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## Research and Development

Office of Driver and Pedestrian Research  
Problem-Behavior Research Division

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Prepared by:

U.S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Office of Driver and Pedestrian Research  
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## FIELD EVALUATION OF A BEHAVIORAL TEST BATTERY FOR DWI

Theodore E. Anderson

Robert M. Schweitz

Monroe B. Snyder

This paper presents initial findings from a recently conducted field evaluation of a sobriety test battery. Police officers from four jurisdictions were trained in the use of the sobriety test battery. They then administered the battery to drivers stopped for suspicion of Driving While Intoxicated (DWI) during the three month test period. The results indicate that the test battery can be easily administered in the field and is effective in determining whether a driver's Breath Alcohol Concentration (BAC) is above or below .10%.

I. Background

Estimates suggest that alcohol is involved in a large proportion of the fatal and injury accidents nationwide. Current attempts to deter the drinking driver are directed at raising the perceived risk of arrest and punishment. Unfortunately, research indicates that there is a very low actual risk of arrest, and the public's perceived risk is also quite low.

One factor that may contribute to the low probability of a drinking driver being arrested for a DWI tip is the difficulty police officers have in discriminating those drivers with BACs above 0.10% who are not obviously impaired. As a rule, police officers seem reluctant to arrest a driver unless there is a high degree of certainty that the drinking driver's BAC is above 0.10%. This results in the arrest of only those drivers whose impairment is quite clear and unquestionable. It has been estimated that there are three times as many drivers on the road with BACs in the 0.10% to 0.14% range as in the 0.15% to 0.19% range. However, at least twice as many drivers are arrested who have a BAC in the 0.15% to 0.19% range as there are drivers arrested with BACs in the 0.10% to 0.14% range.

-3-

The ability of the sobriety test battery to assist police officers in determining whether the BAC of a person stopped for suspicion of DWI was above or below 0.10% was tested under laboratory conditions. A total of 441 subjects were dosed to varying BAC levels (between 0% and 0.19%) and scored by participating police officers, according to their performance on each of the three sobriety tests. Given the knowledge of the subjects' performance on each test, the police officers correctly classified 81% of the subjects as being at or below .10%. Nine percent of the subjects were classified as above .10% although they were actually below .10%. Ten percent were classified as below .10% although they were actually above .10%. One should also remember that the percentage of correct classifications will depend on the BAC levels of the subjects. The lab study attempted to get a range of BACs but did not get representation of the distribution of BACs that an officer might encounter at the roadside.

Although the police officers in the second study did use standard procedures for administering each test, they did not use a standardized procedure combining results and reaching an arrest/no arrest decision. Standard procedures for interpreting combined results should optimize the effectiveness of the battery and strengthen the use of the results in court.

### II. Study Objectives

The objectives of the current study were to:

- o develop standardized, practical and effective procedures for police officers to use in reaching an arrest/no arrest decision when giving one or more of the three sobriety tests;
- o test the feasibility of use in operational conditions by police officers; and
- o secure data to help determine if the tests will discriminate about as well in the field as in the lab.

### III. Analysis and Development

Laboratory data from the Psychophysical Tests Development Study<sup>3</sup> were used to develop procedures for police use in drawing conclusions from test results. The objective was to have procedures that:

- o were quick and easy to use;
- o could be used whether the officer decided to give one, two or three of the tests; and
- o would maximize the detection of drivers at BACs of .10% or above while minimizing the continued investigation of persons below .10% BAC.

IV. Field Evaluation

Four police agencies participated in the three month field evaluation. They were Arlington County (Virginia) Police; Maryland State Police; North Carolina State Police; and Washington, D.C. Police. The test period lasted from November 15, 1982 thru February 15, 1983. Due to legal problems surrounding the use of the evidential breath test device in Virginia, the Arlington County Police were forced to limit their field data collection period to two months.

A. Training

Training sessions were conducted at each of the police agencies during early November, 1982. Each police officer participating in the field evaluation attended a one day training session and was given a training manual that included the newly developed scoring procedures. The manual also covers the history and purpose of the standardized field sobriety test battery and administrative procedures including conditions under which the tests must be administered to be considered valid.

The first part of the training session was devoted to reading and explanation of the training manual. Next, the participants viewed a videotape. It demonstrated how to administer and score the sobriety battery and then gave the trainees an opportunity to practice their newly acquired skills by showing several subjects being given the three tests. Lastly, the police officers received instruction in how to present the behavioral data when testifying in court.

The second part of the training session was devoted to practice. Several volunteers (not participants) were dosed to BAC levels between 0.08% and 0.16%. The trainees then practiced administering the sobriety tests to the dosed volunteers. Their performances during this phase of the training session were critiqued by the course instructor.

B. Data Collection

Police officers participating in the field evaluation were requested to administer the sobriety battery tests to all persons they stopped for suspicion of DWI during a three month period. This was done in conjunction with their normal DWI arrest. They were asked to administer and score the sobriety battery tests prior to using a preliminary breath testing (PBT) device. The reason for this ordering was to reduce the possibility that the police officers' scoring of the sobriety tests might be influenced by the results obtained from the PBT device. They were also asked to record the following data for each DWI stop made:

V. Results

Since the DWI arrest data for the three month period before use of the test battery, and the court disposition data have not yet been received, only the data collected during the three month field evaluation period are presented.

Some of the analysis involving BAC information used the preliminary breath tester (PBT) data and some used the evidential breath tester (EBT) data. Although EBT data were more precise, they are available only for arrested drivers. When BAC data were needed for as many drivers as possible who were stopped for suspicion of DWI, PBT data were used. Since the North Carolina State Police do not use PBTs, analyses using PBT results are based only on data from the other participating police agencies.

