

Young Researchers Seminar 2009

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Driver assessment of road weather conditions and road weather information

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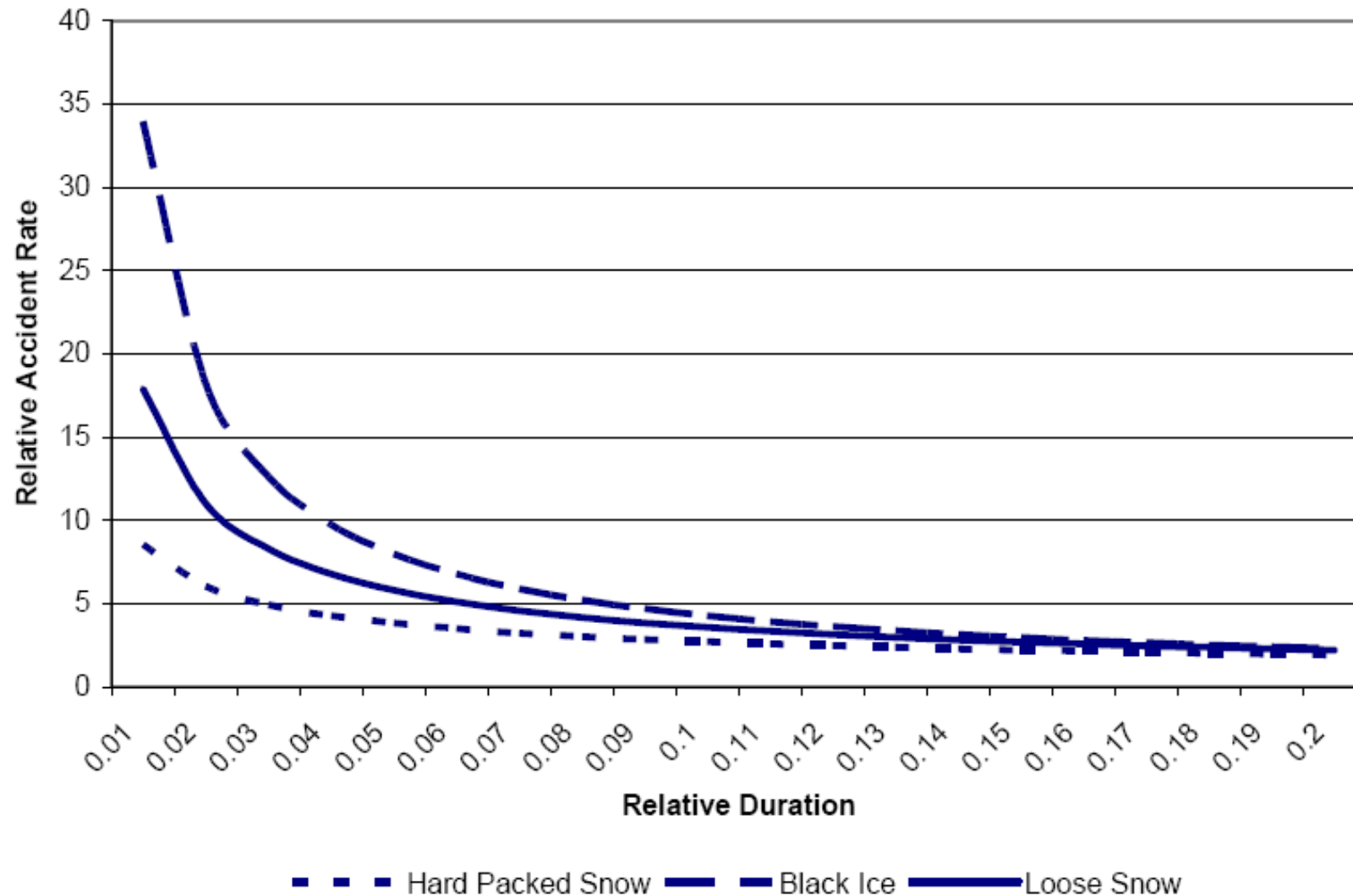


Introduction

- Despite effective winter road maintenance, hazardous road conditions cannot be avoided entirely and drivers are faced with poor road conditions. In bad weather they have to estimate the driving conditions and how to change their driving behaviour compared with that in normal weather.
- Many studies have shown that the accident risk in adverse weather and road conditions is many times higher than on a bare road surface
- The main errors leading to increased risk in winter are drivers' poor ability to recognise slipperiness and to adapt their speed to adverse winter conditions

