

Psycho-technical driver assessment: a useful tools for detecting bad drivers or complete waste of money?

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According to recently enacted law in Turkey, certain driver groups have to be tested in "psycho-technical" laboratories. The psycho-technical driver assessment may involve assessment of both a driver's cognitive and motor skills as well as psychiatric fitness to drive. Similar "psycho- technical" assessment systems are used mainly in countries with many traffic accidents (e.g. Italy and Spain) whereas driver assessment systems are not used in the safest countries with relatively safe traffic (e.g. the Netherlands, UK, Scandinavian countries) except Austria and Germany – two main producers of testing devices. Despite the unpopularity of psychological testing of drivers in countries with good traffic safety record, Turkey seems to see psycho-technical and psychiatric driver assessment as an easy way to improve traffic safety. In this paper, usefulness of these driver assessment tools will be evaluated both theoretically and empirically.

Theoretical and historical background of psycho-technical driver assessment: accident proneness theory

Behavioural interventions in traffic safety work are usually focused either on the risky behaviours or on individual drivers. The objective of the former approach is to find out those driver behaviours and characteristics of the traffic system, which increase accident risk. According to this view, the main focus in interventions should be in risky **driving**, not in risky **drivers**. The latter approach focuses on an individual driver and tries to find and eliminate risky drivers from the driver population. According to this view, accidents are mainly caused by a small group of drivers. The task of traffic specialists is to find out these "traffic monsters" and either rehabilitate or – if rehabilitation is not successful – prevent them from driving. It can be claimed that the psycho-technical assessment represents this approach

whereas police enforcement, traffic engineering solutions and basic driver education belong to the latter system-oriented approach.

The idea of a small number of individuals being responsible for all accidents during a certain time period was introduced by Greenwood and Woods in 1919, when they found out that certain factory workers had more accidents than others in one year's time. Later, this finding was named as "accident proneness" and applied to traffic safety. According to accident proneness theory, a small percentage of drivers accounted for 100% of accidents in a certain time period. For example, it can be roughly estimated that 6% of drivers caused 100% of accidents in Turkey in 1999 (approximate estimation based on number of registered vehicles and reported accidents; OECD, 2002). The main task for traffic psychologists was to develop tests to detect these "accident prone drivers". Unfortunately, the basic assumptions of the accident proneness theory were soon found faulty and the theory was widely rejected as early as in 1950's.

One of the main problems in accident-proneness theory is that the assumption that the accident-involved drivers in year 1 would have again an accident in the following years. In a large study including all Californian drivers, it was found out that 6.5% of drivers had 100% of accidents in 1961. In 1962, however, these same "accident-prone" drivers were responsible only for 11.5% of accidents (overrepresentation was 1.71). Similar figures for overrepresentation have been found also in later studies (Elliott, Waller, Raghunathan, Shope, & Little, 2000). It seems that the number of previous accidents is a fairly poor predictor of future accident involvement. As James Reason, the author of "Human Error" so well summarized: "Accident proneness theory failed because it was found that unequal accident liability was, in reality, a "club" with rapidly changing membership. In addition, attempts to find a clearly definable accident-prone personality proved fruitless." (Reason, 1990)

In addition to the theoretical shortcomings, all attempts to develop a valid test for finding the mystical "accident-prone driver" were unsuccessful (for a review about accident-proneness theory, see Haight, 2001). So far, no psychological or psycho-technical test has been able to show enough predictive validity in detecting risky drivers.

Validity of decisions based on psycho-technical assessment: problems in instrument or problems in use?

Traffic psychologists have been trying to develop psycho-technical assessment systems since 1920's. So far, the validity of testing systems either has not been properly studied or the tests have not been able to show required predictive validity. Despite tens of thousands of drivers having been tested with psycho-technical assessment tools (including the testing systems used in Turkey today), it is surprising that no proper successful validity studies have been reported in scientific traffic research literature. A quick search in PsycInfo database for psycho-technical assessment systems (keywords "psycho-technical assessment", "ART-90", "ART-2020", "Vienna Test System", or the last names of the test developers) found only two articles directly related to validity of tests (Bukasa, Kisser, & Wenninger, 1990; Heikkilä, 2000). Both studies showed certain degree of discriminant validity, but predictive validity was not investigated.

As far as I can see, adequate tests should be able to measure a driver's ability to drive safely enough. The best and finally the only criterion for safe driving is the lack of (future) accidents. Therefore, a valid test should be able to predict a driver's future involvement in accidents. Unfortunately, none of the modern tests predict a driver's future accident involvement so well that it could be used as an assessment tool. The only types of validity, which the manuals of these testing systems report, are a test's ability to differentiate between groups of people (e.g. patients vs. non-patients) or correlation between test scores and performance in a short test drive. Unfortunately, performance in a short test drive is a rather questionable criterion for safe driving.