During the field evaluation (November 15, 1982 thru February 15, 1983) battery-trained police officers recorded data on the following number of drivers that they stopped for suspicion of DWI:

- \* Arlington County Police - 345 (Note: Arlington did not record data on suspected DWI stops made after early January, 1983)
- \* Maryland State Police - 451
- \* North Carolina State Police - 434
- \* Washington, D.C. Police - 276

During this same period of time officers in the North Carolina State Police control group recorded data on 813 drivers stopped for suspicion of DWI, and those in Washington, D.C. recorded data on 195 drivers stopped for suspicion of DWI.

Table 1 shows the percent of drivers stopped for suspicion of DWI that were given each test as well as the percent that were given all three of the sobriety battery tests. (PBT usage is also shown in Table 1.)

TABLE 1

Sobriety Battery Test and PBT Usage by Police Agency

Police Agency	Gaze	Walk & Turn	One Leg Stand	All Three Tests	PBT
Arlington County Police	84%	76%	72%	70%	97%
Maryland State Police	92%	91%	90%	88%	63%
North Carolina State Police	91%	85%	85%	82%	0
Washington, D.C. Police	82%	78%	76%	74%	87%
All Police Agencies	89%	84%	82%	80%	—
Washington, D.C. Police - Control	0	0	0	0	94%

Tests were given in the same order with gaze nystagmus first. The results of the gaze nystagmus test were then known to the officer and may have had some subtle influence on his expectations and scoring of the next two tests.

Two major reasons make it necessary to be extremely cautious in analyzing the data collected in this study to draw conclusions about the relative effectiveness of the different techniques that were used. First of all, officers were not randomly assigned to different groups and differences in effectiveness data available in this study relates to the BAC distributions for subjects who were arrested, and for some others who were given PRTs. There are a number of problems in using these data. We do not know how those given a PRT differ from or are representative of the rest. Perhaps most significant of all, except for North Carolina, all agencies had PRTs available, and in the great majority of the cases, PRT data were available to the officer for a driver before he was arrested. Thus, most arrest decisions were based on PRT data, rather than just test battery data. Given these limitations and constraints, a few additional analyses were done that can be used to help compare and assess the different DWI detection techniques.

Table 3 presents data on the BAC distribution for drivers arrested as a result of police use of different procedures. The BACs are based on EBT results. The percent of arrested subjects falling in each BAC range is presented in the body of the table, for each different procedure. The procedures are as follows: (1) PRT and Normal Police Procedures. This was the Washington, D.C. control group, that did not use the sobriety test battery, but did use PRTs (in 94% of the stops). (2) Sobriety Test Battery and PRT. This procedure was used by the D.C., Maryland and Arlington police, but did use PRTs the test battery. (3) Sobriety Test Battery, no PRT (NC); arrest indicated by 2 test combined decision rule only. These data are based on arrests made by the North Carolina State police who were trained in the use of the test battery. No PRTs were available. Only those cases for which the combined test score indicated there should be an arrest were included in this data set. (4) Sobriety Test Battery, no PRT (NC); officer arrest decision. This was similar to (3) above but also included cases in which the officer decided to arrest even though the combined two test score indicated no arrest. (5) Normal Procedures, no PRT (NC). This was the North Carolina control group which had neither PRTs or the sobriety test battery available.

Table 3 presents BAC data (based on EBTs) in 3 categories of operational relevance to the police. BAC category 1 (0 - .04) contains obvious false positives (people who are not legally impaired due to alcohol, but are arrested). However, it should be noted that some or all of these people may have been impaired from drugs other than alcohol. The information required to assess the extent of this factor was not available. The information required to contain people who may be impaired - legally as well as in their performance; however, the BAC by itself will not prove it. Whether people in this category were good arrests or poor ones cannot be determined with the data available. Category 3 (.10+) contains people who would be considered legally impaired, even in the absence of signs of behavioral impairment, in States with "per se" legislation.

Table 3 shows relatively little difference between the resulting BAC distributions for police using PRTs and the test battery or the test battery alone. However, use of the PRT and/or test battery appears far superior when compared to the normal DWI arrest procedure.

Table 4 presents information on the BAC distribution for arrested drivers where the arrest decision was indicated by two of the sobriety test scores (no PRT available). It shows that when both the Walk and Turn and Gaze Nystagmus recommended arrest, 9 of the subjects were above .10%. If the two test combination and the gaze nystagmus score by itself recommended arrest, even though the Walk and Turn recommended no arrest, 77% were above .10%. Finally, if the walk and turn recommended no combined score recommended arrest even though the gaze nystagmus score by itself recommended no arrest, 53% were above .10%.

Table 4  
Percent in Each BAC Category  
for Arrested Drivers Given  
Two Sobriety Tests

Arrest Recommended by:	Resulting BAC Distribution	
	0-.04%	.05-.09%
Walk & Turn	0-.04%	.05-.09%
Gaze Nystagmus	0-.04%	.05-.09%
Two Test Combination	0-.04%	.05-.09%
Yes	4	4
No	15	8
Yes	23	23
No	15	77
Yes	23	53
No	15	77
Yes	23	53

VI. Conclusions

The results of the field evaluation:

Confirm the laboratory findings regarding the ability of the sobriety test battery to effectively discriminate between drivers with BACs less than 0.10% at drivers with BACs over 0.10%.

Demonstrate that the three sobriety battery tests (Gaze Nystagmus, Walk & Turn and One Leg Stand) can be easily and effectively used in the field by police officers who have received a one day training session.

Indicate that the test battery appears to be about as effective as the use of PRTs in improving the BAC distribution of those arrested (e.g., a reduction of false positives).

Suggest that the gaze nystagmus test is the most powerful of the three if only one is used, and that the combination of gaze nystagmus and walk and turn offers the most potential for discriminating between those above and below .10% BAC.