Changes in Emerging Adults' Alcohol and Cannabis Use from Before to During the COVID-19 Pandemic: Evidence from a Prospective Birth Cohort

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Abstract

Objective: Prospective research is needed to better-understand changes in substance use from before to during the COVID-19 pandemic, among emerging adults (18-25 years), a high-risk group for substance use. Method: *N*=1,096 (weighted sample *N*=1,080; 54% female) participants enrolled in the Québec Longitudinal Study of Child Development, who completed pre-pandemic (2019; 21 years) and COVID-19 (mid-March to mid-June 2020) surveys. COVID-19-related and pre-existing factors were examined as moderators of change in substance use. Results: Full sample analyses revealed decreased binge drinking (p<.001, Bayes factor (BF)=22, Cohen's f^2=0.02), but no changes in alcohol and cannabis use. Stratified analyses revealed emerging adults who reported <monthly use pre-pandemic increased their alcohol use (p<.001, BF>150, f^2=0.05) and binge drinking (p<.001, BF=27, f^2=0.01), but not their cannabis use. Conversely, emerging adults who reported ≥monthly use pre-pandemic decreased their binge drinking (p<.001, BF>150, f^2=.12) and cannabis use (p<.001, BF>150, f^2=.06), but did not change their alcohol use frequency. Several factors moderated change in substance use, including employment loss (p<.005, BF>39, f^2=.03) and loneliness (p<.018, BF>150, f^2=.10) during COVID-19. Conclusions: Changes in alcohol and cannabis use frequency among emerging adults in the first three months of COVID-19 largely differed according to pre-pandemic substance use, COVID-19-related factors, and pre-existing factors. While some youth with pre-existing vulnerabilities (e.g., more frequent substance use pre-pandemic) remained stable or decreased their substance use during COVID-19, emerging adults who experienced employment loss, loneliness, and financial concerns during COVID-19 increased their substance use, highlighting the need for increased supports for vulnerable populations.

Keywords: COVID-19, emerging adults, alcohol use, cannabis use, binge drinking, risk factors

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The coronavirus disease 2019 (COVID-19) pandemic resulted in major disruptions to societal norms, with physical distancing measures implemented worldwide to slow the spread of the virus. In Canada, the province of Québec was greatly affected by the first wave of pandemic (mid-March to mid-June 2020), which resulted in 54,708 cases, 6,530 hospitalizations, and 5,552 deaths (Quebec National Institute of Public Health, 2021). To reduce the rate of new infections, social distancing measures were introduced, including working from home arrangements, bans on indoor gatherings, and school and university closures (Québec Government, 2020a, 2020b, 2020c). While non-essential businesses were also closed, liquor stores and cannabis dispensaries remained open, and reported increased sales during this time (Québec Government, 2020a; Société des alcools du Québec, 2020; Société Québécoise du Cannabis, 2021), suggesting increased use of these substances.

Emerging adults (18-25 years) may be particularly susceptible to changes in alcohol use (AU) and cannabis use (CU) during COVID-19, given their high rates of pre-pandemic use (Statistics Canada, 2021; World Health Organization, 2018). Emerging adults have also experienced the highest levels of loneliness and mental health problems (e.g., depression) during COVID-19 (Groarke et al., 2020; Pierce et al., 2020; Watkins-Martin et al., 2021), known risk factors for substance use (SU; Lai, Cleary, Sitharthan, & Hunt, 2015; McKay, Konowalczyk, Andretta, & Cole, 2017). As such, conditions surrounding COVID-19 may lead to increased SU in emerging adults who use substances to cope or self-medicate (Khantzian, 1987); however, given emerging adults mainly report AU and CU in social contexts (Lau-Barraco & Collins, 2011; Shrier, Walls, Rhoads, & Blood, 2013), social disruptions during COVID-19 may also lead to reduced SU. Thus, prospective research is

needed to examine changes in AU and CU among emerging adults from before to during COVID-19.

The limited number of prospective studies examining changes in AU among emerging adults found no changes in AU frequency, but decreased binge drinking (BD; consumption of ≥4 (females) or ≥5 (males) drinks in a single session) and weekly/monthly alcohol consumption, particularly among those who engaged in greater levels of drinking pre-pandemic (Bartel, Sherry, & Stewart, 2020; Clare et al., 2021; Minhas et al., 2021). Further, Bartel et al. (2020) found no changes in CU overall, but found increased CU among vulnerable subgroups, including isolated individuals and those who reported using cannabis to cope with depression. While findings from Bartel et al. (2020) highlight the importance of context, it is yet unknown how other important risk factors may moderate changes in SU among emerging adults during COVID-19. Ultimately, identifying risk factors associated with changes in SU will allow for the identification of emerging adults that are most at risk and highlight intervention targets to reduce SU in this high-risk group.

Cross-sectional studies and studies conducted with other groups have linked risk factors including male sex, lower socioeconomic status, news-seeking, being single, health worries, loneliness, financial strain, sexual minority attraction, low social support, and depression, to increased SU during COVID-19 (Coakley et al., 2021; Horigian, Schmidt, & Feaster, 2021; Krueger, Barrington-Trimis, Unger, & Leventhal, 2021; Laghi et al., 2021; Lechner et al., 2020; Mohr, Umemoto, Rounds, Bouleh, & Arpin, 2021; Papp & Kouros, 2021; Stanton et al., 2020). While some of these findings derive from studies conducted with university students and young adults (including those >25 years), contextual differences limit the generalizability of these findings to emerging adults. Namely, university attendance is associated with greater AU in emerging adulthood (Patrick, Terry-McElrath, Kloska, & Schulenberg, 2016). Thus, changes in the university context during COVID-19 (e.g., campus

shutdowns), are inextricably linked to SU changes among university students, an effect that does not generalize to emerging adults not attending university. Further, given SU tends to decrease after 25 years (Chen & Jacobson, 2012), it is difficult to disentangle whether SU changes among young adults >25 years, are attributable to the pandemic, or normative developmental processes. Finally, given employment status and living situation (i.e., with/ without parents) are also associated with emerging adult SU (Jager, Keyes, & Schulenberg, 2015), research is also needed to examine whether these factors and changes in these factors during COVID-19 (if applicable), are associated with SU changes.

This study used population-representative data from a large birth cohort to examine changes in AU and CU among emerging adults from pre-pandemic (21 years) to during COVID-19 (22 years). We also examined whether pre-pandemic SU, COVID-19-related factors, and pre-existing vulnerabilities moderated change in SU during COVID-19. It was anticipated that while there would be overall decreases in SU, emerging adults with elevated pre-pandemic SU, or pre-existing or COVID-19-related risk factors would increase their SU.

Method

Participants

Data were drawn from the Québec Longitudinal Study of Child Development (QLSCD; *N*=2,120), led by the Institut de la statistique du Québec (Orri et al., 2020). The QLSCD includes a stratified random sample of singletons born in 1997/98 in Quebec. Ninety-five percent of participants who met eligibility criteria (i.e., gestation period between 24-42 weeks, and mother who spoke French or English), were enrolled in the study. The current sample comprised *N*=1,096 individuals (62% female; 59% students; 4% parents; 95% living independently both pre- and during COVID-19), who participated in the pre-pandemic (21 years) and COVID-19 (22 years) surveys (see Table 1 for descriptive statistics).

Compared to the broader QLSCD sample, participants included in this study were more likely to be female, but did not differ on other demographics nor on SU at 20 years.

Procedure

The pre-pandemic survey was completed between mid-February and end of June 2019. The COVID-19 survey was completed between July and August 2020. Both surveys were completed online. Data from previous QLSCD surveys were used in the calculation of some pre-existing risk factors (detailed below). The QLSCD protocol was approved by the Institut de la statistique du Québec and the St-Justine Hospital Research Centre ethics committees. Informed consent was obtained at each survey.

