

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Psychological correlates and binge drinking behaviours among Canadian youth: a cross-sectional analysis of the mental health pilot data from the COMPASS Study
AUTHORS	Butler, Alexandra; Romano, Isabella; Patte, Karen; Ferro, Mark; de Groh, Margaret; Jiang, Ying; Leatherdale, Scott T.

VERSION 1 - REVIEW

REVIEWER	Brian McCabe University of Miami
REVIEW RETURNED	30-Jan-2019

GENERAL COMMENTS	<p>Thank you for the opportunity to review this interesting manuscript.</p> <p>Abstract</p> <ol style="list-style-type: none">1. Strong, brief summary of important aspects of the study.2. Measures should only describe the measure, not the associations expected or tested, and included other outcomes even if not significantly related to binge drinking. Show definition of measure, e.g., binge drinking = 5 drinks, depression = measure name3. Title should agree with abstract—correlation not concurrent4. Binge drinking and depression/anxiety do not seem common—only about a third reported these5. Would be useful to have more about COMPASS in abstract <p>Literature Review</p> <ol style="list-style-type: none">1. Compelling argument for studying homesickness of students from minority groups2. Social factors related to drinking need to be developed and described in more detail, e.g., drinking with friends may protect against what kind of problems—DUI, death, fights, disorders?3. Not clear why social factors are included—very little, if any, mention outside of the flourishing concept and measure4. Need to define flourishing as a concept, possibly how it could be measured in youth, how it is different from well-being, and why it could moderate links between mental disorders and drinking behavior5. Not clear if this is the first study to test a link between flourishing and binge drinking at all, or in this population, or if similar constructs have been examined <p>Method</p> <ol style="list-style-type: none">1. Need a rationale and explanation for using complete-case analysis—about 20% missingness may not be ignorable. Analysis
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	<p>could be done to support the use of this analysis, or alternatively a multiple imputation could be used to address missing IV and DV</p> <ol style="list-style-type: none"> 2. Measure of depression cutoff should cite Andresen et al., 1994 in addition to Bradley et al. 3. Interpretation would be much easier if flourishing maintained original scale meaning—higher scores mean more healthy 4. Not clear why covariates were included—rationales for each should be in literature review, e.g., what is theoretical or conceptual link between flourishing and tobacco use? 5. Analysis appears appropriate to stated research questions <p>Results</p> <ol style="list-style-type: none"> 1. Tables very clear and informative 2. Not clear why differences between boys and girls were examined—should be addressed in the lit review or removed <p>Discussion</p> <ol style="list-style-type: none"> 1. Interpretation of highly prevalent from these results is misleading—only about 1/3 using or with depression/anxiety 2. Binge drinking could be high compared with other substances, but this data on other substances should be presented in literature review 3. Should spend more time discussing negative results—main research questions were about depression, anxiety, flourishing, and binge drinking 4. The Theory of Planned Behaviour should be explained in literature review—not introduced in discussion 5. Intervention and Exposure to alcohol advertisement, social acceptability were not examined in this study, so should not be addressed in discussion, unless findings suggest an important implication for these, which should be spelled out 6. Overall, the discussion reaches far beyond the actual scope of this study. Authors should be commended for submitting a manuscript with null findings (which is important for the field and science as a whole)—but the ideas should still be developed in sufficient detail to understand the ideas conceptually
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VERSION 1 – AUTHOR RESPONSE

Reviewer 1: Brian McCabe

Thank you for the opportunity to review this interesting manuscript.

Abstract

Comment: Strong, brief summary of important aspects of the study.

Response: Thank you.

Comment: Measures should only describe the measure, not the associations expected or tested, and included other outcomes even if not significantly related to binge drinking. Show definition of measure, e.g., binge drinking = 5 drinks, depression = measure name

Response: The measures section within the abstract has been updated accordingly to now show the definition of measures: binge drinking behaviours (5 or more drinks) and symptoms of depression (CESD-R-10 scores ≥ 10) and anxiety (GAD-7 scores ≥ 10), and flourishing (FS: 8-40).

Comment: Title should agree with abstract—correlation not concurrent

Response: We have revised the title of this manuscript to “Psychological correlates and binge drinking behaviours among Canadian youth: a cross-sectional analysis of the mental health pilot data from the COMPASS Study.”

Comment: Binge drinking and depression/anxiety do not seem common—only about a third reported these

Response: We have since replaced the term ‘common’ with ‘problematic’ throughout the manuscript. Based on minimum age requirements for alcohol purchase and consumption (19+ years old) within the Canadian provinces included in this study (Ontario, British Columbia), reported substance use by participants (14-18 years of age) was illegal. Additionally, substance use during this stage of development can have adverse health effects, particularly with regards to neurological development as this is a highly active process during adolescence.

