The Open Transportation Journal
DOI: 10.2174/0126671212381793250410071023, 2025, 19, e26671212381793

ISSN: 1874-4478
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RESEARCH ARTICLE **OPEN ACCESS**

Peer Pressure on Road Safety: The Case of Student Drivers in Greece

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Abstract:

Introduction: This study investigates the influence of peer pressure on road safety among student drivers, analyzing the relationship between peer influence, driving behavior, and accident involvement. Traffic accidents are a leading global cause of death, particularly among young adults, with 1.35 million fatalities annually. Young men are especially overrepresented. Peer pressure is a significant factor affecting risky behaviors during transitional life stages, including driving.

Methodology: A structured questionnaire survey of 309 students (50.5% men, 49.5% women) was conducted using the snowball sampling technique. Statistical methods, including Pearson's chi-squared and Cramér's V tests, identified correlations between variables.

Results: Of the respondents, 31.4% reported accident involvement, with 27.2% involving material damages and 4.2% injuries. Men (37.17%) were more accident-prone than women (25.49%), and students from small villages had the highest accident rates (50.0%). Overconfidence was notable, with 81.41% of men and 64.05% of women rating themselves as capable drivers despite correlations with accident causation. Passenger presence influenced behavior variably.

Discussion: According to self-reported data, peer pressure significantly impacts road safety, especially for young male drivers. Overconfidence and social influences contribute to higher accident rates, highlighting the need for targeted interventions addressing these factors.

Conclusion: The paper underscores the dual nature of peer influence; while it can encourage safer driving in some cases, it also increases the likelihood of reckless driving, particularly among young male drivers. These findings emphasize the need for targeted educational programs addressing self-awareness, social influence, and early driving habits. Future studies could explore longitudinal patterns of peer influence and employ simulations to better understand the real-time impact on driving behavior.

Keywords: Peer pressure, Road safety, Traffic accidents, Traffic psychology, Students, Drivers, Young drivers, Aristotle University of Thessaloniki, Greece.

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Cite as: Nalmpantis D, Beli E. Peer Pressure on Road Safety: The Case of Student Drivers in Greece. Open Transp J, 2025; 19: e26671212381793. http://dx.doi.org/10.2174/0126671212381793250410071023

Received: January 08, 2025
Revised: March 02, 2025
Accepted: March 12, 2025
Published: April 18, 2025

1. INTRODUCTION

Many factors contribute to traffic accidents and road safety. Every year, millions of traffic accidents occur worldwide. Therefore, investigating the contributing factors is very important. The influence of peer pressure is multidimensional, and it has both a negative and a positive effect. In both cases, peer pressure is very strong when applied to transition-age people, such as students. Young people, like students, in an effort to adapt to and be accepted by their social environment, make changes in their behavior and, in general, adopt specific attitudes. Therefore, the aim of this paper is to understand the way that peer pressure affects student drivers in relation to other factors such as personal characteristics, elements of driving behavior, gender, origin, *etc*.

Through the research that was carried out, an attempt was made to identify situations where peer pressure has a negative or a positive impact on road safety. Of course, as will be analyzed in the literature review, the way and intensity of the influence vary, depending on who the passenger is and the relationship that the driver has with him or her.

2. LITERATURE REVIEW

2.1. Road Safety Statistics

According to data from the World Health Organization (WHO), approximately 1.35 million people die every year in traffic accidents worldwide. For children and young adults, car accidents are the main cause of death. Especially young men are more likely to be involved in traffic accidents than women, as about 73% of accidents involve men under 25, who are three times more likely to be killed in an accident than women [1]. According to data from the Hellenic Statistical Authority, in 2017, 10,848 road accidents occurred, of which 679 were fatal and the deaths were 731. More specifically, the majority of the deceased were men (84.1%), while the rest (15.9%) were women. A very interesting fact is that out of the cases where the deceased was the driver of the vehicle (507 people), the number of men was 481 out of 507 (94.87%), while the number of women was 26 out of 507 (5.13%). Out of the cases where the deceased was a passenger (106 people), the number of men was 58 out of 106 (54.71%), while the number of women was 48 out of 106 (45.29%), rates that do not differ very much. It becomes clear that men are more prone to be involved and die in traffic accidents than women, especially in the case where they are the drivers [2].

2.2. Peer Pressure

Newman and Newman (1976) were among the first to introduce the concept of peer pressure. According to them, pressure from peers is the major contributor that affects young people's social interaction. Young people, while trying to form a sense of solidarity with peers and avoid alienation, are more likely to adopt and conform to behaviors that are consistent with group norms. Conformity to these behaviors forms a kind of pressure on group members. This pressure is especially potent when youth attach a high value to affiliation with specific groups [3].

A definition of peer pressure is that those who receive it are being "heavily influenced by the wishes and expectations of their friends" [4]. Most of the time, peer pressure is against subjects' inclinations or parents' discipline and directed toward delinquency or even criminal behaviors [4].

