

Research Paper: Lived Experience of Transportation Network Company Driver About the Causes of High-risk Driving Behaviors: A Thematic Analysis



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ABSTRACT

Background: Nowadays, industrialization, using cars and consequently traffic jams are part of human life which grows every day. Along with the expansion of communication and transportation speed, the number and severity of traffic accidents increases. According to the World Health Organization, traffic accidents are now recognized as the ninth cause of death worldwide. In Iran, traffic accidents after cardiovascular diseases are the second leading cause of death.

Materials and Methods: This qualitative study was designed and implemented to determine driver's views and opinions in two cities of Warsaw, Poland, and Tabriz, Iran, about driver's high-risk behaviors. This study was conducted using in-depth interviews with 27 drivers. The study results were divided into four main questions about driving behaviors, reasons for driving abnormal behaviors, the prevalence and causes of abnormal behaviors, and suggested measures to correct these behaviors.

Results: The study results were divided into six main themes of driving norms, individual factors, social factors, external factors, driving skills, and driving laws. Our findings indicate that drivers are more likely to rely on individual skills in driving in unacceptable conditions. In other words, they ignore the rules and regulations. But, when driving in high standards conditions and good facilities, drivers accept the rules and prioritize them.

Conclusion: Internal control should be considered a helpful complement to external control, and that external control provides the highest efficiency when it comes with internal control. To internalize norms and observe driving laws and regulations, the authors suggest removing obstacles such as distrust among drivers regarding the effectiveness of driving laws, unawareness of breaking the laws, lack of job satisfaction, low level of participation, and structural barriers. Also, roads and vehicle safety must be improved along with a better track of the drivers' behavior.

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1. Introduction

Nowadays, industrialization, using cars, and traffic on the roads are increasing. Despite the benefits of expanding communication and the speed of transportation of goods and people, the number and severity of traffic accidents increase, highlighting the safety issues on the road [1]. Road accidents have financial costs, estimated at 1% to 3% of the country's gross income annually. It is a waste of national funds and affects countries' development, mainly in low-income countries [2]. In other words, the cost of road accidents in low- and middle-income countries is between 1% and 2% of gross domestic product and is estimated at more than \$100 billion per year [3].

In 2013, the World Road Safety Organization presented a comprehensive global strategic plan to improve this area's safety from 2013 to 2020. In this plan, objectives, procedures, current and future status, and the estimated percentage of road accident prevention, and the number of deaths after implementing these plans were explained, separated by regions and countries. According to this analysis, in Asian countries, the number of deaths was about 1640000, but about 164 million people were saved from injuries due to road accidents between 2010 and 2020 [3].

There are some data on the rate of deaths from traffic accidents. Low- and middle-income countries have the highest mortality rates due to traffic accidents (21.5 and 19.5 per 1000 people). Other studies reported between 20.7% and 15.6% for low-income countries and high-income countries, respectively [4].

Therefore, accidents, their financial costs, and mortality have become one of the challenges of human societies. Traffic accidents have become the ninth cause of death worldwide in recent years, as reported by the World Health Organization [5]. After cardiovascular diseases, traffic accidents are the second leading cause of death in Iran [5].

A traffic accident is a complex event due to human, technical, and environmental risk factors. Road structures, traffic signs, and legislation on transportation networks affect the number and severity of accidents [6]. Identifying the most behavioral risk factors that affect the severity of accidents can be considered a basis for preventing traffic accidents, too [7].

According to global studies, about 27% of accidents happen in the human-vehicle-road context because of

human interaction with the road environment. Considering the number of road deaths and accidents help to depth, correct, and consistent knowledge of the road safety problem and, therefore, the use of performance indicators in road safety [8].

The 2013 report of the World Health Organization (WHO) collected information from 182 countries and stated that global mortality is estimated to be unacceptable in millions of road accidents each year. Only 28 countries (7% of the world population) have comprehensive laws on risk factors, such as drinking alcohol, high speed, the use of helmets for motorcyclists, non-use of seat belts, and the protection of children on road safety [9].