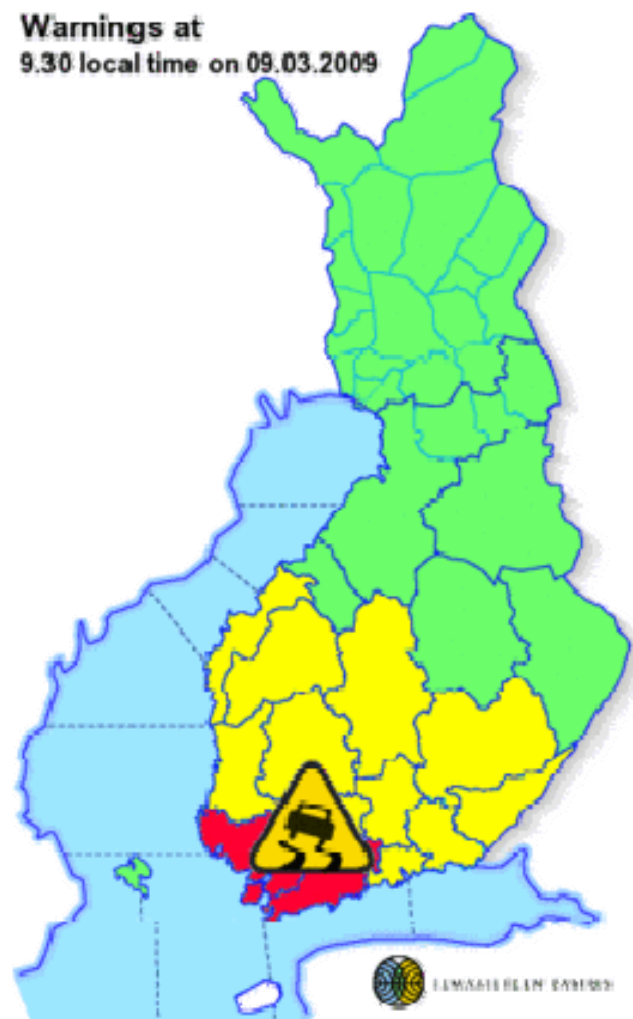
Introduction

- Relative accident rate as a function of relative duration for three different ice and snow conditions



Introduction

- In Finland Road Weather Information Service since 1997
- The forecast is based on current weather and road conditions, maintenance, and weather forecasts
- The forecasts are valid for 24 hours and are produced at least four times a day.
- The road weather information service sets three levels for conditions on roads: normal, poor, and hazardous
- In 1997–2007, poor road weather conditions were predicted about 27–35% of the time and hazardous conditions 2–5% of the time
- The service has been well recognised and accepted



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Aim of the study

- The study was designed to update the situation and produce new information about effects of the road weather information.
 - Use of new media when looking for road weather information.
 - Previous information about prevailing road weather versus driver assessments was quite old and needed to be updated.
- The main issues included
 1. do drivers receive forecast information,
 2. do informed drivers change their travel plans or driving behaviour.
 3. how drivers assess different road weather conditions and
 4. how these assessments relate to weather forecasts