In addition to validity problems, the adaptation of foreign tests to Turkey seems to be a problematic issue. Most of the tests nowadays used in Turkey were originally developed outside Turkey - usually in German-speaking countries. Before a psychological test can be used in a different country or a culture, it should go through a careful and usually time-taking adaptation procedure (ITC, 2000). In traffic related tests, test adaptation needs especial attention, because traffic conditions, degree of motorization and driving cultures vary a lot between countries – traffic in Istanbul is definitely quite far from that of Vienna. Since adapting a test to a different culture is often difficult and sometimes impossible, it is often better to develop a completely new test battery than use an inadequately adapted test. It can be concluded that it would be easier and safer to develop a Turkish psycho-technical testing

system to be used in Turkey than to adapt foreign systems to Turkey with questionable success.

In addition to the tests themselves, the current use of psycho-technical assessment systems in Turkey have several shortcomings. According to the law, drivers with several speeding tickets, drivers having certain amount of penalty points, and drivers caught form drinking while intoxicated should be tested in psycho-technical laboratories. Drinking and driving, speeding and other traffic violations are deliberate acts, which people choose voluntarily to make. Traffic research literature shows that the numbers of traffic violations (i.e. deliberate risky driving) – not driver errors or mistakes - is the best predictor of accident risk see (Elander, West, & French, 1993). However, psycho-technical assessment measures only a driver's skills and cognitive abilities, but not his/her driving style or attitudes to traffic safety. Since the main problem in traffic is the large number of drivers not obeying the traffic rules (e.g. speeding, shooting the red lights and drinking and driving), a test focusing on individual drivers is not a cost-effective solution to traffic safety problems in Turkey. In this way, psycho-technical assessment (even a valid one) is a wrong tool and can never lead to any significant improvement in traffic safety in Turkey.

Back to basics in traffic safety work: Engineering, Education and Enforcement

Although the psycho-technical assessment is unlikely to contribute significantly to traffic safety in Turkey, there is not need to be pessimistic. Instead of expensive easy solutions like psycho-technical tests, we should turn back to three big E's in traffic safety work: engineering, education and enforcement. The safest countries in the world reached the present state of safety without any kind of psycho-technical assessment. In 1971, for example, 1143 Finns (108,3 people per 100,000 vehicles) died in road accidents. In 2000, the number of killed in traffic was 396 people (15,9 people per 100,000 vehicles). This remarkable reduction was achieved by improving the road infrastructure, driver education and licensing, and appropriate enforcement of traffic code.

Traffic psychology in Turkey is largely seen identical with psycho-technical assessment. Although psycho-technical assessment as psychological testing can be done only by a trained psychologist, Turkish traffic psychologists should not limit their interest only to psychological testing. Several examples from Western Europe and Scandinavia show how psychologists can have an important contribution to traffic engineering and vehicle design,

development of driver training and licensing as well as to enforcement. Human factor issues in road design (e.g. usability of different types of roads, perception of information devices like traffic signs), vehicle ergonomics (e.g. effects of in-car technology on safety), effective enforcement and legislation (e.g. attitude campaigns), and education (e.g. development and assessment of successfulness of driver training programs) all are field in which psychologists can have a significant contribution to traffic safety in Turkey too.

Now we have the law of psycho-technical assessment: What next?

Since we now have the law of psycho-technical assessment, we should at least ensure that the most valid tests are used in the most appropriate way. First of all, a proper large-scale validation and usability study of the current tests is urgently needed. The aim of the validation study should be to critically assess how well the current tests actually predict risky driving and accident involvement. In addition to test validation, a Cost-Benefit Analysis is needed for assessing the estimated safety impact of psycho-technical tools. Cost-Benefit Analysis estimates and totals up the equivalent money value of the benefits and costs to Turkey to establish whether they are worthwhile. If the impact of psycho-technical assessment is found to be minimal, then Turkey should re-assess the need for a large-scale driver assessment program. Validation studies and Cost-Benefit Analyses should be conducted by an independent research institute or university, not by test manufacturers or retailers, and the results should be open to public discussion.

Although psycho-technical assessment of ordinary drivers will probably not improve the traffic safety situation in Turkey, certain special driver groups might benefit from such assessment. Professional drivers in general and especially drivers of dangerous goods vehicles could be tested with skill tests to ensure that they are well fit for their demanding profession. In addition to professional drivers, psychological tests could help us to assess driving ability of certain patient groups like neurological patients (e.g. patient with early forms of the Alzheimer's disease, trauma and stroke patients, etc.), patients with visual impairment, and elderly drivers in general. In every case, the testing session should include also a well-designed test drive with a properly trained driving instructor.

This paper emphasised the need for a testing system, which would be validated for Turkish drivers. In addition to obvious financial benefits, we can expect that a good Turkish

testing system would work among Turkish drivers at least as well as a foreign system. Therefore, developing new driver assessment tools in Turkey should be seriously considered.

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