alcohol consumption, a positive high correlation with perceived intoxication and a small negative correlation with binge drinking”. It is a bit difficult to understand how the DI pattern can be negatively correlated with alcohol consumption and binge drinking.

We are aware that the interpretation of drinking patterns is not of immediate comprehension. We have tried to fulfill adequately the reviewers’ suggestions strengthening the interpretation of drinking patterns in the Statistical analysis section (page 7, lines 5-7) and in the Results section (page 9, line 2, lines 3-4, lines 7-13, lines 17-23, lines 26-28).

We also agree that the figure (now Figure 1) is quite complex. For this reason, we have put in other words its description and meaning (page 9, lines 29-30, page 10, lines 1-5).

Minor Essential Revisions

10. Method: The participants-section lacks information about retention rates.

Two sentences have been added about retention rates:

a. “Of the sampled schools, 89% participated in the survey.” (page 5, lines 6-7);

b. “Less than 0.5% of the students refused to participate in the study.” (page 5, line 8).

11. Results: Regarding alcohol consumption and aggression; it seems natural that a positive association with alcohol-related aggression was found for all the indicators. It is by definition “alcohol-related aggression”, so this a bit of a circular reasoning.

We have tried to better clarify that the relationship between alcohol consumption and alcohol-related aggression is based on frequencies (page 10, line 18) and not on prevalence.

Two sentences have been rewritten:

a. “... in a univariate model (Model 1) and all three indicators increased the probability of being involved in alcohol-related aggression and in both genders.” as "... in a univariate model (Model 1): the higher the frequency of the three indicators, the higher the likelihood of being involved in alcohol-related aggression and in both genders.” (page 10, lines 19-21);

b. “... a multivariate model (Model 2): again, a positive association with alcohol-related aggression was found for all the indicators, but changes in beta coefficients...” as "... a multivariate model (Model 2): although, as expected, a positive association with alcohol-related aggression was found for all the indicators, changes in beta coefficients ...

12. Discussion: In general, the authors need to relate and discuss their results in relation to previous research, as well as recognizing their study limitations, to a greater extent.

The discussion of the results has been extended adding some sentences (page 12, lines 8-10, lines 13-15, lines 21-24,
lines 26-30; page 13 lines 1-19), as well as study limitations. We are aware that other important indicators such as volume of drinking or drinking context could provide more comprehensive information regarding alcohol-related aggression. We have rewritten the limitations of the study recognizing them to a greater extent (page 13, lines 20-30).

13. The risk and protective factors are only mentioned briefly, as is previous research in this area.

As reported at point n. 1, in the Introduction section we have described in more detail the other variables entering the study (page 4, lines 16-24). In the Discussion section, we have commented them in a more comprehensive way (page 12, lines 26-30 and page 13, lines 1-19).

Discretionary Revisions

14. Abstract: the authors mention previous epidemiological studies in young adults. This is a bit confusing considering the fact that their study is about adolescents.

The term "in young adults" has been replaced by "among adolescents" (page 2, line 3).
Reviewer 3

Major Compulsory Revisions

1. While the authors address an important issue, the introduction needs to be strengthened. Specifically, I would like to see a more comprehensive review (at least another page), particularly about the link between alcohol use and aggression.

We acknowledge that the Introduction needed to be strengthened. Several changes have been done:

1. a new paragraph (text and n. 10 new references, current references n. 3-5-6-7-8-9-10-11-12-13) about the link between alcohol use and aggression has been added (page 3, lines 3-25);
2. the sentence starting "Although the average amount of alcohol consumed...” has been completed with (..."and, notably, to alcohol-violence association [4].” (page 3, line 28);
3. to better focus on the measures used, we have tried to strengthen two points:
   a. the choice of the composite measure to assess the impact of alcohol consumption on aggressive behaviour (we have rewritten a sentence, page 4, lines 6-10), and
   b. the description of the other variables (page 4, lines 16-24);
4. due to the general restructuring of the text, some sentences of the old version have been deleted:
   a. "Thus, the first aim of the study ... indicators of alcohol use.” (page 3, lines 16-19 of the old version);
   b. "One of the main issues of adolescent drinking.... in alcohol-related aggression.” (page 3, lines 22-27 of the old version)
   c. ” For this reason, ... behaviour problems were also evaluated.” (page 3, lines 29 and page 4 line 1 of the old version);
5. the aims of the study are now mentioned in the last paragraph of the Introduction section (page 4, lines 25-28).

