Available online at www.sciencedirect.com

ScienceDirect

Transportation Research Procedia 45 (2020) 46–53

Transportation Research Procedia

www.elsevier.com/locate/procedia

AIIT 2nd International Congress on Transport Infrastructure and Systems in a changing world (TIS ROMA 2019), 23rd-24th September 2019, Rome, Italy

Self-Reported Route Familiarity and Road Safety Negative Outcomes: First Results from a Transnational Survey-Based Study

Paolo Intini[a]*, Nicola Berloco[a], Pasquale Colonna[a], Damiano de Gennaro[a], Vittorio Ranieri[a], Eirin Ryeng[b]

[a]*Department of Civil, Environmental, Land, Building Engineering and Chemistry, Polytechnic University of Bari, v. Orabona 4,70126 Bari, Italy*
[b]*Department of Civil and Environmental Engineering, NTNU The Norwegian University of Science and Technology, Høgskoleringen 7, 7491 Trondheim, Norway*

Abstract

Previous research has shown the influence of drivers' route familiarity on road safety. The drivers' familiarity was possibly related to some negative safety outcomes such as speeding, violations, inattention. On the other hand, drivers unfamiliar with the route (especially if foreigners) were related to over-involvement in specific types or at-fault crashes. Drivers' route familiarity is mainly identifiable from frequency-based self-reported scales and distance from residence scales. In this study, another perspective was used, by relying on surveys. The familiarity with given routes and the behavioral differences with respect to generic routes was self-reported by drivers, who have answered to a specifically designed survey. Other questions were related to other safety issues and negative outcomes, such as accidents and sanctions/violations. The survey was submitted to both Italian and Norwegian young drivers, to explore also possible cultural/geographic differences of the phenomenon. The first results from the study are presented here, by focusing on the relevant aspects emerged from both the Italian and Norwegian surveys. In particular, the representation of the habitual routes is different between Italy and Norway. Some stated behavioral differences emerge from the comparison between answers related to the generic routes travelled and those specifically related to the habitual routes. Most accidents occur on routes frequently traveled, while there is a relevant part of fines which occur on roads rarely/never travelled. Those tendencies should be confirmed and other possible relationships should be explored after having enlarged the sample of respondents.

Keywords: Route familiarity, Survey, Driving behaviour, Road accidents, Fines.

* Corresponding author. Tel.: +39 0805963390; fax: +39 080 5963414.
E-mail address: paolo.intini@poliba.it

10.1016/j.trpro.2020.02.061

1. Introduction

Among the aspects related to the crucial influence of human factors on road safety, those related to the everyday mobility are gaining importance (see e.g. Charlton and Starkey, 2018). In fact, clearly, several travels are repeated by the same drivers every day, toward the same destination, and by using the same routes. Hence, from a road safety perspective, it is important to study how the driving behavior can be affected by the drivers' route familiarity (Intini et al., 2019), which is a very common condition for drivers worldwide.

The familiarity of drivers with the routes repeatedly traveled was associated in previous research to negative driving outcomes such as speeding and traffic violations (Colonna et al., 2016; Rosenbloom et al., 2007). On the other hand, familiarity was also related to mind wandering and inattention while driving (Yanko and Spalek, 2013), which can be detrimental as well. The unfamiliarity of drivers with the routes was related instead to the over-involvement in at-fault crashes (Yannis et al., 2007), or specific crash types (Intini et al., 2018). However, most of these studies which relates unfamiliarity to crashes, have compared country (or state) residents with foreigners (see e.g. Harootunian et al., 2014).

The exact definition of the "driving familiarity condition" is actually arduous and it is then difficult to catch differences between familiarity and unfamiliarity of drivers, if several possible identifications of "familiar" and "unfamiliar" are used. Two main scales are used for identifying the drivers' familiarity in research studies: a frequency-based scale (i.e. how frequent is the traveling on a given route), and a distance-based scale (i.e. how far are drivers from home, while observed on a given route) (Intini et al., 2019). In the first case, the more is the traveling frequency, the more drivers can be assumed as route familiar, such as in experimental research based on repeated tests (e.g. Martens and Fox, 2007, Harms and Brookhuis, 2016). In the second case, the more is the distance from home, the more drivers can be reasonably assumed as route unfamiliar, as often implied in crash database analyses (e.g. Intini et al., 2017, 2018). However, both strategies may lead to misclassifications, because (especially in the second case), the drivers' route familiarity is deduced from indirect measures (Intini et al., 2019), which are the only available.

