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# ATTITUDES TOWARDS THE STRESS CREATED BY EVER INCREASING TRAFFIC IN THE MALTESE ISLANDS

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## ABSTRACT

**The relatively large and rapid increase in population in the Maltese Islands over the past decade has placed significant strain on the infrastructure of the country. These factors, together with the fact that issues with the public transport system have never been completely sorted, has led to an over-reliance on private cars as the main means of transport in most cases. Increased transport has been shown to increase stress and aggressive behaviour in drivers, amongst other possible negative consequences, leading to a negative effect on personal wellbeing. In order to assess the perceptions of the Maltese about the stress created by traffic, a cross-sectional study was conducted by means of telephone interviews with a stratified sample of 400 Maltese participants. A purposely designed questionnaire with twelve items scored on a seven-point Likert scale was used for this purpose. While more than four fifths of participants stated that they owned at least one car, and most agreed that traffic increases stress, both in the short and long term, less than one third of participants strongly agreed to preferring to use public transport rather than their private vehicle, even if public transport were more reliable. Females showed more anxiety than males with reference to the traffic situation and 18–29-year-olds showed the lowest level of agreement overall with the statements in the survey – a surprising result given this age group's awareness of the negative effects of climate change on wellbeing.**

## KEYWORDS

traffic, stress, wellbeing

## INTRODUCTION

The population of Malta in 2023 is listed at over 535,000 individuals. This represents a large increase of over 25% in population in the last ten years *(Macrotrends, n.d.)*, mainly due to the rapid economic growth of the country and immigration. This has, in turn, placed a significant strain on the country's infrastructure, with the road network needing to undergo significant repairs and enhancements during the same time period. These factors, together with issues related to the efficiency of the public transport system which have never been fully sorted despite the attempts of successive governments, have resulted in the over-reliance on the personal car as the method of transport of choice for most adults. In fact, the latest statistics list the Maltese as owning 601 cars per 1000 inhabitants in 2021, placing the country in seventh place among 36 European countries *(Statista, 2023)*. As a result, traffic in the country has increased dramatically in the last few years, with trips which used to take a few minutes until a few years ago now taking much more whether it is peak traffic times or not.

Being stuck in traffic has been empirically linked to a number of possible negative consequences, including stress and aggressive behaviour *(Bigazzi et al., 2022; Henessey &Wiesenthal, 1999)*, brain impairment and cognitive decline *(Jafari et al., 2018)*, and depression *(Ohrstrom, 1991)*. Mullan *(2003)* found that young people aged 11-16

living in an area where traffic was busy were more likely to view people in their area as less friendly and helpful, and experience a sense of lack of safety, than those inhabiting areas with less traffic. Stress has also been shown to be associated with an increase in the possibility of breaking traffic regulations, with the consequent possible increase in traffic accidents *(Simon & Corbett, 2007)*. It is well known that traffic congestion is likely to lead to aggressive behaviour *(Li et al., 2019; Schroeder et al., 2013)* which in turn leads to increased crash risks. Zheng *(2012)*, for example, found that crashes were six times more likely to occur in congested traffic than in free lowing traffic, while Meller et al. *(2016)* reported an even greater difference of 25 times between the two conditions. Furthermore, in a simulator experiment, Li et al. *(2020)* showed that driver behaviour was negatively affected even post-congestion, i.e. when driving on clearer roads following a congested area, as drivers still showed increased aggression and a lack of aware response patterns in such situations.

Anger, another possible reaction to being stuck in traffic, has also been linked to a spike in traffic accidents, as it may lead to increased violent driving and delayed reactions as a consequence of stronger car acceleration and higher speeds following the anger-eliciting event *(Roidl et al., 2014)*. Indeed, strong emotions in general have been associated with maladaptive driving behaviours *(Dula & Ballard, 2003; Nesbit et al., 2007)*.