Driving behavior includes two types of positive and negative behaviors. Negative behaviors cover two groups of errors and misconduct. Errors are the failure of the planned actions to achieve the desired result and deliberate violations of the necessary methods to maintain the safe management of a high-risk system. In other words, violations are an intentional deviation from norms and baseline performance on the road [10].

According to Rising, driving risk behaviors are divided into three parts: lapse, faults, and violations. Lapse is a driving disturbance that arises from problems with attention, memory, and information processing, which can be an embarrassment, but it is unlikely to affect driving safety. Faults are the failure of planned actions to achieve the desired result in driving, and violation is an intentional deviation from inherently necessary behaviors for safe driving. Behavior in general effects stimulates or inclines to new excitement and experience [11].

Among the mechanisms of social behavior, internal control plays an essential and undeniable complementary for external control. The most effective external control is incompatible with internal control [12].

Also, control of behavior during weakness or lack of external control depends on the control of individuals resulting from a successful internal process. Socializing makes it the second nature; in other words, internalizing [13]. Different cultures have different perceptions of the environment. In this regard, behavioral geography believes that people play a role in geographic space, know their surroundings, and deal with them.

It can be assumed if drivers reach their destinations easily and quickly, without complying with specific rules and regulations, they been rewarded somehow. So, they tend to extend these unlawful behaviors to other situations,

such as their jobs, public places, and other social relationships. Regarding nonnormative driving, when behaviors result in the highest negative reward, such as physical damage and even death, the possibility of similar behaviors with less negative rewards will increase. In these social behaviors (driving), many sociological concepts, especially developmental concepts such as social values and social norms of society, socialization processes, trust in specialized systems, job satisfaction, bureaucracy, social participation, and social capital, can be recognized. On the one hand, the management of social issues involves knowledge and awareness of issues, and on the other hand, there are planning, designing, and implementing the necessary mechanisms and processes, allocating appropriate time and budget, and having an atmosphere of fellowship, cooperation, trust, and participation in different layers of society (high social capital). This issue must be realized in three dimensions of micro, intermediate, macro, and in structural and non-structural areas.

The study's main question is to identify the obstacles faced by drivers in internalizing driving rules and internal controls. This research tries to find what factors play a role in shaping driving behaviors.

2. Materials and Methods

This study aimed to determine the driver's views of the causes of high-risk behaviors. This research used the qualitative method to collect in-depth information through semi-structured (open questions) interviews and thematic analysis. Using the qualitative method for high-risk driving helps to understand the multidimensional nature of the problem and its dynamism. Qualitative research is an investigation in the real world, identifying delicate and profound problems. This method makes it possible to unravel the complexity of social problems and the difference between realistic and unrealistic conditions [14]. The qualitative research method, more than generalization, reflects unknown concepts, and it is used to discover new issues and points about different topics and areas that are less considered and developed. Thematic analysis is a poorly demarcated, rarely acknowledged, yet widely used qualitative analytic method [15].

Study sample

In this research, sampling was done purposefully until data saturation, and interviews were conducted among the first group consisted of 15 members of transportation network drivers in Tabriz City, Iran, and in the second group with 12 transportation network drivers who were

of different nationalities and driving in the city of Warsaw, Poland. These people have driving experience in another country and were good candidates for identifying the driving behaviors factors and adapting to the new driving environment. Interviews with drivers continued in terms of number until reaching the stage of theoretical saturation [16].

The inclusion and exclusion criteria

The inclusion criteria were as follows: 1) had more than 5 years' experience as a taxi driver, 2) could speak English, 3) age between 28 to 60 years, and 4) consent to participate in the study. The exclusion criteria were as follows: 1) expressing dissatisfaction during the research, and 2) lack of proper expression.