In this study, another approach is used to reveal possible relationships between the drivers' familiarity and the road safety. This approach is based on the analysis of the relationships between self-reported familiarity and self-reported driving behavior and negative outcomes. Those information are obtained by means of questionnaires submitted to drivers, in which the self-reported familiarity with given routes is asked, alongside with other questions regarding the driving behavior, accidents and fines due to traffic violations.

Some limited research has explored those relationships by means of surveys (see e.g. Liu and Ye, 2011). Moreover, in some cases, the focus of these studies was not related to the drivers' route familiarity, which was only a side aspect of a wider study. Nevertheless, the survey approach based on self-reported information was actually useful to find relationships between self-reported driving behavior and accidents in previous research (De Winter and Dodou, 2010). There is a relevant amount of research studies based on self-reported driving behavior indeed (i.e. those based on the DBQ, Driving Behaviour Questionnaire, see Reason, 1990). In this study, a similar approach is used, even if it is based on a specifically designed questionnaire dedicated to the study of the drivers' familiarity.

1.1. Research questions

This research study is based on to the following main research questions:

- Is it possible to detect possible differences in drivers' behavior between familiar and other generic routes, based on surveys?
- Is it possible to find significant relationships between self-reported drivers' route familiarity and negative safety outcomes, such as accidents and fines?
- Do the results vary if different geographic scenarios (and then different driving populations) are considered?

A trans-national research project was started, which attempts at answering to the above reported questions. This project involves both Italian and Norwegian young drivers. The repetition of the study in two different countries has the specific aim of addressing the question about different possible results if different driver populations are taken into account.

The remainder of the paper is organized as follows. Methods used in this study are presented in the next section. Thereafter, the first results of this trans-national study are described and the significant aspects are further discussed in light of the research questions posed.

2. Methods

In this section, the questionnaire submitted to the respondents is explicitly reported, and the methods used for the data collection and the exploratory data analysis are described.

2.1. Questionnaire

The base questionnaire was developed in English and after translated in Italian and Norwegian, by carefully checking the homogeneity of translations, with respect to the original meanings. The survey is composed of four sections: 1) General Information, 2) Habitual Route, 3) Accidents, 4) Fines. The specific questions asked to the respondents are reported as follows, divided according to the four above indicated sections.

1 General Information

1.1 Age (field to be freely filled)
1.2 Gender ("M" and "F" fields)
1.3 Years of driving license (field to be freely filled)
1.4 In an average week of the last two years, how much time have you dedicated on average to driving a car?
1.4.1 Average number of days a week (field to be freely filled)
1.4.2 More precisely, for each week ("Hours" and "Minutes" fields)
1.4.3 Divide this time into percentages on roads ("Urban" and "Rural" fields, also indicating in a footnote that the sum of the percentages should be 100 %)
1.5 Assess your ability as a car driver ("Awful", "Worse", "Average", "Good", "Outstanding" fields)
1.6 Assess your usual tendency to abide by road rules, in normal conditions ("Awful", "Worse", "Average", "Good", "Outstanding" fields)
1.7 Assess your average driving tendency, in normal conditions ("Very Aggressive", "Aggressive", "Average", "Prudent", "Very Prudent" fields, also indicating in a footnote that the driving tendency relates to speed, acceleration, braking, headways, curves).
1.8 Which is the frequency of your high-speed driving? ("Very Frequent", "Frequent", "Average", "Rare", "Very Rare/Never*" fields)
1.9 Which is the frequency of your drinking and driving attitude? ("Very Frequent", "Frequent", "Average", "Rare", "Very Rare/Never*" fields)
1.10 Which is the frequency of your protection systems use? ("Very Frequent/Always*", "Frequent", "Average", "Rare", "Very Rare" fields)
1.11 Do you like to drive? ("I love driving", "Yes", "Indifferent", "No", "I hate driving" fields)

*a double option was added to improve understandability in the Norwegian context.

