TRAFFIC INJURY RESEARCH FOUNDATION

Automated Vehicles: Driver Knowledge, Attitudes & Practices

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Overview

- **Background**
- **Methodology**
- **Knowledge, attitudes, and practices (KAP)**
  - technology acceptance
  - trust in automation
  - behavioural adaption
- **Conclusions**

Background: Levels of automation

Level 0: No automation

Level 1: Function-specific automation

Level 2: Combined-function automation

Level 3: Limited self-driving automation

Level 4: Full self-driving automation

(Source: NHTSA 2013)

Background: Automation forecast

Methodology

- **Random, representative sample of 2,662 Canadians stratified by region:**
  - valid licence
  - driven in past 30 days
- **Demographics:**
  - males (53.0%) & females (47.0%)
  - age range of 16 to 93 years
  - 95% CI, ±1.9% (margin of error)
- **Four focus groups (drivers and non-drivers).**

Questionnaire

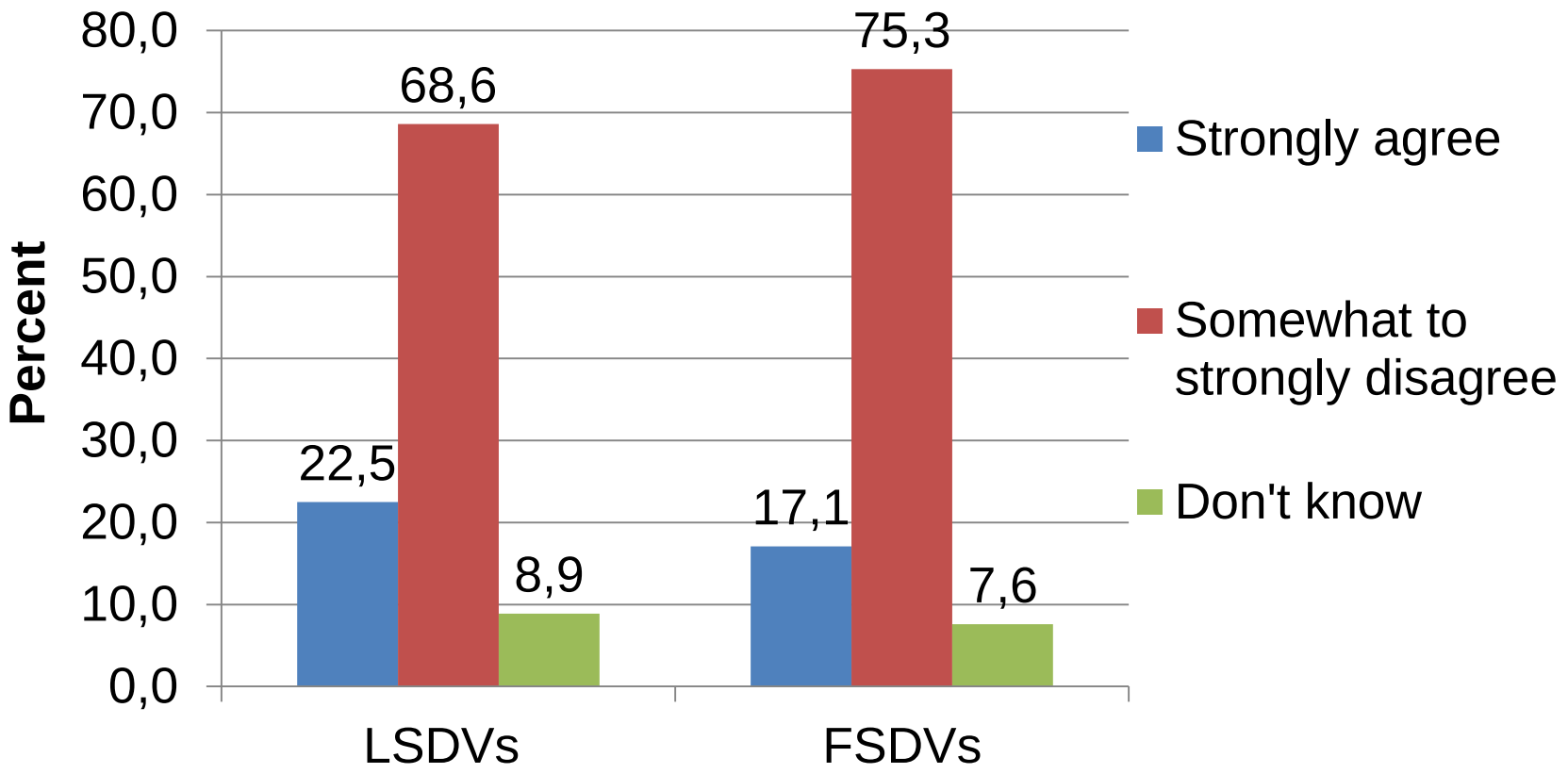
- **Two types of self-driving vehicles explored:**
  - limited self-driving vehicles (LSDVs); and,
  - fully self-driving vehicles (FSDVs).
- **Driver knowledge, attitudes, practices/ behaviour (KAP):**
  - technology acceptance in relation to perceived ease of use and perceived usefulness;
  - trust in automation; and,
  - behavioural adaptation.