Comment: Would be useful to have more about COMPASS in abstract

Response: Within space limitations, we have added a statement within the abstract briefly detailing the COMPASS study: “This research uses data from the COMPASS study (2012-2021) with a large sample size collecting data on youth health behaviours within Canadian secondary schools.”

Literature Review

Comment: Compelling argument for studying homesickness of students from minority groups

Response: Although an interesting idea, COMPASS does not collect information on citizenship, boarded students or homesickness, and as such, homesickness could not be explored within this study.

Comment: Social factors related to drinking need to be developed and described in more detail, e.g., drinking with friends may protect against what kind of problems—DUI, death, fights, disorders?

Response: This point has been clarified in the manuscript where we now provide examples of alcohol-related problems that were examined within the study that was cited. We now state: “One study found that drinking with friends is protective against alcohol-related problems (e.g., physical fights or injuries, driving under the influence, hangovers or vomiting)”

Comment: Not clear why social factors are included—very little, if any, mention outside of the flourishing concept and measure

Response: Discussion of social factors have been included within the literature review to provide rationale for examining the potential moderating effects of flourishing, a measure of social and emotional wellbeing, within this correlation. We now introduce the Theory of Planned Behavior within the introduction to provide additional context and theoretical background for the discussion of social

factors. We state: “The Theory of Planned Behaviour is a psychosocial model that has been effectively applied to the prediction of many health behaviours by considering an individual’s attitude, subjective norms, and perceived behavioural control.(19) Within Canada, alcohol is generally recognized as a socially acceptable and popular substance.(1) Research suggests normative social influences and cultural norms may also play an important role in explaining drinking patterns.(20,21) Given this, behaviours may result from interactions with surrounding social environments and contribute to the development of positive perceptions of drinking.(22–24)”. Additionally, the role of social factors/environments and binge drinking behaviours within a youth population were outlined to provide additional rationale for controlling for team sports within our analysis.

Comment: Need to define flourishing as a concept, possibly how it could be measured in youth, how it is different from well-being, and why it could moderate links between mental disorders and drinking behavior

Response: We thank the reviewer for this suggestion and have since included a definition of flourishing and what is measured (i.e., positive mental health inclusive of emotional, psychological, and social prosperity) as a concept within the literature review. We outline new research demonstrating flourishing as protective against adolescent mental health problems and cannabis use, providing reason to explore how flourishing may impact other domains of substance use.

Comment: Not clear if this is the first study to test a link between flourishing and binge drinking at all, or in this population, or if similar constructs have been examined

Response: We are not aware of past studies testing this association. We agree that this information is an important addition to the manuscript and now include the statement: “The authors are unaware of existing research that has evaluated indicators of mental wellbeing, such as flourishing, as a protective measure factor against binge drinking and mental health problems among youth.”

Method

Comment: Need a rationale and explanation for using complete-case analysis—about 20% missingness may not be ignorable. Analysis could be done to support the use of this analysis, or alternatively a multiple imputation could be used to address missing IV and DV

Response: We have since provided rationale for our use of a complete-case analysis within the methods section, and have noted missing data as a study limitation. We have also included a missing data analysis presenting demographic comparisons of students with and without missing data for measures of anxiety (11% missing) and depression (18% missing). As shown in the table below, we found no meaningful differences between students with and without missing anxiety or depression data. We therefore conclude that majority of data are likely missing at random. In addition, we discuss the possibility of non-differential misclassification as a limitation in our manuscript. This additional analysis has been briefly discussed within the manuscript, and can be included as a supplementary file at the discretion of the editor. We have also clarified that only 0.36% of students within our sample had missing data in the binge drinking measure (our outcome of interest).

Supplementary table

Logistic regression models predicting missing data for anxiety (GAD-7) and depression (CESD-R-10) among COMPASS students participating in the MH-M Pilot Study (2016-2017)

