Field Research: A Comment on Perrine's "Rapprochement Between Epidemiology and Experimentation"

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Dr. Perrine has just described a comprehensive, three-element ("before", "during" and "after" driving) research program directed at the alcohol-involved driving problem which is being implemented at the Vermont Alcohol Research Center. This program is significant because it brings together data from naturalistic drinking situations, real driving and intensive laboratory studies, providing a basis for integrating epidemiological and experimental research. An important feature of this program is that, while it includes drunk-driving offenders, its primary focus is on drinking patterns in commercial establishments and on randomly sampled roadside drivers. This research promises to provide significant information on "normal" drinking and driving patterns as well as those that lead to illegal behavior or traumatic injury.

This paper looks at experimental field research with emphasis on the evaluation of intervention programs. Criminal justice and treatment programs designed to reduce impaired driving by individuals convicted of the drunk-driving offense (special deterrence) and drunk-driving laws and law enforcement designed to produce general deterrence among drinking drivers have attracted considerable research attention over the last decade as citizen's activist groups have pressed national and local governments for tougher drunk driving legislation. Despite this heightened interest and the additional funding flowing into program evaluation, the number of credible studies of impaired driving laws is limited (Ross, 1984).

Dr. Perrine notes that both the epidemiologic and experimental approaches to the drinking driving problem have limitations for establishing causality. In comparison with laboratory research, the evaluation of laws and enforcement programs presents a number of special difficulties. Of particular concern are the exogenous threats to the evaluation of drinking and driving programs presented by the fact that economic conditions can significantly impact both the amount of driving and the amount of drinking. Alcohol-related fatalities, for example, have traditionally risen in the United States in periods of relative prosperity and fallen in recessions as measured by the gross national product or more specifically by employment levels. Further, automobile crashes can be impacted by pricing and/or changes in availability of either alcohol or gasoline, while the extent of injury can be impacted by such things as safety belt and speed limit laws. Because of the number and
complexity of those external factors, emphasis in field research has been placed on the control of the exogenous variable through the use of quasi-experimental designs (Campbell and Stanley, 1966). Time series is a favored analysis technique for controlling "historical" trends and competing programs which threaten the validity of the evaluation.

Figure 1

Model of Risk of Drinking and Driving Component

- Other Command Support
  - Program Funding
    - 1. Specialized Training
    - 2. Special Equipment
    - 3. High Visibility Operations
    - 4. Administrative Simplification
    - 5. Volunteer Support
  - Increased DWI Patrol Efficiency
  - Increase in BAC Testing
  - Increase in DWI Arrests
  - Increase in Perceived Probability of Arrest
  - Reduced Drinking After Drinking
  - Lower BACs in Drivers on the Road
  - Reduced Alcohol Related Crashes

While these quasi-experimental techniques provide a strong methodology, if properly applied for dealing with external threats to the validity of a program evaluation, investigators frequently overlook the need for demonstrating the endogenous relationships within the program which provide a credible basis for assuming a causal relationship between the program and outcome measures. The preceding figure provides an example of a set of measures which together form a "change of action" to tie together program actions (the independent variables of a field intervention) with the dependent measures such as highway crashes which are the criteria for program effectiveness. Thus, in evaluating an enforcement program, funding needs to be traced through measured changes in training, equipment
or operations through intermediate measures to their safety consequences. An effort must be made to collect objective data on the changes which these operations produce in archival measures such as the number and level of BAC tests and increases in DWI arrests. These independent measures need to be connected to the dependent criterion measures through intervening variables where possible. Such measures may include roadside surveys where data on the perceived risk of arrest, the number of nighttime drivers who have been drinking and the BACs of those drivers who have consumed alcohol can be collected.

The creation of such a "chain of action" greatly strengthens the credibility and usefulness of the research result. It generates a detailed program description which permits other program administrators to implement similar interventions. It also helps to characterize the mechanism by which the program is producing results. Since it is rarely possible to measure all of the potential exogenous factors which might influence alcohol related crashes, a failure to create a strong chain of evidence between program implementation and crash reduction leaves the result vulnerable to error. Research such as that being undertaken by the Vermont Alcohol Research Center by Dr. Perrine will not only uncover information useful in the development of programs which can reduce drinking and driving, but will also help to identify those intermediate measures which can be most useful in the evaluation of safety programs.

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REFERENCES
