

More road safety using a frontal brake light

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Starting point: Still more traffic safety is needed!

- Death toll on roads of Europe still too high. So are numbers of serious injuries and social costs of medical care, rehabilitation and lost work amounting far over € 100 billion a year.
- Target, also of EU, to reduce this: Need to take **every** opportunity to improve traffic safety!
- Triangular relationship between human, vehicle and environmental factors means: Improving traffic safety will necessarily rely on innovations.
- One of these: **Front Brake Light**

More communication to recognize others behaviour...

For a rear driver, braking of the vehicle in front is indicated by very visible brake lights

- ☐ prevents rear-end collisions

But it is difficult to recognize the braking process looking at the front of a vehicle

- ☐ Danger to pedestrians and crossing traffic



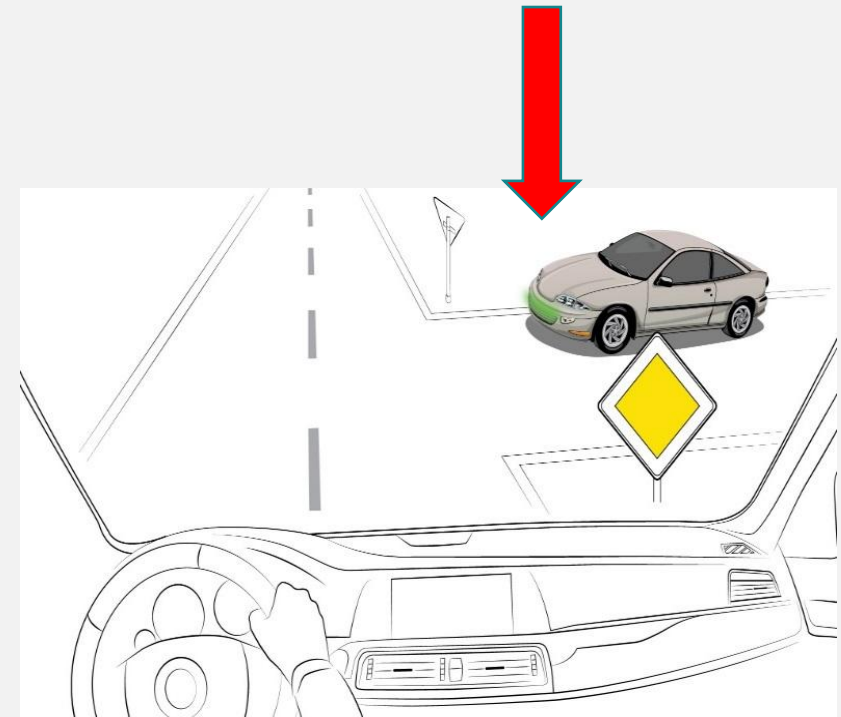
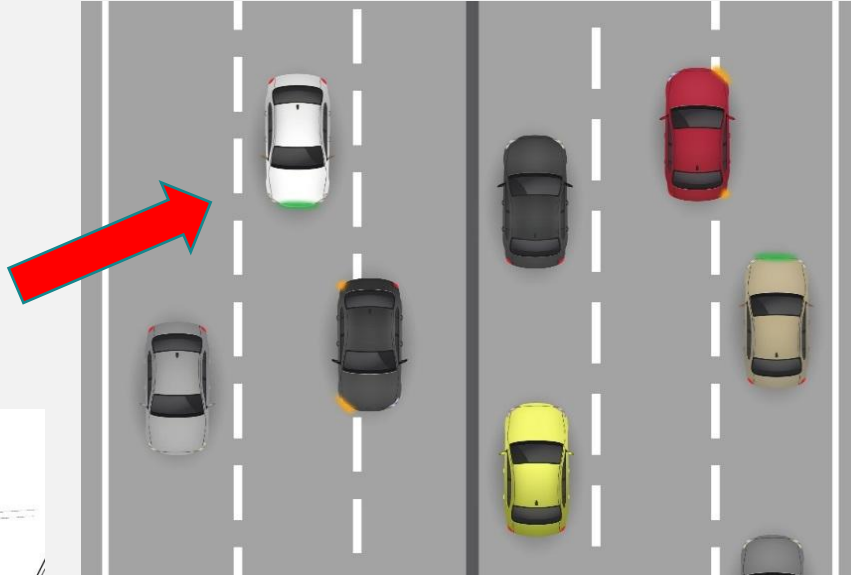
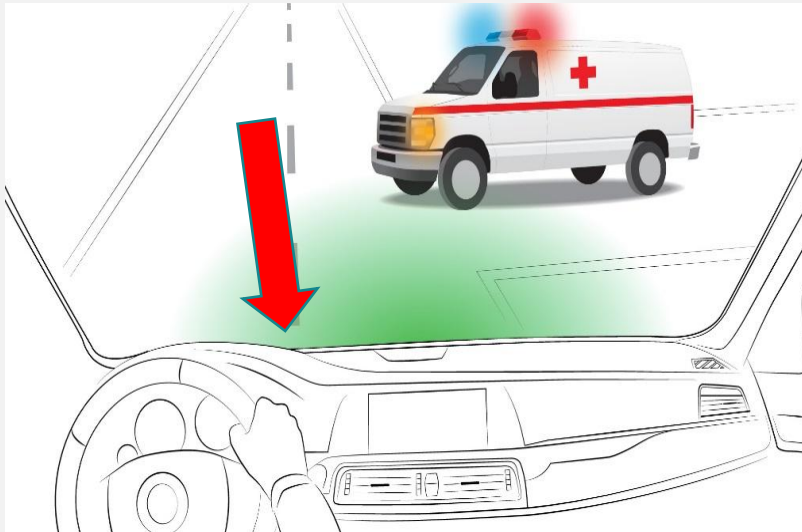
...with a Front Brake Light!