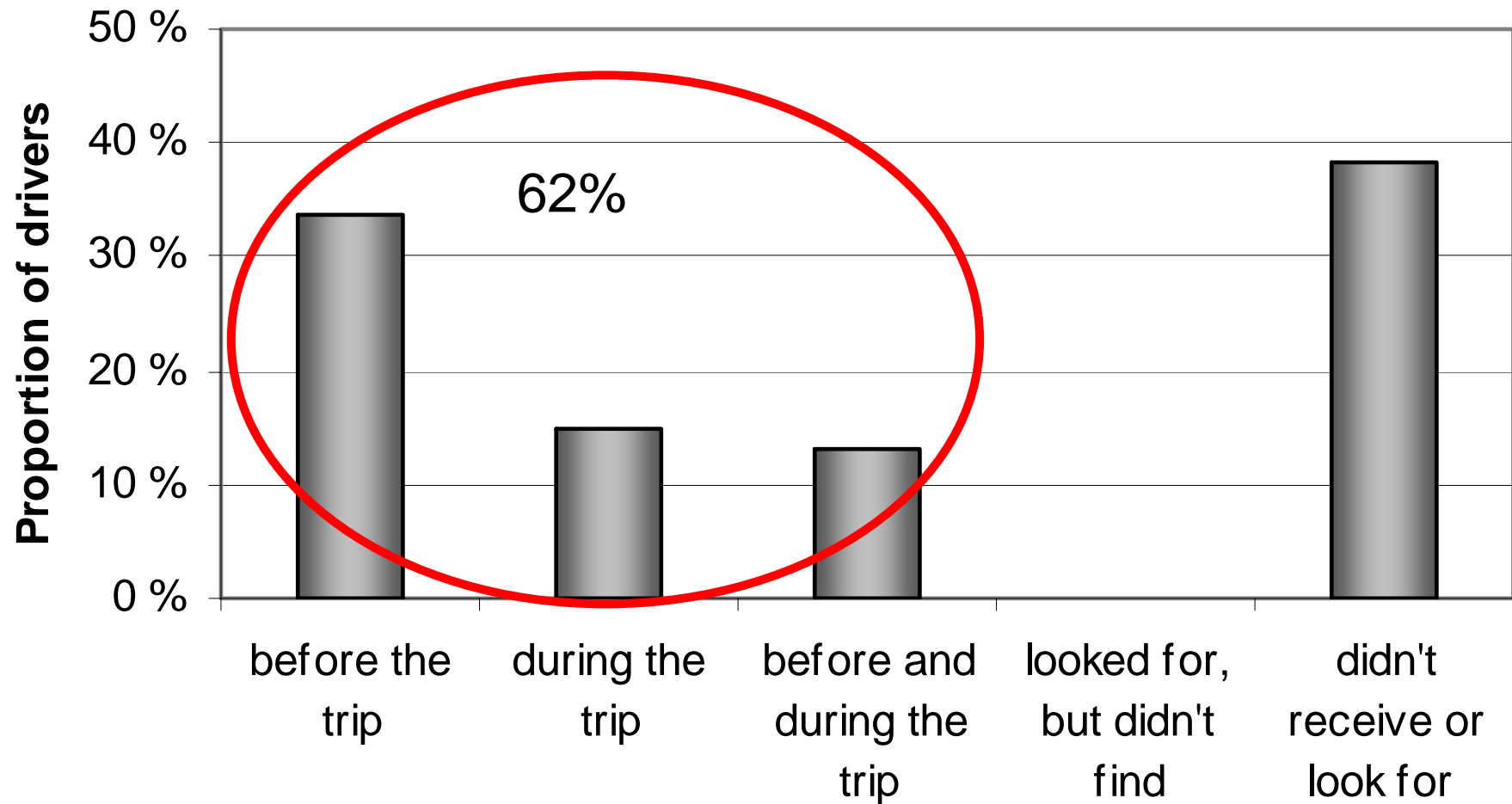
Method

- The data was collected during the winter of 2007–2008 via interviews at service stations (76%) and on the roadside (24%)
 - The sites were located near the automatic road weather stations and automatic traffic measurement spots
 - On the roadside police invisibly measured the speed of the selected drivers by radar before they were asked to stop
- The aim was to conduct interviews when the weather was poor or hazardous
 - The timing of the interviews was based on weather forecasts and actual weather conditions

Results: Drivers

- The data included 308 drivers of which 180 were interviewed in poor or hazardous road weather conditions
 - The proportion of females was 13% of the whole data and 10% of the data for poor or hazardous road weather conditions
 - Share of young drivers was low in both data
 - Also the share of drivers, who drive less than 10,000 km per year was low. Compared to whole data, in poor or hazardous road weather conditions there were more drivers, who drive more than 50,000 km per year
 - About 20% of the respondents were drivers of heavy vehicles
 - 95% of the drivers had been driving more than 20 km before the interview
 - Over 50% of the drivers drove the same trip at least once a week. 7% of the drivers were driving the trip they were on for the first time