Measures

***Substance Use*.** For the pre-pandemic survey, SU across the past 12 months was examined. For the COVID-19 survey, SU across the period mid-March to mid-June 2020 was examined, corresponding with the first three months of the COVID-19 pandemic and a strict lockdown period in Québec (Québec Government, 2020a, 2020b, 2020c). AU and CU were assessed via the questions: (1) "how often did you drink alcohol?"; and (2) "how often did you use cannabis (marijuana, pot, hashish)". Responses were recorded on a seven-point scale [0 (never) to 6 (everyday)]. To assess BD, participants were asked "how many times did you have 4 (females)/ 5 (males) drinks or more on the same occasion?", with responses recorded on a six-point scale [0 (never) to 5 (>1 per week)].

***Moderating Factors*.** COVID-19-related moderating factors were: Female sex (assigned at birth); living independently (without parents); employment loss; education loss; living in Montréal (examined as a moderator given this region experienced the greatest number of cases and deaths, and longest COVID-19 lockdown in Québec (Quebec National Institute of Public Health, 2021; Thomas, 2021)); being in a relationship; hours per day spent viewing COVID-19-related news [0 (none), 1 (≤60 minutes), 2 (<2 hours), 3 (<3hours), 4 (≥3

hours)]; health worries (3 items assessing worries relating to: (i) loved ones who are at risk; (ii) loved ones not at risk; and (iii) participant's own health, from 0 "Not at all" to 6 "Extremely"); loneliness (assessed via the 3-item UCLA loneliness scale; Hughes, Waite, Hawkley, & Cacioppo, 2004); and financial concerns (i.e., how concerned participants were about the potential impact of COVID-19 on their ability to have enough money to meet basic needs [0 (not at all), 1 (somewhat), 2 (very), 3 (extremely)]). Pre-existing moderating factors were: Studying at 21 years; employed at 21 years; sexual minority attraction (i.e., homosexual, bisexual, or asexual), at 17 years; socioeconomic status (SES; mean of variables aggregating parent income, education, and job prestige at 15 and 17 years); social support at 19 years (assessed via the Social Provision Scale; Caron, 2013); depression at 20 years (assessed via the Centre for Epidemiological Studies Depression Scale; Poulin, Hand, & Boudreau, 2005); and problem AU at 20 years (assessed via the Alcohol Use Disorders Identification Test; Saunders, Aasland, Babor, De La Fuente, & Grant, 1993).

Statistical Analyses

Whole sample analyses examined within-person change in SU from pre-pandemic (21 years; 2019) to during COVID-19 (22 years), via multilevel models. To examine whether risk factors moderated change in SU, the slope of within-person change was regressed onto each risk factor (i.e., via a cross-level interaction), simultaneously for each outcome. As a result, findings reflect the association between each risk factor and change in SU, adjusting for the remaining risk factors. Significant moderation effects were further explored via simple slope analyses, with changes in SU examined at each level of the moderator (binary moderators), or at one standard deviation above and below the mean of the moderator (continuous moderators; Preacher, Curran, & Bauer, 2006). Then, participants were stratified into separate groups for each outcome, according to pre-pandemic SU (21 years): (1) <monthly; or (2) ≥monthly use, and data were re-analyzed. Results from the stratified sample analyses were

used to determine whether changes in SU during COVID-19 differed as a function of pre-pandemic SU. Stratified analyses also served as sensitivity analyses, with changes in SU among the ≥monthly group not limited by timeframe differences between the surveys (e.g., weekly SU can be interpreted in the same way across both a 12- and 3-month timeframe).

Effect sizes were calculated via Cohen's f^2 for local effect size (Selya, Rose, Dierker, Hedeker, & Mermelstein, 2012), with ≥0.02, ≥0.15, and ≥0.35 indicative of small, medium, and large effects, respectively (Cohen, 1988). Rather than adjusting for multiple comparisons, complimentary Bayes factors (BF) were calculated, in line with recent statistical recommendations (Benjamin et al., 2018). BF scores of <3, 3 to 20, 20 to 150, and >150 indicative of anecdotal, positive, strong, and very strong evidence against the null hypothesis (Kass & Raftery, 1995). Associations in the current study were determined to be significant if $p<.05$ and BF≥3. Analyses were conducted in Mplus (version 8.5), using weights to ensure a representative sample. The robust maximum likelihood estimator handled any non-normality and full information maximum likelihood accounted for missing data.

Results

Descriptive statistics and correlations between risk factors are reported in Table 1. The percentage of participants that endorsed each SU response category pre-pandemic (21 years) and during COVID-19 (22 years), are reported in Supplemental Figures 1-3. Twenty-nine percent of participants had some missing data, with n=17 (2%) and n=24 (2%) missing BD data for the pre-pandemic and COVID-19 surveys, respectively. There were no missing data for AU or CU. Missing data for risk factors was ≤10%. Participants studying at 21 years were significantly less likely to have missing data, than non-students. Participants with missing data did not differ from those with complete data on other study variables.

Full Sample analyses

Overall, there was a significant decrease in BD frequency during the COVID-19

pandemic (f^2=0.02), however, there was no overall change in AU (f^2=0.001) or CU (f^2=0.001) frequency (see Table 2). Loss of employment during COVID-19 significantly moderated change in AU (f^2=0.03), while problem AU at 20 years significantly moderated change in BD (f^2=0.04) frequency (see Figure 1 for graphical depictions and simple slope effects). There was a significant increase in AU among participants who lost employment during COVID-19, but not among those who remained employed. There was also a significant decrease in BD frequency among participants with elevated problem AU at 20 years, and no change among those with low problem AU at 20 years.

Stratified sample analyses: <Monthly use pre-pandemic (21 years)

Overall, there was a significant increase in AU (f^2=0.05) and BD (f^2=0.01) frequency, but not CU (f^2=0.005) frequency, during COVID-19 (see Table 3). Loneliness during COVID-19 (f^2=0.10), being employed at 21 years (f^2=0.07), and depression at 20 years (f^2=0.10) significantly moderated changes in AU, while financial concerns (f^2=0.05) moderated changes in CU frequency (see Figure 2 for graphical depictions and simple slope effects). There was a significant increase in AU frequency among participants who were employed at 21 years, those who scored high on loneliness, and those low in depression at 20 years, but not among those who were unemployed at 21 years, low in loneliness during COVID-19, or those with elevated depression at 20 years. There was a significant increase in CU among participants with elevated (but not among those with low) financial concerns.

Stratified sample analyses: ≥Monthly use pre-pandemic (21 years)

Overall, there was a significant decrease in BD (f^2=0.12) and CU (f^2=0.06) during COVID-19; however, there was no overall change in AU frequency (f^2=0.004; see Table 4). Loss of employment during COVID-19 (f^2=0.04) and SES (f^2=0.08) significantly moderated change in AU frequency, while living in Montreal during COVID-19 moderated change in AU (f^2=0.07) and BD (f^2=0.08) frequency (see Figure 3 for graphical depictions and simple

slope effects). Emerging adults who did not lose employment during COVID-19, came from a lower SES background, or lived in Montreal during COVID-19, reported a significant decrease in their AU frequency, whereas those who lost employment, those who came from a higher SES background, and those who lived outside of Montreal reported no significant AU changes. Finally, emerging adults who lived in Montreal during COVID-19 reported a steeper decline in their BD, than participants who lived outside of Montreal during COVID-19.

Discussion

This is the first prospective study to examine how 17 important pre-existing and COVID-19-related factors moderated change in AU and CU from pre-pandemic (2019; 21 years) to during an early period of COVID-19 (mid-March to mid-June 2020; 22 years), in a representative sample of emerging adults. Analyses revealed a significant overall decrease in BD, but no overall changes in AU and CU; however, stratified sample analyses revealed differential changes in SU according to pre-pandemic SU (21 years). Namely, emerging adults who engaged in AU and BD less than monthly pre-pandemic, reported small increases in the same SU behavior; however, given the increase in BD was below the accepted threshold for a small effect, this finding is of limited clinical concern. Conversely, emerging adults who reported at least monthly BD or CU pre-pandemic, reported small-to-medium decreases in the same SU behavior. Given research has identified that AU is stable across 21 to 22 years (Auerbach & Collins, 2006), it is unlikely that changes in AU seen in the current study reflect normative processes; however, less is known about the stability of CU during this age. As such, it is possible that the decrease in CU observed among those who used cannabis $\geq$monthly pre-pandemic, may be attributable to normative changes, rather than COVID-19. Thus, to fully understand the role of COVID-19 on CU changes among emerging adults, greater insight is needed into the stability of CU patterns among emerging adults who report $\geq$monthly use.

