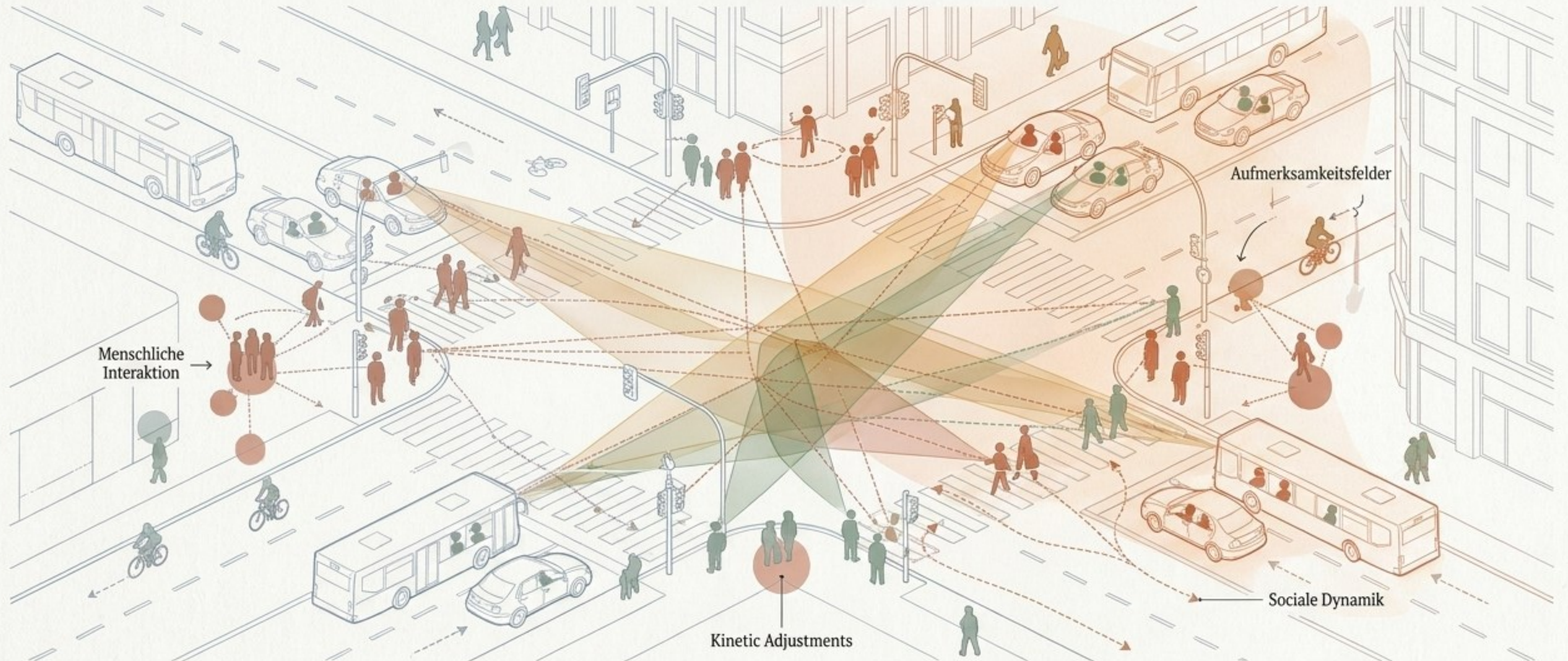


Traffic is what people do in the public space.

Ralf Risser

Vienna, August 2026





Goals of this presentation

- ❖ Remind of the role of psychology in the area of T&M
- ❖ Motivate psychologists to get involved in this area.
- ❖ Advocate for interdisciplinary work involving psychology.

Huge area → only some selected examples are given



Structure of the presentation

- ❖ Presentation of the traffic diamond & its segments:
 - ❖ Issues involved
 - ❖ What is usually analysed
 - ❖ Methods applied to this end
 - ❖ Measures to solve or mitigate problems