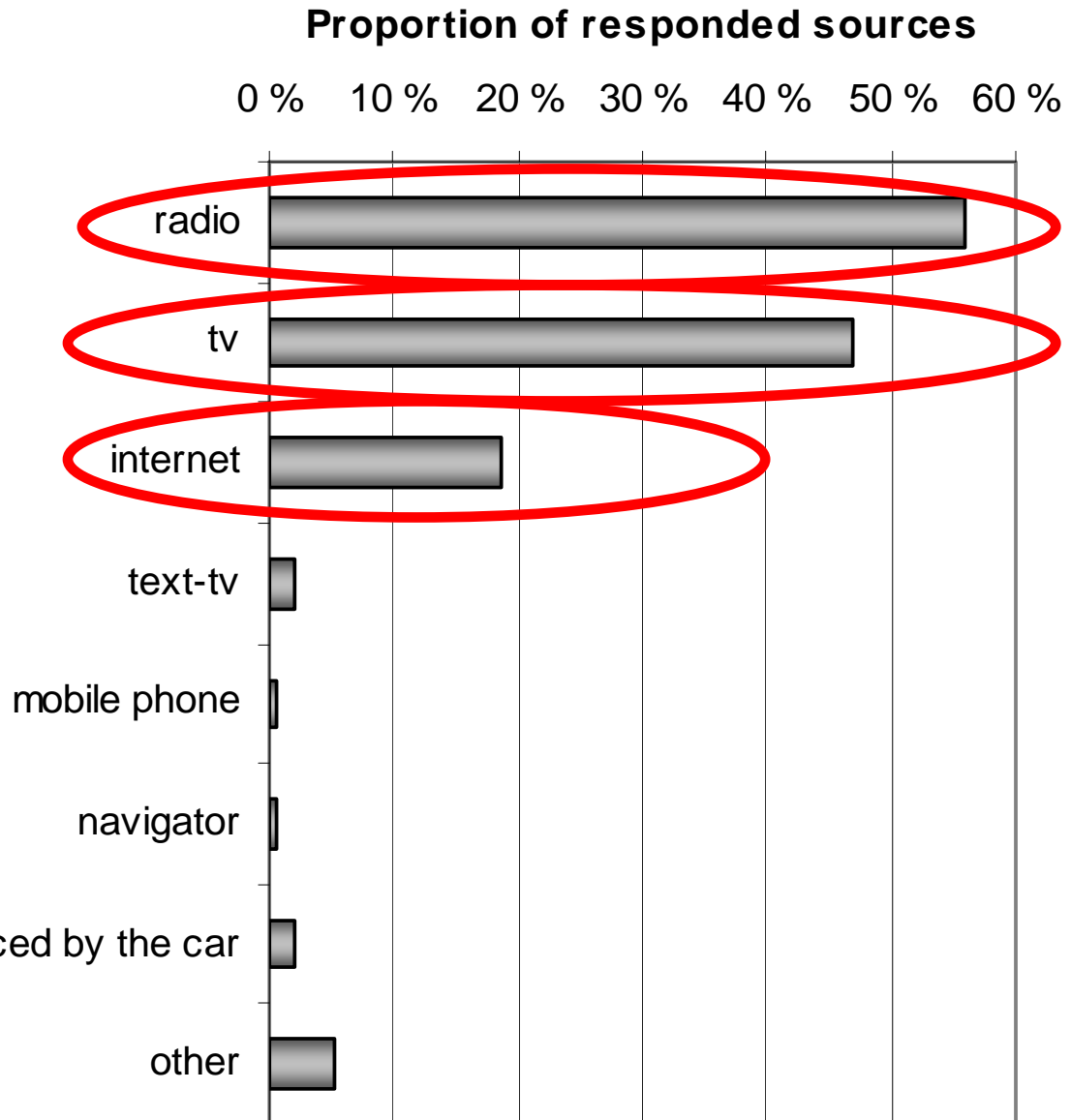
Results: Receiving road weather information



"Had you received or looked for road weather information before or during this trip?"

Results: Receiving road weather information

"If you received or looked for road weather information, where did you get the information?"