Peer pressure is a phenomenon often referred to in discussions aimed at clarifying the causes of inappropriate behavior in young people [5]. Often, the reason behind various unsafe/insecure actions, such as dangerous driving, is attributed to peer pressure. Peer pressure and its effects are stronger at younger than at older ages. Exposure to peer pressure during the action of a precarious procedure doubles the rate of fearful behavior of a young person and increases it by 50% in the case of students. However, it has no effect on older people [6]. The increased influence of social pressure on adolescents results in them seeking to modify their behavior in order to adapt to the beliefs and habits of their social environment [7]. The increased impact on college and university students is probably due to the fact that it is applied and affects people of a transition age in which they are in an intermediate state of emotional severance from the family and the creation of an autonomous and full-fledged personality [8].

2.3. Effects of Peer Pressure on Road Safety

The effect of peer pressure on road safety is controversial as the given results of past research have presented conflicting opinions. In some cases, the presence of passengers affected the driver's road behavior in a positive way, irrespective of the gender and age of the driver, with each added passenger reducing the likelihood of an accident [9]. In contrast, in other research, a negative effect has been observed, which is even stronger with each additional passenger being present [10].

More specifically, multiple studies found that drivers accompanied by passengers had lower crash rates compared to solo drivers [9, 11, 12]. This protective effect often increases with more passengers [9]. However, the impact varied based on driver and passenger characteristics. Young male drivers with young passengers showed increased crash risk [11, 13]. Older drivers benefited from most passenger combinations, except those 75 and older [12]. Passenger presence was associated with reduced unsafe actions for older drivers in some cases [14]. However, other studies reveal increased crash risk for young drivers with passengers, especially with multiple or male passengers [15]. The presence of passengers can influence driver behavior and crash mechanisms, with some studies showing higher odds of certain crash types when passengers are present [16]. The impact on passengers may vary depending on factors such as driver age, passenger characteristics, and driving conditions, highlighting the complex interactions between human presence and environmental factors [11].

One way to distinguish peer pressure is direct and indirect peer pressure. In the direct type of peer pressure, the passenger actively influences the driver, either verbally or physically [17]. This includes increasing the mental

workload of drivers through discussion, choice of loud music, and prompting the driver for dangerous driving [18].

As far as the indirect type of pressure is concerned, it takes place outside the driving context. The culture and the norms are built and welcomed within the driver's social environment, the adoption and adjustment of which leads to his/her social acceptance [17]. An example of indirect pressure is the narration and recalling of specific driving events in conjunction with the acceptance or rejection of the driving attitude in question, which may lead to the adoption or the rejection of similar attitudes [18].

2.4. Transmitters and Receivers

Initially, considering driver age as the main pivot, young drivers (ages from 16 to 24) are more likely to be involved in accidents [19]. Depending on the age of the driver, the presence of passengers may have negative, positive or even zero impact on driving behavior. Another frequently observed difference is according to the driver's gender [9]. Novice drivers, especially men, are more likely to drive aggressively at the presence of passengers, as opposed to women who are not so heavily influenced by them [20]. Men are under increased peer pressure compared to women, especially on developing high speeds, as their moral restraints regarding speed limit compliance are weaker [21].

Obviously, the role of the passenger could be of equal importance to the driver's role regarding road safety. The desired scenario would be for the passenger to have a helpful role, reducing the driver's mental workload. Often, however, the car cabin becomes a place of social interaction, with no passenger adopting the desired role mentioned above [18]. Frequently, drivers tend to adapt their driving behavior to passengers' standards. This is especially true when the passenger is a young man or an older woman. Concerning the passenger, if he is a young male, the driver is usually forced into dangerous driving, either by the direct prompt of the passenger or by the driver's adaptation to the passenger's driving standards. On the other hand, if the passenger is an older female, safe driving and general compliance with the law are promoted. In each case, it is a frequent phenomenon for drivers to tend to adapt their road behavior to the passenger's standards [22]. Similar findings are confirmed by other studies, which report that young drivers drive faster and more dangerously when peers are in the car rather than when there are older passengers [18].

2.5. Recent Relevant Research

Peer pressure can both encourage and discourage risky driving, with younger drivers (18-24) reporting more pressure to engage in risky behaviors [23]. Peer-led education has shown effectiveness in improving road safety knowledge and attitudes among adolescents [24]. Social media and peer behavior significantly predict engagement in illegal mobile phone use while driving [25]. Parental influence also plays a role, with parental alcohol-impaired driving linked to decreased positive attitudes among adolescents toward driving under the influence [26]. These findings underscore the complex interplay of peer pressure on adolescent driving behaviors and highlight the potential for peer-based interventions in promoting road safety, especially among young drivers.

3. METHODOLOGY

In order to collect the required data, a questionnaire survey was carried out, in which 309 university students participated. The questionnaire was a structured questionnaire developed by the authors using the Google Forms platform. The response menu, depending on the questions, included multiple-choice, Likert scale, and drop-down list answers. Thereafter, the data collected was used to perform descriptive and statistical analysis. The questionnaire was disseminated during the spring semester of 2019 through social media (*e.g.*, Facebook) exclusively to students of the Aristotle University of Thessaloniki (AUTh) and through an AUTh students' mailing list, asking them to spread it even further using a modified snowball sampling technique. Since the survey was anonymous, no personal data was collected and it did not involve human tissue or experiments with humans or animals, approval from the Research Ethics Committee AUTh was not required.

