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Research on Driving Aptitude and Extension of Effective Counselling

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Abstract

Psychological problems of drivers are gradaually increasing in importance for safety in road transport systems. The aim of this paper is to make some observations to obtain assurance of road-traffic safety and accident prevention. The following is the gist of the article: The following is a rough outline of the article.

1. On the aptitude test for the persons to be employed as new drivers and also for drivers who have already been working and have become involved in traffic accidents.
2. On counselling service for drivers.
3. On "Safety First Education" and the periodic training for the administrators of auto transport business and also for would-be administrators.

It is assumed that a considerable improvement and modern devices in the future, will have a bearing on the improvement on the entry in the assesment sheet after the test is given and also in comments will be made, but it is recognized that the present system has shown its effectiveness.

Introduction

We have been making efforts for the past 10 years for the research of driving aptitude and also the extension of effective counselling service in the Japan National Organization of Automative Safety and Injured Party Welfare.

This Organization has been giving aptitude tests to drivers employed by the transport industry, offering suitable advices to them based upon the result of the aptitude test, and holding training courses for the administrators of the auto transport business who are responsible for the education of safety driving and the prevention of the accidents. In addition, this Organization has been making necessary loans to the victims of auto accidents and their families for their living.

Research and Development of Driving-related Aptitude Test

We have measured the physical and mental functions of drivers during their driving, for example, by the GSR and the continuous blood pressure measurement with an aim to prevent the traffic accidents, and have been doing research on the development of effective driving aptitude tests to improve personal tests to be given to drivers in the transport industry. The tests currently adopted by the Orgainzation will be explanied. They are divided into the three types

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as follows;

I. Perceptual-motor ability test

This type of test is the so-called performance test and it involves instrumental test mostly by using the testing devices. As was clarified from the result of the safety analysis of the man-vehicle system, the performances required for drivers were perceptual and actual motor skills and these test classes were selected based upon the data from these skills. They consisted of various types as follows;

(1) Perceptual reasoning test.
This requires testees to seek for and point out the task figures form among 4 similar figures. By this, the driver's mental description faculties will be measured. This is only a paper and pencil test. The secoondary aim of this test is to check whether the testees fully understand the purpose of the test classes by a battry of tests and to ascertain whether they are receiving tests fully knowing the meaning of explanations and/or question.

(2) Speed anticipation reaction test.
This test was developed in conformity with the balance assumption of the perceptual and motor function discovered by C. A. Drake, and the discriminant rate between the accident prone group and non-accident grup is about 70%.

This is the test by means of instruments which examine the extent of the adequate speed sense during driving and also the timing of the reaction to the motion. The distribution of the reaction time by testees in this test is shown in Figure 1.

(3) Multiple choice reaction test
This is one of the typical reaction tests where the testees are instructed to push switches corresponding to the right hand or left hand or right foot, whenever each of the three colored lights such as red, yellow and blue is turned on at random. In order to see whether the driver can control his driving operations based on adequate attention distribution or not, it is

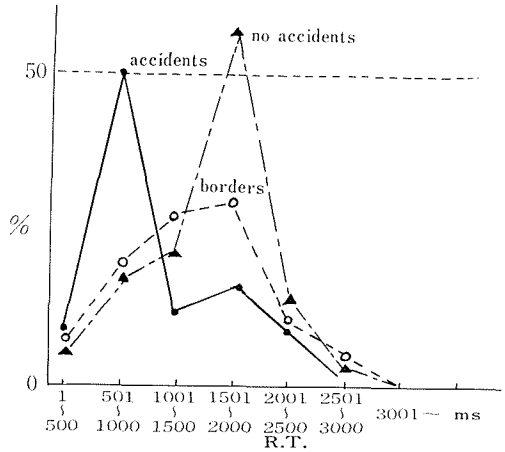

Fig. 1. R. T. distribution of Speed Anticioation Reaction Test. No accidents are drivers who had no accidental affairs over two years and Accidents are more than four times a year and Borders, from one to three times.

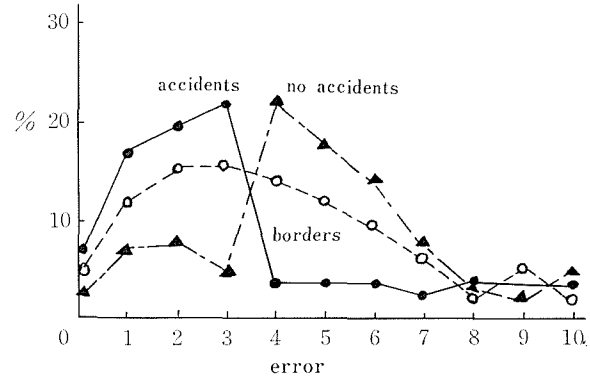

Fig. 2. Error-reaction distribution. A passing mark is less than three errors and 4~5 is "be cautious" and more than 6 errors, failure.

specially emphasized to examine whether there is a wrong reaction or not, by using at the same time, tone stimulus by means of buzzers. According to the data of researchers for the development, the discriminant rate was about 70% which is the same as in the previous test. The distribution of wrong reactions found in ths test are shown in Figure 2.

