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## Determinants Of The Use Of Safety Restraint Systems In Italy

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### Abstract

Wearing a safety restraint system is one of the most effective measures to substantially reduce the risk of serious or fatal accidents. Despite their benefits, a survey in 2015 revealed that on average 62 out of 100 Italian front car occupants wore their seat belt and only 15% of the rear seat passengers were regularly wearing their seat belt. According to several studies, one's (driving) behaviour is based on a combination of attitudes toward the behaviour, subjective norm and perceived behavioural control.

The present study aims at understanding factors contributing to the low wearing rates in Italy.

The data used are based on a questionnaire survey carried out among a representative sample of more than 1.000 Italian drivers within the ESRA project (European Survey of Road users' safety Attitudes).

The survey involved 17 European countries and covered several themes on (un)safe traffic behaviour and attitudes among which those related to the use of seat belts and child restraint systems.

Two methods of investigation were adopted: the comparison between the Italian situation with the European best performers, pointing out the relevant difference with the included selected European Countries, and the use of regression models to study the association between several explanatory variables and self-declared behaviours related to the use of safety restraint systems.

The main results show a high acceptability of risky behaviour in Italy and a relevant contribution of age and gender in shaping attitudes towards unsafe traffic behaviours.

A number of recommendations are proposed to change people's unsafe behaviour and attitudes in Italy, providing both enforcement and voluntary (e.g. campaigns, education and training, incentives) measures.

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## 1 Introduction

In European Union countries, car occupants represent over 45% of all road fatalities (European Commission, 2015). A recent meta-analysis indicate that seat belts reduce both fatal and non-fatal injuries by 60% among front seat occupants and by 44% among rear seat occupants (Høye, 2016). International research has consistently proven that seat belts are the single easiest and cheapest way of reducing crash injury severity for passenger vehicle occupants. Moreover, it is widely recognised that not only front car occupants benefit from being restrained by seat belts but also those in the rear seating positions. Although the unrestrained make up a small proportion of the total vehicle occupants, the portion of unbelted occupant injuries is much greater than this, which explain the high effectiveness of seat belts if they are properly used.

Despite their scientific proved benefits and even though mandatory seat belt legislation is in place throughout Europe, a proportion of car occupants still not wear seat belt. As highlighted by the results of the ESRA survey (Trotta et al., 2017), the proportion of self-declared belt use varies wildly across countries, from 15% for back seat passengers in Greece to 93% for front seat passengers in Finland. The three best performing countries with the highest percentages (Finland, Denmark, Belgium) are the same for wearing a seat belt as a driver or a passenger in the front of the car. Finland and Denmark rank also in the first two positions when considering seat belt users in the back of the car, Belgium in this case is fourth. In Italy, 85% declare wearing (almost) always their seat belt in the front of the car, but only 24% in the back. According to the Italian national survey, that is based on observed data, the proportion of seatbelt use is far less low than what highlighted in the ESRA survey, only 62% among front seat occupants. A decreasing trend is also observed during the last years (ITF, 2016). Targets like halving the number of fatalities would be feasible in Italy only in case of a structural break (Persia, Gigli, & Usami, 2015), like changing the behaviour of Italian car occupants.

The present study aims at understanding attitudes and factors contributing to the low wearing rates in Italy based on the results of a questionnaire survey conducted in 2015 at European level.

The decision to use or not the seat-belt is influenced by several factors, based on an extensive literature review undertaken by Jans et al., (2015) the following characteristics affecting seat belt use can be mentioned:

- Socio-economic characteristics (gender, age, race, the socioeconomic status...)
- Road environment (road type, vehicle type, e.g. Goetzke & Islam, 2015)
- Personality (personality traits, sensation seeking, locus of control, self-efficacy, attitudes, e.g. Şimşekoğlu & Lajunen, 2008; Usami et al. 2017)
- Risk perception and decision modes (risk perception, previous behavior... Tripodi & Persia, 2015)
- Discomfort (obese individuals are less frequent belt users)
- Emotions (it has been suggested that decisions may be driven by emotional or affective states and not entirely by rational decision processes, for instance, anger is associated with a low perception of risk and a high level of control, see Mesken, 2006, Darley and Lim (1993))

At country level, there could be social aspects influencing the seat belt use like: social or subjective norms intended as the perceived social pressure to perform a behaviour (Ajzen, 1991) and the national culture that may shape the road safety culture, i.e. what people believe is an acceptable driving behavior, sometimes expected in a social context (Jans et al., 2015).