Psychology: Understanding the Mind

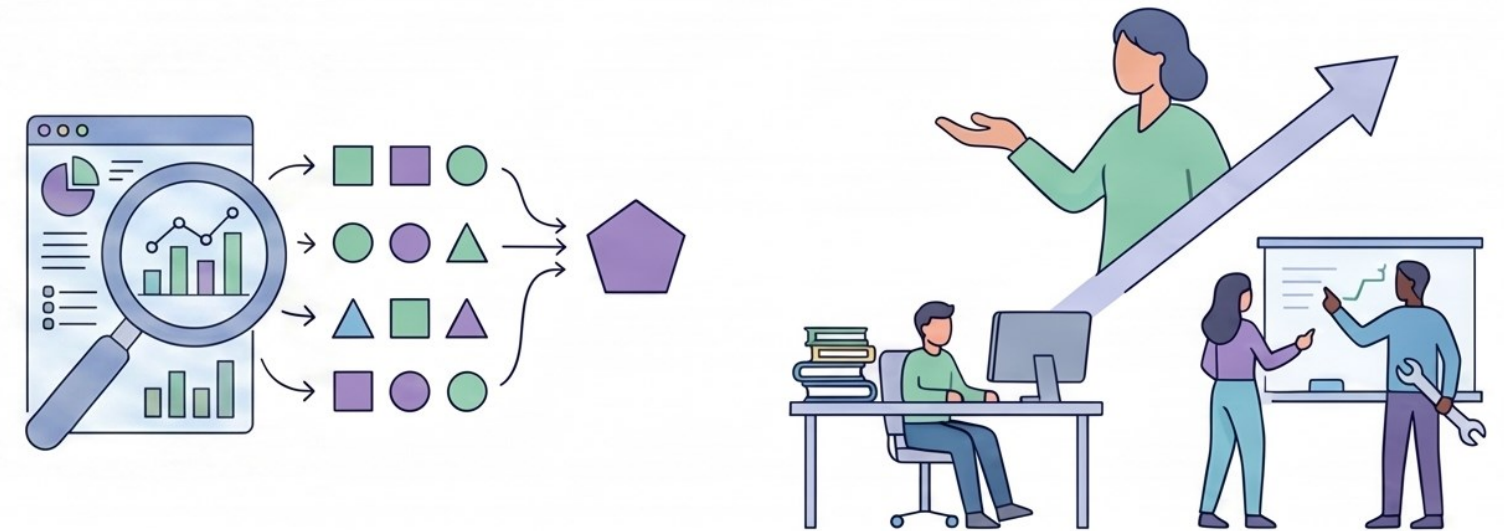
What is Psychology?



Psychology studies human mind & behaviour, and explores how people think feel and act

It also studies groups and patterns and looks how people interact (= how they communicate)

What Psychologists Do



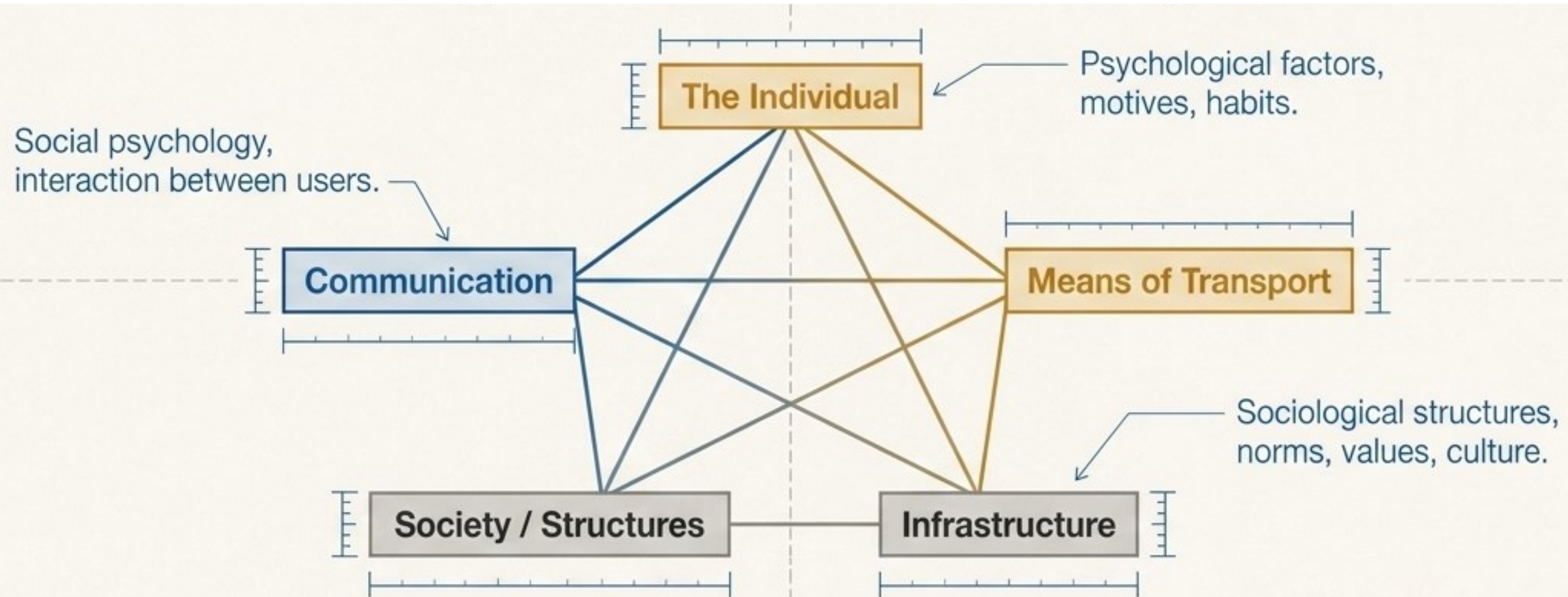
Experiments, tests, observation, interviews, to understand, predict & control behaviour