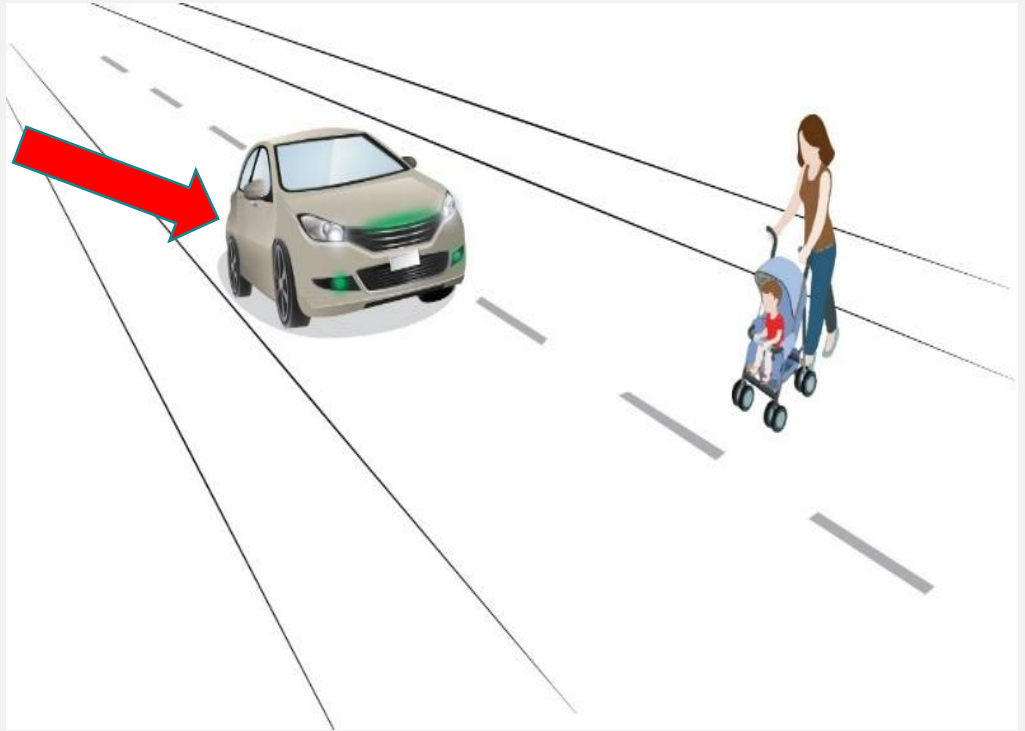
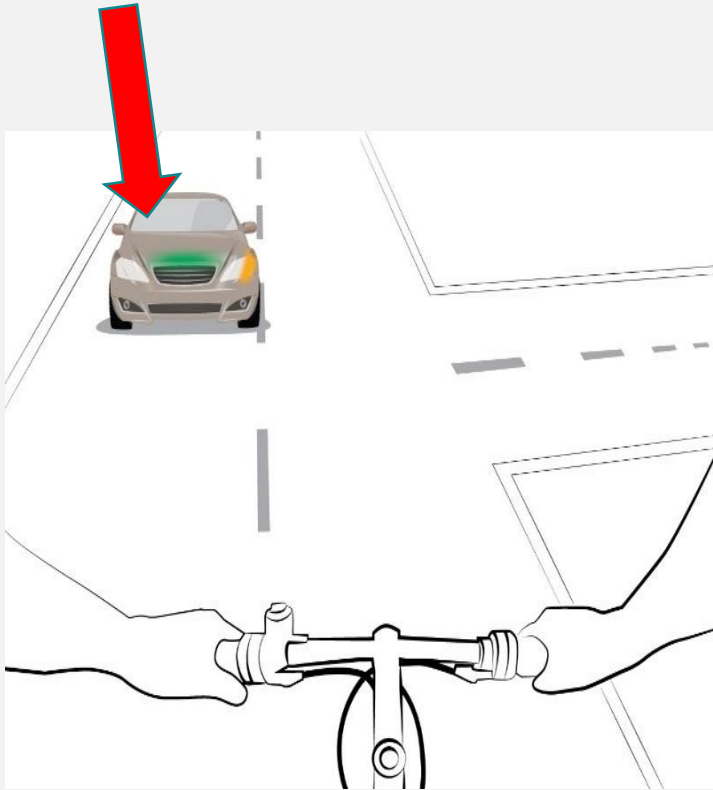
Scope of applications and potential benefits