Findings are in line with prospective studies conducted with other populations (e.g., across all age groups), which found no or only small increases in AU and CU frequency during COVID-19 (Graupensperger et al., 2021; Naughton et al., 2020; Pinkham, Ackerman, Depp, Harvey, & Moore, 2020; Robinson & Daly, 2021). Current findings are also in line with the limited number of other studies conducted with emerging adults, which found no changes in AU and CU and decreased BD (Bartel et al., 2020; Clare et al., 2021; Minhas et al., 2021), during COVID-19. However, current results extend previous findings by underscoring the importance of context in considering changes in SU among emerging adults during COVID-19. For instance, current analyses stratified by SU at 21 years revealed decreased CU among participants who reported ≥monthly CU pre-pandemic, which was masked by a very small increase in CU among emerging adults who reported <monthly CU pre-pandemic. This masking effect highlights the importance of considering pre-pandemic CU when examining change during COVID-19. Further, current findings of increased SU among vulnerable populations (e.g., those reporting employment loss, loneliness, or financial concerns during COVID-19), echo findings from other populations (Cousijn, Kuhns, Larsen, & Kroon, 2021; Papp & Kouros, 2021).

At odds with hypotheses, increased AU frequency was found among emerging adults who had *low* depression at 20 years and <monthly AU pre-pandemic, with no AU changes for individuals with high depression at 20 years. One reason for these unexpected findings may be that individuals with a history of pre-existing mental health vulnerabilities fared well during the first three months of COVID-19, thus reducing the likelihood of increased SU in an attempt to cope or self-medicate. This idea is supported by Hamza, Ewing, Heath, and Goldstein (2020), who found decreased depression symptoms early during COVID-19, among university students with pre-existing mental health concerns. Further, while previous research linked lower SES to increased AU during COVID-19 (Laghi et al., 2021), we found

decreased AU among those from lower SES backgrounds who reported ≥monthly AU pre-pandemic. These findings may be due to the parallel economic crisis surrounding COVID-19, which disproportionately affect lower SES groups and have been posited to lead to reductions in AU via reduced spending (De Goeij et al., 2015).

Strengths and Limitations

Strengths include the prospective design, large, population-representative sample, and adjustment for social roles associated with decreased SU in emerging adulthood (e.g., relationship status and employment; Jager et al., 2015). While the current study is limited to self-reported SU frequency, the reliability of such data among young people is well-established (Ramo, Liu, & Prochaska, 2012; Simons, Wills, Emery, & Marks, 2015). Another limitation is the difference in timeframes between the two surveys (12-months for pre-pandemic and 3 months for the COVID-19 survey). However, SU recall is good across both timeframes (Janssen, Braciszewski, Vose-O'Neal, & Stout, 2017) and AU and CU do not systematically vary across April-June, compared to the rest of the year (Fleming et al., 2021). Further, our use of stratified analyses also mitigated the effect of difference in timeframes on results. Another limitation is attrition in QLSCD; however, use of weights ensured the current sample was comparable to the original QLSCD sample.

Conclusions

Results indicate changes in AU and CU among emerging adults in the early stage of COVID-19 (mid-March to mid-June), largely depend on pre-pandemic SU (21 years), COVID-19 factors, and pre-existing factors. Despite concerns about increased SU during COVID-19, results indicate that some individuals considered most vulnerable (e.g., those engaging in more frequent SU pre-pandemic) fared better than expected. Nonetheless, findings also underscored that those who experienced employment loss, loneliness, and financial concerns during COVID-19 increased their SU, highlighting the need for public

health interventions targeting these risk factors (e.g., government assistance for those experiencing financial hardship), to reduce SU among emerging adults during COVID-19.

References

Auerbach, K. J., & Collins, L. M. (2006). A multidimensional developmental model of alcohol use during emerging adulthood. *Journal of studies on alcohol, 67*(6), 917-925. doi:https://doi.org/10.15288/jsa.2006.67.917

Bartel, S. J., Sherry, S. B., & Stewart, S. H. (2020). Self-isolation: a significant contributor to cannabis use during the COVID-19 pandemic. *Substance Abuse, 41*(4), 409-412. doi:10.1080/08897077.2020.1823550

Benjamin, D. J., Berger, J. O., Johannesson, M., Nosek, B. A., Wagenmakers, E. J., Berk, R., . . . Camerer, C. (2018). Redefine statistical significance. *Nature human behaviour, 2*(1), 6-10. doi:10.1038/s41562-017-0189-z

Caron, J. (2013). Une validation de la forme abrégée de l'Échelle de provisions sociales: l'ÉPS-10 items. *Santé mentale au Québec, 38*(1), 297-318. doi:https://doi.org/10.7202/1019198ar

Chen, P., & Jacobson, K. C. (2012). Developmental trajectories of substance use from early adolescence to young adulthood: Gender and racial/ethnic differences. *Journal of Adolescent Health, 50*(2), 154-163. doi:10.1016/j.jadohealth.2011.05.013

Clare, P. J., Aiken, A., Yuen, W. S., Upton, E., Kypri, K., Degenhardt, L., . . . Hutchinson, D. (2021). Alcohol use among young Australian adults in May-June 2020 during the COVID-19 pandemic: a prospective cohort study. *Addiction*. doi:10.1111/add.15599

Coakley, K. E., Lardier, D. T., Holladay, K. R., Amorim, F. T., Mechler, H., & Zuhl, M. N. (2021). Mental Health Severity Is Associated with Increases in Alcohol Consumption in Young Adult Students during the COVID-19 Pandemic. *Alcoholism Treatment Quarterly*, 1-14. doi:10.1080/07347324.2021.1917325

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences. In: Lawrence Erlbaum.

Cousijn, J., Kuhns, L., Larsen, H., & Kroon, E. (2021). For better or for worse? A pre–post exploration of the impact of the COVID-19 lockdown on cannabis users. *Addiction*. doi:10.1111/add.15387

De Goeij, M. C. M., Suhrcke, M., Toffolutti, V., van de Mheen, D., Schoenmakers, T. M., & Kunst, A. E. (2015). How economic crises affect alcohol consumption and alcohol-related health problems: a realist systematic review. *Social Science & Medicine, 131*, 131-146. doi:http://dx.doi.org/10.1016/j.socscimed.2015.02.025

Fleming, C. B., Duckworth, J. C., Patrick, M. E., Fairlie, A. M., Abdallah, D. A., & Lee, C. M. (2021). Calendar month variation in alcohol and marijuana use in a community sample of young adults. *Journal of Studies on Alcohol and Drugs, 82*(2), 169-177. doi:https://doi.org/10.1016/j.jadohealth.2021.01.008

Graupensperger, S., Fleming, C. B., Jaffe, A. E., Rhew, I. C., Patrick, M. E., & Lee, C. M. (2021). Changes in Young Adults' Alcohol and Marijuana Use, Norms, and Motives From Before to During the COVID-19 Pandemic. *Journal of Adolescent Health, 68*(4), 658-665. doi:https://doi.org/10.1016/j.jadohealth.2021.01.008

Groarke, J. M., Berry, E., Graham-Wisener, L., McKenna-Plumley, P. E., McGlinchey, E., & Armour, C. (2020). Loneliness in the UK during the COVID-19 pandemic: Cross-sectional results from the COVID-19 Psychological Wellbeing Study. *PloS one, 15*(9), e0239698. doi:https://doi.org/10.1371/journal.pone.0239698

