



This project (MeBeSafe) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723430.

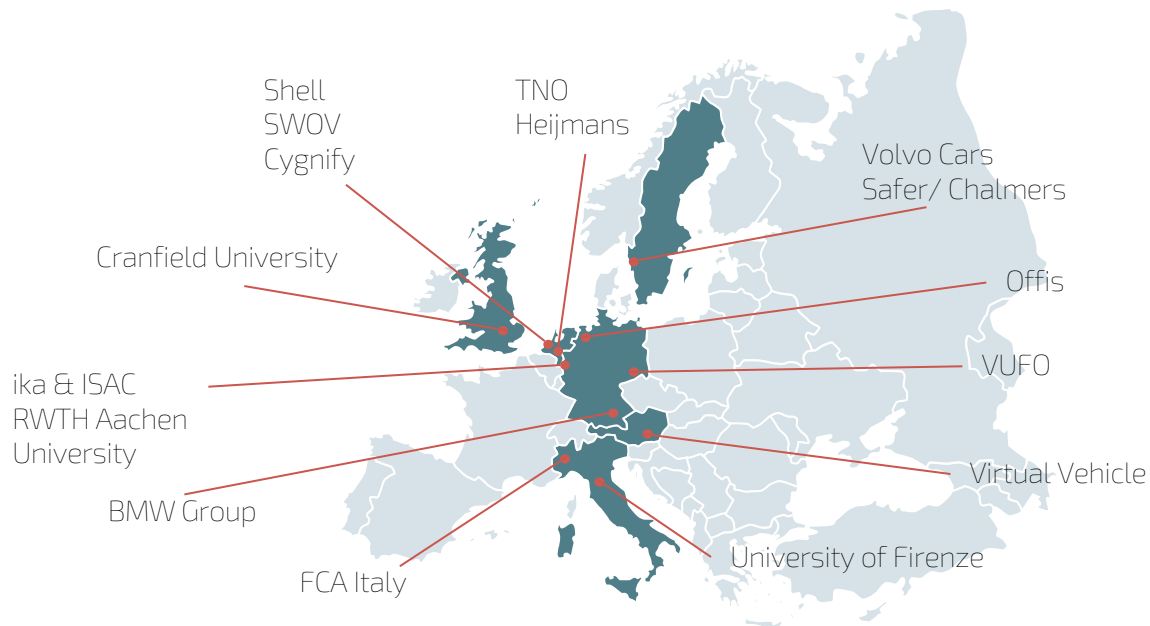


Measures for Behaving Safely in Traffic

Nudging Bicyclists



Partners and funding



MeBeSafe:

Measures for **B**ehaving

Safely in traffic

Duration:

42 Months

May 2017 –

October 2020

Funding:

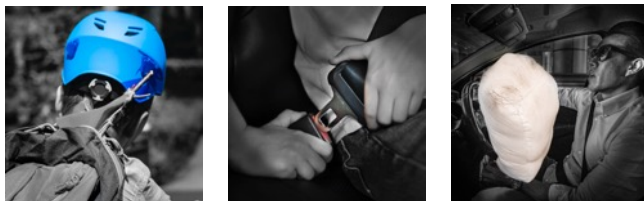
7.136.979€

EU HORIZON RIA 2020

Traffic safety approaches

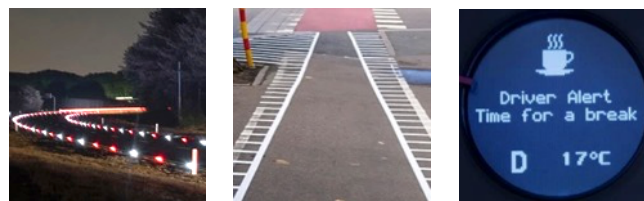
Injury and conflict management

*Protection systems, acute warnings
and interventions*



Risk management

*Reducing the frequency of small
margin driving situations*



Preventing accidents

Traffic behaviour is mainly habitual and we often get into risky situations without even knowing it.



MeBeSafe intends to

- Change habitual traffic behaviour in order to increase safety margins
- Develop & validate behavioural nudging and coaching measures to vehicle drivers and cyclists

High level causation factors

- Lack of attention
- Excessive speed
- Affected mental and/or physical state



Traffic behaviour

Traffic behaviour is largely automated.

It is not effective to appeal to active decision making.

MeBeSafe will change habitual behavior with nudging and coaching.