- Improvement of communication, thus making road traffic more safely and more comfortable for all road users
 - not limited to asymmetric conflicts (e.g. vehicle / pedestrian),
 - also in vehicle / vehicle constellations.
- Main benefits expected to be
 - prevention of collisions in specific situations,
 - reduction of the severity of accidents by its warning function,
 - reduction of stress whilst driving and therefore reduction of failure,
 - compensation of road user communication issues (esp. with electric and/or highly automated vehicles).

Specific situations



Specific situations



Reduction of severity of accidents by warning function



Further information, scientific results etc.



www.frontbrakelights.com

www.vorderebremsleuchte.com

Study 1: Laboratory experiment with video material

Task of the participants

- Detection of braking in the video
- Variation of speed, deceleration, brake light activation

Study 1: Experimental design

Block I

100% Braking **without**
frontal brake light



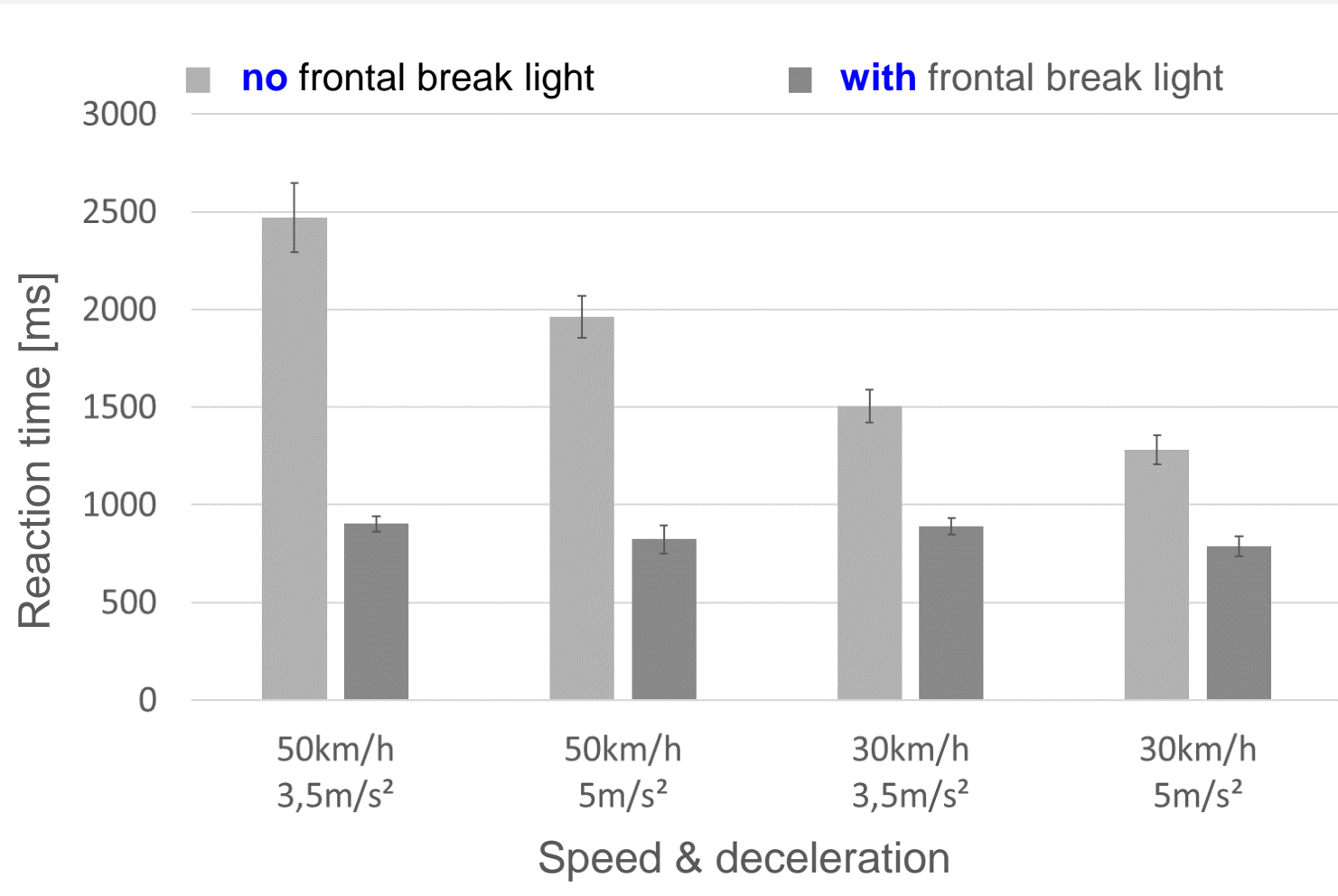
Block II

50% Braking **without**
frontal brake light

50% Braking **with** frontal
brake light



Results block II (mixed traffic)



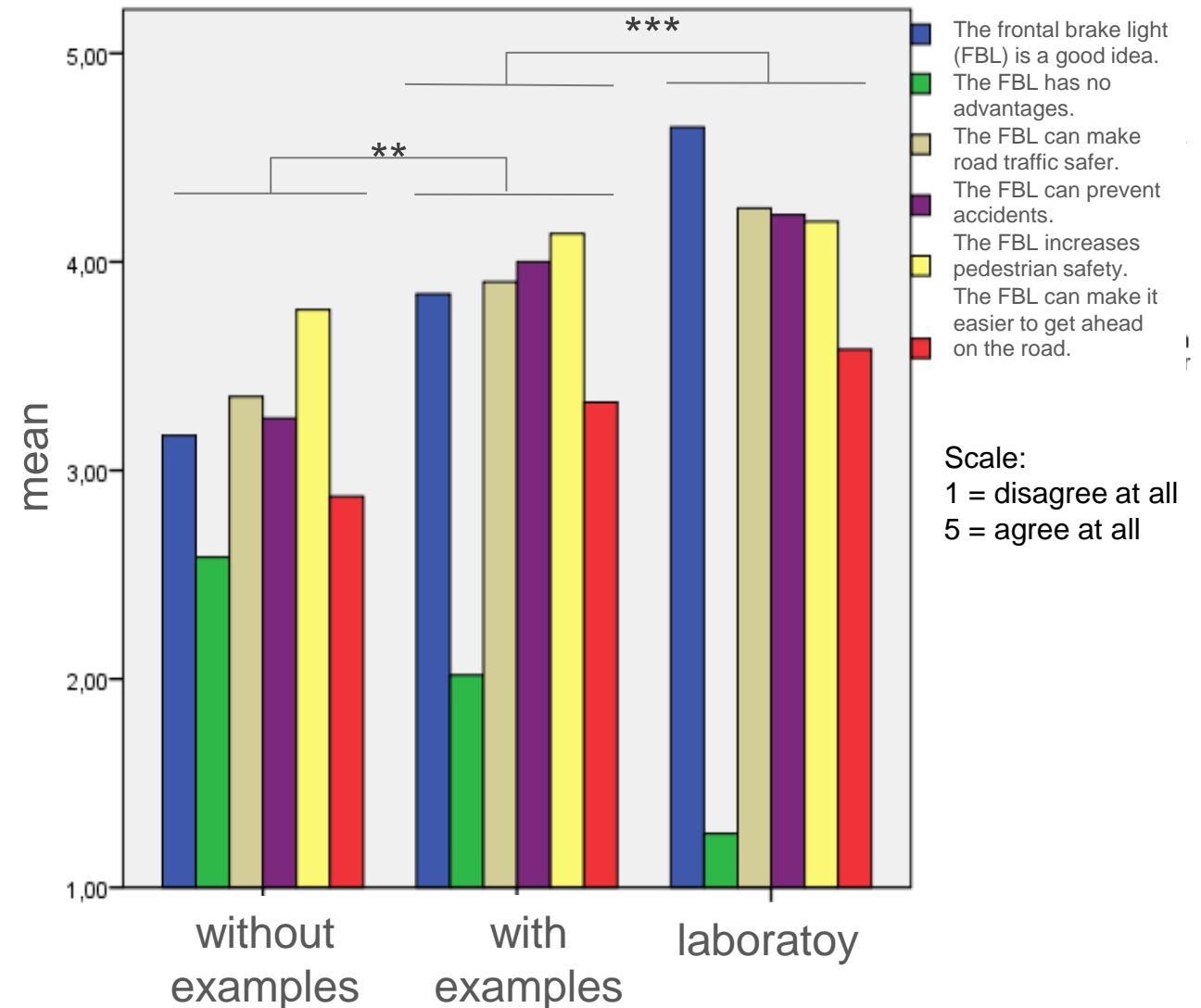
Evaluation of the frontal brake light...