Hamza, C. A., Ewing, L., Heath, N. L., & Goldstein, A. L. (2020). When social isolation is nothing new: A longitudinal study psychological distress during COVID-19 among university students with and without preexisting mental health concerns. *Canadian Psychology/Psychologie canadienne*. doi:http://dx.doi.org/10.1037/cap0000255

Horigian, V. E., Schmidt, R. D., & Feaster, D. J. (2021). Loneliness, mental health, and substance use among US young adults during COVID-19. *Journal of psychoactive drugs, 53*(1), 1-9. doi:10.1080/02791072.2020.1836435

Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on aging, 26*(6), 655-672. doi:10.1177/0164027504268574

Jager, J., Keyes, K. M., & Schulenberg, J. E. (2015). Historical variation in young adult binge drinking trajectories and its link to historical variation in social roles and minimum legal drinking age. *Developmental psychology, 51*(7), 962. doi:http://dx.doi.org/10.1037/dev0000022

Janssen, T., Braciszewski, J. M., Vose-O'Neal, A., & Stout, R. L. (2017). A comparison of long-vs. short-term recall of substance use and HIV risk behaviors. *Journal of Studies on Alcohol and Drugs, 78*(3), 463-467. doi:https://doi.org/10.15288/jsad.2017.78.463

Kass, R. E., & Raftery, A. E. (1995). Bayes factors. *Journal of the american statistical association, 90*(430), 773-795.

Khantzian, E. J. (1987). *The self-medication hypothesis of addictive disorders: focus on heroin and cocaine dependence*: Springer.

Krueger, E. A., Barrington-Trimis, J. L., Unger, J. B., & Leventhal, A. M. (2021). Sexual and gender minority young adult coping disparities during the COVID-19 pandemic. *Journal of Adolescent Health, 69*(5), 746-753. doi:https://doi.org/10.1016/j.jadohealth.2021.07.021

Laghi, F., Di Tata, D., Bianchi, D., Lonigro, A., Pompili, S., Zammuto, M., & Baiocco, R. (2021). Problematic alcohol use in young adults during the COVID-19 lockdown in Italy. *Psychology, Health & Medicine*, 1-11. doi:https://doi.org/10.1080/13548506.2021.1975785

Lai, H. M. X., Cleary, M., Sitharthan, T., & Hunt, G. E. (2015). Prevalence of comorbid substance use, anxiety and mood disorders in epidemiological surveys, 1990–2014: A systematic review and meta-analysis. *Drug and Alcohol Dependence, 154*, 1-13. doi:http://dx.doi.org/10.1016/j.drugalcdep.2015.05.031

Lau-Barraco, C., & Collins, R. L. (2011). Social networks and alcohol use among nonstudent emerging adults: A preliminary study. *Addictive behaviors, 36*(1-2), 47-54. doi:10.1016/j.addbeh.2010.08.017

Lechner, W. V., Laurene, K. R., Patel, S., Anderson, M., Grega, C., & Kenne, D. R. (2020). Changes in alcohol use as a function of psychological distress and social support following COVID-19 related University closings. *Addictive behaviors, 110*, 106527. doi:https://doi.org/10.1016/j.addbeh.2020.106527

McKay, M. T., Konowalczyk, S., Andretta, J. R., & Cole, J. C. (2017). The direct and indirect effect of loneliness on the development of adolescent alcohol use in the United Kingdom. *Addictive behaviors reports, 6*, 65-70. doi:http://dx.doi.org/10.1016/j.abrep.2017.07.003

Minhas, M., Belisario, K., González-Roz, A., Halladay, J., Murphy, J. G., & MacKillop, J. (2021). COVID-19 impacts on drinking and mental health in emerging adults: Longitudinal changes and moderation by economic disruption and sex. *Alcoholism: Clinical and Experimental Research*. doi:10.1111/acer.14624

Mohr, C. D., Umemoto, S. K., Rounds, T. W., Bouleh, P., & Arpin, S. N. (2021). Drinking to Cope in the COVID-19 Era: An Investigation Among College Students. *Journal of Studies on Alcohol and Drugs, 82*(2), 178-187. doi:https://doi.org/10.15288/jsad.2021.82.178

Naughton, F., Ward, E., Khondoker, M., Belderson, P., Marie Minihane, A., Dainty, J., . . . Notley, C. (2020). Health behaviour change during the UK COVID-19 lockdown:

Findings from the first wave of the C-19 health behaviour and well-being daily tracker study. *British journal of health psychology*. doi:10.1111/bjhp.12500

Orri, M., Boivin, M., Chen, C., Ahun, M. N., Geoffroy, M.-C., Ouellet-Morin, I., . . . Côté, S. M. (2020). Cohort profile: Quebec Longitudinal Study of Child Development (QLSCD). *Social Psychiatry and Psychiatric Epidemiology*, 1-12. doi:https ://doi.org/10.1007/s0012 7-020-01972-z

Papp, L. M., & Kouros, C. D. (2021). Effect of COVID-19 Disruptions on Young Adults' Affect and Substance Use in Daily Life. *Psychology of Addictive Behaviors, 35*(4), 391–401. doi:10.1037/adb0000748

Patrick, M. E., Terry-McElrath, Y. M., Kloska, D. D., & Schulenberg, J. E. (2016). High-intensity drinking among young adults in the United States: Prevalence, frequency, and developmental change. *Alcoholism: Clinical and Experimental Research, 40*(9), 1905-1912. doi:10.1111/acer.13164

Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., . . . McManus, S. (2020). Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *The Lancet Psychiatry, 7*(10), 883-892. doi:https://doi.org/10.1016/S2215-0366(20)30308-4

Pinkham, A. E., Ackerman, R. A., Depp, C. A., Harvey, P. D., & Moore, R. C. (2020). A longitudinal investigation of the effects of the COVID-19 pandemic on the mental health of individuals with pre-existing severe mental illnesses. *Psychiatry research, 294*, 113493. doi:https://doi.org/10.1016/j.psychres.2020.113493

Poulin, C., Hand, D., & Boudreau, B. (2005). Validity of a 12-item version of the CES-D [Centre for Epidemiological Studies Depression scale] used in the National Longitudinal Study of Children and Youth. *Chronic Diseases and Injuries in Canada, 26*(2-3), 65.

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of educational and behavioral statistics, 31*(4), 437-448. doi:https://doi.org/10.3102/10769986031004437

Québec Government. (2020a). COVID-19 pandemic - The Quebec government mobilized more than ever, assures François Legault [Press release]. Retrieved from https://www.quebec.ca/nouvelles/actualites/details/pandemie-de-covid-19-le-gouvernement-du-quebec-mobilise-plus-que-jamais-assure-francois-legault

Québec Government. (2020b). Quebec on hiatus until May 4, announces François Legault [Press release]. Retrieved from https://www.quebec.ca/nouvelles/actualites/details/le-quebec-sur-pause-jusqu-au-4-mai-annonce-francois-legault

Québec Government. (2020c). Quebec Premier François Legault steps up emergency measures to protect the population [Press release]. Retrieved from https://www.quebec.ca/nouvelles/actualites/details/pandemie-de-la-covid-19-le-premier-ministre-du-quebec-francois-legault-accentue-les-mesures-durgence-pour-proteger-la-population

Quebec National Institute of Public Health. (2021). Données COVID-19 par région sociosanitaire. Retrieved from https://www.inspq.qc.ca/covid-19/donnees/par-region

Ramo, D. E., Liu, H., & Prochaska, J. J. (2012). Reliability and validity of young adults' anonymous online reports of marijuana use and thoughts about use. *Psychology of Addictive Behaviors, 26*(4), 801. doi:https://doi.org/10.1037/a0026201

Robinson, E., & Daly, M. (2021). Explaining the rise and fall of psychological distress during the COVID-19 crisis in the United States: Longitudinal evidence from the Understanding America Study. *British journal of health psychology, 26*(2), 570-587. doi:10.1111/bjhp.12493