2 Habitual Route (footnote: "Think to the route on which you drive more frequently")

2.1.1 The route is ("From", "To" fields, with a footnote indicating to only provide name of the places, such as town, cities, not specific addresses)
2.1.2 The route is ("From", "To" fields, with a footnote indicating the alternatives: home, study, work, services, sport facilities, shopping, other homes, other)
2.2 Length ("Km" field, with a note indicating that this should be an estimate of the one-way travel)
2.3 In an average week of the last two years, how much time have you dedicated on average to driving a car on this route?
2.3.1 Average number of days a week (field to be freely filled)
2.3.2 More precisely, for each week ("Hours", "Minutes" fields)
2.3.3 Divide this time into % on roads ("Main Rural", "Secondary Rural", "Main Urban", "Secondary Urban", also indicating in a footnote that the sum of the four percentages should be 100 %)
2.3.4 Divide this time into % on roads ("Congested", "Uncongested", also indicating in a footnote that the sum of the two percentages should be 100 %)
2.4 Assess your ability as car driver on this route ("Awful", "Worse", "Average", "Good", "Outstanding")

2.5 Assess your usual tendency to abide by road rules on this route, in normal conditions (“Awful”, “Worse”, “Average”, “Good”, “Outstanding”)
2.6 Assess your average driving tendency on this route, in normal condition (“Very Aggressive”, “Aggressive”, “Average”, “Prudent”, “Very Prudent” fields, also indicating in a footnote that the driving tendency relates to speed, acceleration, braking, headways, curves).
2.7 Which is the frequency of your high-speed driving on this route? (“Very Frequent”, “Frequent”, “Average”, “Rare”, “Very Rare/Never*” fields).
2.8.1 Do you think you behave differently on this route, with respect to other routes? (“Yes”, “No” fields)
2.8.2 If yes, which are the main differences? (lines to be freely filled)
2.9.1 Do you feel more confident with this route, with respect to other routes? (“Yes”, “No” fields)
2.9.2 If yes, why? (lines to be freely filled)
*a double option was added to improve understandability in the Norwegian context.

3 Accidents

3.1 Have you ever been involved in accidents as car driver in the last two years? (“Yes”, “No” fields, with a footnote indicating that if the No answer is provided, it is possible to skip the next question).
3.2 How many accidents? (“N.” field, with a footnote indicating that the provided number should be independently reported from the potential fault in the accident causation).

After, for each accident, a template is provided for reporting the type of accident (run-off-road, head-on, rear-end, lateral, with pedestrians/cyclists, other), the consequence (injured or not), the road accident environment (main rural, secondary rural, main urban, secondary urban road), the accident section (tangent, curve, intersections, ramp, other), the familiarity with the accident place (road frequently traveled, rarely traveled or never traveled before), and a description of the dynamics and eventual fault (lines to be freely filled).

4 Fines

4.1 Have you ever been fined as car driver in the last two years? (“Yes”, “No” fields, with a footnote indicating that if the No answer is provided, this is the end of the questionnaire).
4.2 How many fines? (“N.” field).

After, for each fine, a template is provided for reporting the type of fine (lines to be freely filled), the road environment (main rural, secondary rural, main urban, secondary urban road), the familiarity with the place of the fine (road frequently traveled, rarely traveled, never traveled before).

2.2. Data collection

The data collection was operated in two stages of survey dissemination: the first started two years ago (ended last year), and the second stage is currently in progress. Both stages were based on paper/web surveys mainly submitted to students within the courses taught at the Polytechnic University of Bari (Italy) and the Norwegian University of Science and Technology (Norway). The pilot stage was useful to check problems in the answers consistency. Data collections in both countries were temporally shifted: the second stage was currently only performed in Italy.