Apart from the effects of traffic congestion on driving behaviour, the psychological wellbeing of drivers in mostly congested roads also needs to be considered. Way back in 1978, Stokols et al. had already shown that routine exposure to traffic congestion affects drivers' mood negatively, as shown by an increase in measured systolic blood pressure. Ringhand and Vollrath *(2019)* have shown that complex driving situations, such as those encountered in residential areas, increase driver stress – a finding particularly relevant to the Maltese context, given the high building density on the island, which can practically be categorised as completely residential. Argandar et al. *(2016)* found that people who drive violently were perceived as the most stressful situation out of the twenty-two listed driver actions presented to drivers in Mexico.

The potential negative effects of stress on wellbeing have been extensively documented. These include increased susceptibility to physical illness *(Dragos & Tanasesku, 2010)*, and mental health issues *(Schonfeld et al., 2016)*. The recent Covid-19 pandemic in itself has been shown to have increased baseline stress levels in most persons *(e.g. Barbayannis, 2022; Sigurvinsdottir et al., 2020)*, so any further increase in stress due to other factors is best avoidable, if possible.

This study has sought to understand the perceptions of Maltese drivers about traffic on the roads, and its effects on their emotions and behaviour.

## MATERIALS AND METHODS

The study utilised a cross-sectional design, using a purposely designed questionnaire. The questionnaire consisted of twelve purposely designed statements which were answered on a seven-point Likert type scale. Sample statements include "Thinking about traffic increases my anxiety" and "I waste a lot of time in traffic which could be put to better use". Demographic data collected included age, gender, level of education, employment status, and area of residence. Participants were also asked whether they owned a car or not.

Data was collected by means of telephone interviews in February 2023, carried out by a specialised data collection and analysis company which was specifically commissioned for the purpose. A sample of 400 individuals over the age of 18 from the Maltese population was contacted and answered the questions, resulting in a margin of error of 4.9% at a confidence level of 95% *(Raosoft, 2004)*. The sample was stratified based on gender, district of residence and age, so as to be as close to the composition of the population as possible (see Fig 1).