Conducting interviews

One of the challenging qualitative research processes is that interviewees may respond more to their interest objective; therefore, they do not provide the researcher with the desired information. For this purpose, general questions were used in the first interview [17]. The first, second, and third interviews were conducted without a clearly defined structure and question. They consisted of general talking about their experiences and expressing their views on the state of driving behaviors in the city. In qualitative research, unstructured interviews provide a wider range and allow participants to tell their stories in more detail [18]. After analyzing the first and second interviews, according to the concepts extracted in the analysis process, other interviews were conducted in a semi-structured manner with more directed questions about the conditions involved in driver's risk behaviors and their reasons. All interviews were recorded and then transcribed verbatim. The interviews took between 30 and 90 minutes. The study data were collected from October to December 2019. However, after the coronavirus pandemic in March 2020, additional information was collected through virtual communication with some participants to collect more data.

Validity and reliability

Respondent validation and member check

A comparison was made between what the researcher meant and what the drivers intended, and the necessary corrections were used. Also, we used peer checks and external checks to examine the validity of the results and themes. The data's validity and reliability were assessed with the participants' control methods and re-

searchers familiar with qualitative research [18]. In the participants' control, a part of the text and the initial codes were shown to the participant. The degree of homogeneity of the researcher's ideas was compared with the participants' opinions. In the researchers' control method, the concepts and themes extracted from the data were presented to researchers familiar with qualitative research. They controlled the relations, and in the case of disagreement between colleagues and the researcher, the researcher would re-analyze and conceptualize the data and returned it to colleagues until they approved and reached a consensus.

Data analysis

In this study, the analysis process was done in six below steps [15]:

Step 1: Introduction of the data. For the researchers to understand the depth and scope of the data, they must immerse themselves in it. Data immersion involves continuous updating and actively reading data (searching for meanings and patterns).

Step 2: Create an initial code. The second step begins when the researcher reads the data and becomes familiar with it. This step involves generating basic data codes. The codes show a data quality in the analyst's opinion. Encrypted data differs from analysis units (themes). The data were analyzed by taking notes on the text and using coloring. The codes were first identified and then matched to the summary of the data presenting the code. The critical point at this stage is data summarizing and classifying them in codes.

Step 3: Search for themes. This step involves sorting different codes into potential themes and categorizing all the data encoded in the specified contents. The researcher begins by analyzing codes and considering how to combine different codes to reach a general theme. Second, the validity of the themes concerning the data set was considered.

Step 4: Review the themes. The fourth step begins when the researcher creates a set of themes and reviews them. This step consists of two stages of reviewing and refining the themes. Secondly, the validity of the themes concerning the dataset was considered. When the map of the themes fits well, the next step starts. However, if the map does not fit the dataset well, the researcher must return and continue coding until a fitting map is created. At the end of this phase, the researcher must know the

different themes, how they fit together, and the whole story they tell about data.

Step 5: Defining themes. The fifth step begins when there is a fitting map of the themes. At this step, the researcher defines, redefines, and reviews the themes presented for analysis. It is characterized by defining and reviewing the nature of a theme for find Themes and sub-Themes.

Step 6: Reporting. This stage begins when the researcher has a set of fully prepared themes, including final analysis, categories, and report writing.

3. Results

The demographic characteristics of the participants are summarized in Table 1. The results of the interview with both groups are summarized in six main themes:

The role of driving norms in risky behaviors

Before starting the main discussion, participants were asked to express their views on the state of driving behaviors in the city. All participants in the first group (Iranians) agreed that Iran's driving situation was not good. Using bad driving phrases, lawless driving, awkward and overwhelming prove such a viewpoint. One driver said, "drivers and pedestrians in Iran are not cautious". In answer to the question about taxi driver's role in this type of driving. Drivers have many problems in life that lead to reduce their focus. Another driver said, "different types of drivers have different driving behaviors".

Drivers in the city of Warsaw said, "the status of driving behaviors is good, not bad, it is tolerable, except traffic times, most of the time it's fine", but the two of them saw the aggressive behaviors in drivers. Most participants believed that driving standards are very high, and people are trying to comply with the norms and do not drop standards or make mistakes. One of the drivers said, "if I made the slightest mistake, other road drivers would be angry".

