

A Colorado Validation Study
of the
Standardized Field Sobriety Test (SFST) Battery

Final Report Submitted to
Colorado Department of Transportation
November 1995

Marcelline Burns, Ph.D.
Southern California Research Institute
Los Angeles, California

Ellen W. Anderson, Deputy
Pitkin County Sheriff's Office
Aspen, Colorado

This report was funded by the Office of Transportation Safety, Colorado
Department of Transportation
(utilizing National Highway Traffic Safety Administration funds, under Project
Number 95-408-17-05).

I. Introduction

A battery of standardized field sobriety tests (SFSTs), which was developed under National Highway Traffic Safety (NHTSA) funding during the 1970's, is now used by police officers nationwide. Traffic officers in fifty states, who have been trained in standardized administration of the tests, routinely use them and incorporate their observations of drivers' test performance into their arrest or release decisions. Defense attorneys, however, often challenge the admissibility of court testimony about the test battery.

Roadside decisions are a critical components of alcohol-and-driving enforcement, and, therefore, of traffic safety. Because the SFSTs aid officers in the often-difficult task of identifying alcohol-impaired drivers, it is likely that the tests have contributed in some unknown measure to the significant decline in alcohol-related fatalities over the last decade. Given that they have exerted a positive impact on traffic safety, it is important to resolve questions about their validity and reliability, to maintain their credibility, and to preserve them as a roadside tool.

Because court arguments about SFSTs focus largely on the research conducted at the Southern California Research Institute (SCRI) and because that research is sometimes misrepresented or misunderstood, it is necessary first to clarify its purpose. Two large-scale laboratory experiments were conducted for the purpose of identifying and standardizing a "best" set of tests (Burns and Moskowitz, 1977; Tharp, burns and Moskowitz, 1981). Although it clearly is relevant at this point in time to inquire whether the methods of those experiments were scientifically sound, it should be recognized that the laboratory data are now only indirectly enlightening about current roadside use of the tests. In particular, note that controlled laboratory conditions are less variable and, therefore, may be less challenging than the highly varied conditions which officers routinely encounter in the field.

Also, officer experience with the SFSTs is key to the skill and confidence with which they use them as a basis for their decisions. Thus it is important to understand that the officers who participated in the SCRI studies had not been trained with the SFSTs until just prior to the experiments. They had not had opportunity and time to gain skill or to develop confidence in the tests. In contrast, many of the officers who now use and testify about the tests have been using them regularly for ten or more years, and it is reasonable to assume they have gained skill and to expect that their decisions based on the tests may be more accurate than those of the officers during the initial research.

The question to be addressed in 1995 by agencies, officers and the courts is, "How accurate are the arrest decisions which are made by experienced, skilled officers under roadside conditions when they rely on SFSTs?". A broadly applicable answer cannot be found in laboratory research. It requires field data; i.e., information about real-world arrest decisions by officers trained by NHTSA guidelines to administer the SFSTs.

The Colorado Department of Transportation funded a 1995 study to obtain such data. Through a grant to the Pitkin County Sheriff's Office and with the cooperative effort of seven Colorado law enforcement agencies, records were collected from drivers tested with the SFSTs at roadside. The seven agencies were:

- Aspen Police Department (APD)
- Basalt Police Department (BPD)
- Boulder County Sheriff's Office (BCSO)
- Colorado State Patrol (CSP)
- Lakewood Police Department (LPD)
- Pitkin County Sheriff's Office (PCSO)
- Snowmass Village Police Dept (SVPD)

With information drawn from impaired-driving records, a data base was created and analyzed at the Souther California Research Institute.

Technical Summary

In the State of Colorado, motor vehicle operators are subject to arrest if they are found to be driving with a blood alcohol concentration (BAC) of 0.05% or higher. At BACs of 0.05% or higher but less than 0.10%, they are charged with Driving While Ability Impaired (DWAI). At BACs of 0.10% and higher, the charge is Driving Under the Influence (DUI). These statutes reflect the evidence from both epidemiological and laboratory studies of alcohol impairment of driving skills.

It is the responsibility of law enforcement officers to detect and arrest alcohol-influenced drivers in accordance with these statutory limits. In an efforts to meet that objective, police officers, not only in Colorado but in all fifty of the United States, rely on a battery of standardized field sobriety tests (SFSTs). Observations of drivers' performance of the tests, together with driving pattern, appearance and manner, odor of alcohol, and other signs, underlie officers' arrest and release decisions.