Street survey (Study 2)

- without examples rather neutral
- with concrete examples more positive

After participation in laboratory study (Study 1)

- clearly more positive!



Study 3: Field trial

Requirements

- limited number of vehicles and road users
 - in a closed traffic area (outside of vehicle operating regulations)
- ☐ airside area of Tegel Airport (TXL)



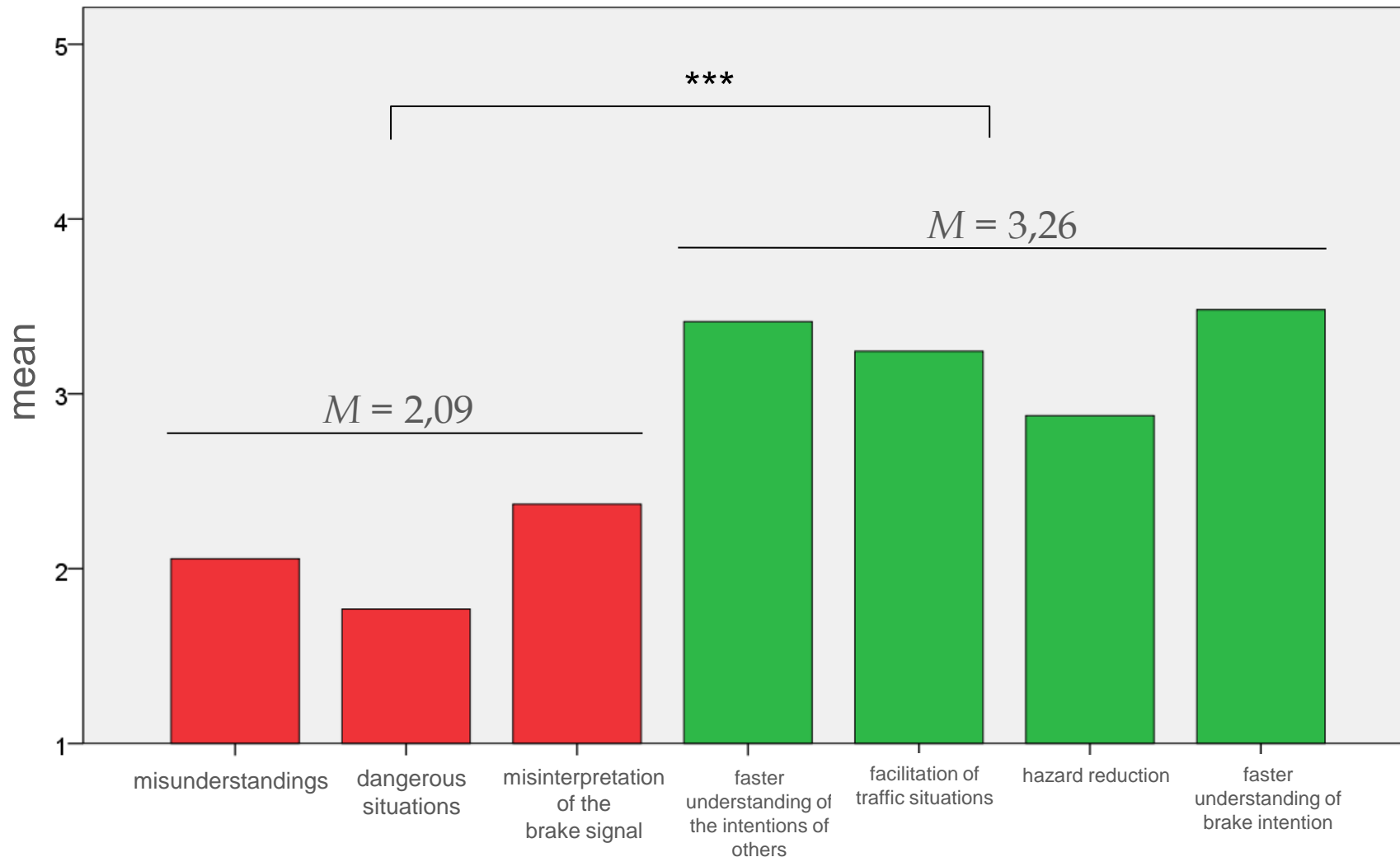
Study 3: Field trial at Tegel airport

Method

- Providing **102 vehicles** with a frontal brake light
- Operation of the equipped vehicles on the apron for **three months**
- Survey of **180** employees before (T1) and after (T2) 3 months of field trial