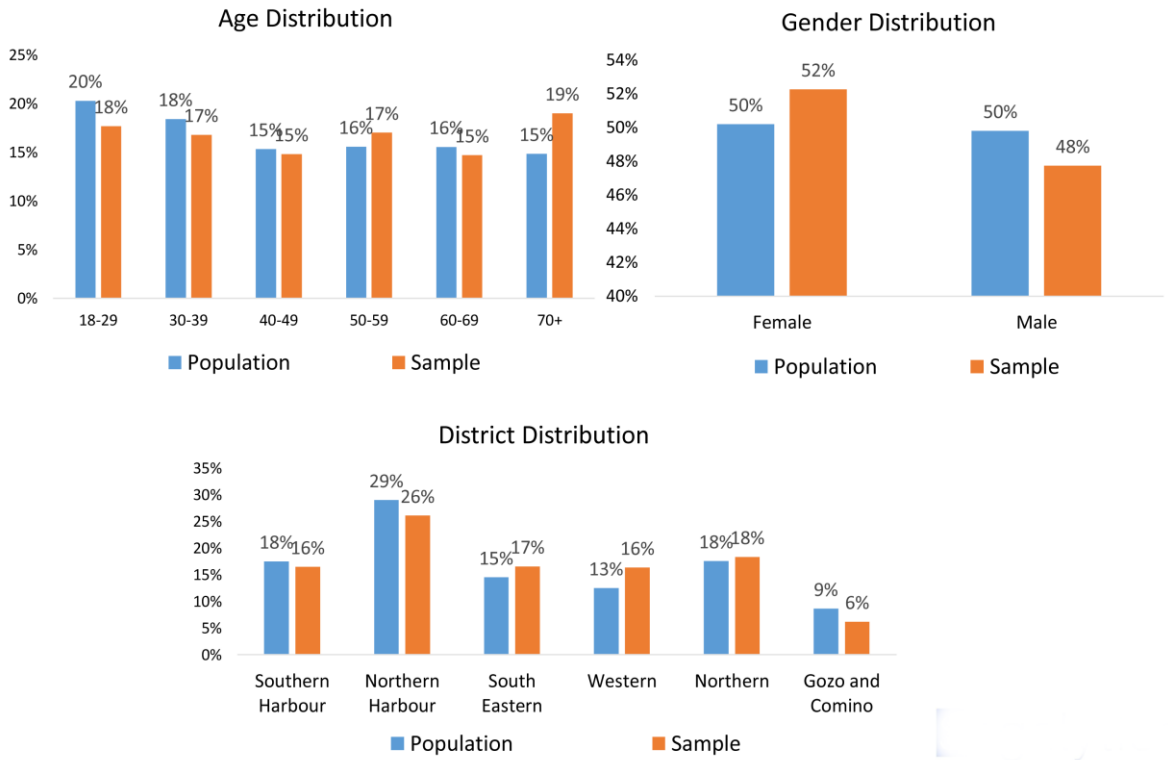


***Figure 1*** *(Gender, age and district of residence distribution of sample compared to the population.)*

## Results and analysis

Eighty-one-point nine percent of the sample stated that they own a car. This result is much higher than the EU statistic cited in the introduction – 601 cars per 1000 inhabitants (60.1%) – although one must keep in mind that the EU statistics include all inhabitants of the island, including children, who cannot own cars, and persons of very low economic status who are unlikely to own cars and were unlikely to be captured by this study. Given the problems with public transport already described in the introduction, most car owners use their car almost every day and for most transportation needs.

| Statement | 1 | 2 | 3 | 4 | 5 | 6 | 7 | *M* |
|---|---|---|---|---|---|---|---|---|
| Thinking about traffic increases my anxiety | 5.2% | 1.1% | 7.2% | 10.3% | 13.8% | 14.7% | 47.7% | 5.61 |
| I worry when I hear about the frequency of serious road accidents happening | 2.0% | 0.7% | 1.0% | 6.1% | 10.7% | 15.6% | 64.0% | 6.26 |
| I am afraid of arriving late to important appointments if I get stuck in traffic | 3.3% | 3.1% | 5.2% | 7.9% | 14.7% | 18.1% | 47.7% | 5.73 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| I would prefer to not use my car if public transport was more reliable | 18.8% | 6.7% | 7.4% | 13.9% | 9.1% | 14.2% | 29.9% | 4.50 |
| I waste a lot of time in traffic which could be put to better use | 2.7% | 4.1% | 4.4% | 7.5% | 12.6% | 19.7% | 49.1% | 5.79 |
| The time I spend in traffic has an effect on my mood for the rest of the day | 12.4% | 5.0% | 10.6% | 12.5% | 14.6% | 13.7% | 31.0% | 4.77 |
| I worry about the amount of emissions in the atmosphere due to the number of cars on the road | 3.8% | 2.0% | 5.5% | 8.2% | 15.7% | 20.6% | 44.3% | 5.69 |
| I do not think there is an easy solution to the problems caused by the number of cars on the road | 8.4% | 2.8% | 4.8% | 13.4% | 17.3% | 20.5% | 32.8% | 5.21 |
| Being stuck in traffic increases my anger | 1.6% | 2.4% | 4.4% | 8.8% | 21.8% | 14.6% | 46.5% | 5.04 |
| Traffic tires me out | 0.7% | 1.0% | 2.9% | 6.1% | 16.5% | 12.5% | 60.3% | 5.66 |
| I sometimes prefer not to go out, due to the thought of traffic/parking difficulties | 3.9% | 6.4% | 3.2% | 10.3% | 13.9% | 17.9% | 44.4% | 4.38 |
| I feel that traffic has increased considerably in these last two or three years | 0.3% | 0.4% | 0.5% | 2.1% | 7.6% | 11.1% | 78.0% | 6.38 |

