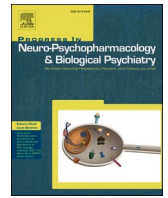




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## Alcohol consumption changes following COVID-19 lockdown among French-speaking Belgian individuals at risk for alcohol use disorder

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## ABSTRACT

We investigated changes in alcohol consumption following the COVID-19 lockdown among French-speaking Belgian individuals at risk for severe alcohol use disorder. Participants ( $N = 299$ ) at risk for alcohol use disorder (AUD, i.e., score higher than 19 at the Alcohol Use Disorder Identification Test), and 299 moderate drinkers (MOD, i.e., score lower than 8) individually matched for age, gender and education provided self-reports of alcohol consumption changes (i.e., number of alcohol units consumed during a typical week before and during lockdown). AUD were more likely (91.31%) than MOD (71.57%) to modify their consumption following lockdown ( $p < 0.0001$ ). They were more likely to decrease (65.89% vs. 35.12%,  $p < 0.0001$ ) and less likely to increase (25.42% vs. 36.45%,  $p = 0.004$ ) their consumption than MOD. Analyses of post-pre lockdown differences in alcohol consumption showed that AUD presented a stronger decrease than MOD ( $-13.97$  units/week vs.  $-0.07$ ,  $p < 0.0001$ ). Among individuals who decreased consumption, AUD decreased more ( $-27.92$  vs.  $-2.74$ ,  $p < 0.0001$ ) than MOD. Among those who increased consumption, AUD increased more (17.32 vs. 2.44,  $p < 0.0001$ ) than MOD. We thus observed sharp consumption increases or conversely abrupt decreases in individuals at high risk of alcohol use disorder, underscoring the need to develop prophylactic interventions for this population during such sanitary crises, to avoid brutal changes of the alcohol consumption pattern. Efforts should be made to mitigate consumption increases but also to favor progressive rather than sudden decreases in order to prevent damaging withdrawal symptoms.

### 1. Introduction

The worldwide sanitary crisis engendered by the COVID-19 pandemic, combined with the radical social distancing and lockdown measures adopted to contain its spread, have led to negative consequences on mental health and behaviors, especially among individuals presenting psychopathological conditions (Holmes et al., 2020; Pierce et al., 2020). Individuals with alcohol use disorder constitute a particularly vulnerable group in such contexts, since both the psychological distress and the social isolation generated by the COVID-19 crisis are established risk factors for relapse and/or increased alcohol misuse in this population (Clay and Parker, 2020; Sliedrecht et al., 2019; Spagnolo et al., 2020). Besides the direct physical and mental health consequences of alcohol misuse, excessive consumption bears additional risks in the COVID-19 context, especially among those presenting an alcohol use disorder: it increases the probability of contracting the virus and developing its most severe symptoms (Testino, 2020) and augments the

number of preventable injury-related hospitalizations, adding to the burden of overcrowded clinical settings. Conversely, the reduced access to alcohol that may have been caused by cuts in revenues and/or the closure of habitual consumption venues (Rehm et al., 2020) may also have led to sudden consumption decreases, exposing at-risk individuals to intense withdrawal symptoms (Narasimha et al., 2020).

Despite these considerations, and the fact that several studies explored how the COVID-19 impacted alcohol consumption in the general population (Callinan et al., 2020; Chodkiewicz et al., 2020; Neill et al., 2020; Pollard et al., 2020; Rolland et al., 2020; Schmits and Glowacz, 2021) and in specific groups (e.g., students; Bollen et al., 2021; Lechner et al., 2020), there has been little research focusing on such impacts among individuals with alcohol use disorder. Indeed, one study (Yazdi et al., 2020) assessed the consumption of patients with alcohol use disorder during the initial stage of the pandemic, but without a comparison with pre-pandemic consumption. Another study (Kim et al., 2020) measured changes in consumption in this population but did not

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comprise a control group. Therefore, it is currently unclear how COVID-19-related changes in alcohol consumption among individuals with alcohol use disorder compare to those observed in the general population. Such empirical results are needed for a better assessment of the differential behavioral and mental health consequences of this crisis, notably among addicted individuals (Marsden et al., 2020). Moreover, as the evolution of the pandemic is currently uncertain, these data may help developing targeted interventions to offer adapted therapeutic responses, should lockdown measures be re-established. We therefore sought to address this gap by investigating self-reported alcohol consumption changes during the lockdown period among people at high risk of presenting an alcohol use disorder, compared with people presenting moderate alcohol consumption.