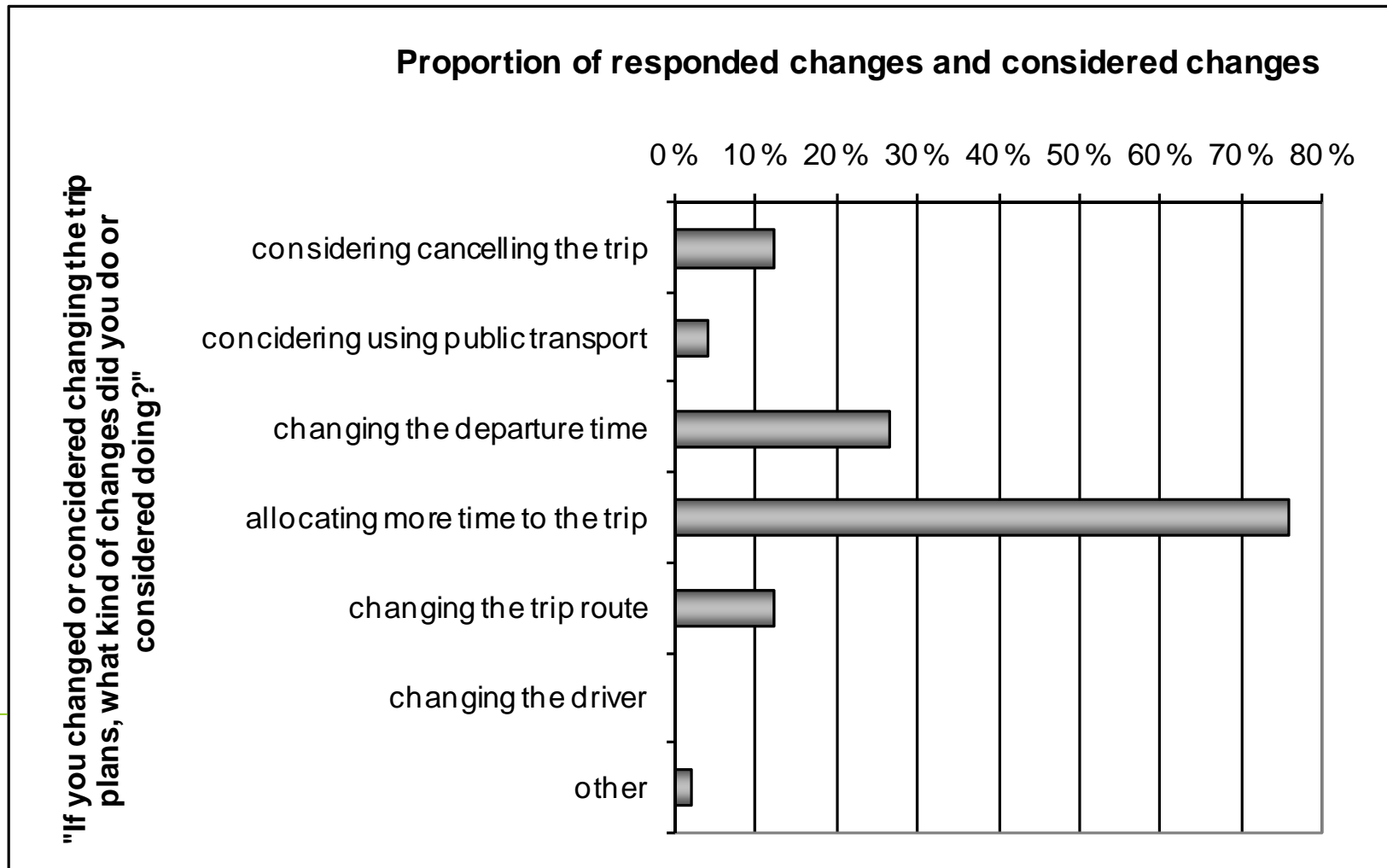


Results: Receiving road weather information

- Drivers, who were more likely than other drivers to have acquired information on weather and road conditions were
 - Less experienced (low amount of driving km's / year)
 - Had driven for a longer time before the interview
 - Were on a trip they did not make frequently

Results: Effects of road weather conditions on travel plans

- Overall, 21% of the respondents indicated that they had changed or considered changing the travel plans for their current trip because of the road weather conditions either before or during the trip