***Table 1*** *(below gives the overall results and mean score for each statement.)*

Almost half of the respondents (47.7%) agree that just thinking about traffic increases their anxiety. Overall, more than three quarters (76.2%) of the sample slightly agree, agree, or strongly agree with this statement. This is a worrying statistic, given that this statement only refers to thinking about traffic, rather than the experience of being in traffic itself. More specific anxieties about traffic referred to by respondents include worry about the frequency of road accidents (64.0 % strongly agree, 90.3% strongly agree/agree/slightly agree) and the fear of arriving late to important appointments due to being stuck in traffic (47.7% strongly agree, 80.5% strongly agree/agree/ slightly agree). The link between actually being stuck in traffic and negative emotional consequences, such as stress *(Bigazzi et al., 2022)*, aggressive behaviour *(Bigazzi et al., 2022; Li et al., 2019)*, depression *(Ohrstrom, 1991)*, and anger *(Roidl et al., 2014)* are strong emotions evoked by high density traffic. If

just thinking about the traffic situation is enough to evoke negative emotions, one can only imagine the effect of actually being stuck in traffic for long periods of time.

Given the above, it seems somewhat incongruous that only 29.9% of respondents strongly agree that they would prefer not to use their car if public transport were more reliable. Only just about half of respondents - 53.2% - agree with this statement to any degree. This result could reflect the fact that the Maltese are reluctant not to use their cars, as they are still considered the most convenient way of getting from one point to another. Another possible explanation for this result is that respondents might not believe that a solution to providing more reliable public transport is actually possible – an observation borne out by the answers to the statement "I do not think there is an easy solution to the problems caused by the number of cars on the road", which only 32.8% of respondents strongly agreed with.

A considerable number of respondents of agree that the time spent in traffic has an effect on their mood for the rest of the day. Thirty one percent of respondents strongly agree with this statement, with a total of 59.3% agreeing with it to some degree. This result is worrying because it indicates that the feelings associated with being in traffic are not transient but tend to linger and affect one's mood for a longer period of time. Once again, given the negative effects of traffic on emotions already noted, it is worrying to note that these emotions might persist, spilling into other aspects of one's life and affecting quality of life more persistently.

Roidl et al. *(2014)* have shown empirically that being stuck in traffic increases anger, which subsequently may lead to an increase in traffic accidents due to more aggressive driving and delayed reactions. This study provides further evidence that being stuck in traffic increases one's anger, with 46.5% of respondents strongly agreeing with this statement, and a total of 82.9% - or more than four out of every five respondents – agreeing with it at least to some extent.

A particularly worrying result was that arising from the replies to the statement "traffic tires me out", with almost two thirds (60.3%) of respondents strongly agreeing with this statement, and a total of 89.3% agreeing with it to some extent. Tiredness has been associated with a number of consequences, such as negatively affecting cognitive functions and concentration *(Randelovic et al., 2016)*, and executive function and attention *(Krabbe et al., 2017)*. Consequently, these could result in issues such as decreased productivity at work or increased risk of workplace accidents, as well as affecting other aspects of one's life. Tiredness has also been associated with mind wandering *(Walker & Trick, 2018)* and decreased reaction time *(Corfitsen, 1993, 1994)* specifically during driving. Hockey et al. (2000) found that fatigue, unlike anxiety and depression, tends to increase risk in decision making, the implication being that the risk of traffic accidents can increase due to increased appetite for risk if one is fatigued.

The statement with the highest number of "strongly agree" responses - 78.0% - was "I feel that traffic has increased considerably in these last two or three years". Almost all respondents (96.7%) agreed with this statement to some degree. This statement tallies with the facts, which saw an increase of an average of thirty-two new vehicles every day on the road in 2022 - an increase of almost 12,000 cars, or almost 3%, over the previous year *(Borg, 2023, February 15)*. This continues to increase congestion on the roads, with all the subsequent negative consequences already noted. Partly as a result of the above, 44.4% of respondents strongly agree to the statement stating that they prefer not to go out due to the thought of traffic and parking difficulties, with 76.2% of all respondents agreeing to some extent with this statement. This result is particularly worrying given the recent statistics from a study carried out by the Faculty for Social Wellbeing at the University of Malta, which showed that almost 55% of the Maltese experience loneliness *(Azzopardi et al., 2022)* an increase of 11% over the figure three years previously *(Clark et al., 2021)*. If people are preferring not to go out due to the perceived traffic and parking problems, it is unlikely their feelings of loneliness will be diminished. In a similar vein, almost half of respondents (49.1%) agree that they waste a lot of time which could be put to better use in traffic, with more than four fifths (81.4%) of respondents agreeing to some extent with this statement. Presumably, the time perceived to be wasted in traffic leads to negative emotional reactions such as frustration and anger, which have been shown to possibly lead to increased risk of maladaptive driving behaviour and accidents *(Dula & Ballard, 2003; Meller et al., 2016; Nesbit, et al., 2007 Roidl et al., 2014; Zheng, 2012)*.