Driver attitudes

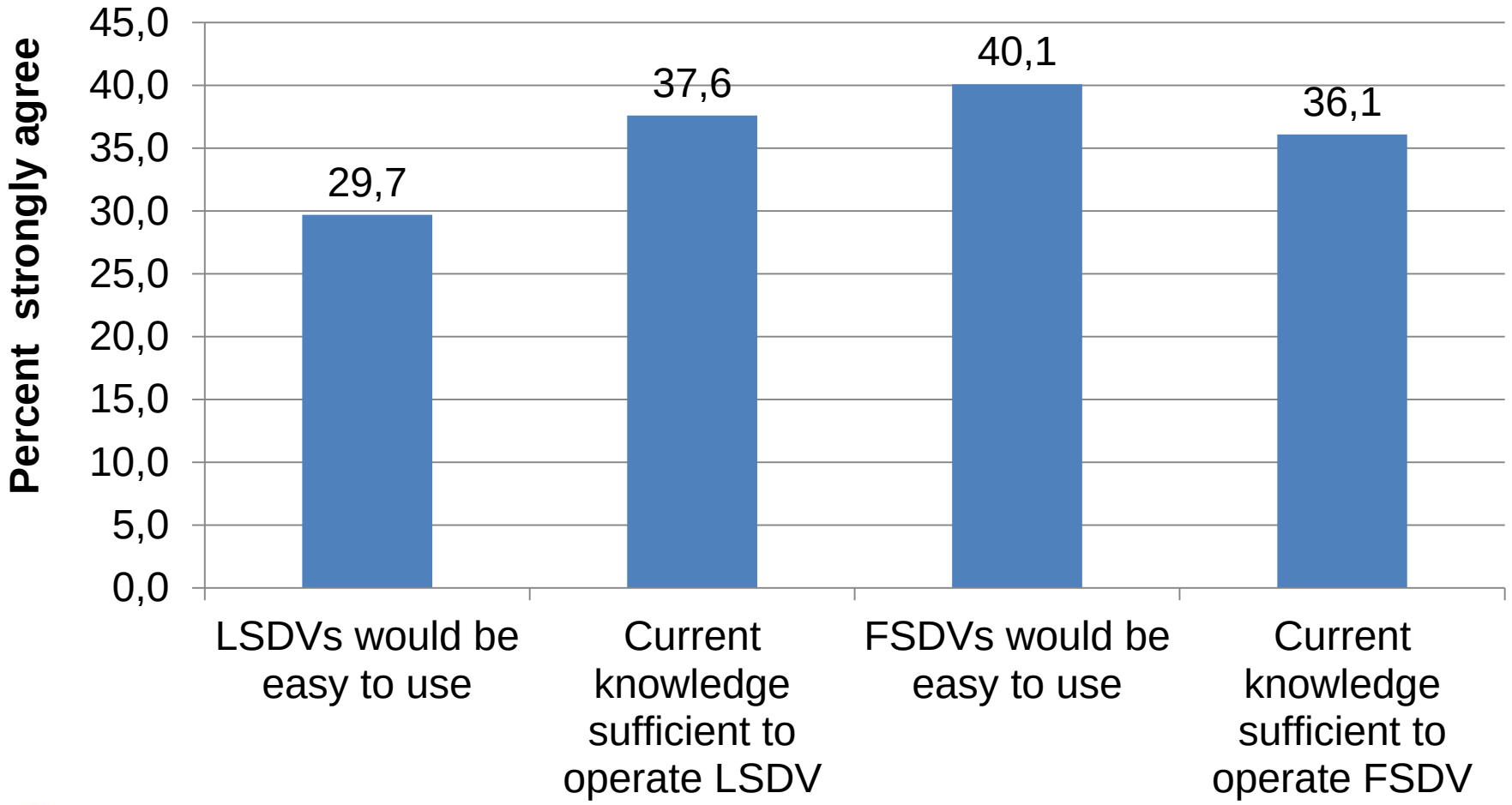
- Familiar with automated vehicle technology: 63.4%.
- Familiar with SDV technology: 39.6%.
- Enjoys driving: 68.5%.
  - Increased by age, if male, and drove longer distances.
- Think SDVs will be very relaxing: 22.0%
- Think SDVs will be very stressful: 40.6%.

