Reviewer's report

Title: Exploring comorbid use of marijuana, tobacco, and alcohol among 14 to 15-year-olds: Findings from a national survey on adolescent substance use

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Reviewer: Jeremy Luk

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This is my second review of the manuscript “Exploring comorbid use of marijuana, tobacco, and alcohol among 14 to 15-year-olds: Findings from a national survey on adolescent substance use”. I continue to read this paper with interest, but find three of my prior concerns unresolved (see below). As I review the details of the “harm hierarchy”, I am also not sure if the analytic strategy is appropriate for the research question and thus am recommending a review by a statistician.

Minor Essential Revisions

1. In response to my prior question on what harm arose from comorbid substance use, the authors utilized the term “behaviour frequency” and referred to it as an indication of harm. I find this terminology non-intuitive. In the substance use literature, harm from substance use is typically referring to consequences. So for example, binge drinking might lead to harmful consequences such as drunk driving, withdrawal symptoms, difficulty with relationships, or alternatively psychopathology or poor school performance. In the first part of the current analysis, the authors (as I understand it) tested whether using more types of substances was associated with greater level of use of each type of substance. First, I’m not sure how meaningful this finding is, as it is in a way using substance use (co-occurrence) to predict substance use (frequency), which seems a bit tautological. Second, if the authors decide to keep this analysis and present this finding, I think they need to adjust their language (a. specify what type of behaviour you are talking about when using the term “behaviour frequency”—or drop this term entirely, and b. drop the “harm” terminology) and justify why this analysis is important.

2. I like the authors’ change from using “alcohol use” to “binge drinking”, as it is more accurate. I suppose the authors can similarly change “alcohol consumption” into “binge drinking” (potentially with a new citation) in the first paragraph of the introduction. I think this would further improve the paper.

3. Despite the authors’ citation of a previous paper by Waa et al. (2011), I am not convinced that the two parenting items can be combined. Parental monitoring/knowledge is a distinct and well-established construct in the literature which reflects the parent-adolescent relationship (so that, for instance, the adolescent would disclose where he/she is going). The parental rule enforcement
item seems vaguely termed and not conceptually overlapping with monitoring/knowledge. For example, what does “trouble” mean? It could well be “rule enforcement” based on a good behavior plan. Alternatively, it can possibly mean that a parent gets deregulated and yell at the adolescent. The authors need to both conceptually and statistically make a case for combining the two items if they wish to keep the current approach (i.e., include correlation between the two items at the very minimum, and then state how the two items are conceptually linked). Ideally, the authors would present analyses with the two parenting items separated (footnote this) and see if the results converge or not. Then, the authors can decide whether to use both items combined or separately, or even just use one and drop the other.

Reasons for a Statistical Review

1. The “harm hierarchy” is presented on page 8 of the revised manuscript. It appears that over 75% of the students endorsed no substance use in the past month. In other words, the distribution of this hierarchy is zero-inflated. Are ordinal and multinominal logistic regressions robust in this situation?

2. More importantly, some of the categories have very small percentages (e.g., only marijuana smoking = 1.8%, and tobacco and marijuana smoking = 1.4%). I believe a person-center analytic approach such as latent class analysis would be ideal in identifying subgroups of students who have different degrees of substance use and potentially avoid very small categories. The question then becomes whether the current analytic approach is acceptable, and whether the small percentages in the middle of the ordinal scale would lead to unstable/unreliable model estimation.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests: I declare that I have no competing interests.