The ESRA survey covers socio-economic characteristics, some personality characteristics (attitudes to seat belt use and opinions on current traffic rules), social norms (personal and social acceptability), risk perception (probability to be checked, unsafety feeling when driving). As in other developed countries (Okamura et al. 2012) the non-seat belt users in Italy are somewhat assumed to perceive less social pressure and behavioural control related to using seat belts.

The purpose of this research was to identify motivational aspects of seat belt non-use in Italy. Two methods of investigation were adopted: the comparison between the Italian situation with the European best performers,

pointing out the relevant difference with the included selected European Countries, and the use of regression models to study the association between several explanatory variables and self-declared behaviours related to the use of safety restraint systems.

## 2 Methods

The data used in this study comes from a questionnaire based survey carried out at European level in 2015 called ESRA (European Survey of Road users' safety Attitudes). The survey was conducted online (CAWI; access panel) using representative samples of the national adult populations in 17 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, The Netherlands, United Kingdom).

Data collection took place simultaneously in June-July 2015, only in Italy the survey was undertaken during the summer break. In total, the ESRA survey gathered data from more than 17,000 road users, including almost 11,000 frequent car drivers. More details on the survey and project results are available at [www.esranet.eu](http://www.esranet.eu).

### 1.1. Questionnaire

A common questionnaire was developed in English (UK) and translated into 20 different country-language versions. The themes covered are: attitudes towards unsafe traffic behaviour, behaviour of other road users, feeling of unsafety as a road user, involvement in road crashes, reported police checks and perceived likelihood of getting caught for traffic offences, self-declared (unsafe) behaviour in traffic, support for road safety policy measures, use of different modes of transportation and some other items (e.g. socio-demographic information).

The survey contains six questions related to the topic of seat belt use. The following items were considered in the study. The measure of self-reported seatbelt use is the question “In the past 12 months, as a road user, how often did you... ?” (5-point Likert scale, from 1 (= never) to 5 (= almost always)):

- wear your seat belt as driver?
- wear your seat belt as passenger in the front of the car?
- wear your seat belt as passenger in the back of the car?

Score 5 on a 5-point scale from 1 “never” to 5 “(almost) always” were considered (almost) always.

Social norms were investigated through: perceived social acceptability and personal acceptability of unsafe traffic behavior. The former refers to the question: Where you live, how acceptable would most other people say it is for a driver to ...

- not wear a seat belt in the back of the car?
- not wear a seat belt in the front of the car?

Personal acceptability is examined with question: How acceptable do you, personally, feel it is for a driver to ...

- not wear a seat belt in the back of the car?
- not wear a seat belt in the front of the car?

In both above questions, scores 4 and 5 on a 5-point scale from 1 ‘unacceptable’ to 5 ‘acceptable’ were considered acceptable.

Attitudes towards unsafe traffic behavior were studied with the question: To what extent do you agree with each of the following statements?

- It is not necessary to wear a seat belt in the back seat of the car
- I always ask my passengers to wear their seat belt

Scores 4 and 5 in a 5-point (Likert) scale, from 1 (= disagree) to 5 (= agree) were considered as an agreement to the statement.

To gather opinions to the national traffic rules and enforcement system, the following questions were considered: What do you think about the current traffic rules and penalties in your country for each of the following themes?

- The traffic rules (on seat belt) should be stricter
- The traffic rules (on seat belt) are not being checked sufficiently

- The penalties (for seat belt) are too severe

The respondents were asked to provide a "yes" or "no" response, with an additional option of "don't know / no response". The last considered question is: On a typical journey, how likely is it that you (as a driver) will be checked by the police for seat belt wearing? Scores from a 5 points Linkert scale were re-framed as a binary variable: big chance (4-5) – small chance (1-3).

