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A Criterion Scale for Classification of Automobile Drivers

By A. R. LAUER

INTRODUCTION

The problem of developing a satisfactory criterion scale for evaluating driving performance has been bothering experimenters in this field for many years. It has been found that accidents used as a criterion are quite unreliable, especially among lay drivers. This is partly due to variance traceable to exposure factors. Sometimes a spurious reliability may be obtained by correlating periods of time in which there is no control made of the risk factor. Studies made in Sweden (1) and elsewhere have shown that a serious error is introduced when correlating segments of driving record due to the spuriousness introduced by exposure which is very difficult to control even when using bus drivers operating in similar sections of a city.

Violations have been used along with accidents (2) but some arbitrary formula has to be used to equate the two. This is difficult to do, either on an empirical or a rational basis.

Members of the staff of the Adjutant General's Office of the Army (5) have done quite an elaborate study on developing criteria for Army drivers by using ratings of associates and of superiors. These ratings leave something to be desired from many points of view. This technique is particularly not applicable to classification of lay drivers and usually not to commercial drivers. In the latter instance not enough raters are available who know the details of a driver's performance pattern.

About the best we have been able to obtain from commercial companies is a rating of A, B or C on the following three-fold classification as used by Tiffin and others at Purdue University for securing an index of efficiency on industrial workers. The classification is based on whether an individual would be rated as A, the last to be released in case there was a necessary reduction in employees; B, whether he would be retained somewhat longer; or C, whether he would be among the first to be released. Many commercial companies do not like to admit that they have poor employees or drivers, but are willing to state that there were some persons they would let go before others. Assuming this is a valid basis on which to judge all-around efficiency we have a working method of classification which may be used as a secondary criterion.

For evaluating accomplishment in driver education, for selection and training of commercial and Army drivers, as well as for the

possible evaluation of driver's license applicants and insurance risks, a need has developed for some kind of a standardized scale which could be used for obtaining an evaluation of a driver's performance at any given time.

The present study is an attempt to explore the hypothesis that a more or less reliable and valid method of rating drivers can be developed for such purposes. The particular instrument under consideration was begun in 1938 by Rogers and Lauer in an attempt to construct a scale for evaluating the progress of driver education students. At that time ten behavior categories were developed which were assumed to have something to do with performance in any type of skill, particularly driving. These were rated on a five-point weighted scale. Since that time two more categories have been added which are in the general nature of behavior categories which might apply to any type of skill but more specifically to driving.

A second section of the scale was developed which has to do with the specific skills used in the manipulation of a car. They apply to any type of vehicle and may be used under any condition which the examiner may care to work. The sections of the scale are labelled Part I and Part II as shown in Figure 1. Simplified directions and norms are attached.

METHOD AND PROCEDURE

These instruments have been assembled with a background of 18 years evaluation, a part of which has been published by Lauer and Miller (3). Various checks made on reliability have shown that the scale has very good consistency when used either by the same individual on a test-retest basis, by different examiners on a test-retest basis, or by one examiner using the odd versus even technique. The scale has held up well in every study made. In the present instance it was standardized by an 8-mile drive in an instrumented car. The elements of measurement in the instrumented car were used as a criterion in a three-phase validation study (4) which is now in the process of being re-analyzed.

RESULTS

The reliability obtained on an 8-mile drive using 349 subjects was .92. In no instance in the various experimental studies of this scale during the past 18 years or more has reliability lower than .85 been obtained using a much shorter route. It is thought that the form may be used in any situation where driving performance at a given time and under a given set of conditions in which an evaluation is desired.

Using four types of readings from a tachograph recording of the driver's performance Lauer and Suhr (4) obtained a validity of .36.

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ROGERS-LAUER DRIVER RATING INVENTORY (To be marked by supervisor or instructor)

Name _____ Date _____

Sex _____ Age _____ Driving Experience _____ Months _____

Rated by _____ Type of Car Used _____

Rides: Bicycle _____ Motorcycle _____ Automobile _____ Light Truck _____

Medium Truck _____ Semitrailer Truck _____ How long? _____ Years _____

Directions: Check the driver according to the trait which fits him best. Check one and only one item under each capital letter. The points to be assigned are as follows: (Do not consider these values until you have checked driver.) Item 1 is given 5, item 2 is given 4, item 3 is given 3, item 4 is given 2, and item 5 is given 1, except capital letter D which is weighted 2, 3, 5, 4, and 1 from top to bottom. K and L value as checked.