In general, everyone agreed that because they comply with the norm of driving in the city, they would have to drive like others.

Individual factors

The second question was about the prevalence of dangerous driving behaviors among drivers: "What do you think is the most dangerous behavior among drivers?"

Table 1. Demographic characteristics of study drivers

Variables	No.		
	Group 1 (Iran)	Group 2 (Poland)	
Educational level	High school	5	3
	Diploma	11	5
	Academic	4	4
Gender	Female	1	3
	Male	14	9
Driving location	City (short trips)	11	9
	Out of city (long trips)	4	3
Driving experience	5-10 years	3	5
	11-15 years	10	6
	More than 15 years	2	1

The Iranian participants referred to them as dangerous driving behaviors. These behaviors consist of driving in a state of anger, a sudden change in driving direction, right overtaking, overtaking of several cars simultaneously on one-way roads, unauthorized speed, spiral movement, low attention to mirrors, and lack of guidance, non-observance of longitudinal distance with other vehicles, deviation to the left, talking with the mobile phone, not driving between lines, not using seat belts, no use of a child seat, no attention to pedestrians and passage of the crossroads, walking and hugging in the streets.

Drivers in Warsaw mentioned high speed and using mobile phones.

Both groups believed they had not had a high-risk driving experience.

The third question was about the reasons for conducting hazardous driving behaviors among drivers.

The participants responded to the question, “What do you think is the cause of dangerous and abnormalities behaviors?” Answers are divided into two categories.

Social factors affecting risky behaviors

Participants in the first group believed that drivers were less likely to pay attention to driving laws. Iranian drivers were not satisfied with how the law was applied to offenders. Some believed that while there is sufficient law,

there are not entirely in effect. Five drivers believed that the number of the traffic police was not enough, but four of the other drivers said: “The people should be their own police”.

About 90% of participants believed that most drivers did not have enough driving training and did not know the principles of good driving. Most maladaptive drivers are in younger age groups that lack enough driving experience. They said: “The reason why I do not increase my distance to the front car is that if I drive with a standard distance, the car behind me will start horn and lights or overtaken and take place between my car and the car in front of me”. Two drivers said: “When a driver cannot buy new parts for his own car, and they have to use recycled parts and second-hand components, it indirectly leads to dangerous driving behaviors”. Most drivers believed that financial pressure makes people drive badly and anxiously. The most experienced taxi drivers have to work 16 hours a day to save money. The number of car park locations is low, and drivers have to park in the streets.

“When the tire flattened, and I cannot buy a new one, I have to buy a used tire, and it affects driving”. Drivers in the second group said that most people are rushing to work at the workplace, and on the other hand, today’s cars are accelerating and encourage the driver to speed up.

Participants often and indirectly and indirectly referred to society's structural and infrastructure problems, especially inflation and unemployment.

External (environmental) factors and road safety

The first group's answer indicated that the roads' capacity is low for this huge number of cars. The hustle and bustle of traffic create anger, especially for drivers who work on the streets for hours. The condition of the street was another point that was mentioned. "The streets are full of bumps and pits; when we are driving and seeing a hole, we try to step on the brake or change our direction abruptly". "Street signs and guides are not suitable, and fewer warning signs are used". "When it is raining and foggy, or at night, road markings are not visible, and driving is very hard". "Many of the cars that run on the streets are old and weary, and driving them is dangerous and can cause problems for the driver and others".

Trucks and riders travel on city streets, so they cause many problems. This condition raises crashes, and sometimes it happens that lots of cars are waiting behind the roadside cars on a one-way road. The emphasis of many drivers of the first group was on the lack of street standards, and they believed that the street should be rebuilt to refine driving. The trackway must be separated from other cars, all roads must be widened with a road diet, and all streets should have signs and guidance lines on the road. Cars should be equipped with safety equipment and high standards. Warning lights and signs should be visible at night and in rainy conditions. Precise media coverage of the causes of city-wide accidents can be helpful. Pedestrian traffic lights and pedestrian crossings should be provided for all pedestrians.

