

## **INVESTIGATING DRIVERS' TRAFFIC KNOWLEDGE IN JORDAN**

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**Summary:** Jordan's fatality rate per registered vehicle is approximately 7.5 times larger than that of the United States (157.2 per 100,000 in Jordan vs 21.0 per 100,000 in the U.S.). This project addresses the traffic safety problem in Jordan by evaluating driver's knowledge of existing traffic laws and regulations. An experiment was conducted in which 55 subjects with current driver's licenses were administered a test composed of 25 questions selected from actual Jordanian driver's license exams. Statistical analyses were then conducted on the results. It was found that a shocking 96.4% of the drivers in this study failed to pass the simulated written driver's license exam, with professional drivers scoring worse than non-professional drivers. Based on the findings, recommendations are made regarding Jordanian public policy governing driver's licensing, including more frequent retesting of drivers, a higher standard of knowledge for traffic rules, and a nationwide program to assess the relationship between driver knowledge, driver behavior, and crash and fatality rates.

### **INTRODUCTION**

Proper traffic legislation is essential to provide smooth and safe traffic operation for societies reaching out to the 21<sup>st</sup> century, and trying to keep pace with global economic competition. Jordan is an 88,946 Km<sup>2</sup> country with a population of 4.75 million people. As of 1998, the number of registered vehicles was 389,196, and there were 43,343 recorded traffic crashes, resulting in 612 traffic-related fatalities and 17,177 traffic-related injuries (Jordan Traffic Institute, 1999).

Jordan's population has doubled since 1980, while the number of registered vehicles has almost tripled since that year. Traffic crashes have kept increasing at a steady rate, and at a pace exceeding population growth (560.5 crashes per 100,000 population during 1980, versus 911.4 crashes per 100,000 population during 1998). However, the fatality rate dropped from 20.2 per 100,000 population (1980) to 12.9 per 100,000 population (1998) (Jordan Traffic Institute, 1999).

Nonetheless, the traffic fatality rate in Jordan is considered high, when compared to countries with similar demographic characteristics. Compared to the United States, Jordan's fatality rate per population (1998 figures) is comparable: 12.5 per 100,000 in Jordan; versus 15.7 per 100,000 in the USA. However, Jordan's fatality rate per registered vehicles is approximately 7.5 times as large as that of the USA (1998 figures): 157.2 per 100,000 in Jordan in 1998; versus 21.0 per 100,000 in the USA! (Jordan Traffic Institute, 1999).

In that regard, it is noted that, in Jordan, drivers are reexamined (licensing renewal) after ten years, with such reexamination being limited solely to a test for visual acuity. In contrast, in the U.S., according to NHTSA and under the provision of the National Highway Act of 1966, Public Law 89-564, the standards specify that drivers should be reexamined at an interval not to exceed four years, at least for visual acuity and for knowledge of the rules of the road (Hamburger, et al, 1984). Further, after reviewing the results of driver's license examination scores in Jordan during 1998, it was found that the percentage of applicants who failed the written exam ranged from 42% in August to 63% in December, where the passing grade was 90%. Thus, a surprising percentage of applicants fail their initial, written driver's license exam, yet Jordanian drivers are never retested to determine retention of basic traffic laws and regulations.

The current research: addresses the traffic safety problem in Jordan, by evaluating drivers' knowledge of existing traffic laws and regulations; and was part of a pilot study, which is being used to set the stage for a nationwide research program. Results are discussed in terms of their implications for public policy changes in Jordan.

## **PROCEDURES USED**

*Subjects.* The sample consisted of 55 volunteers from Jordan, and included 13 females and 42 males, who ranged from 19 to 64 years of age (mean = 34.6; SD = 9.9). The sample included 20 subjects with a high school education or less, 12 with an associate's degree, and 23 with a bachelor's degree or higher. In terms of occupation, two of the subjects were unemployed, eight were students, 14 were professional drivers (primarily bus and taxi cab drivers), 16 were otherwise employed in the public sector, and 15 were otherwise employed in the private sector. Length of driving experienced ranged from less than one year to 20 years (mean = 10.7; SD = 7.8). All subjects had a valid Jordanian driver's license.

*Procedures.* All subjects were administered a simulated driver's license examination (SDLE), conforming to the current model in force in Jordan. The exam consisted of 25 questions, which were selected from actual Jordanian driver's license exams used during the past few years. These questions covered such topics as: traffic signs; signals and markings; motorists' rights and duties; pedestrians' rights; right of way rules; and driving ethics. The resulting test included questions with a wide range of difficulty, and was expected to take about 15 minutes to complete. Following administration, the SDLE was graded, and a percentage score was assigned, consistent with the percentage of SDLE items answered correctly. In accordance with Jordan's standard of 90% correct being a passing score on a driver's license exam, SDLE results were categorized as pass-fail, using 90% correct as the standard for passing.

After completion of the SDLE, subjects completed a brief series of written questions pertaining to such demographic variables as: age; gender; level of education; occupation; length of driving experience; frequency of driving; and whether or not the subject was a professional driver. Based upon the results of this demographic questionnaire, subjects were categorized along the following dimensions: age (one half standard deviation cuts were used to arrive at three groups: 19-30 years of age; 31-40 years; and 41-64 years); education (college degree versus high school education or less); years of driving experience (one half standard deviation cuts were used to arrive at three

groups: less than one to six years experience; seven to 15 years experience; and 16 to 30 years experience); and, finally, type of driver (professional versus non-professional).

*Statistical analysis.* Statistical analysis of SDLE scores was conducted utilizing a Z test for determining a confidence interval and analysis of variance (ANOVA) (William and Sincich, 1995). SPSS software was used, and the level of significance was set at  $p < .05$  for all cases.