For the descriptive analysis, "Microsoft Excel 2016" was used to create aggregate tables and extract the percentages presented below. Statistical analysis was performed using the "IBM SPSS Statistics 25" statistical package to correlate variables and evaluate their significance with Pearson's chi-squared test and Cramér's V test.

Regarding the sample size, the population of students in Greece is around 800.000 people. We can safely assume that around half of them are not active anymore, and half do not hold a driver's license yet. With a confidence level of 95%, a margin of error of 5%, a population proportion of 25%, and a population size of 800,000, we found that the required sample size is 288 people, which is smaller than the 309 respondents we have [27].

4. RESULTS

The first question asked about the gender of the respondent. The responses showed that 50.5% were men and 49.5% were women. This provided us with the opportunity to analyze statistically significant correlations between gender and involvement in road accidents. There were eight (8) more demographic questions concerning age, school, level of studies, marital status, origin, having children, parents' status, and parents' level of education. Particularly encouraging is the fact that the answers were evenly distributed.

The reason behind some questions, such as the origin, was that it is common for people who grew up in smaller communities to drive for the first time at a much younger age than the average, which may be due to the social pressure they receive from their closed community.

Afterwar, questions about one's personality were posed. In this section, there were questions like "I am irritable," "I

Table 1. Rates of responses to personality queries.

Questions	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am irritable	12.0%	33.0%	32.4%	18.1%	4.5%
I am patient	2.6%	4.5%	17.5%	52.7%	22.7%
I care about others' opinion about me	4.5%	13.6%	31.1%	42.7%	8.1%
I would change my behavior in order to be acceptable	7.8%	26.2%	39.2%	23.6%	3.2%
I am a capable driver	3.2%	4.2%	19.7%	52.1%	20.7%
I drive aggressively	31.4%	41.1%	18.8%	8.1%	0.6%
I am concentrated while driving	1.3%	2.3%	12.0%	50.8%	33.7%

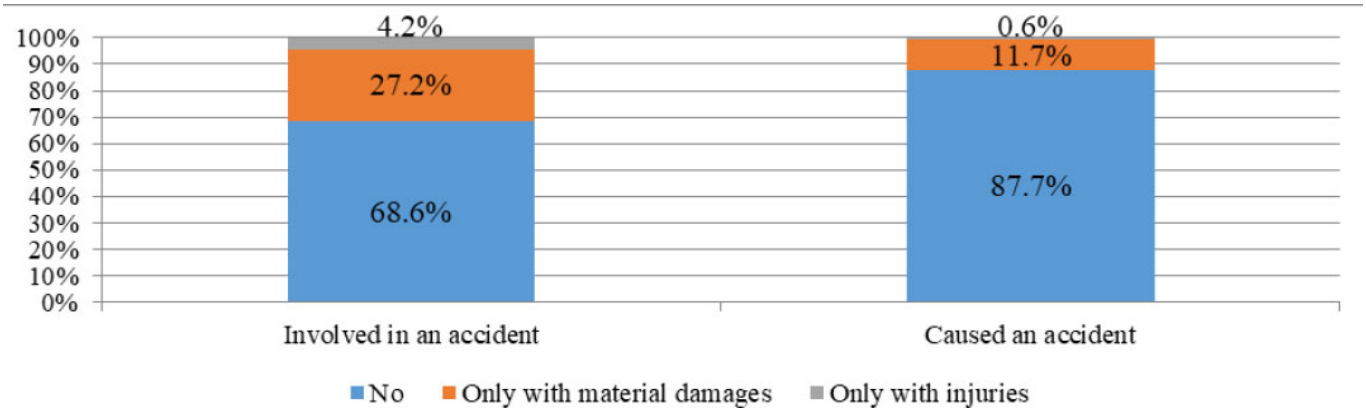

Fig. (1). Involvement and causing a traffic accident only with injuries and/or only with material damages by respondents.

am patient," "I care about others' opinion about me," "I would change my behavior in order to be acceptable," "I am a capable driver," "I drive aggressively," and "I am concentrated during driving." The reason we included such kind of questions is that we think the way the driver receives and perceives peer pressure depends on his/her personality, and thus, we wanted to correlate the driver's personal characteristics with factors that may lead to an accident, as we did for the peer pressure's questions. The answers were given in a 5-point Likert scale. The results of the answers of this section are presented in Table **1** as follows.

Thereinafter, two (2) more main questions were included in the survey. The first one concerned the involvement in traffic accidents, and the second one was about causing a road accident (Fig. **1**).

As demonstrated in Fig. (**1**), as far as the first question is concerned, the results were encouraging, as the students that were never involved in a traffic accident were up to 68.6%, and only 31.4% were involved. More specifically, 27.2% of the students who were involved in traffic accidents had traffic accidents only with material damages, and the rest, 4.2%, with injuries. Fortunately, no student was involved in a fatal traffic accident. The percentages in the case the student was responsible for the accident were 87.7%, 11.7%, and 0.6%, respectively.