The second group referred to traffic hours in Warsaw and hours spent in heavy traffic on some routes. The group also described their economic problems, and the heavy rain and snow would make driving conditions harder. The fourth question was the proposed measures to modify driver's high-risk behaviors.

Driving skills

Most of the first group believed that there is currently no proper training to prevent maladaptive behaviors. When drivers were asked what they mean by training, the participants responded, "in my opinion, drivers should be taught how at the time of driving, take care of their behaviors. We need to know how to take care of our driving problems with traffic and all kinds of problems. Resiliency skills training and anger management skills can help".

Performance driving laws

Some of the first group drivers agreed that hazardous driving behaviors would be less with more police monitoring. They emphasized the seriousness of enforcing the law. Despite the suggestion to increase penalties and exacerbate some driver's offensive laws, the opposition group also had its particular views. "When the amount of traffic penalty increases, those who have an excellent financial situation do not be affected, and those who do not have a good financial situation are trying to reduce the amount of penalty or do not pay until they are forced".

Another comment from the participants was, "interestingly if the drivers committed unintentional contravention, in which underlying factors or road and car safety were involved, it lead to hatred and opposition to the law". Mistrust or lack of trust in driving regulations' efficiency can be a serious factor in internalizing these rules and regulations in drivers. The second group emphasized rewards for good behaviors.

4. Discussion

In this study, the drivers' experiences of risky behaviors in the form of six main themes were extracted: driving norms, individual factors, social factors, external factors, driving skills, and driving laws. There is certainly a lot of evidence to confirm the effectiveness of these interventions in scientific resources. However, the lack of attention (consumer orientation) is visible in designing these programs. Modifying driving behaviors can have a beneficial effect on reducing violations and traffic accidents. The first step in designing and implementing programs to modify hazardous driving is to know their attitudes and behaviors. Knowing about drivers' attitudes and perceptions of driving behaviors and their actual behaviors during driving will determine the intervention program's behavioral goals.

About 58% of the respondents stated that disregarding laws such as high-speed driving has nothing to do with the driver's personality. Interestingly, during the next question, it became clear that most of these drivers always consider themselves to be obliged to observe the rules, and to justify their ignoring of the speed limit, they brought the following reasons: If it is quiet, I drive faster. I adjust my speed with my traffic, driving skills, and fatigue.

These driver's responses lead us to two important conclusions: first, the unsatisfactory of rules and regulations in drivers and the lack of any defects in the socialization processes of these people. Another factor is age. Age has a decreasing effect on traffic accidents because the experience and discre-

tion of individuals will increase over time. According to previous research, inexperienced young drivers are prevalent, and they are hazardous drivers [19].

Also, gaining experience and driving stability is a process that takes 8 to 9 years [20]. Research suggests that tired, mindless, anxious, and unprejudiced drivers do not adapt to simple problems and even sometimes risk driving behaviors for committing crime or suicide [21]. Another study has pointed out that patients with a psychiatric disorder have doubled risky behaviors [22]. In other studies, it has been proven that depression has a positive and significant relationship with dangerous driving behaviors, especially in accidents and driving in drunkenness [22]. There is a relationship between nonviolence, especially anxiety, and depression with accidents [23]. Another study also reported a significant difference between the mean scores of paranoid thoughts, obsession, compulsion, sensitivity to interpersonal relationships, and depression in both accidental and intentional accidents [20].

In this study, Iranian drivers mention the lack of shoulder width, low road width, and poor road conditions as the main road problems. In the study of Salmani, the low road width was also reported as the most critical factor [24], which is consistent with the results of the present study. In various studies, road design has been mentioned as one of the effective factors of road accidents [25-27], and evidence suggests that in advanced countries, attention to harmonizing and coherent methods for road safety has had a dramatic effect on reducing the number of casualties and injuries caused by driving style [26, 28, 29]. In some cases, with a small amount of cost to improve and repair a road network or a high accident spot, a dramatic reduction in accidents and injuries can be achieved. For example, in Ghana, drivers sleeping alarm reduced 35% in the number of accidents and 55% in the number of victims in accidents [30].

