Controlling Motor Vehicle Driver Behavior at Roadside Interview Sites

IN THE DRIVER INTERCEPT STUDY, VEHICLES PASSING A LOCATION ARE INTERCEPTED AND A QUESTIONNAIRE IS ADMINISTERED TO DRIVERS. EFFECTIVE CONTROL OF DRIVER BEHAVIOR IS ESSENTIAL TO AVOID INJURY OR DEATH TO TRAVELERS AND FIELD INTERVIEWERS. HOWEVER, TYPICAL FLAGGERS LACK A CONCEPTUAL MODEL OF THE FACTORS THAT CONTROL HUMAN BEHAVIOR. FIELD RESEARCH HAS SHOWN THAT A FOUR-STEP PROCESS TO CONTROL DRIVER BEHAVIOR IS EFFECTIVE.

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TRANSPORTATION PLANNING agencies use origin-destination studies to help plan transportation facilities and services. The data from origin-destination studies enable transportation planners to develop, verify and revise models that describe the flow of traffic from particular origin locations to particular destinations within a defined geographic area of interest. These models also are used to forecast future requirements for transportation facilities and services within a geographic area.

ORIGIN-DESTINATION STUDIES

One method for conducting origin-destination studies is the driver intercept. With this method, some or all vehicles passing a particular location are intercepted and stopped en route. Trained interviewers briefly explain the purpose of the study and ask drivers to participate.

Drivers who agree to be respondents are administered the questionnaire at the roadside; given the questionnaire to complete at home and mail back to the survey administrator; or administered a few screening questions at the roadside then either rejected from the study or given the questionnaire to complete at home and mail back to the survey administrator.

Typically, driver intercepts provide data from a single sample of motorists for a single time period and yield data about the particular trip being made at the time and place of the intercept. The trip itself is the unit of study.

Driver intercepts have major advantages. They allow potential respondents to be screened and either included in or rejected from the study. Because study personnel have personal contact with prospective respondents, this method is effective in gaining the cooperation of prospective respondents. Consequently, there is a high rate of participation.

A significant disadvantage of the driver intercept method is that, by its very nature, it places the safety of field interviewers and the traveling public at greater risk than methods of conducting origin-destination studies that use mail or telephone to recruit participants and administer a data collection instrument. The risk of injury and death to field interviewers and the traveling public is further increased when personnel assigned to control and direct traffic (usually called flaggers) at driver intercept sites do not effectively control driver behavior.

INEFFECTIVE CONTROL OF DRIVER BEHAVIOR

Informal conversation with flaggers from several state departments of transportation has shown that flaggers learn how to control driver behavior by watching other (ineffective) flaggers and from their own trial-and-error experience. The typical flagger in a driver intercept study is a state department of transportation employee, market researcher, or temporary employee of a research firm and lacks knowledge of any conceptual model of the factors that control human behavior.

Below are examples of ineffective efforts to control driver behavior frequently observed by the senior author during driver intercept studies to which he was assigned:

- Failure to consistently gain the attention of drivers *before* signaling what drivers should do.
- Giving signals too late for drivers to react in a timely manner.
- Using ambiguous hand signals to communicate to drivers to stop, continue, or change lanes.
- Positioning the signal hand about waist-high and just in front of the waist, then making slightly different movements of the signal hand to communicate to drivers that they should stop, continue, or change

lanes. This location of the signal hand makes it difficult for drivers to detect the hand (as foreground) from the flagger's torso (as background), and the slight changes in the position of the signal hand are difficult to observe from hundreds of feet away at speeds of 25 to 35 miles per hour.
- Consistent failure to inform drivers whether they have done as the flagger signaled.

A consequence of ineffective signals is that drivers are confused or ignore the signals. The risk of injury or death to travelers and field interviewers is judged to be unacceptably high.

EFFECTIVE CONTROL OF DRIVER BEHAVIOR

To manage against the risk of collision, injury and death at driver intercept sites, the senior author applied Gilbert's behavior engineering model to control driver behavior.[1] According to this model, human behavior is controlled by six factors:

- Information: what the person is expected to do and how well he or she meets the expectations;
- Resources: the equipment, supplies, materials, work space and procedures required to perform as expected;
- Incentives: the financial and nonfinancial consequences used to recognize and encourage expected performance;
- Knowledge: the skills and knowledge required to perform as expected;
- Capacity: the physical capability to perform as expected; and
- Motivation: the willingness to perform as expected under the conditions that exist when the performance must occur and for the incentives that are available.