As expected from the literature review, the results show that men are involved in traffic accidents more frequently than women are. More specifically, 37.17% of men and only 25.49% of women were involved in traffic accidents. Indeed, the correlation between the driver's gender and his/her involvement in traffic accidents (although moderate to low for Cramer's V = 0.15 and for two degrees of freedom [28]) is statistically significant (chi-squared test: $p = 0.036 < 0.05$).

Similar results were found in the case of gender correlated to traffic accident causation. The correlation is statistically significant ($p = 0.040 < 0.05$). For two degrees of freedom, the effect of gender on the occurrence of traffic accidents appears to be moderate to low (Cramer's V = 0.14).

Statistical significance ($p = 0.020 < 0.05$) is also found in the correlation of driver's age with traffic accident causation with a high effect (Cramer's V = 0.19 for seven degrees of freedom). Although Kim's (2017) table gives no information for df > 5, given the downward trend in rates, we assume that the correlation is indeed high.

It is also observed that men are involved in more serious traffic accidents than women, of those who have been involved in a traffic accident, 6.4% were involved in traffic accidents with injuries, in contrast to women whose involvement in traffic accidents with injuries is at least three times less (1.96%)!

Regarding the relation between self-reported driving capacity and gender, it seems that 81.41% of men consider themselves capable drivers, in contrast to only

64.05% of women. This contradicts the previous result because while men feel that they are more capable drivers, they are involved in and cause more accidents than women. This was expected as, according to the literature, self-confidence is negatively correlated to road safety.

Another relation of traffic accident involvement/causation is the one with self-reported driving capacity in general. The results showed that the two highest rates of being involved in or being responsible for an accident belonged to the students who believe that they are capable drivers (34.16% of them agree that they are capable drivers, and 35.93% of them strongly agree!). It is indicative that the students who disagree with the statement that they consider themselves capable drivers are only 15.3% (of the total number of students who were involved in traffic accidents), which was the lowest percentage in this relation.

The highest percentages concerning the causation of a traffic accident are also of those who "strongly agree" and "agree" with the statement that they consider themselves capable drivers. Furthermore, there is a positive correlation between self-confidence and accident involvement, as expected according to the literature.

Another interesting and unexpected result observed is the relation between involvement in a traffic accident and being concentrated while driving. In this case, although the highest percentage (57.14%) of involvement in traffic accidents belonged to the students who opted for the "I disagree" option, which was expected, the second highest percentage was held by the students who felt that they were totally concentrated while driving. Summing up the percentages of people who "moved" right in the "menu" of the 5-point Likert scale (*i.e.*, "agree" and "totally agree"), we observe that the total percentage of the self-reported concentrated students was 62.94%, that is higher compared to the 57.14% percentage of those who initially stated that they were not concentrated. Perhaps student drivers who have not yet automated driving cognitive queues think they drive without being concentrated, while the opposite is true.

According to the results of the analysis, both men and women are very interested in the opinions of others. The dominant percentages were the cumulative "agree" and "totally agree" responses, which for men was 46.14% and for women 55.54%. Of course, 25.63% of men answered that they do not care about the opinion of others as opposed to women with only 10.44%. The statistical analysis showed that this correlation was statistically significant ($p = 0.004 < 0.05$) with medium power (Cramer's $V = 0.19$).

Regarding the age of the driver, the youngest respondents (18-20) seemed to be more interested (68.75%) than the rest of the survey in the opinion of others.

Concerning the willingness to change driver behavior for social acceptance, men appear to be twice as completely unhappy with change compared to women.

Furthermore, we asked the student drivers about the choice of means of transportation when they are under the influence of alcohol or other substances, as demonstratedin Figs. (**2** and **3**). We posed this question because we wanted to understand the way and the power of peer pressure when he/she is under the influence of alcohol or other substances, something that can be seen by the mode of transport that he/she chooses under the influence. We may extract important conclusions on how much drivers care about other's opinions, even while they are incapable of driving, such as the following:

- Men have a stronger preference for going home on foot, while women prefer taxis.
- The second option for men is driving, in contrast to women, whose second option is being a co-driver.
- Out of six options, driving a car under the influence comes in second place for men, while it comes in fifth place for women.

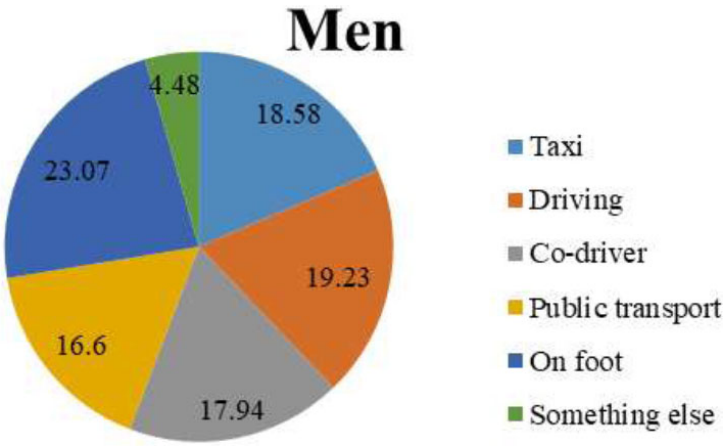

Fig. (2). Modes of transport preferred by male student drivers while under the influence in percentages.