Based on the transtheoretical model, changing behaviors is a process that occurs over time and through certain stages. To pass during these stages, certain principles are applied [12]. The designers of this model believe that most at-risk people are not ready to change and do not respond to traditional behavioral changes [13]. Based on this model, the sequence of steps that a person must undergo to change is as follows: 1) a thought in which the person does not intend to change his or her behaviors in the next six months, 2) a contemplation, in which a person intends to change his or her behaviors over six months or has taken the desired behaviors for 24 hours, 3) preparation, in which the person intends to change his behaviors during the next month and has taken steps to change the behaviors, 4) the action, in which the person has been under the six months, and has changed his or her behavior, 5) main-

tenance, that has been over six months after. People seem to be moving through a regular sequence, and some faster than others, and in each stage, processes of change need different interventions [31].

Most drivers in the second group stated that they did not have dangerous driving behaviors, and now I also do not have any such behaviors. Or I had dangerous behaviors before, but I did not have these behaviors now for more than 6 months. In other words, most of these drivers felt that they were at the stage of maintaining their behaviors. They were worried about answering this question, which seemed to make them in trouble.

Viewing the focus of most responses to these two questions suggests that the drivers of the two selected societies considered themselves to be in the stage of non-observance of driving behaviors. Therefore, it seems that their cautious responses have been accompanied with direct questions from drivers about the behavioral situation, and they deny the existence of dangerous behaviors in their daily driving patterns. Such a situation can also be seen in measuring the self-efficacy structure. Self-efficacy is a self-consciousness that a person knows about who can behave in a particular way [31]. A study that examined American driver's attitudes toward driving situations showed that most drivers consider themselves skillful and cautious drivers, and they believe that environmental factors increase the likelihood of an accident [32].

Another study compared the views and behaviors of taxi drivers in China and the United States. The results showed that in the United States, most drivers were concerned with the role of instructions and manuals in reducing accidents, while Chinese drivers relied on their skills and abilities. This study showed that while Chinese drivers reported their driving behaviors as acceptable, observation showed that only 64% of Chinese motorists bumped their seat belts, and 40% of them used the traffic lights when changing their route [33]. In our study, there is a significant difference between self-report and observational behaviors. Another study on Norwegian drivers showed that attitudes toward traffic safety issues affect driving behaviors, especially behavioral patterns and driving speeds [34]. Our findings suggest that drivers are more likely to rely on individual abilities in driving in unacceptable conditions, and ignore the rules and regulations. Moreover, when driving in high standards conditions and good facilities, drivers observe the rules and regulations of driving and prioritized them.

5. Conclusion

Internalizing the norms and regulations of driving and adherence to them is a two-way and continuous process. People also interpret the content of norms, the conditions of implementation, the authoritative and the implementers of norms, and the spatial and temporal situations of its implementation. Then, they decide to internalize or not internalize to create new norms, keep or disregard the previously existing norms, and follow or unfollow the internal norms. The presence of any obstacle or gap in this process will lead to the realization of normative driving in the most basic forms. Internal control should be considered a useful complement to external control, and external control provides the highest efficiency when it comes with internal control. To internalize norms and observe driving laws and regulations, the authors suggest removing obstacles such as distrust among drivers regarding the effectiveness of driving laws, unawareness of breaking the laws, lack of job satisfaction, low level of participation, and structural barriers. Also, roads and vehicle safety must be improved along with a better track of the drivers' behavior.

Study limitations

This study did not examine pedestrians' opinions. Besides, the review was qualitative and cross-sectional and required little review to generalize.

Ethical Considerations

All ethical principles are considered in this article. The participants were informed about the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them.

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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