The pilot stage of data collection has led to 96 answers to surveys for Italy and 85 answers for Norway. Out of the total data collected, respectively about 5 % (5 answers) and 30 % of data (26 answers) were discharged from the initial Italian (“I”) and Norwegian (“N”) dataset. This was due to years of driving license incompatible with the hypothesis of the study (i.e. < 2 years, 2 “I” cases), drivers who declared to not actually driving (i.e. 0 hours of driving, 2 “I” cases), missing information about the habitual route travelled (16 “N” cases), missing information about routes travelled (6 “N” cases), clearly illogical or incomprehensible data (1 “I” case, 4 “N” cases).

2.3. Data analysis

This study explores the most significant relationships arising from the first results of this trans-national survey. To allow a preliminary comparability between Italian and Norwegian samples, only data belonging to the first stage of data collection are analyzed. Descriptive statistics are provided for the two separate country database in next section. The most relevant results and the differences between answers from the different countries are further discussed, in light of the research questions posed.

3. Results

The final dataset includes 91 Italian (I) and 59 Norwegian (N) valid answers. Descriptive statistics about the surveyed samples are as follows: "I" drivers are 65 males (71 %) and 26 females (29 %), mean age 24.8 years (st. dev.: 1.9 years) and mean years of driving license 6.1 (st. dev.: 2.7 years); "N" drivers are 43 males (73 %) and 16 females (27 %), mean age 21.3 years (st. dev.: 1.3 years) and mean years of driving license 3.3 (st. dev.: 1.3 years).

The results obtained from the surveys are reported as follows in Table 1. The results are presented according to the questions posed in the questionnaire and divided as based on the respondents' countries (Italy and Norway). Means and standard deviations of the answers within the two samples are reported, by converting qualitative judgments (e.g. very frequent, frequent, average, rare, very rare) into 5 points scales (from 0 to 4), when needed.

Table 1. Combined results from the first stage of Italian and Norwegian surveys.

