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The Influence of Hangover on Subsequent Drinking: Preliminary Results from MARC Project 6

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Background
- Hangover is the most common negative consequence of heavy drinking, yet very little empirical research has explored the construct of hangover and even less is known about the influence that hangover has on subsequent drinking.
- Hangover has been thought to punish heavy drinking and therefore should result in less frequent heavy drinking episodes.
- Alcohol consumption has also been thought to be the consummate cure for hangover symptoms and popular culture refers to the phenomenon of drinking after a night of heavy consumption as "hair of the dog", thus, using alcohol as a cure for hangover could result in increased consumption.
- The current study explores the influence of hangover on subsequent drinking to determine whether empirical evidence supports the general belief that hangover punishes heavy drinking.
- In addition, potential individual difference variables that may moderate the relation between hangover and subsequent drinking are explored.

Method
- Data are from an intensive longitudinal study of the conjoint effects of alcohol and tobacco that utilized ecological momentary assessment techniques to capture data about individuals’ drinking and smoking in their natural environments.
- Details about the study are provided in Box A.
- The first drinking episode reported during the 21-day study was selected as the index drinking episode (N=396).
- Next, the drinking episode that immediately followed the index drinking episode was selected to determine time between drinking episodes.
- Hangover and intention to drink were assessed by items administered the morning after the index drinking episode.
- "Do you have a HANGOVER from last night’s drinking?"
- "What is the likelihood that you will drink tonight?" (Likert scale: 1=definitely not, 5=definitely plan to drink)
- Individual difference variables (potential moderators) were assessed at baseline using computerized questionnaires.
- Sex
- Paternal and maternal family history (FH) of alcohol problems (as indicated by a score ≥ 5 on the short Michigan Alcohol Screening Test; sMAST)
- Average frequency of alcohol consumption (study protocol required drinking on average once per week)
- Alcohol abuse/dependence (as indicated by scores on the Alcohol Use Disorders Identification Test; AUDIT)
- Smoking status (smokers were required to smoke at least one cigarette per week)
- Nicotine dependence (as indicated by scores on the Fagerström Test for Nicotine Dependence; FTND)

Results
- General description of participants included in this study:
  - Age M (SD) = 23.3 (7.1), range 18 – 70
  - 50.5% Male
  - 63.6% Smokers; FTND Score M (SD) = 2.1 (2.2), range 0 – 8
  - 14.9% paternal FH; 6.1% maternal FH
  - 18.7% drink 2-4 times/month; 60.4% drink 2-3 times/week; and 20.9% drink 4 or more times/week
  - AUDIT Score M (SD) = 12.2 (5.5), range 2 – 29
  - 20.5% of index drinking episodes resulted in hangover
  - Percentage of index drinking episodes that occurred on Tuesday, Wednesday, Thursday, and Friday night: 18.4%, 25.5%, 23.5%, and 17.7% respectively
  - Results from a multilevel model predicting intention to drink from hangover suggest that hangover is not related to participants’ intention to drink ($\beta = -0.007$, $p = .919$).
  - However, results from a survival analysis covering the 24-hour period following the index drinking episode indicate that intention to drink is highly predictive of time to next drink ($HR = 1.4$, $p < .001$; Figure 1), thus participants were accurate in estimating whether or not they would drink.
  - Results from survival models with hangover:
    - Base model: Typical drinking frequency was associated with decreased time to next drink ($HR = 1.4$, $p < .01$).
    - Moderator models: No significant interactions between hangover and moderators
    - Full model: AUDIT score was associated with decreased time to next drink ($HR = 1.0$, $p = .07$, $p = .04$ in moderator model; Figure 2).
    - Hangover was not significant in any model (Figure 3).

Analysis
- Multilevel models were used to examine the relation between hangover and intention to drink.
- Time to next drink was modeled in a survival framework using Cox regression.
- The survival models examined time to next drink across a 24-hour period; participants without a subsequent drinking event within 24 hours following the index drinking episode were censored ($n = 243$, 61.4%).
- All models included a set of dummy-coded variables indicating the day of the week in which the index drinking episode occurred and also each participants typical frequency of drinking reported at baseline.
- A series of survival models were conducted.
  - Base model: day of week, typical drinking frequency, and hangover
  - Moderator models: Base Model + moderator, and hangover*moderator
  - Full model: Base Model + all moderators, and all hangover*moderator interactions

Discussion
- Hangover does not appear to have an immediate influence on subsequent drinking in this study.
- Hangover was not related to intention to drink that night.
- Intention to drink was related to time to next drink in a 24-hour survival analysis, suggesting that participants are accurate in predicting their own drinking behavior, but this does not appear to be influenced by the presence of hangover symptoms.
- The lack of influence of hangover on subsequent drinking held in a number of potentially relevant subpopulations, including smokers and nonsmokers, males and females, and participants with and without a family history of alcohol problems.
- Alcohol abuse/dependence as measured by AUDIT scores was associated with decreased time to next drink within a 24-hour period.
- It should be noted that these results are preliminary and do not include within subject comparisons of time to drink on hangover and non-hangover days.

Future Directions
- The preliminary analyses presented examine only one drinking episode per participant and do not take full advantage of the intensive longitudinal nature of the Project 6 dataset.
- Future analyses on this dataset will include within subjects analyses comparing hangover and non-hangover days as well as multi-spell survival analyses that incorporate all drinking episodes reported by each participant.

Box A.
Overview of Project 6
- 404 (Mean age = 23.4, range 18-70; 50% male) participants were enrolled and carried electronic diaries for a period of three weeks.
- Participants completed 7,443 morning reports.
- The diaries were programmed to beep randomly five times per day to assess mood and physical symptoms; 26,977 random prompt assessments were completed.
- Smokers (64.4%) were asked to initiate an assessment every time they finished a cigarette; smokers logged 16,670 cigarette events, when not consuming alcohol.
- All participants were asked to initiate an assessment every time they finished the first drink of a drinking episode and then respond to drink follow-up beeps as they occurred; 2,119 initial drinking episodes were reported, with 8,516 drink follow-up reports completed.