Part I -- Behavior Patterns (check proper descriptive phrase) Note order of values changes with items.

____A. ATTENTION

- ____1. Good concentration
- ____2. Somewhat easily distracted
- ____3. Easily distracted
- ____4. Somewhat easily confused
- ____5. Easily confused

____B. OBSERVATION AND ALERTNESS

- ____1. Quick, accurate
- ____2. Accurate, methodical
- ____3. Slow but accurate
- ____4. Quick but inaccurate
- ____5. Slow, inaccurate

____C. EMOTIONAL CONTROL

- ____1. Very calm
- ____2. Calm
- ____3. More or less calm
- ____4. Somewhat nervous
- ____5. Very timid and nervous

____D. ATTITUDE

- ____1. Conceited, "show-off"
- ____2. Over-confident
- ____3. Alert, confident
- ____4. Hesitant, somewhat timid
- ____5. Very timid, overcautious

____E. EFFORT AND WORK ATTITUDE

- ____1. Concentrates on task
- ____2. Interested in task
- ____3. Indifferent to task
- ____4. Seems bored
- ____5. Contempt for task, cynical

____F. KNOWLEDGE AND UNDERSTANDING

- ____1. Complete, detailed knowledge
- ____2. Knows most points
- ____3. General--not detailed
- ____4. Knows few points
- ____5. Complete lack of knowledge

____G. MASTERY OF INSTRUCTIONS

- ____1. Comprehends instructions, asks questions
- ____2. Listens closely to instructions
- ____3. Digresses from instructions
- ____4. Instructions need repeating
- ____5. Uninterested, does not try

____H. POSITION AT WHEEL

- ____1. Easy, relaxed
- ____2. Somewhat relaxed
- ____3. Slightly tense
- ____4. Very nervous
- ____5. "Freezes up"

____I. MOVEMENTS

- ____1. Quick, confident
- ____2. Smooth, consistent
- ____3. Slow, correct
- ____4. Hesitant, jerky
- ____5. Confused, erroneous

____J. MECHANICAL AND SPACE JUDGMENT

- ____1. At home with machines
- ____2. Somewhat mechanically inclined
- ____3. Understands general points
- ____4. Lacks mechanical ability
- ____5. Gross lack of mechanical ingenuity

____K. CLEARANCE AND ROAD JUDGMENT

- ____1. Very lax and indifferent
- ____2. Somewhat lower than average
- ____3. Average in this respect
- ____4. Quite alert and cautious
- ____5. Extremely careful

____L. OBSERVATION OF CONDITIONS AROUND

- ____1. Very poor observation
- ____2. Somewhat lax in this respect
- ____3. Watches sporadically
- ____4. Quite careful
- ____5. Exceptionally observant

Part I -- Score _____ ()

Part II -- Basic Skills (Encircle proper rating as given at head of column).

Rating	A	B	C+	C-	D	E	Rating	A	B	C+	C-	D	E		
____A. Starting routine	7	6	5	4	3	2	1	____I. Spacing (longitudinal)	7	6	5	4	3	2	1
____B. Checkup of the car	7	6	5	4	3	2	1	____J. Straight driving	7	6	5	4	3	2	1
____C. Controls	7	6	5	4	3	2	1	____K. Right turn	7	6	5	4	3	2	1
____D. Wheel	7	6	5	4	3	2	1	____L. Left turn	7	6	5	4	3	2	1
____E. Signs (observation of)	7	6	5	4	3	2	1	____M. Observation of road	7	6	5	4	3	2	1
____F. Hand signals	7	6	5	4	3	2	1	____N. Courtesy to pedestrians and other cars	7	6	5	4	3	2	1
____G. Stopping	7	6	5	4	3	2	1	____O. Attitude	7	6	5	4	3	2	1
____H. Spacing (lateral)	7	6	6	4	3	2	1								

Part II -- Score _____ ()
Total Score Part I plus Part II ()

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Figure 1.

From seven measures of road performance a validity of .57 was obtained which shrunk to .56 when corrected for the number of cases and the number of variables. Six measures on the Auto Trainer yielded a multiple r of .45 which shrunk to .43. From the analysis now in progress it seems that an estimated validity of .60 for the scale would be conservative.

CONCLUSIONS

The hypothesis that a valid scale for rating drivers can be developed in a relatively simple form is confirmed within reasonable limits and the reliability of a form of the scale is substantially confirmed. The first edition in published form is now in the process of being printed and will be available for further experimental use in studies of automobile driving performance.

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