Besides the seat belt related variables, four more variables on demographic information and driving exposure were considered both into the multivariate logistic regression and in the country comparison: gender, age, driving frequency and education. Moreover, three more items were considered in the analysis to cope with risk perception, these are:

- Concerned about road accidents (Binary variable from a 4 points scale: concerned (1-2), not concerned (3-4))
- (Un)safety feeling as a car driver (Binary variable from a 10 points scale: feel safe (5-10), feel unsafe (0-4))
- (Un)safety feeling as a car passenger (Binary variable from a 10 points scale: feel safe (5-10), feel unsafe (0-4))

## 2.2 Statistical Analysis

### 2.2.1. Country comparison

According to the ESRA survey results (Trotta et al. 2017), the three best performers showing a general safe behaviour related to seat belt use are Belgium, Denmark and Finland. The three countries were grouped together in order to be compared with the Italian sample characteristics. Data were then analysed using SPSS, version 23. Descriptive statistics were presented as proportions in the two groups. Z-test was used to compare two sample proportions.

### 2.2.2 Logistic regression

The logistic regression analysis was used to assess the effects of several variables on the propensity to use seat belt both as a driver and as a passenger in the front and in the back of the car. Three logistic regression models were developed referring to the questions: "In the past 12 months, how often did you wear your seatbelt as a... driver (1), a passenger in the front seat (2), a passenger in the back seat (3)?" The outcome variable in these models is the dichotomized variable: (almost) always (5) – at least once not (1-4). The explanatory variables initially considered were: socio-demographic variables (gender, age group and level of education), driving frequency, personal and social acceptability on seat belt use (front and rear seats), attitudes towards seat belt use, support for road safety policies affecting seat belt use (opinion on traffic rules and enforcement), risk perception and perceived likelihood of being checked for seat belt use.

Data were then analyzed using SPSS, version 23. Stepwise selection methods were used to identify "best" predictors to include in the models. Odds ratios and the respective 95% confidence intervals were used to measure the strength of association between the variables. To assess the fit of the models, the Hosmer-Lemeshow test was used (Hosmer et al., 2013).

## 3 Results

### 3.1 Comparison with best performing countries

When comparing Italy sample characteristics with those observed in the group of best performers (Belgium, Denmark and Finland), a number of significant differences can be observed (Table 1). Among the demographic and exposure characteristics a lower proportion of women and a higher driving frequency are observed in the Italian

sample. Moreover, the two samples differ in terms of age and education level. The proportions in the groups of 18-24 years and over 64 in the best performers are from two to almost four times higher than those found in the Italian sample. A higher proportion of higher educated people is observed in the Italian group too. These disproportions could affect the comparison since from other studies they seem to be related to seat belt use. The use of the safety belt seems to decrease with an increasing kilometrage of the drivers (SARTRE3, 2004). Males are reported to have lower seat belt use rates than females (Beck et al., 2007). Road users with a higher socioeconomic status seem to be more likely to wear seat belts than those with lower status (Jans et al., 2015). Moreover, use of seatbelt seems to increase with age (Bhat et al., 2015), even if the study of Zanjani, Schaie, and Willis (2006) did not find any change in belt use with age.

The difference in the reported use of seat belts among drivers is not significant (87.3% in Italy and 89.4% in the best performing countries), while the declared use of seat belt for front and back seat passengers is significant. More in detail Italy, had a particularly low percentage on self-declared behaviour for seat belt in the back of the car (24%) compared to the rate in the best performers (almost 80%). One could argue that a higher level of enforcement is applied in best performers countries, however the perceived probability for a driver to be checked by the Police is three times lower in Italy than in the comparison countries (24.4% in Italy and 79.6% in the comparison group).

A further significant difference is in terms of opinions about the existing traffic rules and enforcement in a country. A lower percentage of subjects in the Italian sample believes traffic rules should not be stricter, penalties are too severe and traffic rules are not sufficiently controlled. A lower number of subjects in the Italian sample agree in always asking passengers to wear their seat belt or agree that it is not necessary wearing a seat belt in the back seat.