2. Can the authors please comment on why rotation procedures were not performed? Given the high correlations among alcohol measures, I believe an oblique rotation, such as direct oblimin, would have been appropriate.

The choice of a rotation procedure is done to obtain more interpretable factors. We are confident that the factors found reflect interesting patterns (e.g. DNE pattern) that disappear when a rotation procedure is applied (e.g. each indicator loads on only one factor). Thus, our main reason for not using rotation was to preserve the opportunity of describing the influence of DI and DNE patterns on alcohol-related aggression.

In the text, a sentence has been written differently (page 7, lines 3-4).

Results of the oblinin rotation are reported below:

```
<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol: Last 30 days</td>
<td>1.000</td>
<td>4.3E-009</td>
<td>-2E-011</td>
</tr>
<tr>
<td>Drunk: Last 30 days</td>
<td>-3E-011</td>
<td>1.000</td>
<td>3.3E-015</td>
</tr>
<tr>
<td>Five+ drinks</td>
<td>1.4E-016</td>
<td>-1.000</td>
<td></td>
</tr>
</tbody>
</table>
```


```
<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol: Last 30 days</td>
<td>.401</td>
<td>1.000</td>
<td>.474</td>
</tr>
<tr>
<td>Drunk: Last 30 days</td>
<td>-569</td>
<td>.474</td>
<td>-1.000</td>
</tr>
<tr>
<td>Five+ drinks</td>
<td>.569</td>
<td>-1.000</td>
<td></td>
</tr>
</tbody>
</table>
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3. The authors could do a better job overall of explaining how the PCA factors are interpreted, as well as how the composite scores were calculated. In the “statistical analysis” section, the authors say “due to the nature of the indicators, each component increases (positive loading) or decreased (negative loading) with the increasing frequency of the three indicators. My understanding of factor loadings is that a positive loading means that higher levels of an indicator are associated with higher levels on that factor and a negative loading would mean that lower levels of an indicator are associated with higher levels on that factor. Therefore, the DI pattern which has the following loadings (-.538*alcohol use + .816*intoxication - .210*binge), would be interpreted as youth who (1) drink infrequently, (2) who do not binge drink, but (3) do experience intoxication. Also, the minimum and maximum composite values presented in the results section (page 7-8) are particularly unclear. How can a person have a pattern of DE if they score zero on all three alcohol indicators? Overall, it would strengthen the paper to spend much
more time interpreting the patterns that were found, as well as why they may be interesting or important. I found the DI pattern particularly interesting. It accounted for 21% of the variance and, if I am interpreting it correctly, it shows that youth experience intoxication far below the typical “binge” criteria and that there are a substantial proportion of youth who experience intoxication even though they drink infrequently.

We are aware that the interpretation of drinking patterns is not of immediate comprehension. We have tried to fulfill adequately the reviewers’ suggestions strengthening the interpretation of drinking patterns in the Statistical analysis section (page 7, lines 5-7) and in the Results section (page 9, line 2, lines 3-4, lines 7-13, lines 17-23, lines 26-28).

4. The models predicting alcohol-related aggression are interesting, but the authors need a better rationale in the discussion for why using the patterns are better than using just a single indicator. The fact that binge drinking and intoxication occur jointly (as noted on page 9) is not a sufficient reason for using patterns. Most indicators occur jointly. The authors need to expression the added value of using these drinking patterns, over and above a single measure such as binge drinking, as well as comment on the potential limitations. For example, what do the alcohol patterns tell us about the relationship between alcohol and aggression that the single indicators do not? Perhaps draw on the finding that moderate levels are associated with lower levels of aggression. Or what percent of the variance in aggression did the individual indicators compared to the patterns explain?