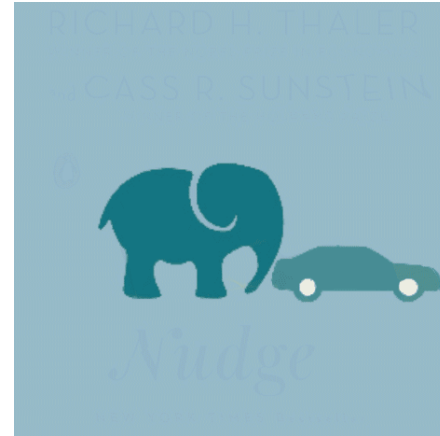
Nudging

”

Any aspect of the **choice architecture** that alters people's behaviour in a predictable way **without forbidding any options** or significantly changing their economic incentives.

To count as a mere nudge, the intervention must be **easy to implement** and **cheap to avoid**. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not.

Thaler and Sunstein (2008)





Gothenburg
cyclists
nudges

The process

- An iterative design process
 - Theory
 - Quick-and-dirty idea testing
 - Concept development
 - More elaborate tests
 - Concept fine tuning
 - Evaluation

Two tests



Real-traffic
visual nudge test



Experimental
haptic nudge test

Visual nudges

Transverse Stripes



Lane narrowing

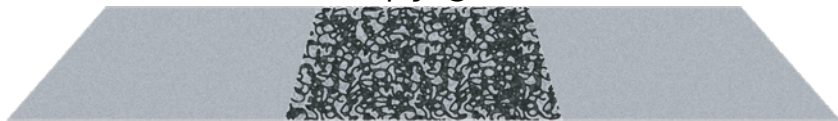


Digital Speed Sign

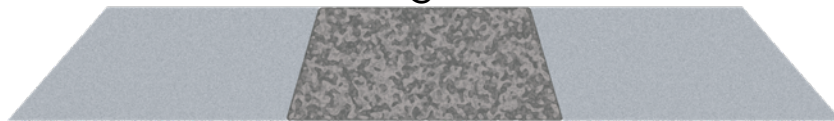


Haptic nudges

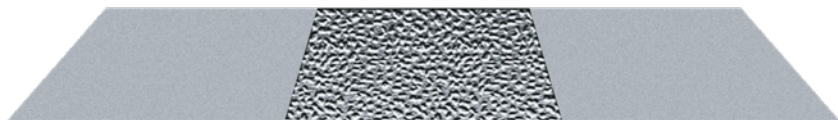
Swampy ground



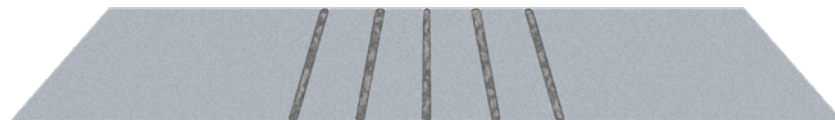
Soft ground



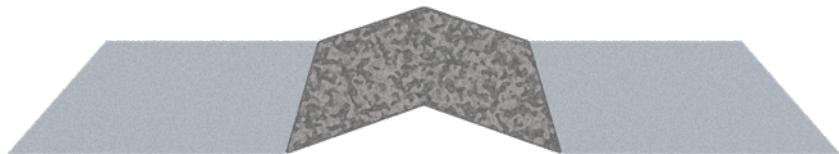
Rugged ground



Softly rumbling ground



Bumpy ground



Sloping ground



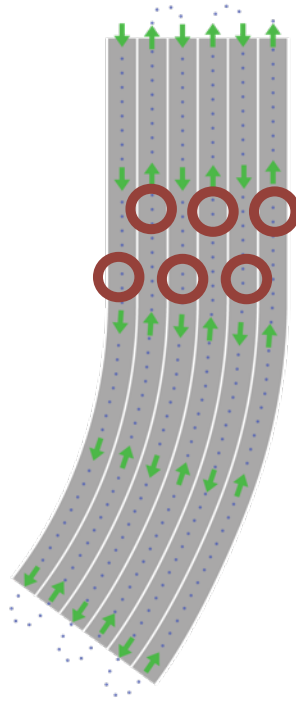
Visual test - 93 test persons

800 metre route, 3 stations in intersections where 6 nudges and 1 baseline were tested