Other relevant differences are related to the personal and social acceptability of the unsafe behaviour, with a higher proportion of subjects in the Italian sample considering acceptable not using seat belts and perceiving this attitude shared by other people in the place they are living.

Table 1. Comparison of seat belt use behavior and relevant variables between Italy and best performing countries.

Variable	IT	BE+DK+FI
Gender - % of women *	42.5%	50.7%
Age - 18-24y *	2.5%	9.0%
Age - 65+ *	10.3%	20.0%
Driving Frequency- At least 4 days a week *	69.3%	63.5%
Education - Bachelor or higher *	64.1%	44.1%
In the past 12 months, how often did you wear your seatbelt as a driver? - Almost always	87.3%	89.4%
In the past 12 months, how often did you wear your seatbelt as a passenger in the front of the car? - Almost always *	85.3%	91.5%
In the past 12 months, how often did you wear your seatbelt as a passenger in the back of the car? - Almost always *	24.4%	79.6%
On a typical journey, how likely is it that you (as a driver) will be checked by the police for seatbelt wearing? - Big chance *	19.7%	6.3%
Traffic rules should be stricter – No *	30.8%	37.1%
Traffic rules are not sufficiently checked – No *	38.6%	32.2%
The penalties are too severe – Yes *	15.6%	23.3%
Not wear a seat belt in the back of the car– acceptable for other people (1-3) *	54.3%	14.0%
Not wear a seat belt in the front of the car– acceptable for other people (1-3) *	19.3%	6.9%
Not wear a seat belt in the back of the car – personally acceptable (1-3) *	25.1%	7.1%

Not wear a seat belt in the front of the car – personally acceptable (1-3) *	6.7%	3.7%
I always ask my passengers to wear their seat belt - agree (4-5) *	77.4%	93.1%
It is not necessary to wear a seat belt in the back seat of the car - disagree (4-5) *	78.6%	83.7%

\*An asterisk denotes if proportions differ significantly from each other at the 0.05 level.

### 3.2 Logistic regression

Fourteen variables were significant predictors and are presented. The results from this analysis are given in Table 2 and are summarized below. It must be pointed out that the Hosmer and Lemeshow statistic indicates a poor model fit for back seat passenger model. However, since both forward and backward stepwise selection methods lead to the same variables, it was decided to report anyway the results.

*Socio-economic factors.* Front passenger seat belt use is lower (7 times less) among those of lower education. Strangely the result is different in case of occupying rear seats, back seat passengers with a bachelor or higher-level education are more than three times likely not to use the seat belt (OR= 3.47;  $p<.001$ ). Age is a non-significant risk factor for not wearing seat belts for drivers and front seat passengers. The highest risk of not using seat belts in the rear seats is found among adult occupants (50-64 years old), ten times as high as in the reference group of youngsters. The risk decreases with age but all age groups younger than the oldest group show an increased risk even if not significant.

*Exposure.* A significant association was found only for back seat passengers using their car 1 to 3 days a week (OR = 2.37,  $p<.001$ ).

*Attitudes.* Subjects who agree with the statement that wearing seat belts in the back seat of the car is not necessary, have a higher risk of belonging to the group of non-users of safety belts both as drivers (OR=5.29;  $p<.001$ ) and as front (OR=3.42;  $p<.001$ ) or back passengers (OR=3.02;  $p<.001$ ). The risk is between one third (front passenger) to almost one fourth (back seat passenger) as low as for those who agree with this statement. No association was found for attitudes related to the statement “I always ask my passengers to wear their seat belt”.

*Acceptability of not wearing seat belts.* Those who perceive socially acceptable not wearing seat belts in front car seats have 2.3 more chance to report not having worn their seat belt at least once during the last year as a driver (OR= 2.31;  $p<.001$ ) or a back-seat passenger (OR= 5.57;  $p<.001$ ). The personal acceptability of not using the restraint systems is a significant predictor for not wearing seat belts of the drivers and passengers themselves. If a driver considers “acceptable” not using seat belts his or her risk of not using the seat belt himself is 2.11 (driver) to 4.92 (back seat passenger) times higher than for the reference group ( $p < .001$ ).