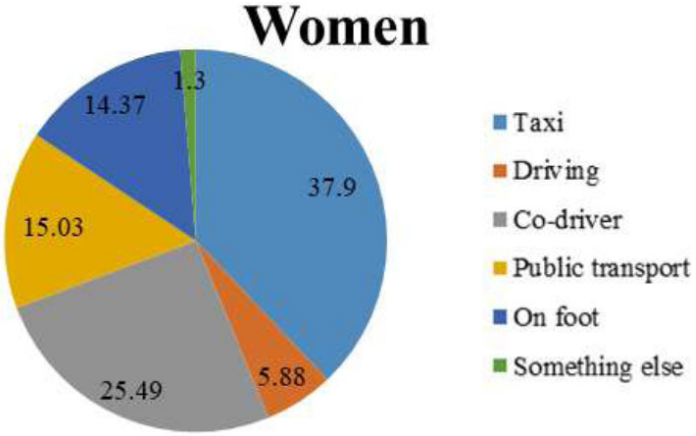

Fig. (3). Modes of transport preferred by female student drivers while under the influence in percentages.

Following, we asked the student drivers about the choice of means of transportation when they are under the influence of alcohol or other substances, as seen in Figs. (**2** and **3**). We posed this question because we wanted to understand the way and the power of peer pressure when he/she is under the influence of alcohol or other substances, something that can be seen by the mode of transport that he/she chooses under the influence. We may extract important conclusions on how much drivers care about other's opinions, even while they are incapable of driving, such as the following:

Regarding the questions on the respondents' driving behavior, the answers showed a great deal of uniformity in terms of type and degree of influence. Initially, the impact of the presence in the car of a young person of the same or opposite gender was analyzed. Analyzing this influence, in conjunction with the driver's gender, it seems that all genders think that they are largely unaffected. "Neutral" has the highest proportion for all genders. Interestingly enough, in all genders the second highest percentage is the "positive" option. Concerning the analysis of the co-driver's influence on the age of the driver, it is also observed that at each age students think that they are mostly not affected in any way. However, it was shown that the negative effect from the presence of such a person in the car got lower as the driver's age increased.

In the next question on driving behavior, student drivers responded to the influence they receive from having an older and of the opposite gender person in the car. Even though, in this case, the neutral and positive effects have gained the highest rates, it is worth noting that women are negatively affected, at least twice as much, by the presence of older men in their car than the other way round. Regarding driver's age, it seems that all the students, regardless of their age, think that they are mostly positively affected. Indeed, the results showed statistical significance ($p = 0.025 < 0.05$) with relatively high power (Cramer's $V = 0.169$ for eight degrees of freedom). Similar are the results on the influence of the presence of an older person of the same gender in the car on both gender and age. The only difference in this case is that the negative impact rates for all genders are almost equal.

Continuing with the question of the effect of adding extra passengers on board, it was observed that the "Neutral" option received the largest percentage. Regardless of gender and age, the interviewed drivers chose the "Positive" effect option as the second answer.

It is noteworthy that although the "Negative" effect option occupies the third position, the percentages it accumulates are not negligible as they reach up to 21%, while in certain age groups, the difference from the positive is just 3%.

Analysis was also carried out with regard to the gender and age of the student driver and the influence of the presence of a relative in the car (Fig. **4**). In both cases, there is mainly a positive effect, excluding some cases where the percentage of neutral responses slightly exceeds the percentage of positive, depending on the age group. More specifically, in the correlation of age with the presence of a relative, the results were statistically significant ($p = 0.041 < 0.05$) with a relatively high power (Cramer's $V = 0.16$).

The presence of a person in the car with whom the driver maintains a friendly relationship seems to have a positive effect on the driver, which in the case of male drivers reaches 49.66% (by adding the percentages of the "Positive" and "Very positive" answers). The effect is also positive at different driver ages as in all age groups (with the exception of the age group 26+), the rates of the "Positive" and "Very positive" answers are significantly higher than both the "Neutral" and "Negative" responses. It is observed that in this question, the percentages of "Neutral" choices increase as the age of drivers increases. This may indicate, as mentioned earlier, that with the passage of time and the gain of experience, peer pressure seems to be less potent.