ID	QUESTIONS	POSSIBLE ANSWERS[1]	ITALY Mean (St. dev.) or Percentages[2]	NORWAY Mean (St. dev.) or Percentages[2]
1	**General information**			
1.4	**Time spent driving**			
1.4.1	Days a week	Free	4.01 (1.92)	2.49 (1.79)
1.4.2	For each week	Hours and minutes	2.46 (6.27)	2.33 (2.44)
1.4.3	% on roads	Urban (U, %) or Rural (R, %)	60.4 (U), 39.6 (R)	51.5 (U), 48.5 (R)
1.5	**Ability as car driver**	from "Awful" (0) to "Outstanding" (4)	3.01 (0.78)	2.97 (0.83)
1.6	**Abiding by road rules**	from "Awful" (0) to "Outstanding" (4)	2.97 (0.85)	3.14 (0.54)
1.7	**Driving tendency**	From "Very Aggressive" (0) to "Very Prudent" (4)	2.35 (0.92)	1.98 (0.78)
1.8	**High-speed driving**	From "Very Frequent" (0) to "Very Rare" (4)	2.20 (0.88)	1.68 (0.92)
1.9	**Drinking and driving**	From "Very Frequent" (0) to "Very Rare" (4)	3.54 (0.72)	4.00 (0.00)
1.10	**Protection systems use**	From "Very Frequent" (4) to "Very Rare" (0)	3.15 (1.05)	4.00 (0.00)
1.11	**Driving pleasure**	From "I love driving" (4) to "I hate driving" (0)	2.76 (0.92)	3.05 (0.63)
2.2	**Habitual route length**	Km	28.60 (35.93)	16.34 (16.91)
2	**Habitual route**			
2.3	**Time spent driving**			
2.3.1	Days a week	Free	3.04 (1.66)	2.10 (1.59)
2.3.2	For each week	Hours and minutes	0.49 (0.87)	1.48 (1.71)
2.3.3	% on roads	Main Rural (MR, %), Secondary Rural (SR, %), Main Urban (SU, %) or Secondary Urban (SR, %)	31.1 (MR), 17.3 (SR), 30.7 (MU), 20.9 (SU)	32.8 (MR), 22.4 (SR), 28.0 (MU), 16.7 (SU)
2.3.4	% on roads	Congested (C, %), Uncongested (U, %)	44.2 (C), 55.8 (U)	11.6 (C), 88.4 (U)
2.4	**Ability as car driver**	from "Awful" (0) to "Outstanding" (4)	3.25 (0.68)	3.37 (0.61)
2.5	**Abiding by road rules**	from "Awful" (0) to "Outstanding" (4)	2.91 (0.91)	3.02 (0.54)
2.6	**Driving tendency**	From "Very Aggressive" (0) to "Very Prudent" (4)	2.34 (0.96)	1.81 (0.73)
2.7	**High-speed driving**	From "Very Frequent" (0) to "Very Rare" (4)	2.21 (1.10)	1.86 (0.99)
2.8.1	**Different behaviour**	Yes (Y, %) or No (N, %)	40.7 (Y), 59.3 (N)	54.2 (Y), 45.8 (N)
2.8.2	Main differences (if yes)	Free[3]	Familiarity (35 %), Other behavioural factors (31 %), Speed (22 %)	Other behavioural factors (50 %), Speed (32 %), Familiarity (18 %)
2.9.1	**Different confidence**	Yes (Y, %) or No (N, %)	61.5 (Y), 38.4 (N)	76.3 (Y), 23.7 (N)
2.9.2	Main reasons (if yes)	Free[3]	Frequent traveling/habitude (40 %), Route knowledge (37 %), Dangers knowledge (10 %)	Route knowledge (44 %), Dangers knowledge (17 %), Frequent traveling/habitude (15 %)
3	**Accidents**			
3.1	**Involvement**	Yes (Y, %) or No (N, %)	9.9 (Y), 90.1 (N)	6.8 (Y), 93.2 (N)
3.2	**Number**	Free	11 (to 9 persons)	4 (to 4 persons)
	Type	Run-off (RO, %), Head-on (HO, %), Rear-end (RE, %), Head-on/Lateral (HL, %), Lateral (L, %), with Pedestrians/Cyclists (PC, %); Other (O, %)	54.5 (RE), 27.3 (L), 9.1 (RO), 9.1 (O)	50.0 (L), 25.0 (RO), 25.0 (O)
	Injuries	Yes (Y, %) or No (N, %)	12.5 (Y), 87.5 (N)	25.0 (Y), 75.0 (N)
	Road Type	Main Rural (MR, %), Secondary Rural (SR, %), Main	50.0 (SU), 40.0	75.0 (SU), 25.0

		Urban (SU, %) or Secondary Urban (SR, %)	(MU), 10.0 (MR)	(MR)
	Section Type	Straight (S, %), Curve (C, %), Intersection (I, %), Ramp (R, %), Other (O, %)	50.0 (R), 40.0 (I), 10.0 (C)	50.0 (I), 25.0 (C), 25.0 (O)
	Familiarity	Frequently travelled (F, %), Rarely travelled (R, %), Never travelled (N, %)	100.0 (F)	75.0 (F), 25.0 (R)
4	**Fines**			
4.1	**Involvement**	Yes (Y, %) or No (N, %)	25.3 (Y), 74.7 (N)	6.8 (Y), 93.2 (N)
4.2	**Number**	Free	31 (to 23 persons)	4 (to 4 persons)
	Type	Free[3]	Illegal parking (24.2 %), Speeding (9.7 %), Wearing no seat belts (6.4 %)	Speeding (66.7 %), Illegal parking (33.3 %)
	Road Type	Main Rural (MR, %), Secondary Rural (SR, %), Main Urban (SU, %) or Secondary Urban (SR, %)	80.0 (SU), 24.0 (MR), 8.0 (MU)	33.3 (MR), 33.3 (SR), 33.3 (SU)
	Familiarity	Frequently travelled (F, %), Rarely travelled (R, %), Never travelled (N, %)	56.3 (F), 31.3 (R), 12.5 (N)	33.3 (F), 33.3 (R), 33.3 (N)

[1]Qualitative answers (e.g. from very frequent, frequent, average, rare, very rare) were converted into 5 points scales (from 0 to 4), when needed. The 0 score of the scales was always assigned to the less safe condition (e.g. very aggressive driving tendency, very rare use of protection systems).
[2]Percentages are computed on valid data (excluding missing data).
[3]The three main clusters of answers are reported here, together with the related percentages.