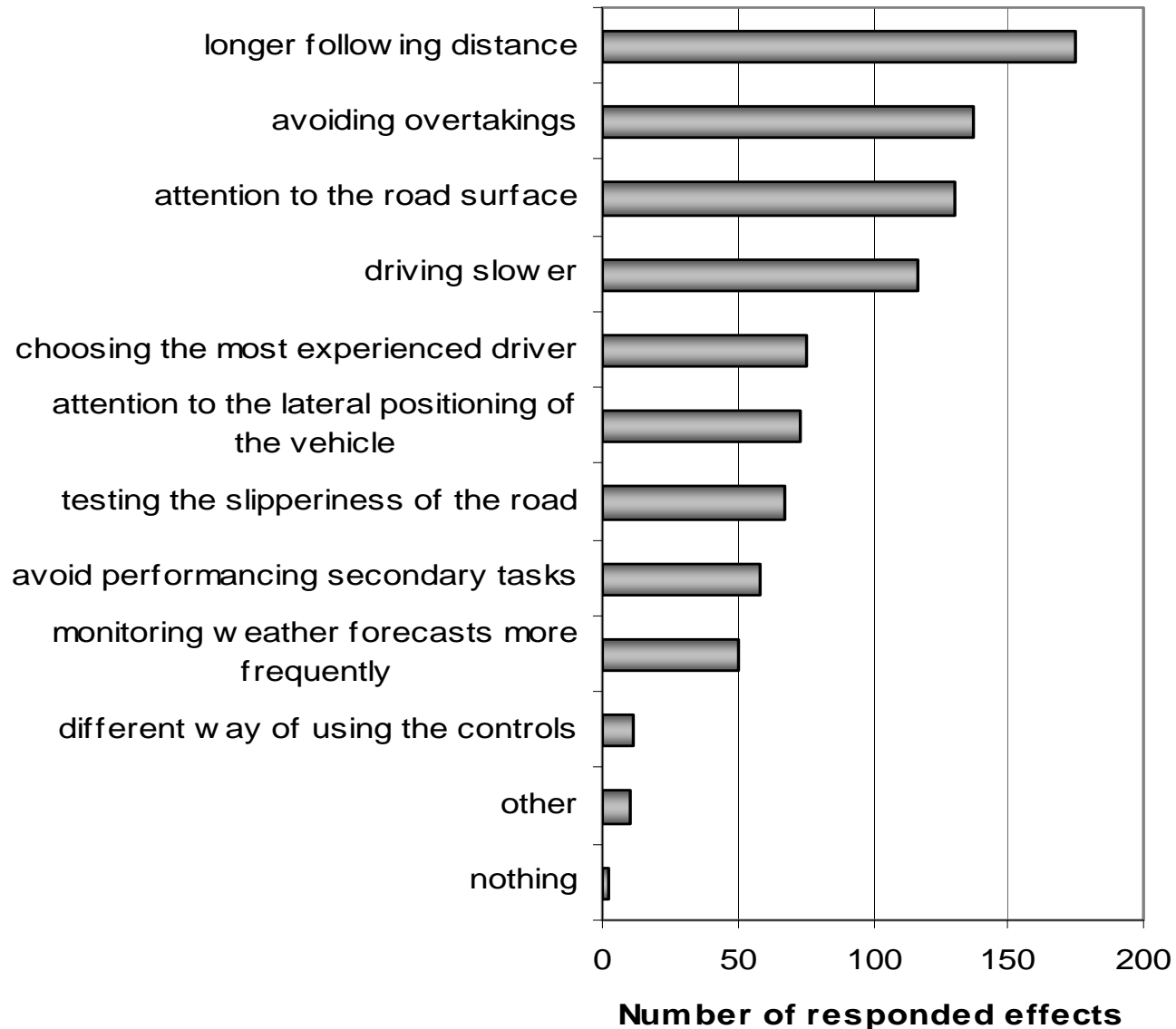


Results: Effects of road weather conditions on travel plans

- Elderly drivers (over 64 years) reported more often than others that they had considered or changed the plans of the trip because of the weather
- Drivers on a work-related trip seldom reported that they could have cancelled or postponed it.
- Based on interviews it was not possible to get information on drivers who had cancelled their trip because of the weather or used public transport. Comparison of traffic volumes, however, showed that during poor or hazardous road conditions the traffic volume was about 10% less than in normal road conditions.

Results: Reported effects of road weather information on driving behaviour

"How does the information about poor road weather conditions effect on your behaviour?"



Results: Reported effects of road weather information on driving behaviour

- Drivers estimated that the information that most affected their behaviour was
 - warnings concerning main roads shown on a provincial map, and
 - verbal descriptions of the weather and road conditions.
 - Also individual and focused information, such as road maintenance, was appreciated.

Results: Prevailing road weather during interviews versus driver assessments

- The road weather forecast class given by the road weather information service was poor or hazardous during 61% of the time the interviews were taking place.
- Of the respondents, 17% rated the road weather conditions as hazardous and 57% as poor during the interview.
- Snowfall was most often cited as a factor affecting the current road weather conditions.
- Police measurements at the roadside showed that drivers drove 4 km/h slower when the road weather forecast class was poor than when it was normal