Saunders, J. B., Aasland, O. G., Babor, T. F., De La Fuente, J. R., & Grant, M. (1993). Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction, 88*(6), 791-804. doi:https://doi.org/10.1111/j.1360-0443.1993.tb02093.x

Selya, A. S., Rose, J. S., Dierker, L. C., Hedeker, D., & Mermelstein, R. J. (2012). A practical guide to calculating Cohen's f2, a measure of local effect size, from PROC MIXED. *Frontiers in psychology, 3*, 111. doi:10.3389/fpsyg.2012.00111

Shrier, L. A., Walls, C., Rhoads, A., & Blood, E. A. (2013). Individual and contextual predictors of severity of marijuana use events among young frequent users. *Addictive behaviors, 38*(1), 1448-1456. doi:https://doi.org/10.1016/j.addbeh.2012.05.026

Simons, J. S., Wills, T. A., Emery, N. N., & Marks, R. M. (2015). Quantifying alcohol consumption: Self-report, transdermal assessment, and prediction of dependence symptoms. *Addictive behaviors, 50*, 205-212. doi:https://doi.org/10.1016/j.addbeh.2015.06.042

Société des alcools du Québec. (2020). Net income of $243.5 million in the first quarter of fiscal 2020-2021. Retrieved from https://www.saq.com/en/first-quarter-results-of-2020-2021

Société Québécoise du Cannabis. (2021). *T1 2020-21: Rapport financier intermédiaire pour le trimestre de 12 semaines clos le 20 juin 2020*. Retrieved from https://www.sqdc.ca/en-CA/about-the-sqdc/medias/2021/03/01/The-SQDC-posts-a-profit-of-233-million-for-the-third-quarter-

Stanton, R., To, Q. G., Khalesi, S., Williams, S. L., Alley, S. J., Thwaite, T. L., . . . Vandelanotte, C. (2020). Depression, anxiety and stress during COVID-19: associations with changes in physical activity, sleep, tobacco and alcohol use in

Australian adults. *International journal of environmental research and public health, 17*(11), 4065. doi:10.3390/ijerph17114065

Statistics Canada. (2021). *Prevalence of cannabis consumption in Canada 2014-2018*. Retrieved from https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610059701

Thomas, K. (2021). COVID-19 timeline: A year like no other in Quebec. *Montreal Gazette*.

Watkins-Martin, K., Orri, M., Pennestri, M.-H., Larose, S., Gouin, J.-P., Castellanos-Ryan, N., . . . Geoffroy, M.-C. (2021). Depression and Anxiety Symptoms in Young Adults Before and During the COVID-19 Pandemic: Evidence from a Canadian Population-Based Cohort. *Annals of General Psychiatry, 20*. doi:https://doi.org/10.1186/s12991-021-00362-2

World Health Organization. (2018). *Global status report on alcohol and health 2018*. Retrieved from Geneva:

Table 1

Descriptive Statistics and Correlations Between COVID-19 and Pre-Existing Factors

Substance Use																	*Mean*	*SD*
Alcohol frequency	Pre-pandemic																2.98	1.36
	During COVID-19																3.01	1.77
Binge drinking frequency	Pre-pandemic																1.55	1.35
	During COVID-19																1.37	1.55
Cannabis frequency	Pre-pandemic																1.50	1.91
	During COVID-19																1.50	2.17
COVID-19 Factors	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	*M* / valid %	SD/ *n*
1. Female	.132	.073	.092	.046	.035	.159	.149	.139	.087	.056	.055	-.002	.125	.073	.176	-.014	54%	586
2. Living independently	1	-.037	-.016	.010	-.066	.282	-.107	.039	.107	-.142	.001	-.205	.036	-.008	.032	.043	37%	401
3. Loss of employment		1	.030	-.003	.030	.048	-.006	.044	.048	.050	.137	.105	-.012	.048	-.031	.091	23%	241
4. Loss of education			1	.107	.045	.020	.058	.045	.049	.241	-.083	.096	.015	-.017	.053	.009	22%	234
5. COVID-19 news-seeking				1	.070	.055	.102	.018	.062	.078	.048	.021	-.077	.084	-.037	.104	2.05	1.1
6. Living in Montreal					1	.008	.155	.120	.107	.135	-.028	.112	.038	-.051	.130	.003	21%	217
7. In a relationship						1	.016	-.067	.030	-.042	.104	-.015	-.007	.045	.019	.009	57%	610
8. Health worries							1	.162	.176	.047	-.022	-.008	.015	-.052	.091	-.090	6.7	4.15
9. Loneliness								1	.254	.014	-.077	.024	.079	-.194	.330	.052	4.77	1.88
10. Financial concerns									1	-.039	-.080	-.166	.053	-.133	.245	.012	0.66	0.86
Pre-existing Factors																		
11. Studying at 21 years										1	-.117	.327	-.079	.098	-.052	.001	63%	577
12. Employed at 21 years											1	.008	-.052	.062	.003	.136	75%	810
13. Socioeconomic status												1	-.096	.161	-.073	.080	-0.1	1.04
14. Sexual minority attraction													1	-.128	.146	.014	11%	105
15. Social support														1	-.327	.009	26.65	4.24
16. Depression															1	.100	9.37	6.54
17. Problem drinking																1	4.89	4.61

Note. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2020), ©Gouvernement du Québec, Institut de la statistique du Québec.

Table 2
Overall Change and Change x Moderator Effects for Substance Use from Pre-Pandemic (21 years) to During COVID-19 (22 years), In the Whole Sample

	Alcohol Use Frequency				Binge Drinking Frequency				Cannabis Use Frequency			
	B (SE)	95% CI	*p*	BF	B (SE)	95% CI	*p*	BF	B (SE)	95% CI	*p*	BF
Overall Change	0.056 (0.041)	[-0.024, 0.136]	.168	0.06	**-0.15 (0.039)**	**[-0.227, -0.074]**	**.000**	**22.38**	-0.028 (0.045)	[-0.116, 0.06]	.530	0.03
Change x Moderator Effects												
COVID-19 Factors												
Female	-0.03 (0.092)	[-0.210, 0.150]	.745	0.00	-0.021 (0.085)	[-0.188, 0.146]	.804	0.00	-0.115 (0.104)	[-0.319, 0.090]	.272	0.00
Living independently	0.044 (0.093)	[-0.137, 0.226]	.632	0.00	0.108 (0.089)	[-0.066, 0.282]	.224	0.01	0.094 (0.100)	[-0.102, 0.291]	.347	0.00
Loss of employment	**0.259 (0.093)**	**[0.077, 0.441]**	**.005**	**39.23**	0.157 (0.100)	[-0.039, 0.352]	.116	0.11	0.081 (0.111)	[-0.137, 0.300]	.466	0.00
Loss of education	-0.057 (0.093)	[-0.240, 0.126]	.543	0.00	0.028 (0.094)	[-0.156, 0.212]	.766	0.00	0.106 (0.110)	[-0.109, 0.320]	.334	0.00
News-seeking	0.049 (0.040)	[-0.029, 0.127]	.221	0.01	-0.017 (0.040)	[-0.095, 0.060]	.663	0.00	0.018 (0.045)	[-0.071, 0.107]	.692	0.00
Living in Montreal	-0.191 (0.113)	[-0.413, 0.030]	.090	0.07	-0.124 (0.110)	[-0.339, 0.092]	.261	0.00	0.027 (0.141)	[-0.250, 0.304]	.850	0.00
In a relationship	-0.099 (0.087)	[-0.270, 0.072]	.256	0.00	-0.070 (0.087)	[-0.241, 0.102]	.427	0.00	-0.162 (0.097)	[-0.353, 0.028]	.095	0.01
Health worries	-0.011 (0.011)	[-0.032, 0.010]	.310	0.00	-0.009 (0.010)	[-0.029, 0.011]	.384	0.00	-0.003 (0.012)	[-0.027, 0.021]	.826	0.00
Loneliness	0.045 (0.025)	[-0.003, 0.094]	.068	0.19	0.030 (0.023)	[-0.015, 0.076]	.191	0.02	0.010 (0.027)	[-0.043, 0.063]	.713	0.00
Financial concerns	0.012 (0.057)	[-0.100, 0.125]	.827	0.00	0.021 (0.053)	[-0.083, 0.126]	.688	0.00	0.118 (0.061)	[-0.001, 0.237]	.053	0.06
Pre-Existing Factors												
Studying at 21 years	0.214 (0.095)	[0.029, 0.400]	.023	2.06	-0.172 (0.086)	[-0.341, -0.003]	.046	0.58	-0.016 (0.114)	[-0.239, 0.206]	.886	0.00
Employed at 21 years	0.151 (0.097)	[-0.040, 0.341]	.121	0.02	0.119 (0.089)	[-0.055, 0.294]	.180	0.01	0.112 (0.109)	[-0.101, 0.325]	.302	0.00
Socioeconomic status	0.073 (0.049)	[-0.023, 0.169]	.138	0.02	-0.005 (0.045)	[-0.093, 0.084]	.918	0.00	0.000 (0.051)	[-0.100, 0.101]	.995	0.00
Sexual minority attraction	0.064 (0.138)	[-0.207, 0.335]	.642	0.00	0.051 (0.136)	[-0.215, 0.317]	.706	0.00	-0.026 (0.145)	[-0.310, 0.258]	.857	0.00
Social support	0.010 (0.013)	[-0.014, 0.035]	.411	0.00	-0.002 (0.012)	[-0.025, 0.021]	.848	0.00	0.005 (0.013)	[-0.020, 0.030]	.706	0.00
Depression	-0.002 (0.008)	[-0.019, 0.014]	.768	0.00	0.005 (0.007)	[-0.010, 0.019]	.524	0.00	0.002 (0.009)	[-0.015, 0.020]	.786	0.00
Problem drinking	-0.010 (0.010)	[-0.029, 0.009]	.300	0.00	**-0.026 (0.009)**	**[-0.043, -0.008]**	**.004**	**>150**	-0.027 (0.011)	[-0.048, -0.006]	.011	1.07