Some findings can be highlighted by analyzing results in Table 1. Italian respondents generally drive more than the Norwegian ones (both in terms of days and hours a week), and they drive more in urban environments (about 60 % compared to the about 50 % of Norwegian drivers). Both Italian and Norwegian respondents have good self-perception of their ability as car drivers (the converted average score is about 3 out of 4). Norwegian respondents declare a higher respect of road rules as based on explicit questions on abiding by road rules, drinking and driving tendencies and protection systems use, compared to Italian respondents. In particular, all Norwegian respondents declared a "very rare" tendency to drink and drive and a "very frequent" use of protection systems. When the reference to road rules is not explicit, as in the case of generic high-speed driving and driving tendency, Italian respondents declared in average a more prudent behavior (more prudent driving tendency and less frequent high-speed driving) compared to Norwegian respondents. Moreover, Italian respondents have declared a generic less driving pleasure (even with higher standard deviation of scores) than the Norwegian respondents.

For what concerns the habitual route, Italian respondents drive on average more on the habitual route in terms of days a week (about 3 versus about 2) than the Norwegian ones. However, the hours spent on the habitual routes are strongly different (less for the Italian respondents: 0.49 hours a week, st. dev.: 0.87, versus 1.48, st. dev.: 1.71). The habitual route environment is different as well: Italian respondents spend more time in urban environments than Norwegian ones (in particular on secondary urban roads). However, most of Norwegian respondents drive on an uncongested habitual route (88.4 %), compared to Italian respondents (for which habitual routes are almost equally split into congested and uncongested roads). The perception of the ability as a car driver is still high (scores slightly more than 3) for the habitual routes for the two countries' respondents. The average score related to abiding by road rules is similar for Italian and Norwegian respondents as well (about 3, even if the standard deviation of scores is higher for Italian respondents). Italian respondents declared a more prudent behavior than the Norwegian drivers also on the habitual route (as based on the answers related to driving tendency and high-speed driving). It is important to note that, when asked about if they feel behaving differently on habitual routes, about one half of respondents do not declare any difference. However, the "No" answer is more frequent for Italian respondents than for Norwegian respondents. On the other hand, when asked about if they feel more confident on habitual routes, most respondents declare an increased confidence. Even in this case, Norwegian respondents declare higher levels of confidence (76.3 % of "Yes" answers) than Italian respondents (61.5 %). The stated reasons for having declared to behaving differently on the habitual routes are mainly clustered into answers related to "Familiarity", "Other behavioral factors" and "Speed". The "Familiarity" effect is declared more frequently by Italian respondents with respect to the Norwegian ones (who preferred other behavioral factors). The stated reasons for having declared to being more confident on the habitual routes are mainly clustered into answers related to "Frequent travels/habitude", "Route knowledge", "Dangers knowledge), The "Frequent travels/habitude" effect is declared more frequently by Italian respondents with respect to the Norwegian ones (who preferred the route knowledge to explain a greater confidence).

For what concerns accidents, few accidents were reported by the respondents (11 for Italy and 4 for Norway). This is clearly due to the small sample of first stage respondents, and to the fact that accidents are rare events (about 90 % of drivers were not involved in accidents in the past 2 years). Most of these few accidents are PDO accidents (Property Damage Only accidents without injuries) and they have occurred on roads frequently travelled (100 % of Italian accidents and 75 % of Norwegian accidents). The analysis of the other additional information (accident type, road type, section type) is not informative, due to the small sample.

Few fines were reported by the respondents as well (31 for Italy and 4 for Norway). This result is clearly due to the small sample of first stage respondents too. The Italian respondents' fine involvement in the past 2 years is significantly higher than the Norwegian ones (25.3 % versus 6.8 %). The analysis of the other additional information (fine type, road type, familiarity) is not informative, due to the small sample, especially in the Norwegian case. Some preliminary information can be deduced from the Italian sample of fines: they essentially were due to illegal parking and speeding, mostly on urban roads (88.0 %) and on frequently traveled roads (56.3 %). Note that, differently than accidents, in about one half of cases, drivers were fined on roads rarely (31.3 %) or never traveled before (12.5 %).