Driver attitudes

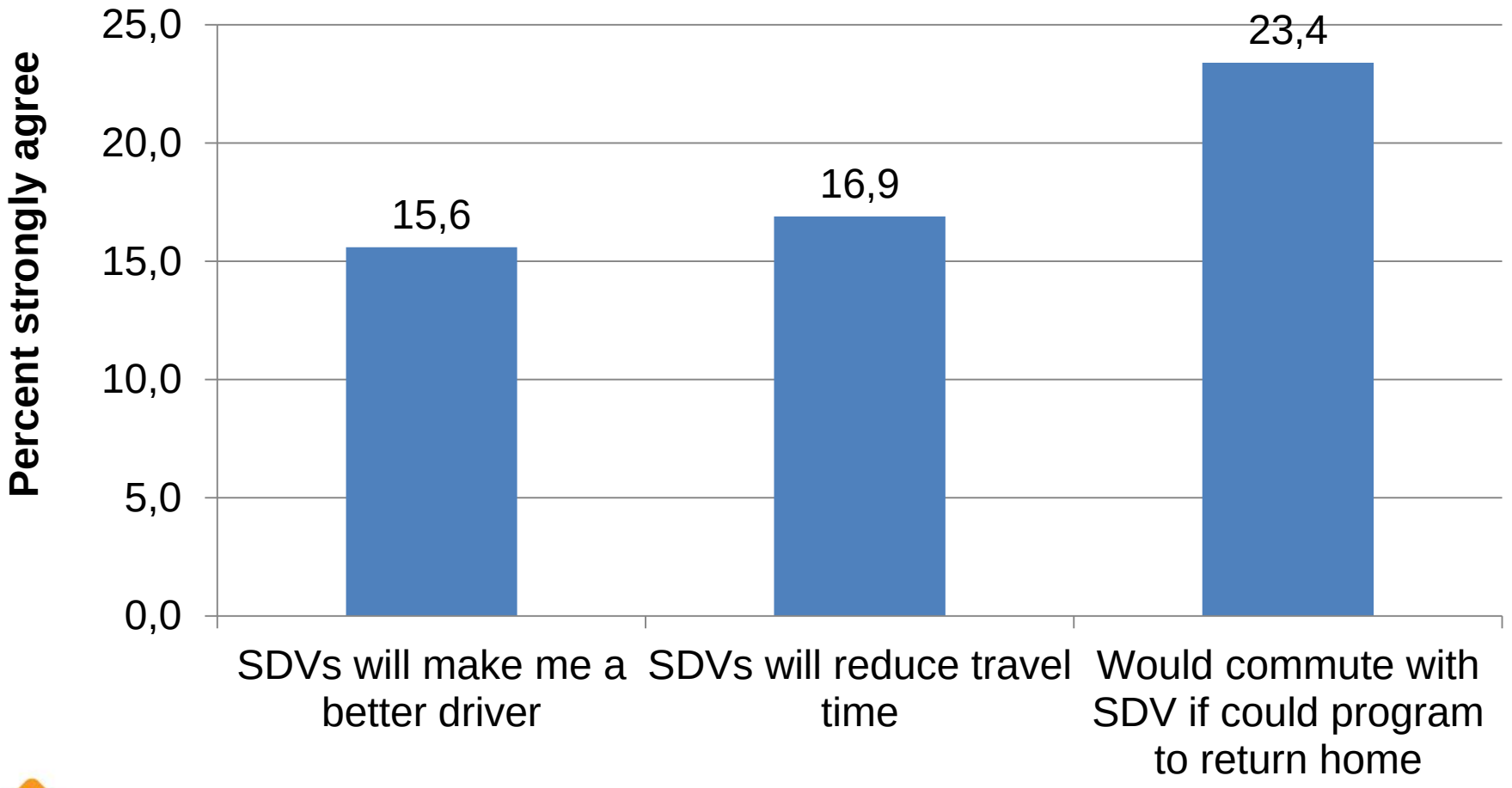
Driver would use LSDVs and FSDVs if available today.