## 2. Method

### 2.1. Participants, setting and measures

Data were extracted from a larger online survey conducted to evaluate COVID-19-related changes in alcohol consumption and to identify relevant predictors of these changes among the general population of French-speaking Belgian adults. This survey was disseminated through social media, University/Higher education school websites and national media between April 1st and May 3rd 2020 (i.e., weeks 3 to 8 of lockdown in Belgium). Lockdown measures in Belgium entailed the limitation of real-life social contacts to persons living in the same house, the restriction of outside activities to solitary exercise or walks, and closure of non-essential venues (e.g., fitness/sport clubs, cultural/entertaining places) and shops (including restaurants and bars). Alcohol could however be purchased from off-trade outlets. 10,899 responses were recorded. We excluded 3,215 participants (29.50% of the sample) because responses were not complete (21.79%) or aberrant (1.66%), or because participants were not living in Belgium (5.87%) or were not adults (0.17%). 7,718 complete and clean responses were thus included in the analyses. This study complied with the ethical standards of the declaration of Helsinki, as revised in 2008, and all participants provided informed written consent before completing the survey. The main outcome measure was participants' self-reported number of alcohol units (1 unit corresponding to 10 g of ethanol) consumed each day during a typical week [using the day-by-day procedure, as proposed in the Timeline Follow-Back Procedure (Sobell and Sobell, 1992)] before lockdown onset and since lockdown onset. For the present study, we extracted data from all participants (hereafter referred to as AUD) presenting an Alcohol Use Disorder Identification Test [AUDIT (Saunders et al., 1993), a validated 10-item screening tool assessing intensity/harmfulness of alcohol consumption] score higher than 19 ( $N = 299$ , aged 18–73), indicative of a high risk of alcohol use disorder (Babor et al., 2001), as well as from 299 non-abstinent (at least one drink in a typical week before or during lockdown) moderate drinkers (MOD) with an AUDIT score below 8, indicating low-risk consumption. MOD were individually matched with AUD for age, gender and education (primary, secondary or tertiary degree) using the propensity score-based matching procedure from the "MatchIt" (Ho et al., 2011) package in R (see Table 1 for group characteristics).

### 2.2. Analyses

We first computed difference scores by subtracting the total number of alcohol units consumed in a typical week before lockdown from the total number of alcohol units consumed weekly since lockdown onset. Positive scores reflect increased alcohol consumption and negative scores reflect decreased consumption. Second, we compared the proportion of people who increased, decreased or did not change their consumption in both groups using chi-squared tests. Third, we tested for a group effect on difference scores in the whole sample as well as among individuals who respectively increased or decreased their consumption,

**Table 1**

Sociodemographic and alcohol consumption characteristics of individuals at-risk for alcohol use disorder (AUD) and matched moderate drinkers (MOD) [M (SD) or N (%)].

	MOD (N = 299)	AUD (N = 299)
Age	32.76 (14.01)	32.84 (14.01)
Gender		
Female	121 (40.47%)	120 (40.13%)
Male	178 (59.53%)	179 (59.87%)
Education		
Primary	1 (0.34%)	3 (1.00%)
Secondary	93 (31.10%)	91 (30.44%)
Tertiary	205 (68.56%)	205 (68.56%)
AUDIT Score	2.12 (1.45)	23.40 (3.65)
Alcohol units per week		
Before lockdown onset	2.85 (3.44)	34.51 (21.14)
Since lockdown onset	2.78 (4.01)	20.52 (25.07)

using independent samples *t*-tests (Welch's correction of degrees of freedom was applied in cases of unequal variances). Finally, we investigated the potential influence of age and gender on alcohol consumption changes within the AUD group by fitting a general linear model with difference scores as a dependent variable and age (centered) and gender ( $-1 = \text{Male}$ ,  $1 = \text{Female}$ ) as predictors.

## 3. Results

The percentage of individuals reporting increased consumption during lockdown was 25.42% ( $N = 76$ ) among AUD and 36.45% ( $N = 109$ ) among MOD [ $\chi^2(1) = 8.52$ ,  $p = 0.004$ ]. The percentage of individuals reporting decreased consumption was 65.89% ( $N = 197$ ) among AUD and 35.12% ( $N = 105$ ) among MOD [ $\chi^2(1) = 56.62$ ,  $p < 0.0001$ ]. The percentage of people reporting unchanged consumption was 8.70% ( $N = 26$ ) among AUD and 28.43% ( $N = 85$ ) among MOD [ $\chi^2(1) = 38.51$ ,  $p < 0.0001$ ].