*Subjective safety and risk perception.* Being concerned about the road accidents issue and feeling unsafe as a car passenger seem not to have a significant effect on the self-declared use of seat belts. While feeling unsafe as a car driver or car passenger seems to be linked to a higher probability of not using the seat belt (OR= 4.98 for drivers and 21.22 for back seat passenger;  $p<.001$ ).

*Perceived likelihood of getting caught for traffic offences.* People who perceive a considerable risk of being checked by Police are more inclined to always use seat belts. The risk of being part of the group of not wearing seatbelt users is 0.15 (back seat passenger) as low as for those who perceive a low chance to be checked by Police.

*Road safety measures support.* Those drivers who do not agree that penalties are too severe and traffic rules are not being checked sufficiently are more likely to not use seatbelt as a driver (OR = 1.92 for the former and OR = 2.6 for the latter). Back seat passengers not considering penalties too severe are on the contrary three times likely to use seatbelt. Also, drivers and front passengers disagreeing with making rules stricter are more prone to use seatbelt.

Table 2. Logistic regression model predicting seat belt non-use for driver, front passengers and back seat passengers in the past 12 months in Italy.

Driver	Front passenger	Back seat passenger
OR [95% C.I.]	OR [95% C.I.]	OR [95% C.I.]

Constant	0.049	0.624	1.341
Are you...? (ref. Male)			0.26 [0.16; 0.41]
Female			
Level of education (ref. Up to secondary education)			
4-5 (bachelor or higher)		0.14 [0.09; 0.23]	3.47 [2.12; 5.67]
Age_category (ref. 18-24y)			
25-49y			2.6 [0.6; 11.32]
50-64y			10.89 [2.36; 50.32]
65+			0.64 [0.12; 3.36]
Frequency of driving a car (ref. At least 4 days a week)			
1 to 3 days a week	0.87 [0.49; 1.54]		2.37 [1.33; 4.24]
A few days a month			1.58 [0.67; 3.72]
A few days a year/Never	3.25 [0.67; 15.9]		0.47 [0.14; 1.59]
Social acceptability on not using seatbelt in the rear seats (ref. Unacceptable)			
(rather) Acceptable (4-5)			5.57 [3.37; 9.23]
Social acceptability on not using seatbelt in the front seats (ref. Unacceptable)			
(rather) Acceptable (4-5)	2.31 [1.27; 4.2]		
Personal acceptability on not using seatbelt in the front seats (ref. Unacceptable)			
(rather) Acceptable (4-5)	2.11 [0.93; 4.76]	4.37 [2.14; 8.94]	
Personal acceptability on not using seatbelt in the rear seats (ref. Unacceptable)			
(rather) Acceptable (4-5)			4.92 [2.35; 10.33]
I always ask my passengers to wear their seat belt (ref. Disagree)			
Agree (4-5)			
It is not necessary to wear a seat belt in the back seat of the car (ref. disagree)			
Agree (4-5)	5.29 [3.19; 8.78]	3.42 [2.18; 5.35]	3.02 [1.6; 5.7]
Concerned about road accidents (ref. Concerned)			
Not concerned (1-2)			2.08 [1.15; 3.74]
(Un)safety feeling as a car driver (ref. Feel safe (5-10))			
Fell unsafe (0-4)	4.98 [2.52; 9.84]		
(Un)safety feeling as a car passenger (ref. Feel safe (5-10))			
Fell unsafe (0-4)			21.22 [2.84; 158.36]
Probability to be checked by Police (ref. Small chance)			0.15 [0.06; 0.35]

big chance		
Penalties are too severe (ref. Yes)		
No	1.92 [1.12; 3.29]	0.3 [0.17; 0.51]
Traffic rules are not sufficiently checked (ref. Yes)		
No	2.6 [1.55; 4.36]	
Traffic rules should be stricter (ref. Yes)		
No	0.51 [0.27; 0.99]	0.38 [0.21; 0.68]

#### 4. Conclusion

A number of determinants of seat belt use behavior in Italy was examined by this study. The possibility to compare the same set of seat belt use determinants in various countries was the major strength of the study and provided an insight of cultural differences potentially leading to seat belt use/nonuse.

