Very Rapid Onset Cannabis Dependence Risk in Relation to Co-Occurring Use of Other Psychoactive Drugs

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**Abstract**

**Background:** Epidemiological estimates for lifetime cumulative incidence indicate that for every 9-11 who start using cannabis, one becomes a case of the cannabis dependence syndrome (CDS) – i.e., roughly 9%-11%. More recent estimates clarify that CDS risk might be much lower among ‘cannabis only’ users, due in part to the fact that many ‘cannabis only’ users try the drug a few times and never again. We turned to Hill functional analysis in order to study CDS probability soon after 1st cannabis use, estimated across strata defined by the number of recent days of cannabis use, with an acknowledgment that a persistence of cannabis use beyond a few trials (may signify a potentially higher risk subgroup).

**Methods:** United States National Surveys on Drug Use and Health (NSDUH), 2004-2014, sampled and assessed more than 500,000 participants, yielding a nationally representative probability sample of 13,874 newly incident cannabis users, with CDS assessment no more than 12 months since 1st use. For this analysis, we focused on the subgroup of 4,934 subjects with persistence of cannabis use into the 30 days prior to assessment. For this subgroup, we used Hill Functions to estimate variations in CDS probability across strata defined by cannabis-using days during the 30 days prior to assessment, and by history of using other psychoactive drug compounds.

**Results:** Our preliminary results show that among ‘cannabis only’ users (n=1,811) the probability of CDS starts at about 1% for occasional users (95% bootstrap confidence interval, CI: 0, 2), rising to about 9% for daily users (95% CI: 4.5, 23). However, estimated probability of CDS for daily users is greater when cannabis plus ethanol (but no other drugs) is being used (n=1,753): 63% (95% CI: 47, 84); here, use on same day is not required. Our presentation will show additional Hill function estimates for other cannabis and drug combinations (e.g., cannabis and tobacco, cannabis and alcohol and tobacco).

**Conclusions:** Notwithstanding NSDUH self-report methods and other limitations, the main finding is that probability of observing cannabis dependence is greater when cannabis use co-occurs with other psychoactive drug use. CDS probability is relatively low for ‘cannabis only’ users even when ‘trial’ users are excluded. These epidemiological estimates are consistent with a re-appraisal of cannabis dependence risk for ‘cannabis only’ users.

**Main Findings**

Figure 1 presents the estimated Hill function curves with the shaded regions depicting 95% bootstrap confidence intervals (CI). Based on the Hill function parameter estimates, CDS is observed among about 9% of the daily cannabis users with no co-occurring use of alcohol or tobacco cigarettes, with a much lower CDS estimate for infrequent ‘cannabis only’ users (~2%). Figure 1 also suggests that the co-use of tobacco cigarettes (without alcohol) does not signal increased probability of observing CDS soon after 1st cannabis use, while co-occurring use of alcohol is linked to greater CDS probability among daily cannabis users (~63%; 95% CI = 47%, 85%). Newly incident cannabis users with recent co-occurring cannabis, tobacco cigarette, and alcohol use are also much more likely to be observed with cannabis dependence versus cannabis only users. Note that in Table 1, estimated PD50 for CAN+CIG+ALC is 20 days (95% CI = 19, 23) versus 12-13 days for other combinations and just 5 days for ‘cannabis only’ users.

**Limitations**

Of special concern is the self-report interview survey data from NSDUH. However, in the context of nationally representative sample surveys on this scale, there are few logistically feasible and affordable alternatives to self-report. In addition, cross-sectional data always will be inferior to longitudinal data when fitting Hill functions of this type. Nonetheless, in these cross-sectional estimates, we can forecast what a followup study might show about variation in probability of developing cannabis dependence within 12 months after 1st cannabis use, with relatively smaller estimates for ‘cannabis only’ users and substantially larger estimates for ‘polydrug’ newly onset users. Finally, feedback loops might be present (Anthony, 2010) such that cannabis dependence, once it develops, may have prompted larger estimates for ‘polydrug’ newly onset users. Furthermore, feedback loops might be present (Anthony, 2010) such that cannabis dependence, once it develops, may have prompted larger estimates for ‘polydrug’ newly onset users.

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**Disclosure**

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