The mean difference score between post and pre-lockdown consumption (in units per week) was  $-13.99$  ( $SD = 27.45$ ) among AUD and  $-0.07$  ( $SD = 3.29$ ) among MOD [ $t(306.58) = 8.71$ ,  $p < 0.0001$ ,  $d = 0.71$ ]. Among individuals who increased their consumption ( $N = 178$ ), the mean difference score was  $17.32$  ( $SD = 17.22$ ) among AUD and  $2.44$  ( $SD = 2.77$ ) among MOD [ $t(77.72) = 7.47$ ,  $p < 0.0001$ ,  $d = 1.33$ ]. Among individuals who decreased their consumption ( $N = 319$ ), the mean difference score was  $-27.92$  ( $SD = 20.76$ ) among AUD and  $-2.74$  ( $SD = 3.05$ ) among MOD [ $t(211.58) = 16.70$ ,  $p < 0.0001$ ,  $d = 1.49$ ], see Fig. 1.

Results from the general linear model (see Table 2) indicated that there was no statistically significant effect of gender on difference scores [ $F(1;296) = 3.28$ ,  $p = 0.07$ ,  $\eta^2_p = 0.01$ ]. There was, however, an effect of age [ $F(1;296) = 27.61$ ,  $p < 0.0001$ ,  $\eta^2_p = 0.09$ ]: a one-year increase/decrease in age was accompanied by a 0.58 increase/decrease in the difference score.

As shown in Fig. 1, there were extreme difference score values in the AUD group, with the most negative ( $-140$ ) and most positive ( $92$ ) values being identified as outliers by Rosner's test. We decided not to exclude these data as they were considered as plausible.<sup>1</sup>

<sup>1</sup> A consumption of 20 doses per day (140 per week) is not uncommon in AUD, and an individual with such consumption who would totally stop drinking during lockdown would present a difference score of 140, which is the maximum observed in our sample. Moreover (1) at the methodological level, there was no evidence from other survey questions that these values had been entered erroneously; (2) at the statistical level, these data were not identified as influential points based on Cook's distance in either statistical test, and all presented means in this group were unaltered when removing these values (i.e., differences were less than 1 unit).

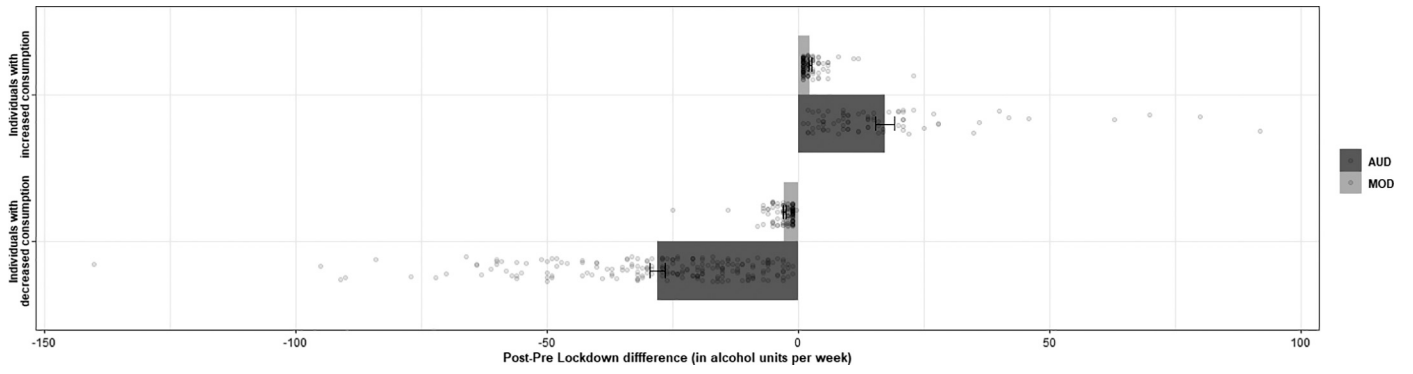


Fig. 1. Changes in alcohol consumption (number of units per week) following lockdown onset among individuals who increased (upper bars) or decreased (lower bars) their consumption, as a function of AUDIT score (high risk of alcohol use disorder; AUD versus moderate drinkers; MOD).

**Table 2**

*b* estimates and corresponding standard errors (SE) for the general linear model predicting difference scores using age and gender in the AUD group.