4. Discussion

Results from the first data collections stage are discussed here, in light of the research questions. They were mainly related: 1) to the exploration of stated differences between behaviors on habitual and generic routes, 2) to the possible relationships between drivers' familiarity and negative outcomes (accidents/fines), 3) to the trans-national variability.

Some differences between stated behaviors on habitual routes compared with generic routes, emerge from the analysis of results. This entails comparing the scores of answers from 1.5 to 1.8 (generic routes) with answers from 2.4 to 2.7 (habitual routes), by also considering answers related to behavior/confidence differences (2.8.1, 2.9.1). In general, both Italian and Norwegian drivers increase their scores of ability as a car driver on the habitual routes compared with generic routes (answers 1.5-2.4). Both Italian and Norwegian drivers decrease their scores of abiding by road rules towards a rarer abiding tendency (ans. 1.6-2.5) and their scores of average driving tendency towards a more aggressive behavior (ans. 1.7-2.6) on the habitual routes compared with generic routes. Italian (irrelevantly) and Norwegian drivers (more significantly) increase their scores from frequent to rare high speeds (ans. 2.8-2.7) on the habitual routes compared with generic routes. Those tendencies are depicted in the diagram in Fig. 1. However, when considering results from paired sample t-tests, the only statistically significant difference between generic and habitual routes at the 95 % confidence level, is the difference between the driving ability on the habitual compared to generic routes, for both Italian, $t(90) = -3.6124$, $p < 0.001$, and Norwegian, $t(58) = -4.3274$, $p < 0.001$, respondents.

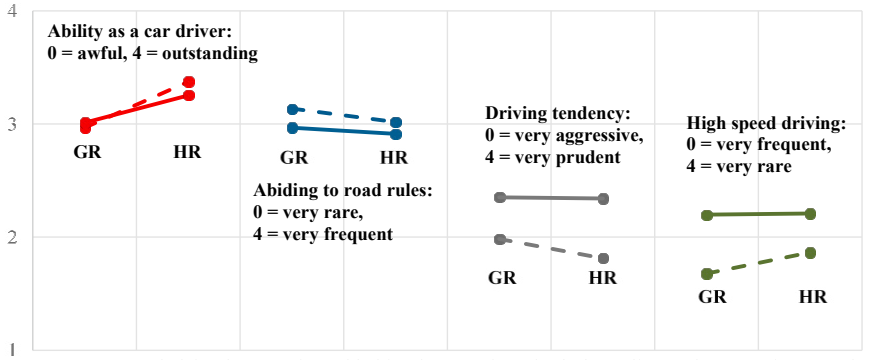

Fig. 1. Different mean scores recorded for the generic and habitual routes from both the Italian and Norwegian samples (GR = Generic Route, HR = Habitual Route; solid lines for the Norwegian sample, dotted lines for the Italian sample).

When directly asked about possible different behaviors and confidence, a relevant share of respondents report no differences. However, Norwegian respondents report higher behavioral differences and confidence on the habitual routes compared to the Italian ones. The differences in scores reflect a significant change only in the stated driving ability, and some minor differences (not statistically significant) in other scores. These differences between the stated ability on the habitual and the generic routes are anyway valid for both countries' respondents (scores are very similar).

Possible relationships between familiarity of drivers, as based on stated behaviours on the habitual route, and negative outcomes are hardly to be found from the analysis of the small dataset of accidents and fines of this pilot collection stage. However, it is important to note that, even if the habitual route is stated to be only a part of the total routes travelled by the respondents (both Italian and Norwegian), most of the accidents (all in the Italian case) occurred on roads frequently travelled. This is a well-known effect (see e.g. Burdett et al., 2017) also explainable with over-exposure, and it sheds additional light on the relationship between route familiarity and accidents on familiar routes (see also Intini et al., 2018, 2019). On the other hand, several fines occurred on roads rarely or never travelled before (especially based on the greater Italian sample). This difference with respect to accidents should be better inquired, especially when considering the effectiveness of enforcement (see also Ryeng, 2012). In fact, it may seem that familiarity with habitual routes may foster accident involvement and prevent (or reduce) the occurrence of fines. For example, this may be reconducted to the exact knowledge of the presence and location of the enforcement.