## RESULTS

*Driver knowledge.* Incredibly, only two of the 55 subjects managed to obtain a passing score (90% correct or better) on the SDLE. Extrapolating from this finding, it is estimated that only 3.64% of Jordan's licensed drivers could pass Jordan's written driver's license exam, if asked to retake it. Furthermore, a Z test for determining the population mean from the mean and standard deviation of the sample, and utilizing a 95% confidence interval, suggested that, at most, only 08.64% of the entire population of Jordan's licensed drivers could be expected to pass a readministration of Jordan's written driver's license exam!

*Demographic considerations.* In order to investigate the SDLE results in more detail, ANOVA was utilized to study the relationship of various demographic variables and SDLE scores. As demonstrated in Tables 1 and 2, neither age nor length of driving experience was significantly related to obtained SDLE scores. Given that Jordan currently has no procedure for the re-administration of the written driver's license examination, length of driving experience can be utilized as a measure of elapsed time since the driver last took a written driver's license examination. As such, one can extrapolate to there being a lack of any statistically significant relationship between SDLE scores and elapsed time since the driver last took the written driver's license examination.

TABLE 1: SDLE % TEST SCORES BY AGE GROUPS

	19 – 30	31 – 40	41 – 64
Mean	72.8	72.4	72.6
Standard deviation	8.3	7.7	12.3
N per group	20	21	14

$F_{2,52} = 0.01, n.s.$

TABLE 2: SDLE % TEST SCORES BY YEARS OF DRIVING EXPERIENCE

	00 – 06	07 – 15	16 – 30
Mean	71.8	74.0	72.4
Standard deviation	6.9	7.3	12.6
N per group	23	14	18
$F_{2,52} = 2.52, n.s.$			

However, as illustrated in Table 3, a statistically significant relationship was obtained between SDLE scores and educational level ( $F_{1,53} = 5.94; p < .02$ ). Those subjects with some type of college degree, whether an AA/AS, BA/BS, MA/MS, or PhD, scored significantly better than those with a high school education or less. One question arising from this finding has to do with the actual reading skills of those subjects in the less educated group. Additional research is needed, in order to exclude definitively the possibility that this finding might be secondary to the subjects in the less educated group having a reading comprehension level inadequate to the task of passing the SDLE.

TABLE 3: SDLE % TEST SCORES BY EDUCATION

	HS OR LESS	COLLEGE
Mean	68.8	74.7
Standard deviation	9.5	8.2
N per group	20	35

$$F_{1,53} = 5.94; p < .02.$$

However, this possibility is somewhat obviated by the fact that their reading comprehension level was sufficient to pass the Jordanian driver's license examination in the first place. In that regard, it must be remembered that the SDLE test items were selected from written driver's license examinations, which were actually administered in Jordan during the past few years.

Finally, ANOVA demonstrated a statistically significant relationship between type of driver, i.e. professional versus non-professional, and obtained SDLE percentage scores ( $F_{1,53} = 5.14, p < .05$ ). Even though the public safety is continually entrusted into the hands of bus and taxi cab drivers, and even though large segments of the Jordanian population must avail themselves on a

daily basis of such public transportation, the professional drivers in this study scored significantly worse on the SDLE than did the non-professional drivers. These results are presented in Table 4.

TABLE 4: SDLE % TEST SCORES BY DRIVER TYPE

	PROFESSIONAL	NON-PROFESSIONAL
Mean	68.0	74.1
Standard deviation	11.2	07.8
N per group	14	41

$$F_{1,53} = 5.14; p < .05.$$

## DISCUSSION

One assumes that there may be many factors contributing to Jordan's excessively high traffic fatality rate per number of registered vehicles. Such factors may include, but are not necessarily limited to: inadequate design of roads, coupled with marginal safety requirements; road systems, which were originally designed for substantially fewer vehicles than now exist, and which are currently forced to function beyond their design capacity; inadequate maintenance of road surface; inadequate safety inspection procedures for registered vehicles; etc. Given Jordan's traffic fatality rate, additional research is needed to investigate these possibilities.

However, the current research dramatically illustrates one crucial factor, which may well be contributing to Jordan's traffic fatality rate. Fully 96.4% of the licensed drivers in this study failed to pass a simulated Jordanian written driver's license examination. Such an appalling, widespread lack of knowledge about elementary traffic rules and regulations represents a potentially substantial assault on traffic safety in Jordan. While neither age nor length of driving experience was related to such knowledge, both level of education and type of driver (professional versus non-professional) were. Of note, these findings indicated that professional drivers, primarily bus and taxi cab drivers, i.e. the group of drivers to whom the safety of the public is most entrusted, demonstrated significantly less knowledge of basic traffic rules and regulations than did non-professional drivers.

Given current findings, three substantive recommendations can be made regarding Jordanian public policy governing drivers' licenses. First, with 96.4% of the sample failing to pass a simulated, written driver's license examination, there is a clear need for a system for routine readministration of the written driver's license test at periodic intervals. Given the staggering failure rate demonstrated in this study, the need for periodic readministration of the written driver's license exam cannot be obviated by the lack of a relationship between SDLE scores and length of driving experience, i.e. an indication of how much time has passed since the licensee

last took the written exam. Second, public policy must demand an even higher standard of knowledge pertaining to traffic rules and regulations from professional drivers, than it does from non-professional drivers. The obtained research results indicate that precisely the opposite is currently the case in Jordan. As such, it is recommended that Jordan develop a separate and more demanding driver's license examination for professional drivers, a procedure currently in place in the USA, where professional drivers are required to have a special "chauffeur's" license. Third, a nationwide research program is needed to assess further: the relationship between driver knowledge of traffic rules and regulations and driver behavior behind the wheel; and the relationship of both driver knowledge and behavior to crash and fatality rates in Jordan.

## REFERENCES

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