Perceived ease of use



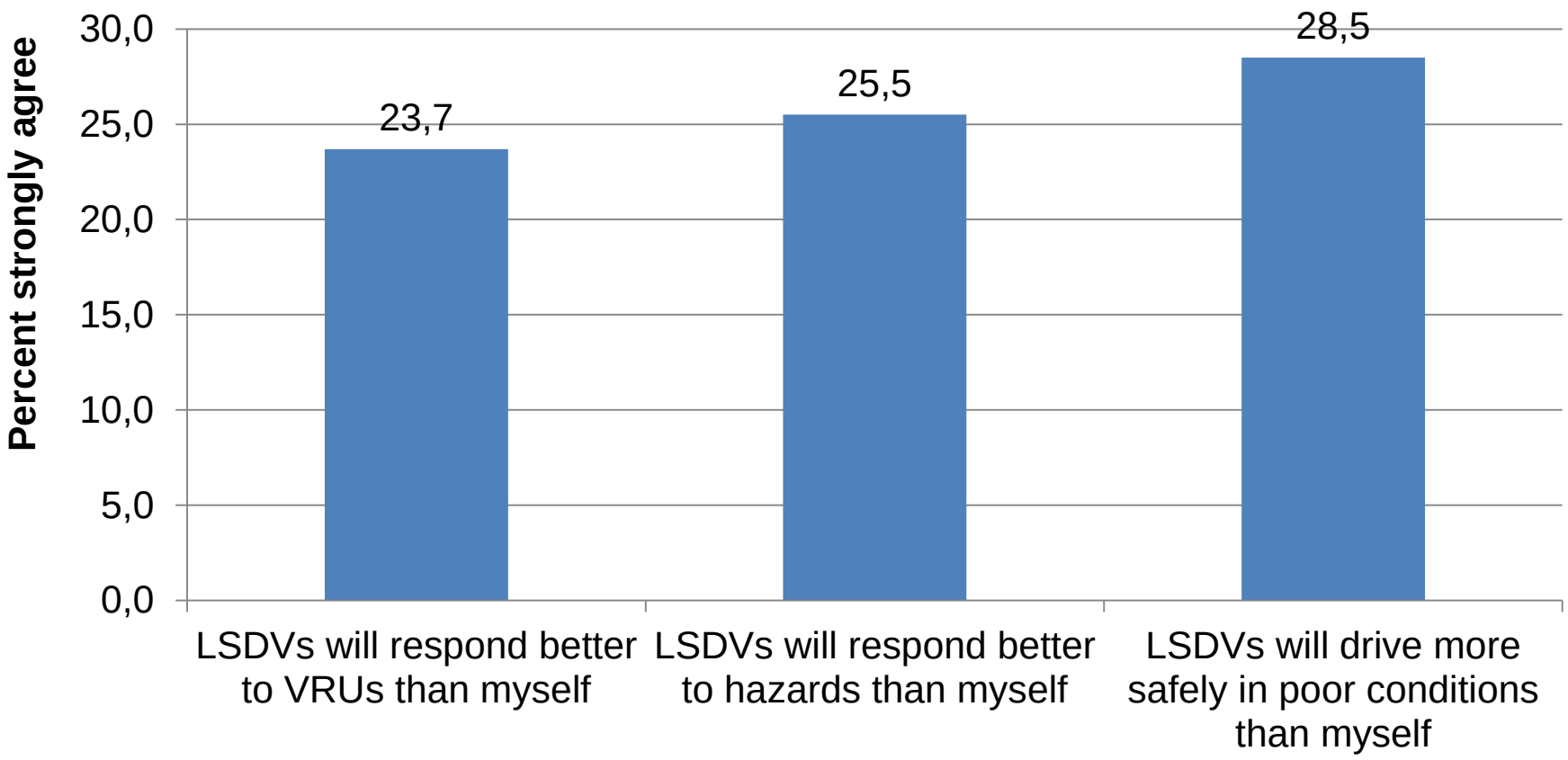
Perceived usefulness



Perceived usefulness: focus groups

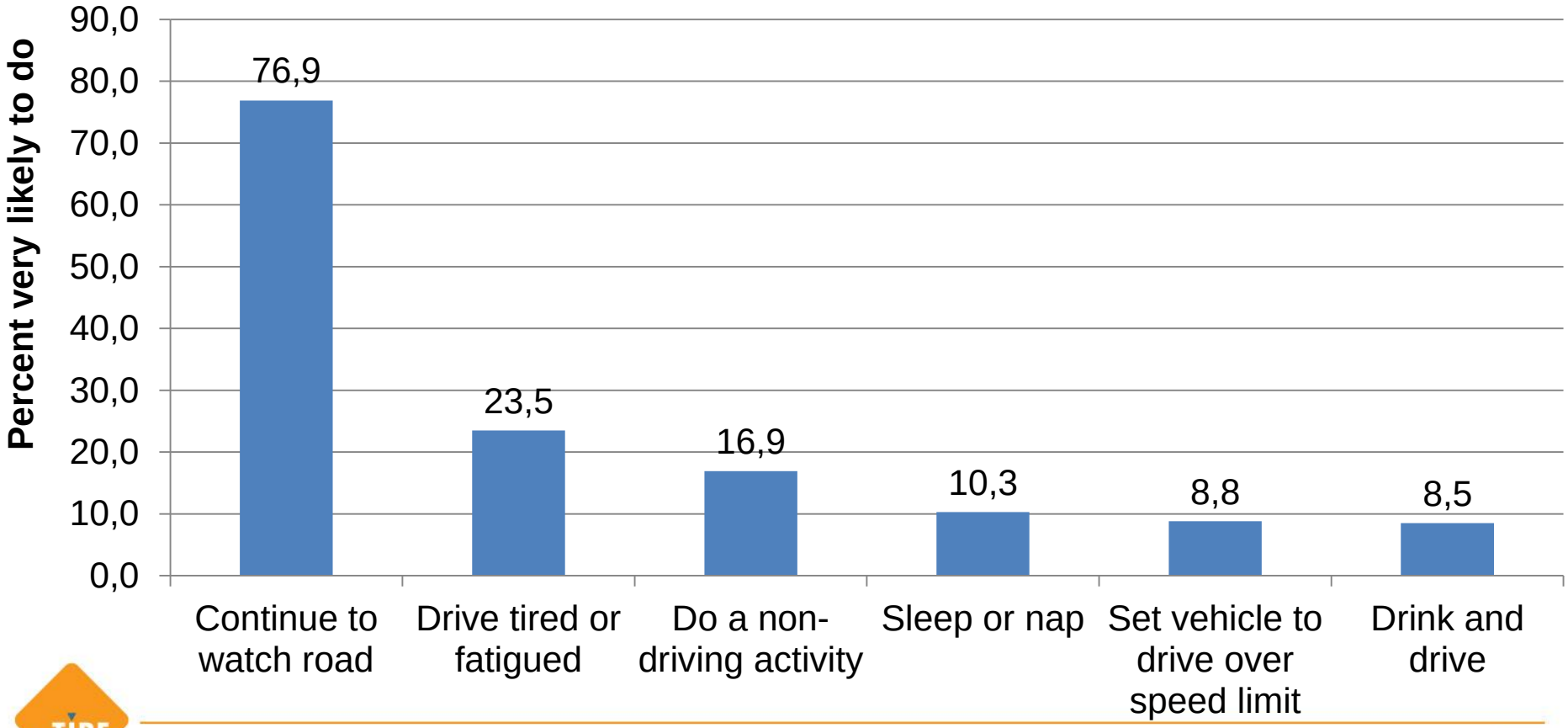
- **Benefits:**
  - run errands;
  - vehicle would not sit idle;
  - greater independence/mobility for non-drivers.
- **Concerns:**
  - increased congestion and pollution;
  - reduced opportunities for human interactions;
  - job loss for professional drivers.