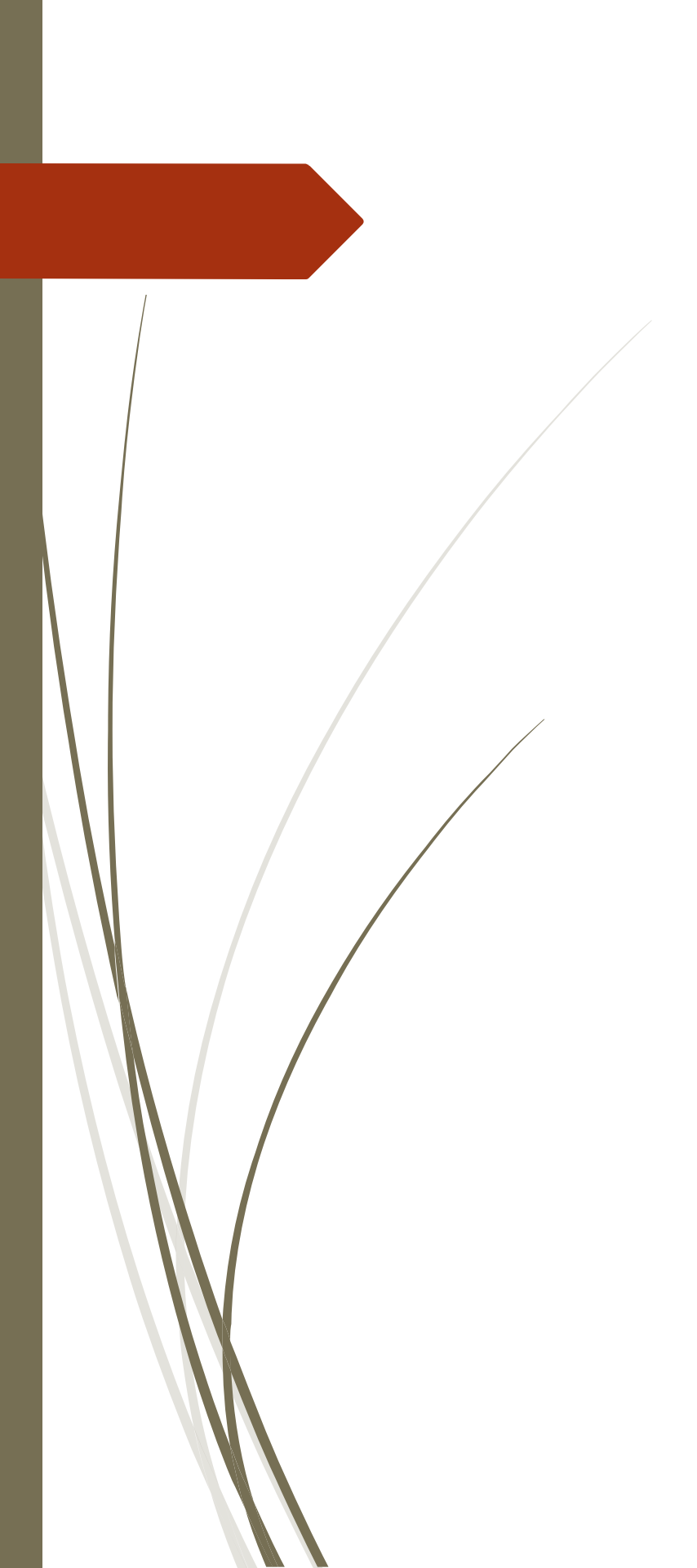
Rehabilitation, consulting & advising, therapy, assisting other disciplines, e.g. with advertising/communicating

Traffic: Necessary to understand

- ❖ Role of road users' psycho-physical performance & mental states: motives, attitudes, habits, emotions and perceptions,
 - ❖ Impact of the physical & social environment on mental states and behaviour.
- ➔ To this end follow the diamond:

Possible structure of factors impacting behaviour in the shape of a diamond





A look at the Individual

Analysis work



ANALYSES OF THE
RELATIONSHIP BETWEEN
PSYCHOLOGICAL
CONSTRUCTS OR MENTAL
STATES AND THE BEHAVIOUR
AS ROAD USERS.