To be genuinely useful, roadside tests must be valid and reliable; i.e., they must measure changes in performance associated with alcohol and they must do it consistently. To the extent that they meet the validity and reliability criteria, they can be expected to contribute to traffic safety by increasing the likelihood that alcohol-impaired drivers will be removed from the roadway by arrest. Importantly, they also will further serve the driving public's interest by decreasing the likelihood that a driver who is not alcohol-impaired will be mistakenly detained or arrested. Thus, the validity and reliability of the tests are important issues.

This study was undertaken specifically to extend study of the SFSTs from the laboratory setting to field use. The primary study question was, "How accurate are officers' arrest and release decisions when the SFSTs are used by trained and experienced officers?" Over a five-month period, officers from seven Colorado law enforcement agencies who

volunteered for the study provided the records (N=305) from every administration of the SFSTs.

Using only the standardized 3-test battery (Walk-and-Turn, One-Leg Stand, Horizontal Gaze Nystagmus), officers seldom erred when they decided to arrest a driver.

Breath or blood specimens confirmed that 93% of the arrested drivers were above 0.05% BAC.

Officers were more likely to err on the side of releasing drivers than on the side of incorrectly arresting drivers. Given the difficulty of the task which confronts officers at roadside, in particular with alcohol-tolerant individuals, the finding that approximately one-third of the released drivers should have been arrested is not unexpected. However, it is important to note that officers' decisions to release *were correct* two-thirds of the time.

Overall, 86% of the officers' decisions to arrest or release drivers who provided blood or breath specimens were correct.

It is concluded that the SFSTs are valid tests; i.e., they serve as indices of the presence of alcohol at impairing levels. The study design did not support an examination of test-retest reliability. It should be noted, however, that the test battery appears to have served equally well across agencies and officers, strongly suggesting that it achieves acceptable reliability as well.

III. Study Design

This study was designed to:

- (1) gather data to assign officers' decisions to the four cells of the decision matrix illustrated in Figure 1, and to
- (2) examine the accuracy of the SFST battery when used in the widely varying weather conditions of Colorado winter, spring, and summer months.

Both the design and the execution of the study focused on the *integrity, completeness, and standardization* of the data.

It is important to note how the study population was defined and how the sample of subjects was drawn. Subjects were a subset of the population of drivers who were detained by police officers during the study period. They were drivers, both those arrested and those released, who were stopped by police officers during the study period *and who were requested to perform the SFSTs*. The officers' decisions about those drivers have been analyzed in terms of correct decisions (Correct Arrests and Correct Releases) and errors (Incorrect Arrests and Incorrect Releases).

In a broader context, the terms Correct Releases and Incorrect Releases could be extended to motorists who were stopped but who were not asked to perform the SFSTs. In many of those cases, the release decisions were correct, but it is likely that some of there were impaired drivers who were released without ever being asked to perform the SFSTs. Those individuals and those decisions are of interest and would be included in an assessment of overall proficiency in DUI detection and arrest. In fact, the entire population of impaired drivers, only some of whom are detected and stopped, is of interest in terms of traffic safety. In a validation study of SFSTs, however, the subjects were only those drivers who were asked to perform the tests.

VI. Summary and Discussion

In 1995, there is a sound base of scientific evidence to support the use of 0.10%, 0.08%, and 0.05% BACs as presumptive and per se alcohol limits for drivers. There also appears to be strong support for those statutes among citizens throughout broad (though not all) segments of society. A clear-cut shift of attitude over the past ten to fifteen years has resulted in anti-drunk driving sentiments by much of the driving population. In many social circles drinking-and-driving now is unacceptable behavior.

Why then, in a largely pro-alcohol enforcement climate, are there negative views of traffic officers' related activities? Citizens often seem to believe that enforcement is hit-or-miss and that officers regularly fail to remove many, if not most, alcohol-impaired drivers from the roadway. Some also seem to believe that the activities at roadside are arbitrary and calculated to harass. Although the multifaceted social and individual variables that underlie this paradox of concurrent anti-enforcement sentiment and anti-drunk driving sentiment are beyond the scope of this report, it is germane to consider one set of factors. At least part of this view of alcohol enforcement is attributable to a general failure to recognize the importance of traffic officers' duties, and to understand not only what their duties encompass but also the difficulty of their task.

