

TITLE: Marijuana and Alcohol: A Driver Performance Study

DATE: September 1986

AUTHOR(S): Alfred A. Biasotti, Patrice N. Boland, Calvin Mallory, Victor C. Reeve, DOJ; Raymond C. Peck, DMV

REPORT NUMBER: Unnumbered (NRN052)

NTIS NUMBER: None

FUNDING SOURCE: Office of Traffic Safety

PROJECT OBJECTIVE:

To determine the effects of marijuana, and marijuana in combination with alcohol, on driving performance.

SUMMARY:

In a double-blind experiment, approximately 100 volunteer male marijuana and alcohol users received one of four experimental treatments: (1) marijuana and placebo alcohol, (2) active alcohol and placebo marijuana, (3) active marijuana and alcohol, or (4) double placebo. After consumption, each subject drove a vehicle over a test course which simulated a number of real-world driving conditions, and then performed a series of ancillary tests, including a battery of CHP field sobriety tests and other measures of psychomotor performance, which have been shown to be associated with an increased traffic accident risk.

Four post-drug runs were evaluated, separated by one-hour intervals. The subjects' performance was independently rated by an in-car examiner, outside observers, and computerized vehicle measurements. Blood and urine specimens were extracted after each run to establish levels of THC, serum carboxy, and alcohol.

Through a variety of multivariate statistical techniques it was found that both marijuana and alcohol had significant effects on driving performance, with particularly detrimental effects under the both-drugs treatment. The effects of the both-drugs treatment were found to be primarily additive. The both-drugs group produced the largest performance decrement on all ancillary measures, with a significantly lengthened duration of impairment over that for alcohol or marijuana alone. The effects of marijuana were more rapid than those of alcohol and somewhat less severe for most tasks. Although conclusions about the effect of marijuana alone on safety performance might be guarded, the report notes, the results strongly imply that the combination of marijuana and alcohol increases accident risk. It was concluded that while it could not be deduced from this study that marijuana-impaired driving causes accidents, the consistent additive effects of alcohol and marijuana on a wide array of performance measures implies that marijuana in this context increases accident risk.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Not applicable.

SUPPLEMENTARY INFORMATION:

A report summarizing some preliminary results was presented at the *Ninth International Conference on Alcohol, Drugs, and Traffic Safety*, San Juan, Puerto Rico, November 17, 1983, and was published in the conference Proceedings.

A condensation of this report was published by Peck, R. c., Biasott:i, A., Boland, P. N., Mallory, c., and Reeve V. (1986). The effects of marijuana and alcohol on actual driving performance. *Alcohol, Drugs and Driving*, 2(3-4), 135-154.

A summary of toxicological findings obtained from this study was published by Hanson, V., Buonarati, M., Baselt, R., Wade, N., Yep, c., Biasotti, A., Reeve, V., Wong, A. and Orbanowsky, M. (1983), Comparison of 3H and 125I radio immunoassay and gas chromatography / mass spectrometry for the determination of delta-9-tetrahydrocannabinoids in blood and serum, *Journal of Analytical Toxicology*, 7, 96-102.