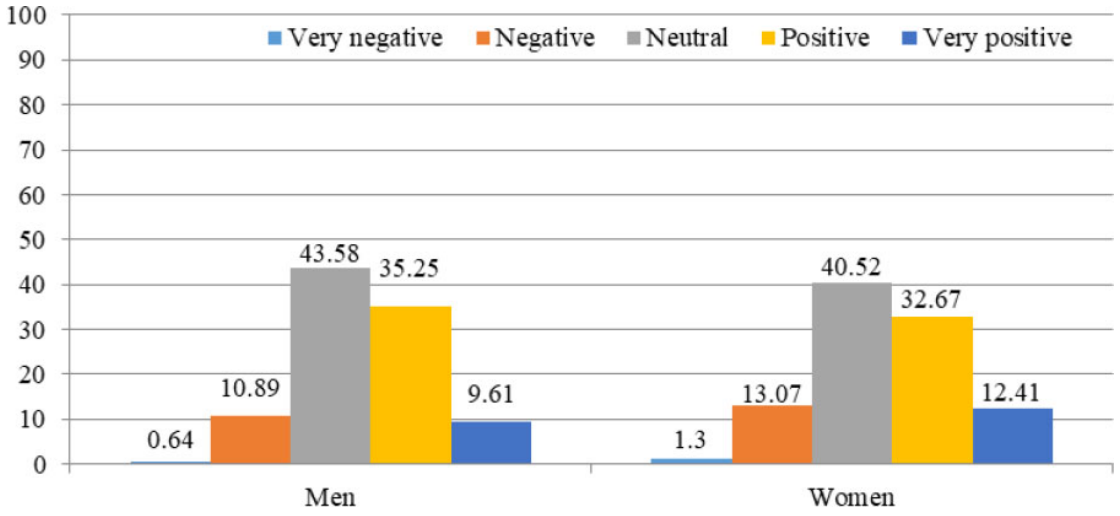

Fig. (4). Influence of the presence of a relative in the car on student drivers per gender in percentages.

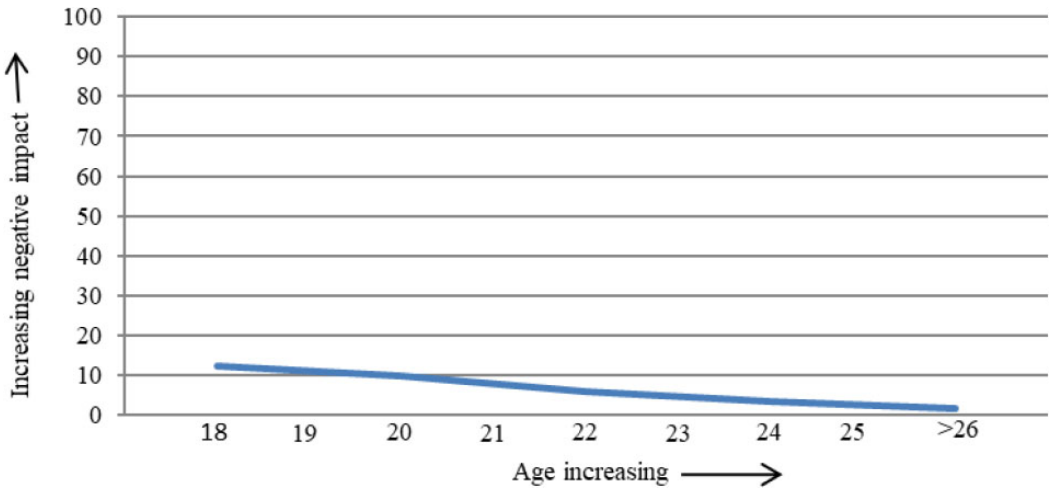

Fig. (5). Negative impact of peer pressure from a person with whom the student driver maintains a personal relationship in relation to age.

The analysis of the presence in the vehicle of a person with whom the driver maintains personal relationships has given the following conclusions:

- For both genders, the percentages of "Positive" and "Very positive" effects are the highest, with males exceeding 50%.
- Similarly, for driver's age, the effect is strongly positive, with the 24-26 age group concentrating up to 62.06% of "Positive" and "Very positive" answers.
- The negative impact of the presence of such a person in the car decreases as the driver's age increases. Specifically, in the youngest age group (18-20), the negative impact rate is 12.49%, while for the older students (26+), the respective rate is 1.53%. The downward trend is demonstrated in Fig. (**5**).

More specifically, in Fig. (**5**), the diminishing effect of peer pressure by age is presented. While peer pressure has a high negative impact on the youngest drivers, *e.g.*, 18 years old, it gradually diminishes as the driver gets older, and this is positive, as maturity promotes road safety.

Finally, we treated the area in which the responders grew up as the main factor of our analysis. In Fig. (**6**), "Village" refers to small villages, villages, and towns, City refers to small cities, cities, and large cities, and "Urban center" refers to urban centers and metropolises. The area in which someone grows up plays an important role in shaping the individual's attitude and, possibly, in the development of a specific driving behavior. More specifically, after examining the relation of the origin of the respondents with accident involvement, it appeared that