Legislators, regulatory agencies, activities groups, and safety-conscious citizens alike sometimes appear to overlook the fact that traffic officers are pivotal in the deterrence of drunk driving. Unless officers are able to detect and arrest impaired drivers, those drivers will never enter the system of sanctions and, therefore, the existence of enabling statutes and anti-drunk driving sentiment will be largely irrelevant to them. Unfortunately, it is also true that the escape of detection and arrest on multiple occasions serves to reinforce the risky behavior. In effect, if no accident and no arrest occur on one or more occasions of drinking and driving, the

citizen may conclude that driving after drinking is acceptable behavior on other occasions.

For a number of reasons, the difficulties associated with traffic officers' alcohol-enforcement responsibilities typically are underestimated. One reason is the misnomer "drunk driving," which suggests that their duty is to apprehend "drunks" or obviously-intoxicated individuals. If that were indeed the sole definition of alcohol enforcement duties, the task would be fairly straightforward. In reality, the risks associated with drinking and driving are not limited to obviously-intoxicated drivers, nor are officers' enforcement responsibilities restricted to those drivers.

Traffic officers are responsible for removing alcohol-impaired drivers from the roadway, and the Colorado statute sets the criterion alcohol levels at 0.10% and 0.05% BAC. In other jurisdictions the BAC limit is 0.08%, with additional lower levels for lesser charges and specific driver groups. Enforcement problems arise in part from the fact that although the evidence clearly establishes that driving skills are impaired at 0.10% BAC and lower, many, possibly even most, individuals who are willing to drive after drinking are not obviously intoxicated at those levels.

Leaving aside the problem of detecting alcohol impairment by the observation of driving behaviors, consider officers' task once they stop vehicles and contact drivers at roadside. Working under widely-varying conditions without special measurement apparatus, they must decide within a few minutes whether a specific driver is impaired by alcohol. Impaired drivers may or may not display atypical speech, appearance, or other personal characteristics, but in either circumstance the officers have no knowledge of any given driver's sober appearance and behavior. The task is further complicated by the tolerant drinker's normal appearance even at very high BACs.

Are there signs and symptoms which are reliably associated with 0.05% and 0.10%? With what level of confidence can the officer arrest or release a driver? With a decision criterion that minimizes incorrect arrests, the risk of releasing impaired drivers rises. On the other hand, a very strict decision criterion will decrease the number of impaired drivers who are released but at the risk of unnecessarily detaining non-impaired drivers. Is one risk preferable to the other? These questions define the context of traffic officers' alcohol enforcement activities and the background of the Colorado Validation Study of the SFSTs.

The records collected and analyzed during this study provide evidence that the SFSTs, as used at roadside by trained and experienced law enforcement officers, are valid indices of the presence of alcohol.

Records of all driver contacts, which resulted in administration of the SFSTs during the study period, were entered into the analysis. Overall, for 234 cases confirmed by breath or blood tests, officers' decisions to arrest and release were 86% correct, and 93% of their arrest decisions were correct.

It was not unexpected to find that officers were almost twice as likely to release incorrectly as to arrest incorrectly. Nonetheless, only 36% of the released drivers were at or above the statutory limit.

These findings obtained in the field with officers experienced with the use of SFSTs can be compared with findings from a laboratory setting with officers recently trained with the SFSTs. It should be kept in mind that the current data are not fully comparable to data from laboratory experiments, since there are differences other than time-since-training and laboratory vs. field. With that caution, the comparisons are instructive.

In an initial study of field sobriety tests with 238 laboratory subjects, officers' decisions overall were 76% correct (Burns and Moskowitz, 1977). Only 54% of their arrest decisions were correct, and only 8% of their release decisions were incorrect. In a second laboratory study, officers' decisions overall were 81% correct, their arrest decisions were 68% correct, and 14% of their release decisions were wrong (Tharp, Burns and Moskowitz, 1981). It is apparent that the arrest criterion was lower in the laboratory. The penalties for mistakes in a laboratory setting are, of course, fairly trivial compared to a real-world setting. The lower criterion, together with lack of experience with the tests, accounts for higher rates of incorrect arrests and lower rates of incorrect releases than found in this study. It is not surprising to find that officers in the field require more certainty about arresting a citizen and adopt a higher criterion with the result that they err in the direction of incorrect releases.

In summary, the data provide clear-cut findings about the use of SFSTs by officers in six Colorado communities. On a broader scale, they provide partial and tentative answers to some important questions. It is hoped that current data from a field setting will facilitate court proceedings with drivers arrested on DUI and DWAI charges. It is hoped, too, that the content of this report will add to the driving public's understanding of roadside enforcement activities, as well as to recognition of police officers' critical role in traffic safety.