Trust in automation



Behavioural adaptation

Activities drivers reported they were very likely to engage in while using LSDVs.



Behavioural adaptation

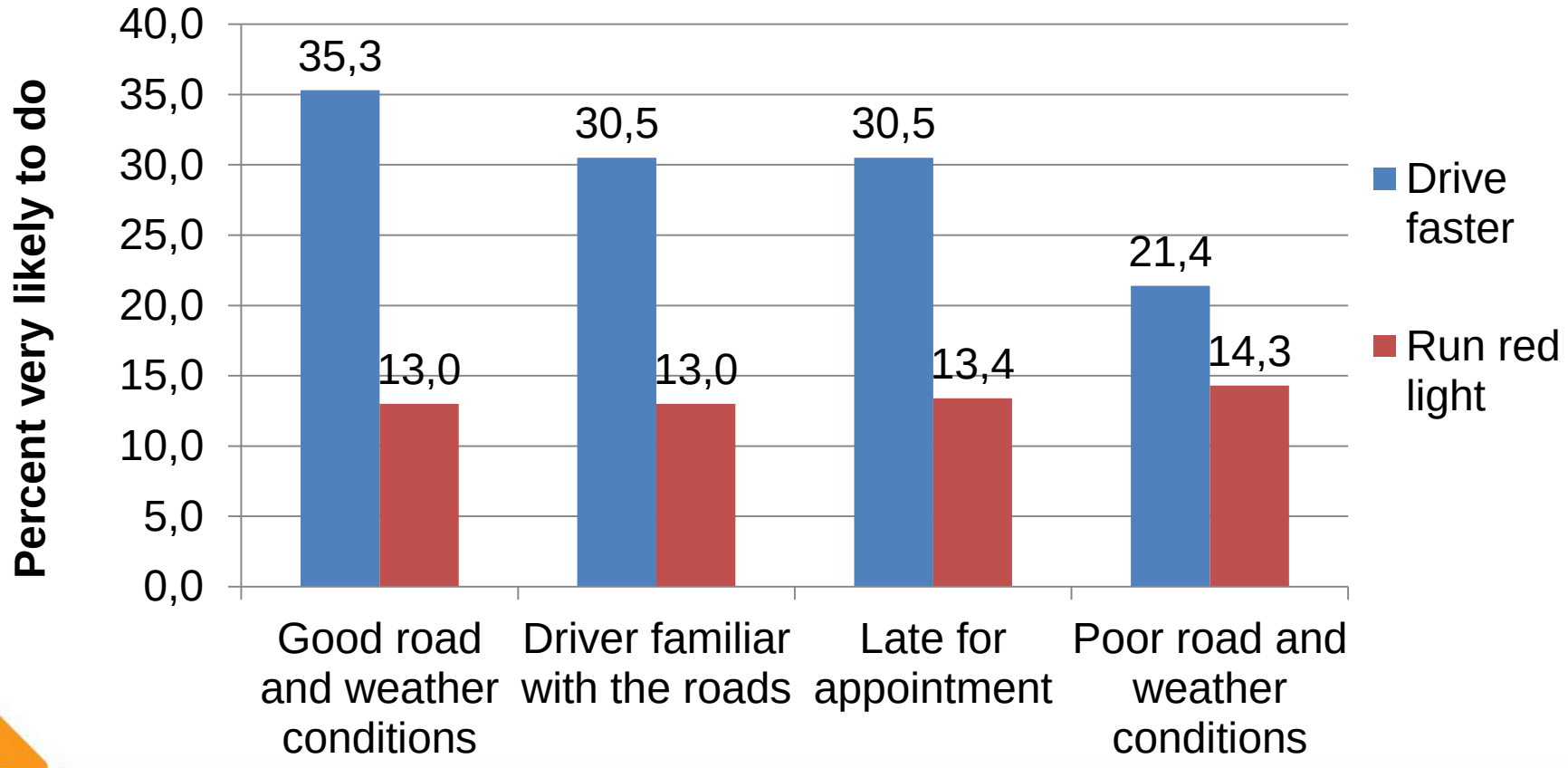
What drivers reported currently doing versus what they think they will do using LSDVs.