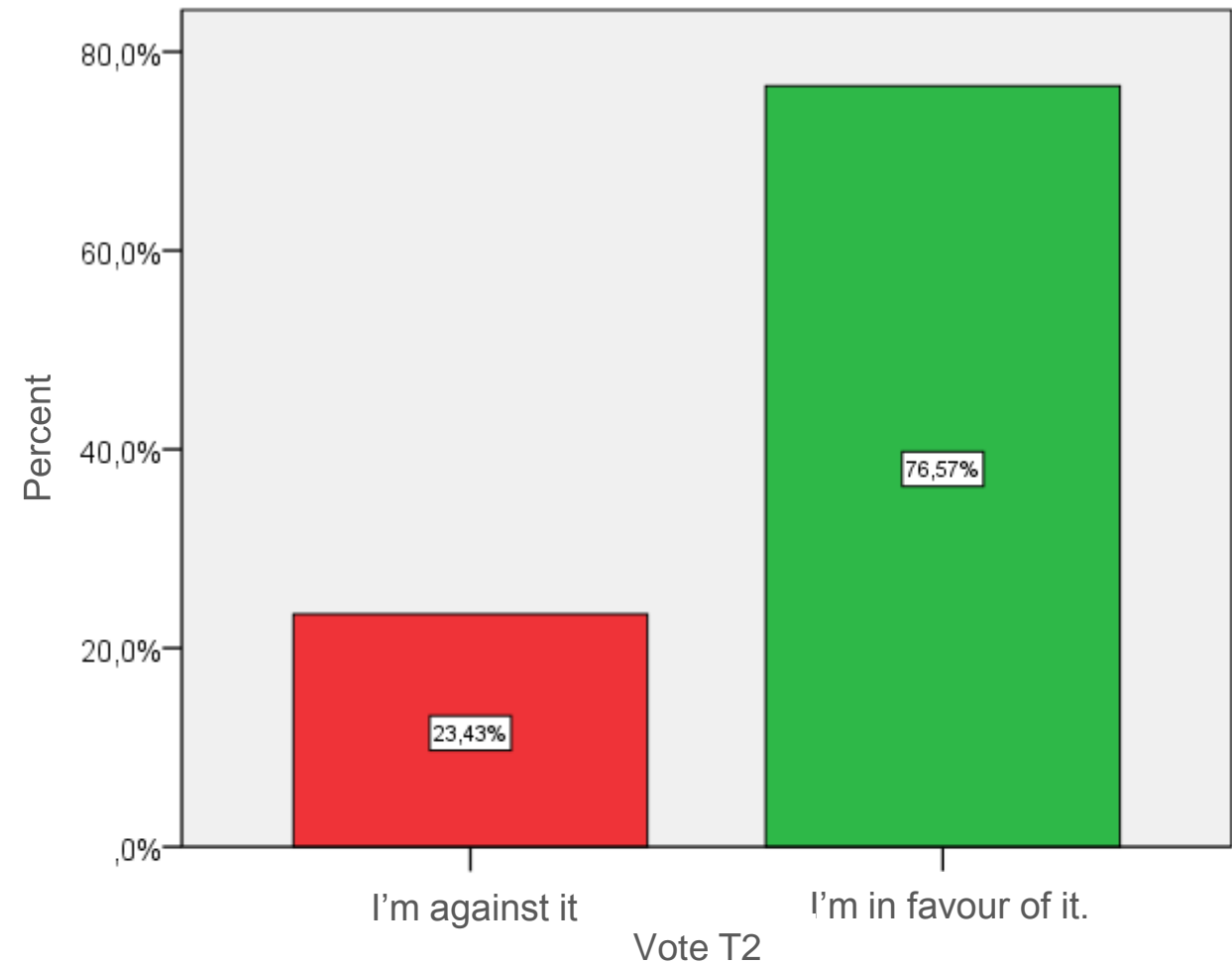