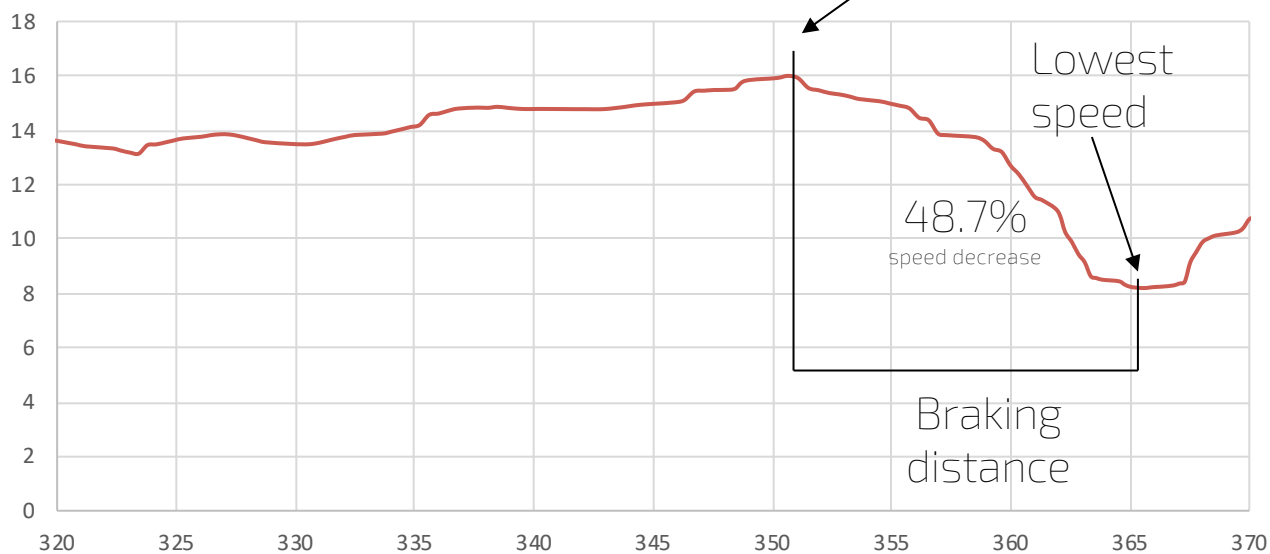
Haptic test - 16 test persons

600 metre route, 6 stations where nudges were tested



Definitions

Speed over distance



Speed reduction defined as difference between top to lowest speed in percent.

$$\text{Difference} = (\text{top} - \text{lowest}) / \text{top}.$$



Visual – large speed reductions

Speed reduction **independent of noticing** the nudges
(except for DigiSign)

Speed reduction **independent of how much the cyclists claim to slow down** in intersections usually



Visual nudges – Speed reduction

on top of baseline reduction (baseline corrected to 0%)

Everybody subjected to the nudges reduced speed

The speed reductions with nudges were **much larger** than speed reductions without nudges present

More apparent nudges reduced speed more.



Haptic – seemingly low speed reductions

Most speed reduction occurs **before nudges**,
and that will **wear off** until next exposure

Speed reduction within nudges are often
counteracted towards the end



Haptic nudges – Speed reduction

potential speed reduction the first time encountered

Speed reductions were very small – much less than for visual nudges

Speed reductions were generally larger for less appreciated nudges

In the long term, the effect will be negligible

Results for slope applies if sloping up before intersection and down after

Modalities of nudges

Haptic	Visual
Less effect than visual nudges	More effect than haptic nudges
Less appreciated than visual nudges	More appreciated than haptic nudges
Very large spread in which nudges are appreciated	Very coherent results on appreciation
Nudges with more effect are less appreciated	No clear connection between effect and appreciation
Nudge with useful effect demands serious rebuilding of roads	None of the nudges demand especially large efforts to implement
Effect very likely to wear off after first encounter	Effect likely to persist over time

Visual nudge types

DigiSigns		Transverse	Narrow
Reduce cyclist speed the most	Most dependant on being seen	Make cyclists most attentive	Lead to straighter trajectories
Speed is affected longer before	Lowest speed is reached earlier before intersection	High comfort/pleasure rating	Effective although few understood it
		Lowest speed reached close to intersection	




Visual – more or less apparent nudges

Less apparent	More apparent
Seem to make cyclists more attentive and look more in intersections	Reduces speed more
Less understood by cyclists (at least for lines on the ground)	Preferred by cyclists
Cyclists seem to reach lowest speed later	Cyclists may brake a larger share of distance between highest and lowest speed
	Cyclists seem to reach lowest speed earlier



Final conclusions

- **Visual nudges** are **more appreciated** and have **larger potential** to affect speed for **all types of cyclists**
- **Visual stripes on ground** affect speed on a **subconscious level**
- **Rumble stripes** neither reduce speed or are appreciated
- **Speed decrease** together with **longer braking distances** could make collisions less likely



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Gothenburg
cyclists
nudges

Thank you for your attention!



MeBeSafe



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