Note. B=Unstandardized regression estimate. SE=Standard error. CI=Confidence interval. BF = Bayes Factor. Significant effects (i.e., p<.05, BF≥3) are bolded. Drinking and Cannabis use frequency were assessed on a 7-point scale ranging from 0 (never) to 6 (everyday). Binge Drinking Frequency was assessed on a 6-point scale ranging from 0 (never) to 5 (>1 per week). Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2020), ©Gouvernement du Québec, Institut de la statistique du Québec.

Table 3
Overall Change and Change x Moderator Effects for Substance Use from Pre-Pandemic (21 years) to During COVID-19 (22 years), Among Participants Who Engaged in that Substance Use Behavior <monthly, Pre-Pandemic

	Alcohol Use Frequency[a] (weighted *n*=380)				Binge Drinking Frequency[b] (weighted *n*=607)				Cannabis Use Frequency[a] (weighted *n*=833)			
	B (SE)	95% CI	*p*	BF	B (SE)	95% CI	*p*	BF	B (SE)	95% CI	*p*	BF
Overall Change	**0.304 (0.075)**	**[0.157, 0.451]**	**.000**	**>150**	**0.121 (0.042)**	**[0.038, 0.204]**	**.004**	**27.40**	0.091 (0.045)	[0.003, 0.179]	.042	0.31
Change x Moderator Effects												
COVID-19 Factors												
Female	-0.134 (0.168)	[-0.464, 0.196]	.426	0.01	0.096 (0.092)	[-0.084, 0.277]	.296	0.07	-0.123 (0.107)	[-0.333, 0.087]	.251	0.02
Living independently	0.002 (0.183)	[-0.357, 0.360]	.993	0.00	0.012 (0.104)	[-0.192, 0.216]	.908	0.03	0.032 (0.105)	[-0.175, 0.238]	.763	0.00
Loss of employment	0.297 (0.188)	[-0.072, 0.666]	.114	0.24	0.212 (0.117)	[-0.017, 0.440]	.069	0.65	0.024 (0.114)	[-0.199, 0.247]	.834	0.00
Loss of education	-0.25 (0.176)	[-0.595, 0.096]	.157	0.06	-0.016 (0.097)	[-0.205, 0.174]	.872	0.03	0.046 (0.115)	[-0.179, 0.271]	.691	0.00
News-seeking	0.029 (0.070)	[-0.108, 0.166]	.676	0.00	-0.029 (0.043)	[-0.113, 0.055]	.500	0.05	0.004 (0.044)	[-0.083, 0.090]	.937	0.00
Living in Montreal	0.087 (0.214)	[-0.333, 0.507]	.684	0.00	0.158 (0.128)	[-0.093, 0.409]	.217	0.12	0.192 (0.158)	[-0.117, 0.502]	.224	0.14
In a relationship	-0.101 (0.186)	[-0.465, 0.262]	.585	0.00	-0.037 (0.104)	[-0.242, 0.167]	.720	0.03	-0.075 (0.098)	[-0.268, 0.118]	.445	0.00
Health worries	-0.005 (0.018)	[-0.041, 0.031]	.785	0.00	-0.019 (0.011)	[-0.041, 0.002]	.082	0.37	0.002 (0.012)	[-0.021, 0.025]	.858	0.00
Loneliness	**0.111 (0.047)**	**[0.019, 0.202]**	**.018**	**>150**	0.011 (0.026)	[-0.040, 0.062]	.664	0.03	0.008 (0.028)	[-0.046, 0.062]	.779	0.00
Financial concerns	0.114 (0.109)	[-0.099, 0.327]	.294	0.02	0.061 (0.055)	[-0.048, 0.169]	.273	0.07	**0.138 (0.068)**	**[0.004, 0.272]**	**.044**	**123.22**
Pre-Existing Factors												
Studying at 21 years	0.137 (0.163)	[-0.184, 0.457]	.403	0.01	-0.145 (0.094)	[-0.330, 0.039]	.122	0.20	-0.126 (0.113)	[-0.348, 0.096]	.264	0.02
Employed at 21 years	**0.366 (0.179)**	**[0.015, 0.718]**	**.041**	**17.97**	0.087 (0.098)	[-0.105, 0.279]	.373	0.05	0.124 (0.108)	[-0.089, 0.336]	.253	0.01
Socioeconomic status	0.047 (0.086)	[-0.121, 0.216]	.582	0.00	-0.018 (0.044)	[-0.105, 0.069]	.681	0.03	0.029 (0.058)	[-0.084, 0.142]	.618	0.00
Sexual minority attraction	0.059 (0.246)	[-0.424, 0.542]	.811	0.00	0.054 (0.141)	[-0.223, 0.330]	.704	0.03	-0.136 (0.153)	[-0.436, 0.164]	.373	0.00
Social support	0.021 (0.021)	[-0.02, 0.062]	.309	0.02	-0.002 (0.013)	[-0.027, 0.024]	.890	0.03	-0.013 (0.012)	[-0.037, 0.011]	.292	0.01
Depression	**-0.031 (0.014)**	**[-0.06, -0.003]**	**.031**	**>150**	-0.008 (0.008)	[-0.025, 0.008]	.317	0.07	-0.003 (0.009)	[-0.020, 0.013]	.693	0.00
Problem drinking	0.032 (0.048)	[-0.062, 0.125]	.504	0.02	0.036 (0.020)	[-0.003, 0.076]	.067	0.84	-0.014 (0.012)	[-0.038, 0.01]	.252	0.02

Note. B=Unstandardized regression estimate. SE=Standard error. CI=Confidence interval. BF = Bayes Factor. Significant effects (i.e., p<.05, BF≥3) are bolded. Drinking and Cannabis use frequency were assessed on a 7-point scale ranging from 0 (never) to 6 (everyday). Binge Drinking Frequency was assessed on a 6-point scale ranging from 0 (never) to 5 (>1 per week). Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2020), ©Gouvernement du Québec, Institut de la statistique du Québec.