Finally, one statement was related to respondents' environmental awareness, asking about whether they worried about the amount of atmospheric emissions due to the number of cars on the road. 44.3% of respondents strongly agreed with this statement, and 80.6% agreed with it to some extent, showing that despite their propensity to keep depending on their private cars for everyday use, the Maltese are conscious about the negative effect this has on the environment, without this necessarily being enough of an issue to influence their behaviour in this respect significantly.

***Selected demographic differences.***

**Gender:** Females demonstrated a higher average agreement scores than males on all twelve statements. This indicates a higher degree of anxiety amongst females when considering the traffic situation in Malta.

**Age:** Sixty to sixty nine-year olds had the highest average agreement scores on all but two of the statements, indicating that this age group is the one most concerned with the traffic situation in the country. Somewhat perplexing was the fact that 18 to 29-year-olds scored lowest in agreement on nine out of the twelve statements. It would have been expected that the younger generation, with their greater awareness of the risks of climate degradation and mental health issues would have been more concerned with the ever-increasing traffic on the island.

**District of residence:** Lowest average agreement scores were noted in six out of the twelve statements for the Gozo region. This is understandable since the smaller island of Gozo is less densely populated than the main island, and therefore problems associated with traffic are less in comparison. Highest average scores were noted for eight statements for the Western district, similarly understandable since this is the arguably most densely populated area in the islands. In other words, in general, the greater the population density in one area of the island, the more concerned the people living there are about the negative effects of traffic.

**Education level and employment status:** results for education level and employment status, on the other hand, were more mixed. Some results were quite paradoxical – students, for example showed the lowest propensity for using public transport, even if it was efficient, and were the least worried about the amount of emissions from traffic – one would expect the opposite situation given the concern of the younger generation with environmental degradation and climate change. More in line with expectations, students were by far the least likely to avoid going out because of traffic or fear of not finding parking spaces. The self-employed had the highest average scores on five out of the twelve statements, probably because they were the group most needing of the vehicles as an essential part of their work. Strangely, respondents with a post-secondary level of education had the lowest average score on five out of the twelve statements, indicating a lower overall degree of concern than the other groups. The highest level of concern overall was shown by respondents with a trade school level of education, who had the highest average scores on five of the twelve statements.

## CONCLUSION

This study has shed light on the concerns shown by different demographic groups about the traffic situation in a densely populated country. Overall, respondents demonstrated a high level of concern on all twelve statements they were presented with. Given the association in the literature between traffic and negative effects on mental and physical health, this situation is somewhat concerning. The main implication of these results points towards the need of a systemic effort to reduce the negative effects of traffic by looking for creative solutions to offer alternatives to the consistent use of one's private vehicle. While the authorities should be at the forefront in creating such initiatives, results also point to the reluctance of participants to reduce their private vehicle use, suggesting a greater need for awareness and education about these negative effects.

While this study was conducted rigorously, with due awareness of the sample size needed to have an acceptable error size, and rigorous sampling procedures, any correlational study can only present the situation at one point in time, and no predictions can be made from the results with any degree of certainty. However, the trend over

the past years clearly shows that car ownership, and consequently traffic, is expected to keep increasing, with the situation therefore deteriorating as a result. One must also note that the sample was collected from a specific country with a specific situation – that of being one of the most densely populated countries in the world – and therefore results are unlikely to be directly generalisable to other countries facing different scenarios.

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