		GAD-7 Missing ^a	CESD-R-10 Missing ^b
		AOR (99% CI)	AOR (99% CI)
Sex	Female	--	--
	Male	1.22 (0.95-1.57)	1.08 (0.90-1.30)
Grade	9	--	--
	10	0.87 (0.63-1.19)	1.03 (0.81-1.31)
	11	0.62 (0.45-0.90)*	0.96 (0.73-1.26)
	12	0.68 (0.45-1.03)	0.85 (0.62-1.16)
Ethnicity	White	--	--
	Indigenous	1.11 (0.47-2.65)	0.98 (0.51-1.91)
	Asian	1.12 (0.74-1.71)	0.96 (0.69-1.32)
	Black	1.71 (0.90-3.28)	1.41 (0.83-2.40)
	Latin American	1.70 (0.91-3.19)	1.32 (0.79-2.22)
	Other/Mixed	1.00 (0.67-1.51)	1.09 (0.81-1.46)
Province	Ontario	--	--
	British Columbia	1.11 (0.85-1.45)	1.17 (0.96-1.42)
Weekly spending money	\$0	--	--
	\$1-\$20	1.30 (0.87-1.94)	1.15 (0.85-1.55)
	\$21-\$100	1.25 (0.82-1.90)	1.09 (0.80-1.49)
	>\$100	0.93 (0.58-1.51)	0.94 (0.67-1.33)
	I don't know	1.07 (0.66-1.76)	1.15 (0.80-1.63)
Varsity/community sport involvement	No	--	--
	Yes	1.08 (0.82-1.42)	0.98 (0.79-1.20)
Truancy	No skipped classes	--	--
	1 or more	1.13 (0.85-1.51)	1.02 (0.82-1.26)
Smoking status	Non-smoker	--	--
	Smoker	1.05 (0.66-1.66)	1.11 (0.79-1.56)
Binge drinking	Non-current binge drinker	--	--
	Binge drinker	1.05 (0.76-1.46)	0.98 (0.77-1.25)
Cannabis Use	Never used	--	--
	Ever used	0.97 (0.68-1.38)	0.98 (0.75-1.27)
Flourishing		1.00 (0.98-1.02)	0.99 (0.97-1.01)

^a Predicts the likelihood of a student missing GAD-7 data vs. a student with complete GAD-7 data.
^b Predicts the likelihood of a student missing CESD-R-10 data vs. a student with complete CESD-R-10 data.
* indicates significance at $p \leq 0.01$

Comment: Measure of depression cut-off should cite Andresen et al., 1994 in addition to Bradley et al.

Response: Thank you. We have since included this citation within our depression measure.

Comment: Interpretation would be much easier if flourishing maintained original scale meaning—higher scores mean more healthy

Response: To remain consistent with the other COMPASS MH-M measures (depression and anxiety), where higher scores are indicative of greater mental health problems, the FS was reverse coded (Patte, et al., 2017). We have clarified our use of the FS for ease of interpretation; we now refer to this measure as the “flourishing-languishing scale” throughout the manuscript to help readers understand that psychosocial wellbeing exists along a continuum. As well, “poor flourishing” or “high scores on the flourishing scale” have been replaced with the term “languishing” in the manuscript to reduce confusion.

Reference:

Patte KA, Henderson J, Faulkner G, Elton-Marshall, Sabiston C, Bredin C, Battista K LS. Development of a mental health module for the COMPASS system: Improving youth mental health trajectories. [Internet]. Waterloo; 2017. Available from: www.compass.uwaterloo.ca

Comment: Not clear why covariates were included—rationales for each should be in literature review, e.g., what is theoretical or conceptual link between flourishing and tobacco use?

Response: Demographic and behavioural correlates were included within our analysis to control for potential confounding effects and were detailed in the methods sections. Previous research has demonstrated a significant link between tobacco and alcohol use among youth, and as such, it was controlled for within this paper (Mathers, et al., 2006). Our research was intended as a follow-up to recent findings between cannabis and flourishing (Butler, et al., 2019) to examine whether similar effects were observed between mental health problems and binge drinking. While the link between tobacco and flourishing was not the objective of this research, we hope to examine the possible impact flourishing may have on tobacco uptake among youth using COMPASS data in the future.

Reference:

Butler A, Patte KA, Ferro MA, Leatherdale ST. Interrelationships among depression, anxiety, flourishing, and cannabis use in youth. *Addict Behav.* 2019

Mathers M, Toumbourou JW, Catalano RF, Williams J, Patton GC. Consequences of youth tobacco use: A review of prospective behavioural studies. *Addiction.* 2006.

Comment: Analysis appears appropriate to stated research questions

Response: Thank you.

Results

Comment: Tables very clear and informative

Response: Thank you.

Comment: Not clear why differences between boys and girls were examined—should be addressed in the lit review or removed

Response: Table 1 includes sample descriptive for total population and sex differences to provide readers with additional information regarding how behaviours vary between male and females. As research has demonstrated significant differences between males and females pertaining to both substance use and mental health problems (Patton, et al., 2002), this demographic information was provided to demonstrate possible sex differences and health inequities among marginalized groups within our sample (Public Health Agency of Canada, 2019). Additionally, organizations that fund the COMPASS study, including CIHR (Canadian Institute of Health Research, 2018), require sex/gender based analysis.