Of the six factors identified by Gilbert's behavior engineering model, only three can be used to control driver behavior in driver intercept studies: information, resources and incentives.

The required resources are safety-related items. A flagger can use a signal flag and wear a bright orange or lime-green safety vest, hat and gloves to help drivers detect the flagger against a background.

The following steps describe a process flaggers can use to apply information and incentives to control driver behavior. The senior author created this process and, as a flagger, has used it at more than 30 intercept sites in six driver intercept studies in five states.

Note: These steps are more effective when the flagger stands close to the center of drivers' field of vision.

Get the Attention of the Driver

Face oncoming traffic with legs slightly apart. Fully extend over your head the arm that is holding the safety flag and wave the safety flag several times in a continuous left-right-left-right motion from the 10:00 to the 2:00 position.

Communicate Expectations: Stop Close to the Flagger

Face oncoming traffic with legs slightly apart. Hold the signal flag folded or rolled up in the left hand. Fully extend the right arm horizontal to the ground with thumb and four digits parallel to and touching each other and with fingertips pointing toward the driver. Then, in a continuous motion, bend the right arm 90 degrees at the elbow so the palm faces the chest while keeping the thumb and four digits parallel to and touching each other and, finally, fully extend the right arm downward at a 45-degree angle with index finger pointing to the ground in front of the flagger. Repeat this signal until the driver begins to comply.

Communicate Expectations: Pass through Intercept Site without Stopping

Face oncoming traffic with legs slightly apart. Hold the signal flag folded or rolled up in the left hand. Fully extend the right arm horizontal to the ground with thumb and four digits parallel to and touching each other and with fingertips pointing toward the driver. Then, in a continuous motion, fully extend the right arm 180 degrees away from driver while keeping the arm horizontal to the ground and with thumb and four digits parallel to and touching each other. Repeat this signal until the driver begins to comply.

Communicate Expectations: Change Lanes

Face oncoming traffic with legs slightly apart. Hold the signal flag folded or rolled up in the left hand. Fully extend the right arm horizontal to the ground with thumb and four digits parallel to and touching each other and with fingertips pointing toward the driver. Then, in a continuous motion, while keeping the thumb and four digits parallel to and touching each other, fully extend the right arm downward at a 45-degree angle and about 90 degrees to the driver's left to point in the direction of the traffic lane the driver should enter. Repeat this signal until the driver begins to comply.

Give Feedback

If the driver begins to obey the flagger's expectations, use an exaggerated up and down movement of the head to communicate, "Yes, you are doing what I expect." If a driver does not obey the flagger's expectations, repeat the hand signals to communicate expectations.

Reward Compliance

When a driver obeys the flagger's signals, recognize the driver's compliance by giving a thumbs-up signal and/or a smile.

Although these signals were developed for use by flaggers in driver intercept studies, they also can be used in other situations where flaggers must control the behavior of motor vehicle drivers.

CONCLUSION

Gilbert proposed that successful control of human behavior or job performance requires a relevant model or theory. This feature describes how a flagger in a driver intercept study can control driver behavior effectively using signals based on three of the six factors identified by Gilbert's behavior engineering model as causes of human behavior and job performance. The benefits of using these signals include a reduced risk of injury or death to field interviewers and to the traveling public. ■

Reference

1. Gilbert, T.F. *Human Competence: Engineering Worthy Performance*. New York City, NY, USA: McGraw-Hill Book Company, 1978 (Tribute edition published by HRD Press and ISPI Publications, Silver Spring, MD, USA,1996).

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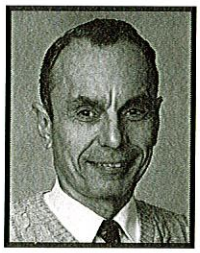

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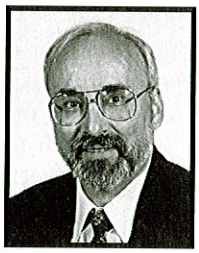

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