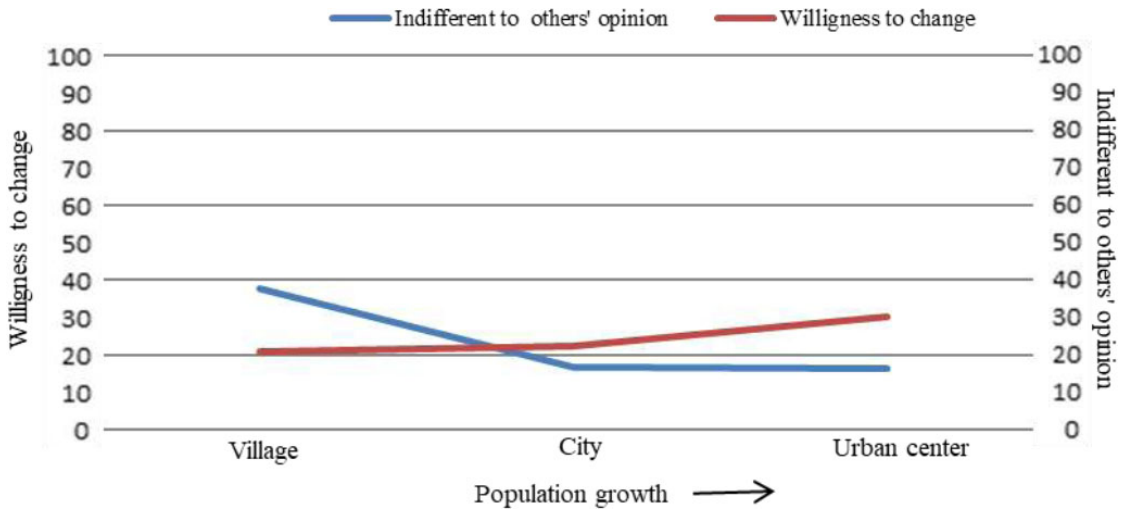

Fig. (6). Diagram showing the course of the interest for public opinion and willingness to change with the population growth.

the highest percentage of involvement in accidents was held by students who grew up in a small village (with less than 500 residents). Despite the small number of respondents from small villages, this percentage was found to be up to 50.00%. Similarly, the highest percentage of being responsible for an accident also belongs to the residents of small villages (25.00%). This is likely due to the mentality developed by young people in small communities, along with the easy access to and use of transportation from a very young age, possibly due to lax law enforcement in these areas.Driving from a young and immature age without proper training and a driving license leads to long-term risk exposure (thus increasing the chances of being involved in an accident). A positive measure for that problem is supervised driving for novice young drivers, *i.e.*, a two-phase driving license.

5. DISCUSSION

The results of the research seem to have a positive sign in the sense that a large percentage of student drivers declared that they are positively affected by the presence of passengers in general. Of course, this result should be taken with a grain of salt as the questions were self-reported questions, and the respondents may not have a very good understanding of how peer pressure influences driving behavior.

According to the respondents, the sample allowed us to do a more robust analysis and to extract reliable conclusions. Regarding the gender of the respondents, men's percentage is 50.5% (156 persons), and women's percentage is 49.5% (153 persons). In terms of age, the age group 18-20, 20-22, 22-24, 24-26, >26 occupy 15.5%, 32.7%, 21.4%, 9.4%, and 21%, respectively. Regarding the level of education, undergraduate students have the highest participation rate (78.3%), while postgraduate and doctoral students have 11% and 10.7%, respectively. This is due to the bigger number of undergraduate students compared to that of the other two levels of studies. In addition, the respondents come from all the faculties of AUTh, with the highest percentage being from the Faculty of Engineering. However, since the questionnaire was sent to the students *via* social media and their institutional academic e-mails, the sample can be considered to be objective. The sample can be considered to be representative of all Greek students as AUTh is the largest, by number of students, university in Greece, and as such it is one of the first choices of students from all over the country.

The high percentage of 'No' responses to the question about involvement in traffic accidents can be explained by the fact that students are novice drivers. Since they have been driving for only a few years, they have not accumulated as many accidents as the average driver. Additionally, they drive less frequently than the average driver, as their car ownership rate is much lower.

In some cases, the descriptive analysis gave us unexpected results, which are nevertheless explainable, and some of them have already been published in the relevant scientific literature.

For example, concerning driving capability, most students identified themselves as capable drivers. As mentioned earlier, the survey was conducted within the academic community, where participants generally have a relatively high level of education. It would therefore be expected that the respondents are aware of what makes a driver capable.Nevertheless, the results were disappointing as the biggest percentage of involvement/causing of traffic accidents belonged to the student drivers who believed they were capable drivers. This finding was expected according to the relevant scientific literature. It seems that in this case, once again, we came across the overestimation of student drivers' abilities that leads to increased traffic accidents.

Similar results were also found in the question about the drivers' concentration during driving, as the respon-

dents who answered positively in this question are the ones who get involved and/or cause more traffic accidents.

Regarding aggressive driving, expected results were found, as those who drive aggressively are also the ones who are more frequently involved in traffic accidents.

In the question about the choice of transport mode under the influence of alcohol or other substances, it is discouraging that the second most common choice of men was driving a car and of women co-driving. Co-driving is a choice that is safe only in the case in which the driver is not under the influence of alcohol or other substances.

The conclusion of the analysis regarding the choice of transport mode under the influence confirms the claim stated in the literature review that men are more likely to face the influence of peer pressure more strongly. For this reason, men are more likely to choose the option of driving, even when driving in conditions that can be hazardous to their safety, *e.g.*, under the influence of alcohol or other substances.

In the question about the effect of a co-driver of the same age and of the same or different gender, the results showed that the rates of the negative effect from the presence of such a person in the car decrease as the student driver's age increases. This shows that as they grow older, student drivers are become less and less negatively affected. This may be due to students' driving experience and their reduced need for wide acceptance. Regarding the addition of extra passengers, the controversial conclusions that were presented in the literature review were partially confirmed in our study. Although the percentages of positive effects are greater in all genders and at all ages, the percentages of negative effects strongly approached the positive ones.