TESTING SUBJECTS &
“PREDICTING” FUTURE
BEHAVIOUR OF MOTOR-
VEHICLE DRIVERS/RIDERS –
THEY DRIVE THE
“DANGEROUS MACHINES”



RELATIONSHIP BETWEEN
NEUROLOGICAL OR
PSYCHOLOGICAL DISTURBANCES
AND APTITUDE TO DRIVE A MOTOR-
VEHICLE

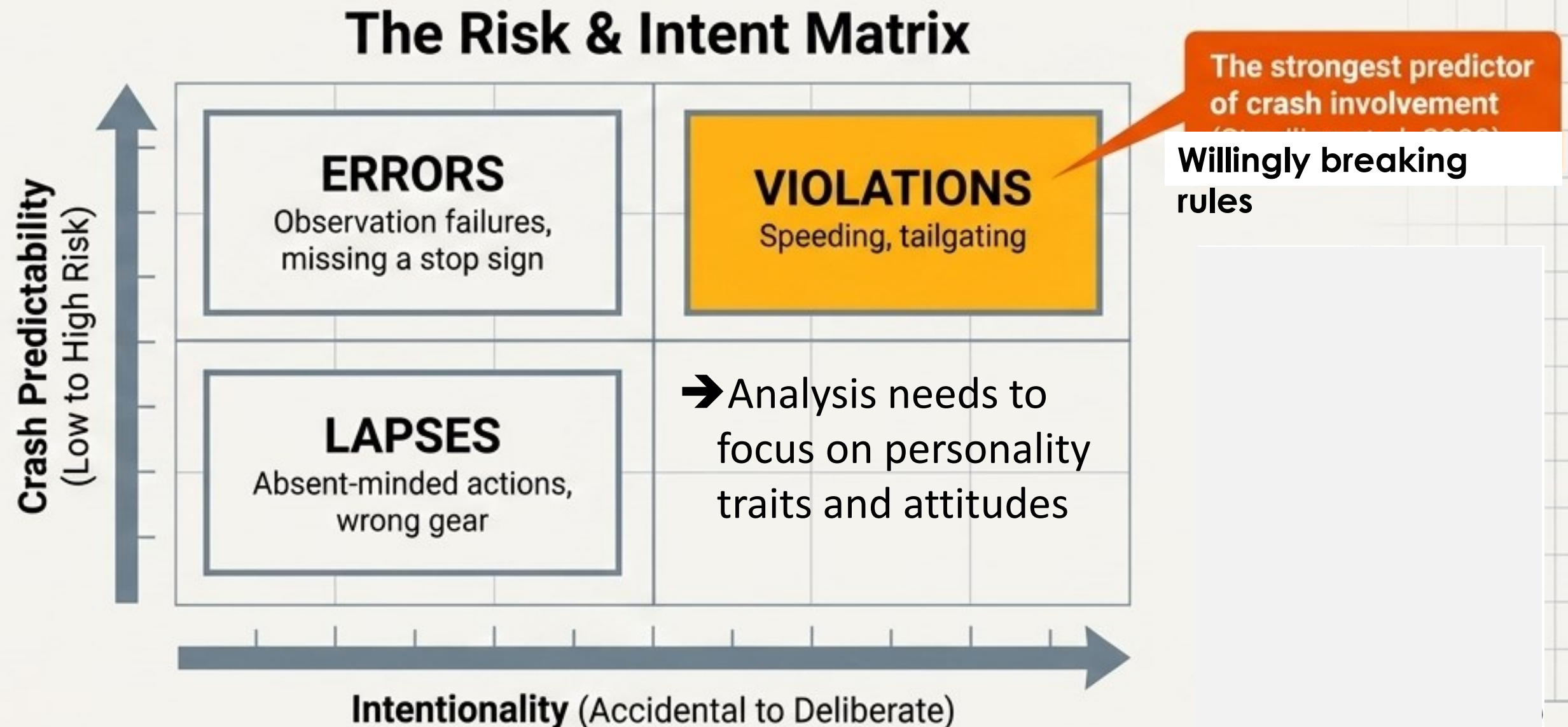


Methods applied for analysis

- ❖ Standardised tests of psycho-physical performance, intelligence, personality.
 - ❖ Verbal data: Exploration, in-depth interviews, structured interviews, questionnaires.
 - ❖ Behaviour observation: Field, simulator, virtual environment.
- 

It is will, not skill, that is the problem

Technical driving skills do not guarantee safe road use. Intentional deviations („violations“) are the strongest predictors of crash involvement





Measures

Practical Measures for Road Safety



Offender Rehabilitation

Programs for drivers cited for speeding, DUI, or failing to yield.