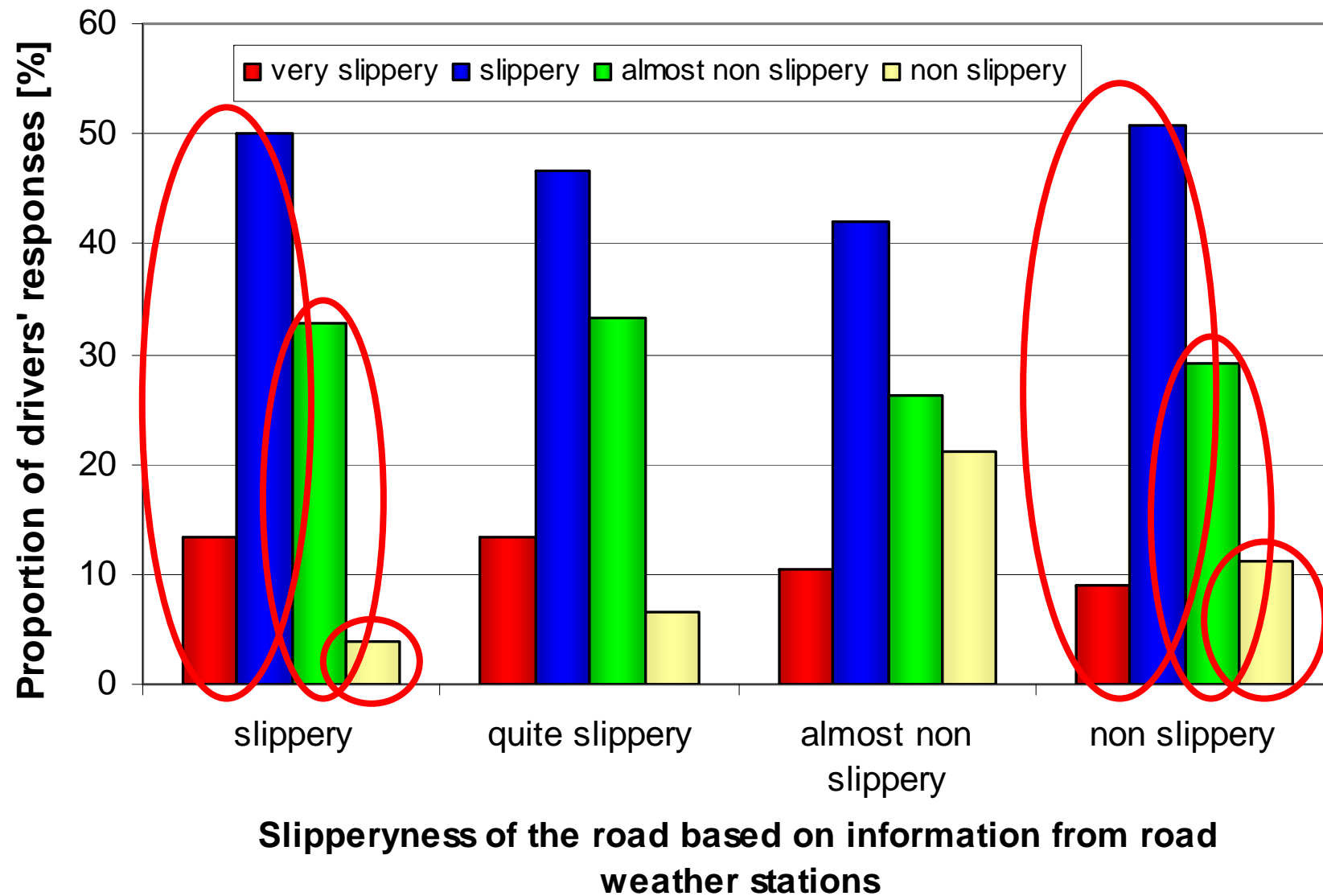
Results: Prevailing road weather during interviews versus driver assessments

- Based on information gathered from automatic road weather stations,
 - 55% of the interviews were done at a time when the road was non-slippery,
 - 9% of the time the main road near the interview place was almost non-slippery,
 - 13% of the time the road was quite slippery, and
 - 23% of the time it was slippery.

Results: Prevailing road weather during interviews versus driver assessments

- The drivers' estimations of the road surface friction level did not correspond to the information from the road weather stations
 - About half of the drivers rated the road surface as very slippery or slippery and about half as non-slippery or almost non-slippery.
 - The opinions of the drivers did not depend on whether the road surface was slippery or non-slippery according to the road weather station.