(4) Eye-hand co-ordination test
This test is conducted by instruments of the simulator type to see whether the driver can take prompt and correct actions to cope with the continuously changing situations or not. This is to test whether the driver can maitain a well-balanced attention distribution on both sides of the road during his driving.

II. Personality and safety attitude test

It is generally recognized in our society that auto driviug behaviors reflect the personality traits of the driver. It is well known that the driver's personality becomes the center of the psychological topics centering around traffic accidents.

Police officers and others concerned with the traffic control emphasize the lack of the traffic morals and anti-social behaviours which are closely related to the violation of traffic regulations and the occurance of traffic accidents. The personality inventory which we selected consists of questions from TPI (Todai Personality Inventory) and comprises 150 questions including the Lie Scale in addition to 5 scales described below.

(1) Feeling of anxiety in health
This is a scale centering around the sense of abnormality, accompanying physical syndromes such as a feeling of anxiety in health, nervousness, feeling of fatigue and sleeplessness. This deals with the psychological anxiety which gives rise to various kinds of physical symptons.

(2) Lack of mental composure
This means the state of lack of self control. The special traits of this state are the easy excitement and the big change of feeling. People in this category are in a hallucinatory state suffering from the constant sense of "being forced by someone else". This kind of feeling is very dangerous for peronnel employd in the business handling machines.

(3) Lack of a comfortable state of mind
This refers to the depressive state and the state of exclusion. Persons in this category are in the autistic state suffering greatly from the interpersonal anxiety and confine themselves to a very small world. It is noticeable that they cannot adequately reach a definite decision because of the dullness of their own brain.

(4) Lack of sense of cooperation
Partly depending upon the society and partly resisting with a egoistic attitude. Persons in this category are apt to change their objects and will, and would presume that they are destined to a unfortunate world.

(5) Lack of understanding of the feeling of others
Persons in this category are misanthropic, lonely and self-satisfied. In many cases they have interpersonal anxiety in the background and also have the feeling of the lack of the self-confidence.

(6) Safety attitude test
This is a test of questionnaire type, and not by the personality inventory. The questions include the knowledge and understanding of traffic regulations,

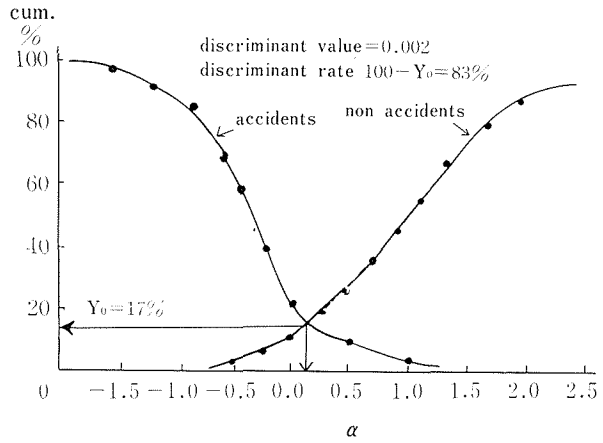

Fig. 3. Predictive validity of Personality Inventory. This figure summarized the survey, using signal to noise ratio.

social values in our daily life and others.

Out of these tests the former three deal with the problems of personal adjustments, while the latter two such as the personal scale and the attitude test consit of questions on the quality of the social adjustments. According to the results of the research made by the originator of this test the discriminant rate between the accident prone group and the nonaccident group calculated by the discriminant function which is shown in Figure 3. Although the importance of the safety attitude which has a strong bearing on traffic operations has been emphasized heretofore, it is regrettable to say that there is no established test method available even at present, which can be relied on objectively. As there are problems which remain unsettled in the attitude scale which we use, we wish to establish a more complete test through our further studies.

III. Visual function test

According to the criterion of the driving licenses tests required by the Road Traffic Law in Japan, it is necessary to have 0.7 or more of visual power of both eyes in case of driving ordinary cars and 0.8 or more for large sized trucks. But there are no regulations for the disturbance of visual field and the abnormal color sensation.

There is no room for doubt that the disturbance of visual and perceptive functions on the part of the professional drivers will become the greatest obstacle in the execution of their duties. Therefore, the following 5 tests were adopted.

(1) Visual acuity ...
The static vision will be measured by using a scrinoscope and the visual target is the Landolt ring.

