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Charles Miller
State College of Iowa

A. R. Lauer
State College of Iowa

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THE MECHANICAL APTITUDE OF DRIVERS IN RELATION TO PERFORMANCE AT THE WHEEL

CHARLES MILLER AND A. R. LAUER

THE PROBLEM

Incidental observation of Oriental people leads the average Occidental to conclude that they do not have a high level of mechanical aptitude. Tales of Oriental drivers by eye witnesses from the Far East would particularly support such observations of automobile drivers.

At Iowa State College during the winter of 1946, thirty Chinese and Japanese students taking special agricultural extension and engineering work in the United States were enrolled in the driver training course given regularly throughout the year. Although the number was limited, it was deemed advisable to make a systematic study of the progress of these learners in order to determine, if possible, the comparison with drivers of Caucasian blood in respect to mechanical aptitude. Also, the relationship between such mechanical aptitude, and their actual performance behind the wheel of an automobile might be ascertained. This is a preliminary report of the findings of the experiment, and the numbers do not warrant elaborate statistical evaluation.

METHOD AND PROCEDURE

There were approximately thirty Oriental trainees in the group, six weeks, and were administered to the separate groups at comparable points of progress. North and South American trainees were interspersed with the Orientals in eleven sections of three or four pupils each. The classes were taught by four instructors.

The various tests used in the study were given over a period of six weeks, and were administered to the various groups at comparable points of progress.

As a measure of mechanical aptitude the O'Connor block test and the Revised Minnesota Paper Form Board Test were given. Auxiliary tests of strength of grip, activity and distance judgment were measured by standard reliable procedures described elsewhere. Each instructor rated his or her pupils on the Rogers-Lauer Rating Scale for Drivers, a ten-point objective form covering attitude, understanding, and other behavior factors related to automotive manipulation. This was done about the sixth week of the course. The writer independently rated the trainees during the eight weeks of the course on the Miller-Lauer Driving Ability Test, which is an objective procedure for evaluating drivers at the wheel, covering twenty-five principles of driving skill.

APPARATUS

Tests were given on the Iowa State College driving field in a full dual-control training car. Adequate equipment available facilitated the accurate observation of driving performance. The field includes various types of intersections and obstacles necessary for driver training and testing. These obstacles and problems are laid out in progressive order to facilitate the training and testing procedures. The roads are of graded, one-lane cinder construction, designed for all weather use. Included are a diminutive traffic circle, miniature cloverleaf intersection, and standard road signs for controlling and directing traffic.

The complete dual-control system of the training car makes handling of the most difficult learners a safe procedure. Each spends about four hours actual time behind the wheel, during the course, in addition to twelve hours observing the instruction of others in his or her group.

RESULTS

The results of the study are shown in two different forms by Table I and Table II.

TABLE I

Comparison of Orientals with Control Group

MEANS FOR GROUPS

	<i>Distance Judgment</i>	<i>Activity</i>	<i>O'Connor Blocks</i>	<i>Minn. Form Board</i>	<i>Rogers-Lauer Scale</i>	<i>Miller-Lauer Scale</i>
Orientals	*29.71	73.60	10.50	47.83	70.08	37.40
Caucasians	*16.07	64.92	9.35	39.75	87.14	52.14
Norms	16.00	70.00	31.00	73.40

*Low score is desirable.

Table I shows means of the most important variables made by the Oriental trainees as compared with North and South American trainees. It is shown that the Orientals were slightly superior in the tests of mechanical aptitude and physical dexterity. They were inferior on distance judgment and driving ratings when at the wheel.

TABLE II

Correlation between various test and examiner's rating on Miller-Lauer Scale.

O'Connor blocks	+ .0472
Distance Judgment	+ .1266
Activity	+ .2365
Grip	+ .1032
Minnesota Form Board	+ .1419
Rogers-Lauer scale	+ .7272

Table II shows the correlations of the various tests given the Orientals with reference to the examiner's scores using the Spearman Rank Formula. Although most correlations were low, they were all positive, and the correlation between the two independent driving ratings was remarkably high considering the differences in time, raters, and scales used. A slightly significant correlation was obtained between the driving scores and the activity scores, suggesting an advantage for active drivers.

CONCLUSION

Although the limited number of cases in this study does not warrant drawing of rigid conclusions, some things do seem worthy of note.

1. Driving ability can be measured by use of an objective check sheet and standard test procedures with a certain amount of reliability and validity.
2. There seems to be a low but positive correlation between driving performance as measured by actual Driving, and mechanical aptitude as measured by the tests used.
3. A simplified objective system for rating driving performance will approximate the results obtained with much more elaborate devices as indicated by the study.
4. The ability to maneuver an automobile would seem to depend more upon cultural background patterns and previous experience than upon mechanical aptitude, or other inherent capacities, as shown by comparison of results from Caucasians and Orientals.

STATE COLLEGE OF IOWA.

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