Table 4
Overall Change and Change x Moderator Effects for Substance Use from Pre-Pandemic (21 years) to During COVID-19 (22 years), Among Participants Who Engaged in that Substance Use Behavior ≥monthly, Pre-Pandemic

	Alcohol Use Frequency (weighted *n*=700)				Binge Drinking Frequency (weighted *n*=456)				Cannabis Use Frequency (weighted *n*=247)			
	B (SE)	95% CI	*p*	BF	B (SE)	95% CI	*p*	BF	B (SE)	95% CI	*p*	BF
Overall Change	-0.069 (0.046)	[-0.159, 0.022]	.137	0.14	**-0.492 (0.067)**	**[-0.623, -0.361]**	**.000**	**>150**	**-0.475 (0.122)**	**[-0.713, -0.237]**	**.000**	**>150**
Change x Moderator Effects												
COVID-19 Factors												
Female	0.033 (0.105)	[-0.172, 0.239]	.752	0.00	-0.152 (0.149)	[-0.445, 0.140]	.307	0.01	-0.336 (0.269)	[-0.863, 0.192]	.212	0.04
Living independently	0.089 (0.105)	[-0.117, 0.295]	.397	0.00	0.223 (0.147)	[-0.066, 0.512]	.131	0.28	0.365 (0.247)	[-0.119, 0.848]	.139	0.07
Loss of employment	**0.225 (0.104)**	**[0.021, 0.428]**	**.031**	**34.83**	0.115 (0.158)	[-0.195, 0.425]	.469	0.00	0.345 (0.285)	[-0.213, 0.903]	.226	0.03
Loss of education	0.032 (0.110)	[-0.183, 0.247]	.769	0.00	0.071 (0.165)	[-0.253, 0.395]	.666	0.00	0.357 (0.295)	[-0.221, 0.935]	.226	0.02
News-seeking	0.051 (0.045)	[-0.037, 0.140]	.256	0.02	0.027 (0.069)	[-0.109, 0.163]	.693	0.00	0.055 (0.121)	[-0.182, 0.292]	.649	0.00
Living in Montreal	**-0.323 (0.132)**	**[-0.583, -0.064]**	**.015**	**>150**	**-0.386 (0.179)**	**[-0.736, -0.036]**	**.031**	**>150**	-0.222 (0.318)	[-0.844, 0.401]	.485	0.01
In a relationship	-0.149 (0.093)	[-0.332, 0.033]	.108	0.20	-0.138 (0.140)	[-0.412, 0.135]	.322	0.01	-0.355 (0.270)	[-0.885, 0.174]	.188	0.04
Health worries	-0.014 (0.013)	[-0.039, 0.010]	.257	0.02	-0.008 (0.018)	[-0.043, 0.027]	.664	0.00	-0.033 (0.036)	[-0.103, 0.037]	.359	0.01
Loneliness	0.008 (0.028)	[-0.046, 0.063]	.764	0.00	0.036 (0.039)	[-0.041, 0.114]	.356	0.01	0.034 (0.074)	[-0.112, 0.179]	.650	0.00
Financial concerns	-0.047 (0.067)	[-0.179, 0.085]	.485	0.00	0.014 (0.094)	[-0.169, 0.198]	.878	0.00	0.132 (0.143)	[-0.149, 0.412]	.358	0.01
Pre-Existing Factors												
Studying at 21 years	0.218 (0.113)	[-0.004, 0.439]	.054	11.82	-0.177 (0.157)	[-0.484, 0.131]	.261	0.02	0.092 (0.316)	[-0.527, 0.710]	.771	0.00
Employed at 21 years	0.086 (0.114)	[-0.138, 0.309]	.452	0.00	0.210 (0.157)	[-0.098, 0.518]	.182	0.04	0.112 (0.306)	[-0.488, 0.712]	.714	0.00
Socioeconomic status	**0.155 (0.065)**	**[0.029, 0.282]**	**.016**	**>150**	0.049 (0.089)	[-0.125, 0.222]	.581	0.00	-0.188 (0.144)	[-0.470, 0.094]	.192	0.04
Sexual minority attraction	0.076 (0.174)	[-0.265, 0.417]	.662	0.00	-0.121 (0.274)	[-0.657, 0.416]	.659	0.00	0.186 (0.391)	[-0.580, 0.951]	.634	0.00
Social support	0.008 (0.017)	[-0.025, 0.040]	.639	0.00	0.015 (0.022)	[-0.029, 0.059]	.505	0.00	0.053 (0.041)	[-0.028, 0.134]	.202	0.13
Depression	0.011 (0.012)	[-0.011, 0.034]	.329	0.04	0.015 (0.014)	[-0.011, 0.042]	.263	0.03	0.018 (0.031)	[-0.043, 0.079]	.559	0.01
Problem drinking	0.012 (0.012)	[-0.012, 0.036]	.322	0.01	0.012 (0.015)	[-0.018, 0.042]	.436	0.00	-0.001 (0.030)	[-0.059, 0.057]	.964	0.00

Note. B=Unstandardized regression estimate. SE=Standard error. CI=Confidence interval. BF = Bayes Factor. Significant effects (i.e., p<.05, BF≥3) are bolded. Drinking and Cannabis use frequency were assessed on a 7-point scale ranging from 0 (never) to 6 (everyday). Binge Drinking Frequency was assessed on a 6-point scale ranging from 0 (never) to 5 (>1 per week). Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2020), ©Gouvernement du Québec, Institut de la statistique du Québec.

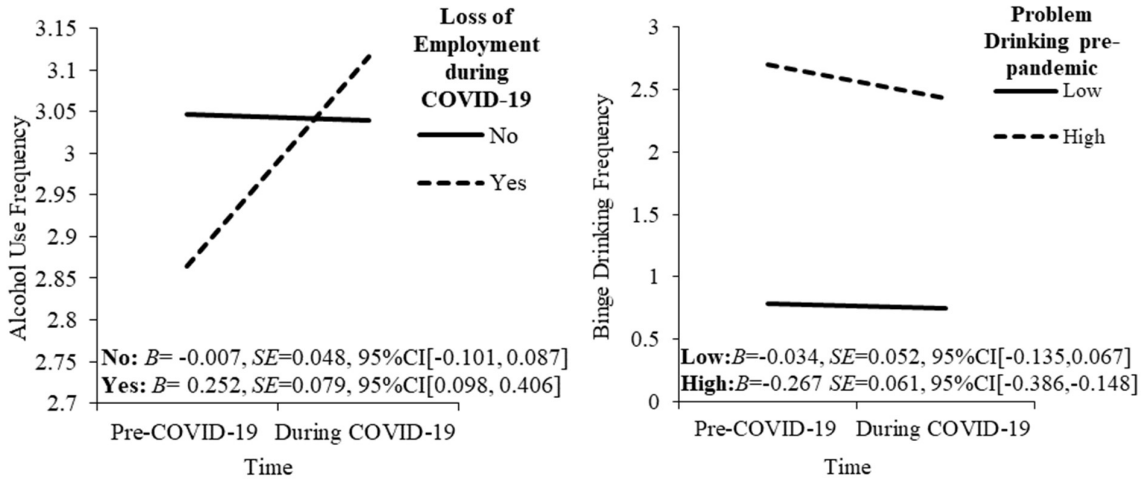

Figure 1. Simple Slope Effects for Change in Substance Use from Pre-Pandemic (21 years) to During COVID-19 (22 years), According to Each Significant Moderator, In the Whole Sample