Differences in the scores were noted between Italian and Norwegian respondents. Moreover, the representation of the Italian and Norwegian habitual route seems different (in terms of different road environment and length of the travel). This may influence the difference in scores related to the habitual routes (see Table 1). However, when inquiring in detail into differences between stated behaviours on habitual and generic routes, the only significant difference was similar for Italy and Norway (increased perceived ability as a car driver on the habitual route).

5. Conclusion

First results of a trans-national study based on surveys to reveal relations between reported familiarity, behavioral differences and negative outcomes were shown, even based on a small dataset (especially for accidents/fines).

In fact, the results mainly relate to a significantly different perceived driving ability on the habitual route with respect to generic routes and to different scores for Italian and Norwegian respondents on how they perceive confidence/behavior changes on the habitual routes. It is also evident how both the frequency and nature of habitual travels can be different in different geographic contexts. Those results encourage the further development of the study, for which a sample enlargement is needed (also to increase the reported accidents/fines), and it is currently in progress.

References

Burdett, B. R., Starkey, N. J., & Charlton, S. G. (2017). The close to home effect in road crashes. Safety science, 98, 1-8.

Charlton, S. G., Starkey, N. J., 2018. Memory for everyday driving. Transportation research part F: traffic psychology and behaviour, 57, 129-138.

Colonna, P., Intini, P., Berloco, N., Ranieri, V., 2016. The influence of memory on driving behavior: How route familiarity is related to speed choice. An on-road study. *Safety science*, *82*, 456-468.

De Winter, J. C. F., Dodou, D. 2010. The Driver Behaviour Questionnaire as a predictor of accidents: A meta-analysis. Journal of safety research, 41(6), 463-470.

Harms, I. M., Brookhuis, K. A. (2016). Dynamic traffic management on a familiar road: Failing to detect changes in variable speed limits. *Transportation research part F: traffic psychology and behaviour*, *38*, 37-46.

Harootunian, K., Lee, B. H., Aultman-Hall, L. 2014. Odds of fault and factors for out-of-state drivers in crashes in four states of the USA. Accident Analysis & Prevention, 72, 32-43.

Intini, P., Berloco, N., Colonna, P., Ranieri, V., & Ryeng, E. (2018). Exploring the relationships between drivers' familiarity and two-lane rural road accidents. A multi-level study. Accident Analysis & Prevention, 111, 280-296.

Intini, P., Colonna, P., Ryeng, E., 2019. Route familiarity in road safety: a literature review and an identification proposal. Transportation research part F: traffic psychology and behaviour. Transportation research part F: traffic psychology and behaviour, 62, 651-671.

Liu, C., Ye, T.J., 2011. Run-off-road Crashes: An On-scene Perspective (No. HS-811 500).

Martens, M. H., Fox, M. R. 2007. Do familiarity and expectations change perception? Drivers' glances and response to changes. Transportation Research Part F: Traffic Psychology and Behaviour, 10(6), 476-492.

Reason, J. 1990. Human error. Cambridge university press.

Rosenbloom, T., Perlman, A., Shahar, A., 2007. Women drivers' behavior in well-known versus less familiar locations. *Journal of safety research*, *38*(3), 283-288.

Ryeng, E. O. (2012). The effect of sanctions and police enforcement on drivers' choice of speed. Accident Analysis & Prevention, 45, 446-454.

Yanko, M. R., Spalek, T. M., 2013. Route familiarity breeds inattention: A driving simulator study. *Accident Analysis & Prevention*, *57*, 80-86.

Yannis, G., Golias, J., Papadimitriou, E. 2007. Effects of driver nationality and road characteristics on accident fault risk. *International journal of injury control and safety promotion*, *14*(3), 171-180.