Comparing participant-reported memory problems with memory performance tests in chronic marijuana users

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INTRODUCTION:
Marijuana use is one of the most common illicit substances abused in the United States. Many studies on the neurocognitive effects of cannabis use have shown deficits in memory function upon chronic use of cannabis. One commonly utilized test to determine memory loss secondary to the use of cannabis is the Marijuana Problem Scale (MPS). It relies upon the subjective self-report of memory loss on an ordinal scale of 0, 1, or 2; these values correspond to "no problem," indicating no impairment in memory, "minor problem," indicating some impairment of memory, and "serious problem," indicating severe impairment of memory. Objective computerized neurocognitive memory tests are commonly performed with both paper and electronic tests and are computerized. These tests report the test taker’s ability to recall a bank of 15 words (Fig A) and 15 shapes (Fig B) with both immediate and delayed challenges. This study examined baseline reports of these two measures made by participants who were enrolled in a randomized, prospective marijuana use study. The aim of this study was to compare the Marijuana Problem Scale (MPS), a subjective researcher-administered questionnaire used in this study to survey memory problems, to objective memory performance testing.

METHODS:
Baseline measurements were conducted before participants were randomized into a marijuana cessation study. Participants were asked to complete the Marijuana Problem Scale per protocol. During the same visit, these participants were tested with the CNS Vital Signs neurocognitive battery to assess verbal memory, visual memory, working memory, composite memory, reasoning, executive functioning, processing speed, psychomotor speed, reaction time, attention, cognitive flexibility, social acuity, and sustained attention. Verbal and visual memory scores from the neurocognitive battery were compared, and participants were grouped by Marijuana Problem Scale response (0, 1, or 2). Participants were included in the study if they met DSM-IV criteria for cannabis dependence, were regular marijuana smokers, were seeking treatment for cessation, and were between the ages of 13 and 21. Participants were excluded from the study if they were allergic to the study medication, taking medications that might interfere with the metabolism of the study medication, currently enrolled in a treatment for cannabis addiction, addicted to another substance besides cannabis or nicotine, physically or mentally ill in such a way as to place them at significant risk due to the treatment protocol, or if they were pregnant or lactating during the study period. To be included in the analysis, participants had to complete both the baseline Marijuana Problem Scale and the CNS Vital Signs neurocognitive memory test being analyzed. One hundred and fourteen participants were analyzed for this study.

RESULTS & DISCUSSION:
There were three possible responses to the MPS: no problem = 0, minor problem = 1, and serious problem = 2 (Fig C). Those reporting "no problem," 0 on the MPS, had a mean verbal memory score of 92.7 with a CI of 84.7 – 100.7 and mean visual memory score of 93.1 with a CI of 88.2 – 98.0. Those reporting memory losses as a "minor problem," 1 on the MPS, had a mean verbal score of 103.9 with a CI of 99.2 – 108.6 and a mean visual memory score of 100.1 with a CI of 98.8 – 105.7. Those reporting "serious problem," 2 on the MPS, had a mean verbal memory score of 82.2 with a CI of 65.4 – 99.0 and a mean visual memory score of 91.7 with a CI of 84.5 – 89.9 (Fig C).

ANOVA analysis revealed that differences between the verbal and visual memory scores among the 3 MPS groups were found to be significant at p=0.0033 and p=0.0039, respectively (Fig D). Further analysis by a Tukey-Kramer test showed that certain combinations of groups failed to demonstrate a significant difference in means. Specifically, there was a significant difference between those reporting "no problem" and "minor problem" (p=0.0372) and between those reporting "minor problem" and "serious problem" (p=0.0088) in verbal memory scores (Fig E), but no significant difference between those reporting "no problem" and "serious problem" (p=0.3286). Likewise, there was a significant difference in visual memory scores between those reporting "no problem" and "minor problem" (p=0.0064), but no difference between the other combinations of groups (p=0.0792 and p=0.9546) (Fig F).

These insignificant differences suggest that participants who reported memory loss scored highest on the Marijuana Problem Scale. Self-reporting offers subjective measures of a problem, but may not provide an objective measure. It may be more reliable to judge memory with objective measures of memory may prove more reliable at assessing memory impairment in research studies than the use of subjective questionnaires.

CONCLUSIONS:
Both verbal and visual memory scores showed significant differences in participants reporting "no problem" and "minor problem." However, the objective memory scores indicated that those with minor problems were less likely to experience the degree of memory impairment that those reporting no impairment experienced. This finding suggests that objective measures of memory may prove more reliable at assessing memory impairment in research studies than the use of subjective questionnaires.

DISCLOSURES:
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