Media Release: European College of Neuropsychopharmacology

Large UK study shows no relationship between moderate adolescent cannabis use and exam results or IQ, but heavier use may predict poorer exam performance

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A large UK study has found that occasional adolescent cannabis use does not lead to poorer educational and intellectual performance, but that heavy cannabis use is associated with slightly poorer exam results at age 16. The results come from the Avon Longitudinal Study of Parents and Children (ALSPAC, also known as "Children of the 90's") a long-term study that follows the health of children born in the Bristol area (UK) in 1991 and 1992. The work is being presented at the annual congress of the European College of Neuropsychopharmacology (ECNP) in Berlin.

The researchers analysed data from 2,612 children who had their IQ tested at the age of 8, and again at the age of 15. These children's examination results were then factored in via the National Pupil Database. At the age of 15, each person in the study completed a survey on cannabis use. The researchers then used regression analysis to look at how cannabis use affected both intellectual and educational performance. A number of children could not be included in the final analyses (for example because they had experienced a head injury), leaving a total sample size of 2,235.

The researchers found two main points

- Cannabis use appeared to be associated with decreased intellectual performance. Cannabis use was, however, highly correlated with other risky behaviours such as alcohol, cigarette and other drug use. When the researchers took these other behaviours into account, they found there was no relationship between cannabis use and lower IQ at age 15.
- Heavier cannabis users (at least 50 times by age 15) however, did show marginally impaired educational abilities. These children tended to have poorer exam results (3% lower) on compulsory school exams taken at age 16, even after adjusting for childhood educational performance, as well as alcohol, cigarette and other drug use.

According to lead researcher, Claire Mokrysz (University College London):

"Our findings suggest cannabis may not have a detrimental effect on cognition, once we account for other related factors- particularly cigarette and alcohol use. This may suggest that previous research findings showing poorer cognitive performance in cannabis users may have resulted from the lifestyle, behaviour and personal history typically associated with cannabis use, rather than cannabis use itself.

People often believe that using cannabis can be very damaging to intellectual ability in the long-term, but it is extremely difficult to separate the direct effects of cannabis from other potential explanations. Adolescent cannabis use often goes hand in hand with other drug use, such as alcohol and cigarette smoking, as well as other risky lifestyle choices. It's hard to know what causes what- do kids do badly at school because they are smoking weed, or do they smoke weed because they're doing badly? This study suggests it is not as simple as saying cannabis is the problem.

This is a potentially important public health message- the belief that cannabis is particularly harmful may detract focus from and awareness of other potentially harmful behaviours. However the finding that heavier cannabis use is linked to marginally worse educational performance is important to note, warranting further investigation".

Commenting ECNP Chair, Professor Guy Goodwin (Oxford) said

"This is a potentially important study because it suggests that the current focus on the alleged harms of cannabis may be obscuring the fact that its use is often correlated with that of other even more freely available drugs and possibly lifestyle factors. These may be as or more important than cannabis itself".

The researchers noted that the study has some limitations. For example, cannabis use was self-reported, and the measure of IQ taken at age 15 was an abbreviated version of the standard Wechsler IQ test. Full details can be found in the abstract (however please note that the abstract shows a preliminary analysis; this may differ from the version which is currently being prepared for publication and which is described above).

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Notes for Editors

Please mention the European College of Neuropsychopharmacology Congress

in any stories which result from this press release.

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ABSTRACT This abstract will be presented on Tuesday 21st October at 11.45. Please note that the final poster differs slightly from this abstract.

P.6.d.016 **Neuropsychological and educational outcomes related to adolescent cannabis use, a prospective cohort study** C. Mokrysz[1 *], S. Gage[2], R. Landy[3], M.R. Munafò[4], J.P. Roiser[5], H.V. Curran[1]

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Previous research has suggested heavy cannabis use in adolescence may lead to persistent neuropsychological deficits. However much of the research to date has been cross-sectional and therefore unable to assess whether pre-exposure group differences are driving the association. There is a considerable lack of consensus in the literature to date. A recent longitudinal study suggested chronic heavy cannabis use is associated with decline in IQ in adolescent-onset cannabis users, but not adult-onset users [1]. It is important however to investigate other possible explanations for this relationship, including the role of socioeconomic status as well as other drug and alcohol use, before drawing a causal conclusion. The present study aimed to further explore the relationship between adolescent cannabis use and cognitive functioning in a new, larger sample, as well as assessing the relationship between cannabis use and educational outcomes. Participants were members of the ALSPAC cohort, a prospective study following 15,247 pregnancies with expected delivery between April 1991 and December 1992, from Avon, South-West England. Participants completed IQ tests pre-cannabis exposure at age 8 and again at age 15, and completed cannabis-use questionnaires at age 15. Data linkage with the National Pupil Database (a central repository for pupil level educational data in England) provided educational performance data for participants. Standardised change scores for full-scale IQ were calculated and regression analyses were employed to test the relationship between reported cannabis use and the outcomes of IQ change and educational performance. Of a complete sample size of 2612, at age 15 years 24% reported trying cannabis at least once. Cannabis use was found to be associated with IQ decline ($p \leq 0.001$). Participants who reported using cannabis more than 100 times saw decline of 3.71 IQ points relative to never users ($p=0.010$). However once other relevant factors (including sex, socioeconomic status, maternal factors, mental health, and other drug use) were included in the multivariate model the association was attenuated. In particular alcohol use was found to be strongly associated with IQ decline ($p \leq 0.001$), and appeared to explain much of the variance in IQ change associated with cannabis use. In those reporting moderate alcohol use (ever use quantity of 6−99 times) this association persisted after control for other relevant factors, however was no longer apparent for heavier alcohol users (ever use quantity of at least 100 times). No other factors were found to be predictive of IQ change. Similar analyses were conducted for educational performance at age 16, controlling for pre-exposure IQ. Cannabis use was no longer associated with educational outcome once controlling for the above factors, however cigarette use remained strongly predictive of educational outcome ($p \leq 0.001$). The findings do not support the hypothesis that cannabis use in adolescence leads to persistent decline in cognitive functioning, once other possible confounding variables are accounted for. The finding that moderate but not heavier alcohol use was associated with IQ decline may relate to a detrimental effect of alcohol use in adolescence, warranting further investigation.

References [1] Meier, M.H., Caspi, A., Ambler, A., Harrington, H., Houts, R., et al., 2012. Persistent cannabis users show neuropsychological decline from childhood to midlife. Proc Natl Acad Sci USA 109(40): E2657-E2664.