Results: Prevailing road weather during interviews versus driver assessments



Results: Prevailing road weather during interviews versus driver assessments

- In general, those who had looked for or received information on the current weather and road conditions rated the conditions as worse, the road surface more slippery and the accident risk higher than those who had not received this information.
- At the roadside survey site where police measured the speeds, drivers who had received information on road weather conditions drove 5 km/h slower than other drivers when the road weather forecast class was poor

Discussion

- The main results of the study showed that drivers' estimations on the road surface friction level did not correspond to the information from road weather stations.
 - The most dangerous situations are those in which an automatic road weather station has indicated that the road is slippery, but the respondent has not detected it.
 - When the road surface was slippery, every third driver estimated that the road was almost non-slippery and some drivers estimated that the road was not slippery at all.
 - The opposite situation is not that alarming, because even if the automatic road weather station has indicated that the road is non-slippery it could have been slippery in some spots, as the weather station only measures small areas of the road.
- This result highlights the importance of informing drivers about road weather conditions.

Discussion

- Furthermore, the results showed that most of the drivers (62%) had received information on road weather before or during the trip, typically from radio or TV.
 - The share of information received via the Internet (19%) was notably higher than in previous studies.
 - In comparison with uninformed drivers, those who had looked for or received a weather forecast rated the conditions as worse, the road surface as more slippery and the accident risk as higher. It can also be assumed that people who generally worry about safety both actively use weather information and evaluate conditions as worse.
 - Compared with earlier studies, the proportion of drivers who had received information on road weather was quite high.

Discussion

- The aim of traffic weather information is to have an effect on driver behaviour where needed.
 - 20% of respondents had changed or considered changing their travel plans for the current trip because of the road weather conditions, either before or during the trip
 - The proportion is quite high compared to earlier results.

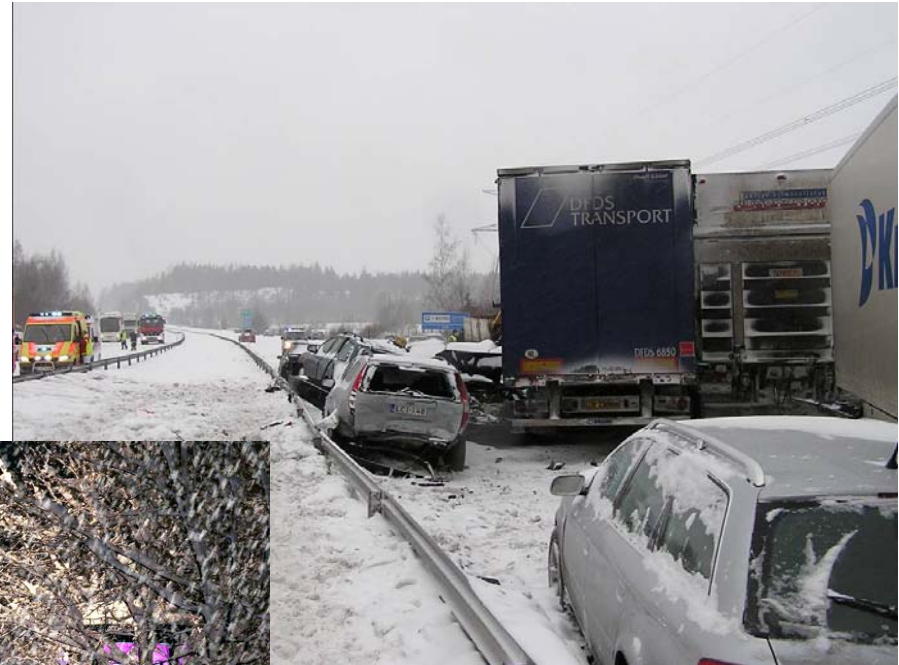
Discussion

- The problem with common weather forecasts is that they classify a whole region on the basis of the worst conditions within the region, even if the local road weather information is available from road weather stations.
 - Drivers' perceptions are most likely to concern a specific road.
 - Mobile in-vehicle information technology is now increasingly providing effective means of distributing local real-time road information.
 - This is favoured by the drivers: The study showed that in the future, drivers wish to receive information also through mobile services in addition to the traditional information sources.

Discussion

- The main implication of this study is that road weather information is useful and needed and that it also has an effect on safety.
- The study showed that road weather information can e.g. affect trip decisions and driving speeds.
- A connection was also seen between received information and the driver's estimation of current road weather conditions.
 - Drivers who had received information were more likely to estimate the road weather as poor and the accident risk as high.

Thank you!



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