Reference:

Patton GC, Coffey C, Carlin JB, Degenhardt L, Lynskey M, Hall W. Cannabis use and mental health in young people: cohort study. *BMJ* [Internet]. 2002;325(7374):1195–8. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=135489&tool=pmcentrez&rendertype=abstract>

Public Health Agency of Canada. Understanding the report on Key Health Inequalities in Canada [Internet]. Ottawa; 2019. Available from: <https://www.canada.ca/en/public-health/services/publications/science-research-data/understanding-report-key-health-inequalities-canada.html>

Canadian Institute of Health Research. Sex, Gender and Health Research [Internet]. 2018. Available from: <http://www.cihr-irsc.gc.ca/e/50833.html>

Discussion

Comment: Interpretation of highly prevalent from these results is misleading—only about 1/3 using or with depression/anxiety

Response: We have removed the terms “prevalent” and “common” and have directly referred to the prevalence rate (1/3) throughout the manuscript, or have interpreted as “problematic” to remain neutral and address the reviewer’s concern. Our results align well with other youth surveillance research (Public Health Agency of Canada, 2018; Health Canada, 2015) within Canada, identifying binge drinking and mental distress and/or disorders as problematic among youth. Robust literature acknowledges that substance use can induce various adverse health effects, and as such, any use during adolescence is considered problematic. Early onset of high risk alcohol use (binge drinking) has been associated with mental disorder, cardiovascular disease, cancers, and diabetes, and was the leading cause of premature death worldwide in 2016 among people aged 15-49 years (Public Health Agency of Canada, 2018). Additionally, mental disorder is among the leading cause of disability worldwide (World Health Organization, 2017), illustrating why these rates are deemed as problematic within a youth population.

Reference:

Public Health Agency of Canada. The Chief Public Health Officer's Report on the State of Public Health in Canada 2018: Preventing Problematic Substance Use in Youth [Internet]. Ottawa; 2018. Available from: <https://www.canada.ca/en/public-health/corporate/publications/chief-public-health-officer-reports-state-public-health-canada/2018-preventing-problematic-substance-use-youth.html>

Health Canada. Canadian Tobacco Alcohol and Drugs (CTADS): 2015 summary [Internet]. 2017. Available from: <https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2015-summary.html>

World Health Organization. Depression [Internet]. 2017 [cited 2017 Oct 1]. Available from: <http://www.who.int/mediacentre/factsheets/fs369/en/>

Comment: Binge drinking could be high compared with other substances, but this data on other substances should be presented in literature review

Response: We have since supplemented binge drinking prevalence rates with other substance use rates (cannabis and tobacco) to provide more context for our readers. We now state: "Although federal and provincial legislations in Canada prohibit alcohol consumption for those under the age of 18 or 19, about 25% of Canadian students in grade 7 to 12 report past-year binge drinking, which has been previously operationalized as consuming five or more drinks on one occasion.(1,2) In comparison, 17% of youth report past-year cannabis use and 10% report using tobacco products in the past-30-days.(2)."

Comment: Should spend more time discussing negative results—main research questions were about depression, anxiety, flourishing, and binge drinking

Response: We have included additional interpretation of the null results observed within our study. We include discussion of the directionality of insignificant odds ratios for depression and anxiety as these findings may still have valuable public health implications. We also highlight existing literature that discusses the importance of identifying subtypes of drinkers within research, providing additional support for our findings as normative drinkers may be more common and attenuate the possible associations between mental health problems and binge drinking. The addition of this research provides improved cohesion within the discussion when addressing social acceptability of alcohol and the implications this has for youth binge drinking.

Comment: The Theory of Planned Behaviour should be explained in literature review—not introduced in discussion

Response: We thank the reviewer for this suggestion and now introduce the Theory of Planned Behaviour within the literature review rather than the discussion section.

Comment: Intervention and Exposure to alcohol advertisement, social acceptability were not examined in this study, so should not be addressed in discussion, unless findings suggest an important implication for these, which should be spelled out

Response: We agree with the reviewer and have removed sections within the discussion that address alcohol advertisement, and have limited our discussion of the social acceptability of alcohol. Although social acceptability of alcohol was unable to be assessed in this study, we feel it is an important implication as it may have masked the relationship between youth binge drinking and mental health problems. This may provide additional context for our findings as well as future research within this domain.

Comment: Overall, the discussion reaches far beyond the actual scope of this study. Authors should be commended for submitting a manuscript with null findings (which is important for the field and science as a whole)—but the ideas should still be developed in sufficient detail to understand the ideas conceptually

Response: We have made major revisions to the discussion based on comments provided by the reviewer, and feel as though this feedback made the manuscript much stronger. Discussion regarding alcohol advertisement has been removed and we now include additional interpretation of the null findings within this manuscript. Attention paid to the possible different subtypes of drinkers allowed for social acceptability to be appropriately included within the interpretation of our findings.