As was observed in the descriptive statistics according to the region of origin, the highest percentage of involvement/causing of a traffic accident was held by the students who grew up in small villages. This likely happens due to the mentality with which the residents of small villages are brought up and the ease with which they access and use the vehicles from a very young age, maybe due to the loose law enforcement in these areas. This results in long-term exposure to danger, and it has, as an outcome, an increase in the possibility of involvement in traffic accidents. The use of vehicles at such an immature age without proper education and a driver's license is very likely to lead to traffic accidents.

The suggestions that can enhance future studies and road safety, in general, derive not only from the driver's but also from the co-driver's attitude. The co-driver, as was also mentioned in the literature review, should assist the driver during driving by avoiding distracting him and increasing his mental workload. Passengers should also avoid encouraging high-speed and risky driving. As far as the driver's driving behavior is concerned, it would be essential for driving to be avoided on emotionally intense occasions because, as it was also shown in this study, students who reportedly are more irritable are more frequently involved in or cause accidents.

The driver should also "protect" himself from every possible encouragement for aggressive driving. The people's awareness of issues such as road safety comprises the key to preventing many traffic accidents that may have, besides material damages, fatal outcomes.

CONCLUSION

The survey presented in this article examines the influence of peer pressure on road safety, particularly among university students at the Aristotle University of Thessaloniki. Through a survey of 309 students, the research explores the relationship between peer pressure, personal characteristics, and driving behavior. The findings highlight several key factors contributing to traffic accidents, including overconfidence among young drivers, the impact of social norms, and demographic influences such as gender and place of origin. Notably, students from small villages, where early and often unregulated driving habits are common, showed the highest accident rates (50%). Furthermore, male drivers demonstrated higher susceptibility to peer pressure and riskier driving behavior compared to their female counterparts.

The results also reveal that the type of passenger influences driver behavior. For example, the presence of a young male passenger often increased the likelihood of risky driving, while older female passengers promoted safer driving practices. Interestingly, self-perceived driving capability correlated positively with accident involvement, demonstrating a critical gap between confidence and actual driving competence. Additionally, men were more likely to choose dangerous behaviors, such as driving under the influence of alcohol or other substances, highlighting a stronger influence of peer pressure compared to women.

The paper underscores the dual nature of peer influence; while it can encourage safer driving in some cases, it also increases the likelihood of reckless driving, particularly among young male drivers. These findings emphasize the need for targeted educational programs addressing self-awareness, social influence, and early driving habits. The contributions of the paper offer valuable implications for road safety interventions, policy-making, and future research exploring the long-term effects of peer influence on driving behavior.

Future research could explore longitudinal changes in peer pressure's influence as drivers mature or expand the focus to include interventions in rural communities where risky driving habits may develop early. Depending on the type of data, logit modeling could be used for binary data or negative binomial modeling for discrete data. Additionally, integrating simulation-based studies or experimental designs could provide a deeper understanding of how peer influence operates in real-time driving scenarios [29], and also other kinds of pressure could be examined, such as time pressure [30], further enhancing road safety strategies. Finally, regarding student drivers, future research should also focus on the traffic circulation and road safety of the school campuses [31].

STUDY LIMITATIONS

A limitation of the paper is that, as in every questionnaire containing self-identification questions, there is a strong element of subjectivity and bias in the responses. Nevertheless, if such kinds of questions are treated properly and as such, *i.e.*, as self-identification questions, many interesting conclusions may be derived, like the level of awareness of the respondents.

The sample of this study was composed of young students; therefore, the results cannot be generalized to older drivers. Initially, we expected to find a negative correlation between peer pressure and road safety, but we found that there might be a positive effect under the appropriate circumstances. This probably shows that the attitudes are changing among the youth, and aggressive driving is not considered as appealing as it used to be. Nevertheless, more research is needed to verify that. Finally, regarding the sample size, it could be higher, but as mentioned in the methodology chapter, we calculated that the required sample is 288 people, which is less than the 309 respondents. In any case we assume that a higher sample might give more statistically significant results.

AUTHORS' CONTRIBUTIONS

D.N.: The conceptualization of the study was carried out; D.N. and E.B.: The methodology was developed; D.N.: Responsible for the validation, formal analysis, and supervision of the project; E.B.: Conducted the investigation and contributed to the resources and data curation, alongside; D.N. E.B.: Also prepared the original draft of the manuscript; while D.N.: Responsible for the writing—review and editing; D.N. and E.B.: Contributed to the visualization of the data; D.N.: Managed the project administration. Both authors have read and agreed to the published version of the manuscript. The authors would like to express their gratitude to the anonymous survey participants for their valuable contributions.

ABBREVIATION

WHO = World Health Organization

ETHIC APPROVAL AND CONSENT TO PARTICIPATE

Not Applicable.

HUMAN AND ANIMAL RIGHTS

Not Applicable.

CONSENT FOR PUBLICATION

Not Applicable.

STANDARADS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from the corresponding author, D.N., on special request.

FUNDING

None.

CONFLICT OF INTEREST

Dr. Dimitrios Nalmpantis is an Editorial Advisory Board Member for the journal TOTJ.

ACKNOWLEDGEMENTS

Declared none.

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