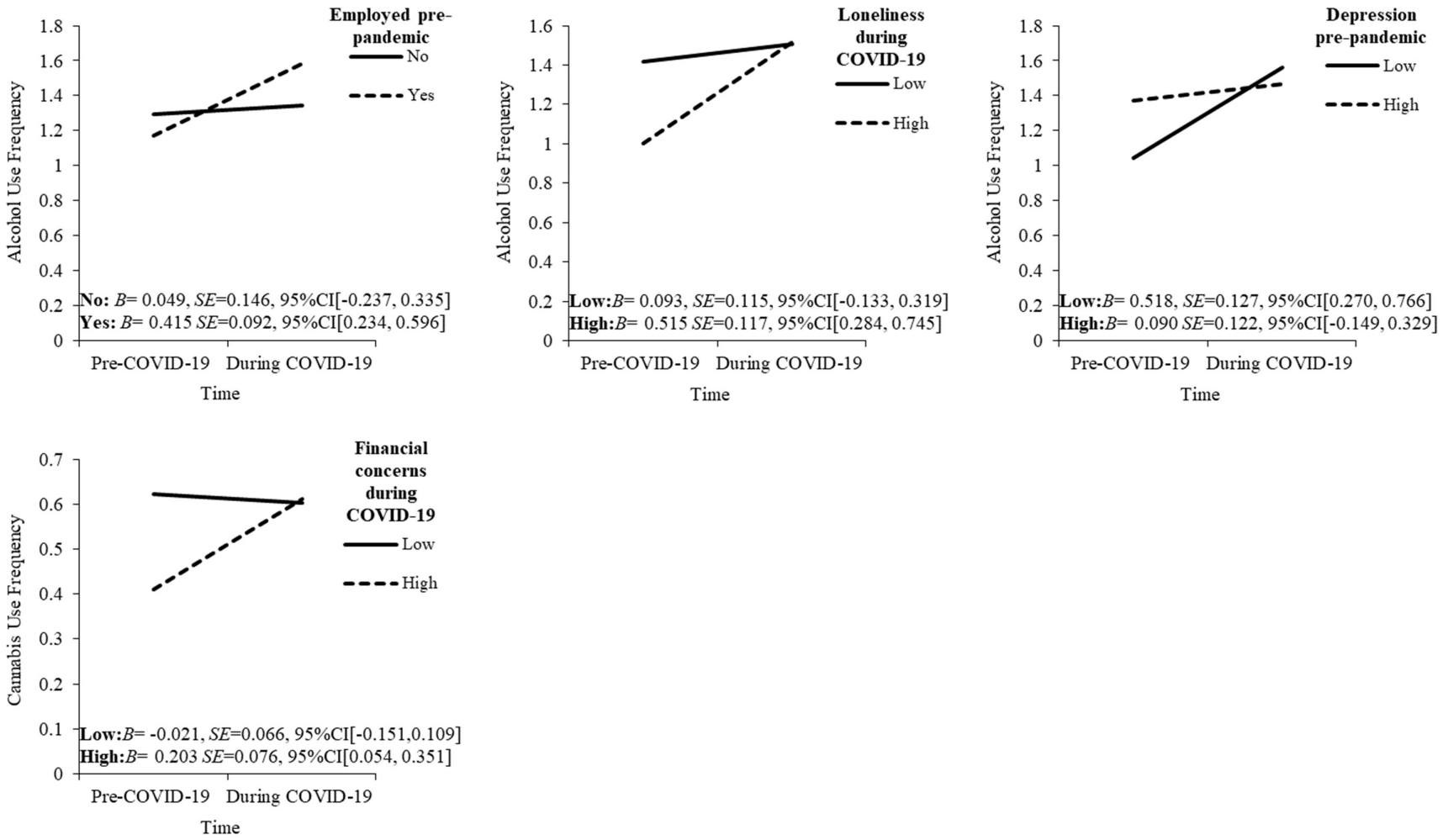

Figure 2. Simple Slope Effects for Change in Substance Use from Pre-Pandemic (21 years) to During COVID-19 (22 years), According to Each Significant Moderator, Among Participants Who Engaged in that Substance Use Behavior <monthly, Pre-Pandemic

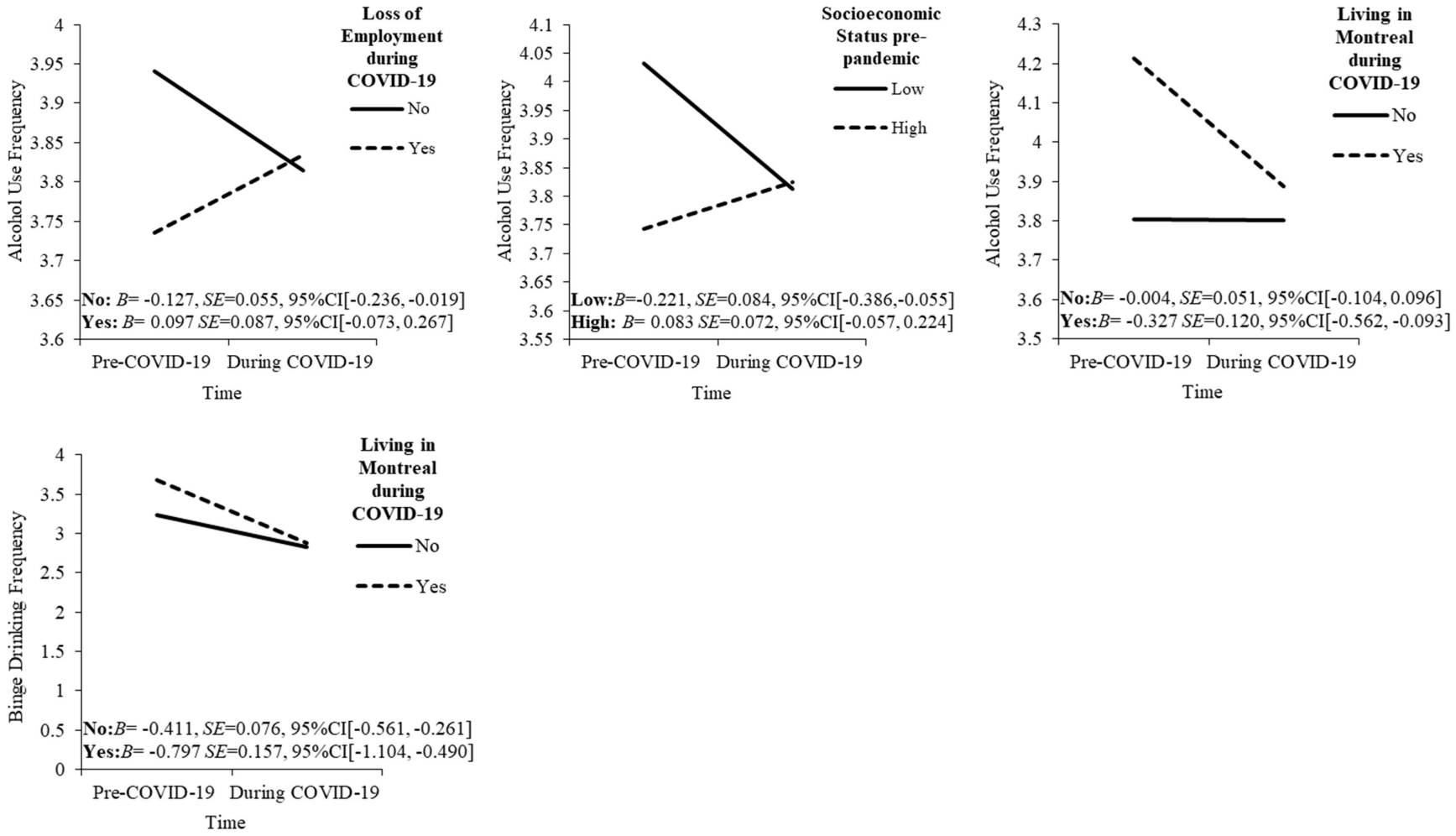

Figure 3. Simple Slope Effects for Change in Substance Use from Pre-Pandemic (21 years) to During COVID-19 (22 years), According to Each Significant Moderator, Among Participants Who Engaged in that Substance Use Behavior ≥monthly, Pre-Pandemic