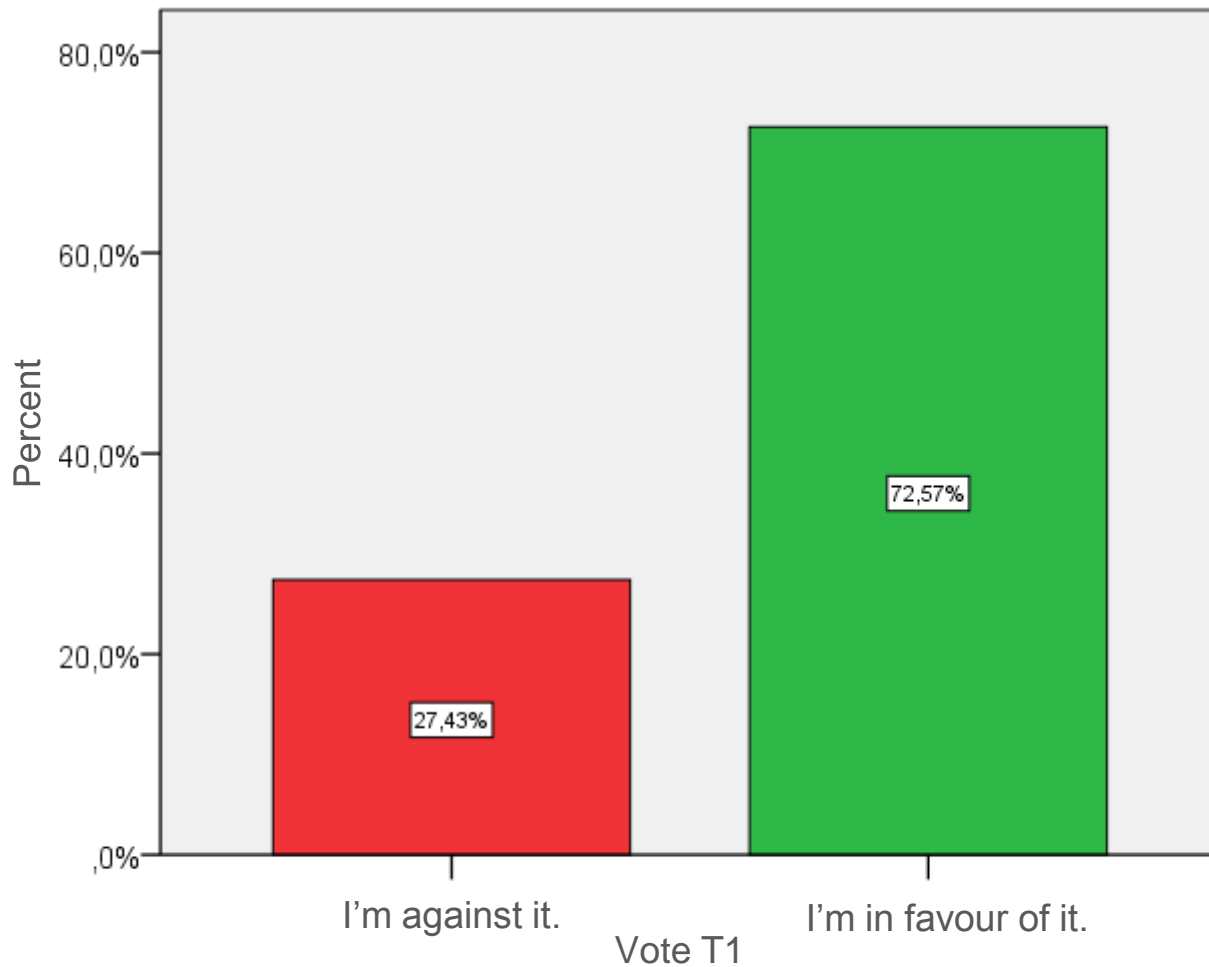