According to the Theory of Planned Behaviour (Ajzen, 1991), behaviours are influenced by social norms, the personal attitudes towards the behaviour under discussion and the level of perceived control over the behaviour. Results from this study confirm that social norms, in terms of socially accepted behaviours, attitudes and risk perception affect the decision of using seat belts for drivers and passengers (both in the front and in the back of the car) in the Italian sample.

Higher levels of enforcement were expected to be associated with higher seat belt use rates, but contrary to our expectations, the perceived risk to be checked for seat belt use by the Police seems to affect only those seating in the back of the car. Social norms and attitudes seem to play a more relevant role in the decision to use seat belts for front car occupants.

In the absence of quantitative data providing findings to explain this, a further hypothesis for such behavior could be linked to the different culture shaping the road safety culture in a country. As an example, in the US, traffic safety culture is based on the incorrect assumption that seat belt use is a personal decision that affects no one but the user, this explains why mandatory seat belt laws faced more obstacles in the US than in most European countries (Jans et al., 2015). These types of attitudes and behaviours are transferred generation by generation thus affecting seat belt use rate. Further research to understand these relationships would be very useful.

In order to understand the variation in level of seatbelt use in the examined countries, it would be useful to understand the efforts done by these countries to improve the use of safety belts. For instance, differences in types of seat belt law exemptions can be observed (Weiss et al. 2006). In Finland, exemptions are provided only for persons with medical exemptions, in Denmark for emergency medical personnel, taxi drivers and if all restraint are in use. In Italy exemptions are provided for a higher number of categories: drivers of specific vehicles for the collection and transport of waste or suitable for urban hygiene, urban bus passengers, pregnant women, person with medical exemptions, driving instructors, armed forces in emergency or escort, drivers of the health or fire service, municipal and provincial police during emergencies.

As found in the comparison analysis, despite Italian road users perceived a high probability to be checked rather than in best performing countries, the rate of declared unhealth behavior (i.e. not using seat belt) especially in the back-seat positions is very high in Italy. According to ESRA survey data this subject and how people respect the rules on seat belt use could be partially explained by how much the police is concerned about non-using seat belts. In fact, while a high percentage of respondents (35%) in Italy declared to have paid a fine in the last year, fines for not wearing seat belts were as low as 3%. As a recommendation, it is important that continuous enforcement action with defined quantitative wearing targets is essential to increase usage rates to a significant level.

Increased seat belt use has been proven to substantially reduce serious injury and death. It is recommended to consider both to adopt seat-belt use observations as a tool to monitor progress to the wearing rate target, and questionnaire survey results about attitudes towards traffic rules and penalties to define an appropriate programme of interventions.

Enforcement remains a key measure, but also the installation of seat belt reminders (Krafft et al., 2006) and seat belt ignition interlocks (in particular by applying a short delay to unbelted drivers before allowing to shift from park, see Van Houten et al., 2005) are more effective measures to contribute extensively to the reduction of fatal and serious road injuries. Seat belt reminders should also be expanded to the rear seats since seat belt use in rear seats is still rather low, not only in Italy. Research confirmed that also rear seat passengers are much more likely to wear their belts in cars equipped with rear seatbelt reminders (Akamatsu et al., 2012). The EuroNCAP protocol for Safety Assist systems describes which features a seat belt reminder must have to qualify for extra points and recently increased the number of points for rear seat reminders: 1.5 points are available for the buckle monitoring function (all rear seats), and 0.5 point are allocated to additional occupant detection with advanced reminder function (EuroNCAP, 2017). A higher availability of this system in cars is then expected in the next future.

Education, training and campaigns should be used to ensure that there is sufficient public and political acceptance of the law and proposed enforcement. As also suggested in SARTRE project (SARTRE, 2004) innovative ways to further improve seat belt rates should be explored. For example, insurance premiums could be lower for drivers who commit themselves always to use the seat belt, and compensation paid by insurance companies could be limited if the driver had not used the belt in a crash.

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