(2) Visual field ...
This will be measured by the perimeter field and to determine whether both eyes have a visual field of 150° or more horizontally.

(3) Colour sensation ...
This will be estimated according to the detection criterion and the criterion of abnormality indicated in each chart by the Ishihara colour Blindness Test Charts.

(4) Depth perception ...
An illuminating device is attached within the orthotelemeter and the accuracy

of the depth perception is examined by the eye-measurement and the function of streopsis will be tested by both eyes.

(5) Kinetic vision ...

The eye-sight against the moving target is measured by the Suzumura Kinetic Vision Tester. This method was studied by Dr. Akihiro Suzumura of Nagoya University in Japan.

Counselling service for enterprises employing drivers and guidance activity for operating administrators

It is assumed that there are drivers who have traffic accident proneness and repeated traffic offenders among professional drivers of buses, taxi and trucks.

It is true that there are certain drivers who are lacking in consciousness of playing an important role in the public transportation business, and also there are special drivers whose attitude to their work are criticized by customers and consignors. We have been giving counselling for such problem drivers through our personal interviews with them, and trying carefully to find a clue to help them, until we develop a mutual understanding by our impartial attitude or listening patiently to the complaints of the clients. Then, we give them adequate information and at times it becomes necessary to admonsih them.

It seems that many clients harbor a discontent of their social status and also their roles in their profession. At the same time, they have a strong feeling of unrest because of the lack of guarantee and security in their roles and positions. For example, their wages are comparatively low and their labour conditions are poor, and the annuity system after their retirement has not been established.

These factors give them the feeling of the unstability for their future and at the same time, we sometimes come across the fact that the unfavorable conditions in their profession are reflected in their home life and cause troubles in the relations with their family members because of their frustration.

Many clients come to the Organization to receive counselling suggested by their superiors and management, but it is rare to see those who have emotional confusion and the symptoms of nervous and mental diseases.

Most of them who have complaints and discontent are apt to lay the blames on other persons and become offensive and therefore, in many cases they are branded as incompetent drivers because of their haughty working attitudes.

It is regrettable that we must hesitate to enumurate the clinical informative cases, because we have not spent enough time since we started our counselling services. However, the assesment sheets are not directly given to testees who took the aptitude test except for certain testese who are considered as problem drivers.

Usually the assesment sheets are directiy mailed to the superiors of their working offices and also to their vehicle operating administrators as reference materials for their guidance in safety driving.

The Japanese Automobile Transport Enterprise Law states that vehicle operating administrators who are responsible for the management of matters with regard to the safety assurance in the operation of business cars should be kept at each business office. This Law recommends that the vehicle operating administrators should make the practical use of the assesment sheets as their reference materials in their daily safety guidance for drivers. It is natural that testees of the aptitude test and also vehicle operating administrators do not have sufficent psychological

knowledge and do not fully understand about the test itself, and therefore, technical terms and difficult words are avoided in the statement of the assesment sheet.

This Organization has been developed as an organ which can play roles of the consultative center for the prevention of auto traffic accidents by drivers in the transport business, and also as a consultant of community welfare centers for the victims of accidents and their famillies.

This Organization gives a training course for candidates who require the basic qualifications necessary for vehicle operating administrators, and also is responsible for an annual study meeting to be attended by persons who are actually working as the vehicle operating administrators and provides them with the administrative technics to ensure the traffic safety. In addition, it teaches the vehicle operating administrators how to read the assesment sheets of testees who took the aptitude test, how to instruct drivers based upon the comments described in the assesment sheets and also how to advise them effectively. We psychologists have been giving assistance to them as instructors for their better understanding of the test by making the most of these occasions. At present, the number of testees of the aptitude test has definitely increased and the counselling service has became routine.

In order to investigate whether such test and counselling service have been giving the desirable effect to drivers for the prevention of traffic accidents or not, 2556 testees were asked to answer the questionnaires by extracting samples in a nationwide scale in 1976 and their answers were summed up. The biggest change in the driving attitude was the one by the group of taxi drivers who became thoughtful to persons other than themselves (15.7% increase), and more careful in driving (15.4% increases) and lessened their mistakes (15.3% increases). These showed remarkable changes. We wish to repeat such an investigation periodically and attempt to confirm its effect since we are making efforts systematically to improve the suitability and reliability of our battery of tests.

Summary

In order to secure the safety of the road transport system we have described the development of the aptitude test and also the aptitude research for drivers in the road transport industry. In addition, we have explained about the actual situation of our counselling services, guidance, education and training for the vehicle operating administrators. Recently the Research and Development Chamber was finally established in the Organization for the convenience of our further studies and research on the important problems with a more positive attitude.

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