	<i>b</i>	SE
Intercept	-13.44	1.55
Age	0.58	0.11
Gender	2.83	1.56

#### 4. Discussion

This study compared self-reported changes in alcohol consumption during COVID-19-related lockdown between AUD and moderate drinkers, and investigated the influence of age and gender on these changes. Most participants reported a modified alcohol consumption pattern during lockdown, but AUD were significantly more likely (over 90%) than MOD (over 70%) to report such modified consumption. They were also more likely to report decreased consumption and less likely to report increased consumption. Moreover, when comparing groups as wholes in terms of number of alcohol units consumed, there was a far greater reduction among AUD.

On the one hand, these findings lend empirical support to the hypothesis that the COVID-19 situation strongly affected alcohol consumption among AUD individuals. On the other hand, they contradict the proposal that this population, as a whole, would be more likely to increase its consumption during the current crisis (Clay and Parker, 2020). Indeed, more than 65% of AUD individuals actually reduced their consumption during lockdown. These findings further seem at odds with previous reports linking higher AUDIT scores (Chodkiewicz et al., 2020) or higher previous drinking history (Neill et al., 2020) with increased alcohol consumption during the pandemic. However, these studies employed samples that substantially differed from the present one, as they comprised less than 10 individuals with an AUDIT > 15 (Chodkiewicz et al., 2020) or defined the most severe form of drinking history as a consumption of more than 10 units per week (Neill et al., 2020), which suggests that the current study provides more valid conclusions regarding changes in alcohol consumption in the specific subgroup of AUD individuals.

The absence of a generalized increase in consumption among AUD individuals during the COVID-19 pandemic is consistent with Kim et al. (2020), who found roughly equal percentages (about 20%) of increases and decreases in a sample of persons with a previous diagnosis of alcohol use disorder. Our finding of more prevalent decreases in AUD may relate to the fact that we categorized increases and decreases based on the number of alcohol units consumed in a typical week instead of differences in AUDIT scores (Kim et al., 2020), which may be more sensitive to subtle consumption reductions.

An important contribution of this study is the analysis of the differential evolution of alcohol consumption among individuals who increased or decreased their consumption, which shows drastically higher absolute changes in consumption among AUD: alcohol consumption reduction/increase in units per week were respectively five/eight times higher in the AUD group than in the MOD group. These massive differences indicate that this population is more subject to both strong increases and abrupt decreases in alcohol consumption during the current sanitary crisis, and underlines the importance of considering the magnitude of changes, beyond their direction.

Finally, in line with previous studies in the general population (e.g., Callinan et al., 2020; Chodkiewicz et al., 2020; Schmits and Glowacz, 2021), we found that age was positively related to COVID-19-related changes in alcohol consumption in the AUD group, suggesting that younger AUD individuals were more prone to important decreases in consumption whereas older AUD individuals were more likely to either present less sharp decreases or to increase their alcohol intake. Greater consumption decreases in younger AUD individuals may be explained by the sudden restriction of contexts favoring heavy drinking in this

population (e.g., social gatherings, drinking on on-trade venues; Stanesby et al., 2019) and reduced alcohol availability (Rehm et al., 2020).

Limitations of the present study include the use of a subjective self-report assessment of alcohol consumption (Del Boca and Darkes, 2003), which could notably be biased by the stress related to the sanitary crisis. Additionally, it should be noted that the current results, obtained in a sample of French-speaking Belgians, may not totally generalize to different countries and contexts given variations in sanitary measures.

Despite these limits, the present results bear important implications. They underline the need for continued care during lockdown for individuals previously or currently involved in an alcohol-related treatment (16% of our AUD sample). Moreover, prophylactic interventions should be implemented, not only to prevent the worsening of consumption patterns among untreated AUD individuals, but also to limit the complications linked to uncontrolled withdrawal, which may be of particular concern among younger individuals. For those actively seeking clinical help, these interventions may take the form of targeted campaigns promoting the availability of remote services such as specialized hotlines (e.g., Liese and Monley, 2020). More generally, individuals with at-risk alcohol consumption may benefit from health messages informing about effective emotion regulation strategies (Cavicchioli et al., 2019) and favoring progressive rather than sudden consumption decrease. Finally, the relatives and friends of individuals with AUD should be encouraged to maximize social support, notably via online platforms (Van Bavel et al., 2020).

#### 5. Conclusion

Our results indicate that AUD individuals strongly modified their alcohol consumption following the onset of the COVID-19-related sanitary measures. These modifications occurred in both directions and were of greater magnitude than those observed among individuals with MOD. Actions should therefore be undertaken to prevent sharp increases and decreases in this group during sanitary crises.

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#### Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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