	Currently do this	Would do this using LSDV	Difference
Continue to watch road		77%	
Drive tired or fatigued	5%	24%	19%*
Engage in a non-driving activity/ distracted	4%	17%	13%*
Sleep or nap		10%	
Set vehicle to drive over speed limit	8%	9%	1%
Drink and drive	3%	9%	6%*

*Difference significant p<0.001

Behavioural adaptation

Percent very likely to disengage LSDV in order to drive faster or run a red light.



Key findings

- **Driver awareness and trust of SDVs is very low.**
- **Expectation to not have to pay attention.**
- **Expectation of lots of warning or that SDV will pull over.**
- **Expectation SDV will continue to protect occupants.**

Key findings

- **Expectation to use in highest-risk driving situations, but will disengage if not their style.**
- **Drivers will not use vehicles without override feature.**
- **Concerns about negative outcomes: family interaction, city planning, public transportation and environment.**

Good news/bad news

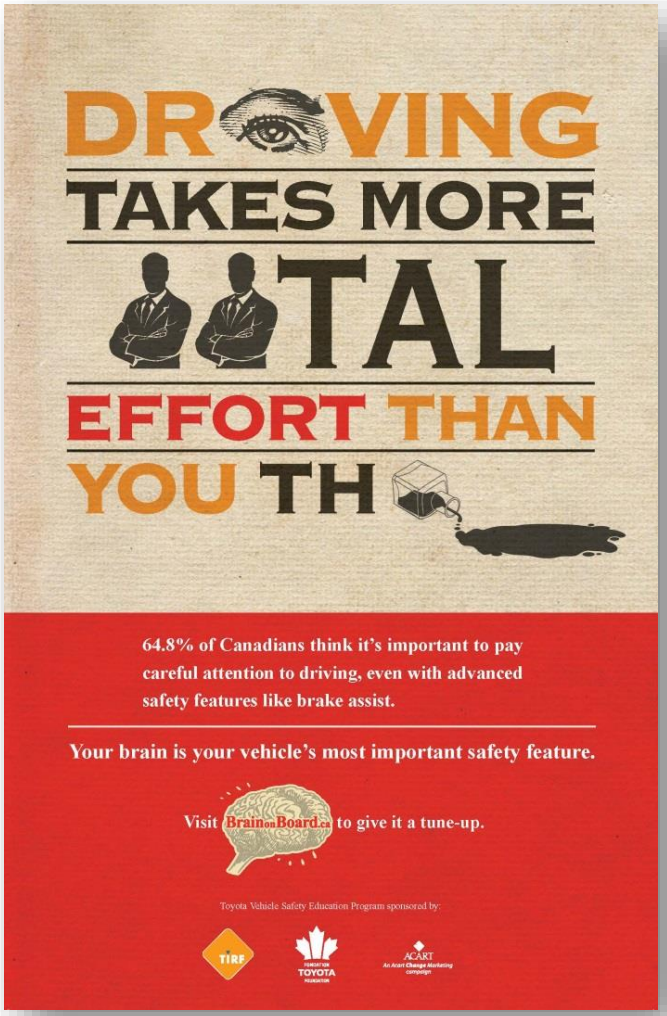
- **Still time to shape public perceptions and expectations with education.**
- **Early vs late adopters:**
  - Drivers who are male, have greater education and drive longer distances are more likely to use and to trust SDVs.
  - Drivers who are male and drive longer distances are more likely to negatively adapt their driving behaviour.
  - Older drivers are less likely to use or trust SDVs; most able to afford and reap benefits.

Policy implications

- **Education is essential to prepare drivers!**
  - Misconceptions exist regarding role of driver attention and response time to warnings.
  - Technology limitations are under-estimated.
- **Early adopters must know how to properly use technology.**
- **The ability to 'turn off' technology will have important implications for safety.**
- **Expectation that occupants will be protected in an unavoidable collision.**

Conclusions

- **Some important measures that speak to the behavioural challenges:**
  - 4
  - 7.2
  - 68



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