Positive and negative **experiences** with the Front Brake Light on **other** vehicles (N = 164)



1 = never
2 = rare
3 = occasionally
4 = often
5 = very often

Vote on a general introduction of a Front Brake Light



Some comments on the Front Brake Light

Anticipation and reaction (13)

"You can see quicker that the vehicle is braking" / "You can respond more quickly to the braking of other road users."

General positive comments (10)

"That was very good." / "Good idea."

Visibility (10)

"Good. I expect it to be even more positive in winter." / "The version currently used on vehicles does not dazzle, but is very clearly visible."

Feeling of safety (7)

"As a road user, you feel safer." / "Safety has increased."

Some comments on the Front Brake Light

Communication (3)

"Improved communication among road users." / "The flow of traffic has improved."

Colour (3)

"Colour is noticeable."

Parking (1)

"The Front Brake Light helped with parking."

Other (7)

"Vehicles of other companies should also be equipped."

Summary of the scientific results

- The more experience with the FBL, the more positive the attitudes became
- In simulated mixed traffic (laboratory study), braking was detected faster with FBL
- In cars not fitted with FBL, the reaction was slower (more cautious)
- In the field trial, positive experiences with FBL were frequent, negative experiences were rare
- After three months of experience, 76% of the field study participants were in favour of generally introducing the FBL

Easily to introduce from a technical point of view

- It is assumed that the Front Brake Light is linked directly to the rear brake lights and thus only one more device must be connected to otherwise identical circuits in the control unit(s).
- With regard to the design of a Front Brake Light, a number of variants are conceivable, depending on the type of vehicle and its vehicle design.
- Therefore implementing a Front Brake Light within existing technical conceptions of vehicles is most easy from a technical point of view.

Why green?

- New Light Signaling Function (LSF) on motor vehicles always means question of the appropriate light colour
- Red lights to the front strictly forbidden by Vienna Convention.
- Other colours legally assigned already to special situations and / or special types of vehicles.
- Already existing high number and range of variation in forward-acting white light signals.
- Colour green not used for LSF on motor vehicles yet, but therefore offers the advantage of unambiguity and fast signal identification.

Legal framework /next steps for introduction

Necessary to introduce **Front Brake Light** in the legal framework on type approval:

- Green must be approved as a colour of LSF on motor vehicles.
- Braking signals must also be allowed to be given to the front.

Medium-term:

Level of the Vienna Convention resp. framework of (UN) ECE type approval regulations.

Short-term:

Changes to be implemented as EU-specific extensions in application provisions of ECE type approval regulations for the EU area.

Nonetheless an introduction of the **Front Brake Light** for national areas and by national exception approval would be also very helpful.

Front Brake Light within EU-objectives

- European Parliament's own-initiative report *On saving lives: boosting car safety in the EU* in 2017 stresses that,

"in order to improve road safety, the deceleration of vehicles should be rendered easier for other road users to perceive by means of clear signal lights on vehicles..." [Nr. 37].

Braking signals to the rear are quite sufficient today. Mentioning signal lights for deceleration in general gives a hint, signaling to the front might be promising.

- Front Brake Light is in line with requirements set out to make driver assistance systems compulsory in future:
 - Scientific evidence of significant contribution to increasing road safety
 - Positive cost-benefit ratio
 - (Given) Marketability
 - No significant financial burden on the citizen (raising prices)

Thank you very much for your attention!

And:

We can make Traffic safety
happen!