We acknowledge that the reason why drinking patterns tell more than a single indicator about the relationship between alcohol and aggression is not enough highlighted. For this reason, in the Discussion, on one hand we have shortened the part related to drinking patterns as useful method to integrate three well-established indicators deleting two sentences “[As shown in this study, it is clear that three indicators cannot be used simultaneously in a multivariate model (either because of confounding effect or multicollinearity). Accordingly, it’s crucial to identify a simple process to describe the total variability explained by single indicators. The present analysis differs from previous studies in that it proposes and evaluates a procedure for identifying drinking patterns that integrates three well-established indicators, and uses this to achieve a broader understanding of youth drinking.”] and, on the other hand, we have underlined the findings on the moderate drinking and on the DI pattern (page 12, lines 21-24).

Minor Essential Revisions

5. There are several English grammatical errors and at times, the manuscript does not read well as a result of this. This is particularly problematic in the introduction. As one example, there should not be paragraphs composed of a single sentence.

A native speaker of English edited English language.

6. Please include the mean age and standard deviation of the sample.

Mean age ±SD of the sample have been included (page 5, line 15).

7. Please include the correlations between the 3 alcohol use measures, as well as the correlations between the drinking patterns and the frequency of use of specific alcoholic beverages.

In Statistical Analysis section correlations "among the three indicators" are now mentioned (page 7, line 20).
In Results section correlations are now included on page 8 (lines 19-21) among the three indicators and on page 10 (lines 9-13) between drinking patterns and the frequency of use of specific alcoholic beverages.

8. Please provide a reference for the variance inflation factor on page 7.

A reference has been added (n 27 in the reference list), cited on page 8, line 4.

Discretionary Revisions

9. It would be helpful to tell the reader why you choose those three measures of alcohol use rather than other common measures such as typically quantity or volume.

Our choice of indicators is justified by their usual use in studies dealing with the alcohol-related aggression and is also related to the available information in the ESPAD questionnaire. We are aware that the volume of alcohol consumed could give a useful contribution in determining drinking patterns, but, in the ESPAD questionnaire, the question as to the volume of alcohol consumed refers to the latest drinking day whereas data of our study concern the last month. Thus, due to time discrepancy, it did not seem appropriate to include this variable. Nevertheless, we agree that other important indicators such as volume of drinking or drinking context could provide more comprehensive information regarding
alcohol-related aggression. We have rewritten the limitations of the study recognizing them to a greater extent (page 13, lines 20-30).

10. The authors discuss the correlations between the drinking patterns and frequency of use of specific beverages in the discussion, but this may be better suited for the results section.

The correlations between the drinking patterns and frequency of use of specific beverages are described, albeit briefly, in the Results section (page 10, line 9-13). We would prefer to keep the comments in the Discussion section.

11. It would add clarity to the paper if the authors would consistent refer to the measure of alcohol frequency as “frequency” rather than “alcohol use”.

We have changed "alcohol use" to "frequency of alcohol use” in the occurrences considered appropriate.

12. I would like to see the eigenvalues of the PCA and the factor loadings presented in a table.

A new table (Table 1) with PCA results has been added (cited on page 8, line 30).

13. I do not think figure 1 adds anything to the paper and is confusing. I would recommend deleting it.

Figure 1 has been deleted.

14. Figure 2 is also difficult to understand, but with additional explanation of the patterns, it may become clearer.

We agree that the figure (now Figure 1) is quite complex. For this reason, we have put in other words its description and meaning (page 9, lines 29-30, page 10, lines 1-5).
Other changes

1. In the Title, "adolescents behaviours" has been corrected as "adolescent behaviours".

2. In the Abstract:
   a. The sentence "This study explores a new procedure for assessing drinking patterns and combining well-established indicators" has been changed to "This study explores a new procedure for defining and evaluating drinking patterns and integrating well-established indicators" (page 2, lines 5-6);
   b. "... impact on alcohol-related aggressive behaviour ..." has been changed to "... the impact of these patterns on alcohol-related aggressive behaviour ..." (page 2, lines 6-7);
   c. "... friends' behaviour ..." has been changed to "... behaviour of friends ..." (page 2, line 12);
   d. "... and ..." has been added (page 2, line 13);
   e. The sentence "Overall, cigarette smoking, illegal drug use, truancy, limited parental monitoring, frequent evenings outside of the home and peer influence were strongly associated with alcohol-related aggression" has been changed to "Overall, cigarette smoking, illegal drug use, truancy, limited parental monitoring, frequent evenings spent outside of the home and peer influence associated strongly with alcohol-related aggression" (page 2, lines 19-21);
   f. "... as monitored with ..." has been changed to "... as uniquely monitored with ..." (page 2, line 22);
   g. "... common indicators ..." has been changed to "... commonly used indicators ..." (page 2, line 23);
   h. "... appears also to strongly associate ..." has been changed to "... also appears to strongly associate ..." (page 2, line 25).

3. In the Introduction:
   a. "... a growing and common concern ..." has been changed to "... a common concern that is growing ..." (page 3, line 2);
   b. "... average amount of alcohol consumed" is reported in inverted commas (page 3, line 25);
   c. "... a basic parameter indicative of the regularity of drinking, one of the characteristics most studied ..." has been corrected as "... a basic parameter indicating the regularity of drinking, one of the most studied characteristics ..." (page 3, line 29);
   d. "... which is exhibited with ..." has been corrected as "... which exhibits ..." (page 4, line 1);
   e. "... total volume consumed is related to ..." has been corrected as "... total volume of alcohol consumed relates to ..." (page 4, lines 2-3);
   f. "... if taken together, are likely to capture ..." has been changed to "... if combined, can capture ..." (page 4, line 4);
   g. "... major ..." has been deleted (page 4, line 5);
   h. "... alcoholic beverage preferences..." has been changed to "... preferences for alcoholic beverage ..." (page 4, line 11).

4. In the Methods:
   a. "The target population comprised Italian..." has been corrected as "The target population comprised of Italian..." (page 5, line 7);
   b. "... referred to ..." has been changed to "... refers to ..." (page 5, line 12);
   c. "Out of 18,427 participants to 2011 ESPAD survey, ..." has been changed to "Of 18,427 participants in the 2011 ESPAD survey, ..." (page 5, lines 12-13);
   d. The sentence "The term “aggression” is used in place of “physical fighting” through the text" has been changed to "We use the term “aggression” in place of “physical fighting”" (page 6, lines 10-11);
   e. A parenthetical clause has been added "expressed as frequencies, ......" (page 7, line 1);
   f. "... as linear combination ..." has been changed to "... as a linear combination ..." (page 7, line 3);
   g. "... source for confounding" has been changed to "... source of confounding" (page 8, line 2).

5. In the Results section:
   a. "... are also currently drinking: in fact ..." has been changed to "... were also current drinkers: in fact, ..." (page 8, lines 13-14);
   b. "... (18%) (females, 6%) ..." has been corrected as "... (18%; females, 6%) ..." (page 8, line 22);
   c. In drinking patterns paragraph, a new sentence has been added at the beginning of the paragraph (page 8, lines 26-28);
   d. "... in every drinking experience" has been changed to "... during every drinking experience" (page 9, line 16);
   e. The term "alcohol-related fighting" has been changed to "alcohol-related aggression" in the text (page 10, line 15) and in Table 2 (column name).

6. In the Discussion:
   a. A parenthetical clause has been added "for both genders, ......" (page 11, line 15);
   b. "... the largest risk" has been changed to "... the greatest risk" (page 11, line 25);
   c. "... to a larger extent" has been changed to "... to a greater extent" (page 12, line 1);
d. in the sentence "... studies have evaluated the interaction ..." the article has been added (page 12, line 6).