Psychological Campaign Design

Expert input used to create effective traffic safety commercials and media campaigns.

Mobility advice e.g for senior citizens



Early Childhood Learning

Traffic safety education integrated into kindergarten and school curricula.



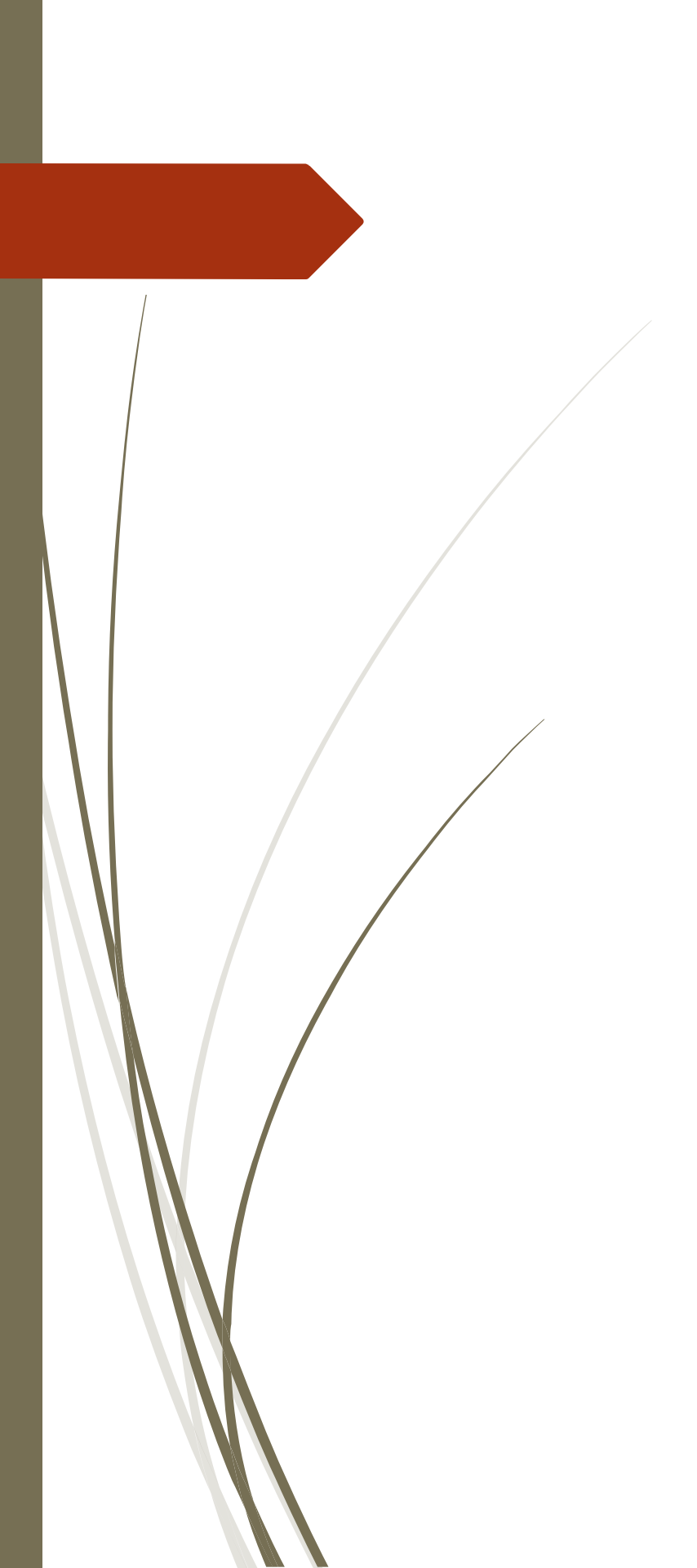
Driver and Rider Training

Formal education and professional training programs for all motor-vehicle operators.



One suggestion for the future

- ❖ (More) work with understanding motives, personality & attitudes in relation to traffic & mobility
 - ➔ of all stake holders including decision makers & engineers/planners.



Communication

A continuous dialogue on the road

It is impossible not to communicate – Paul Watzlawick

Explicit Signals



Implicit Signals



Stopping Distance



Sudden Acceleration

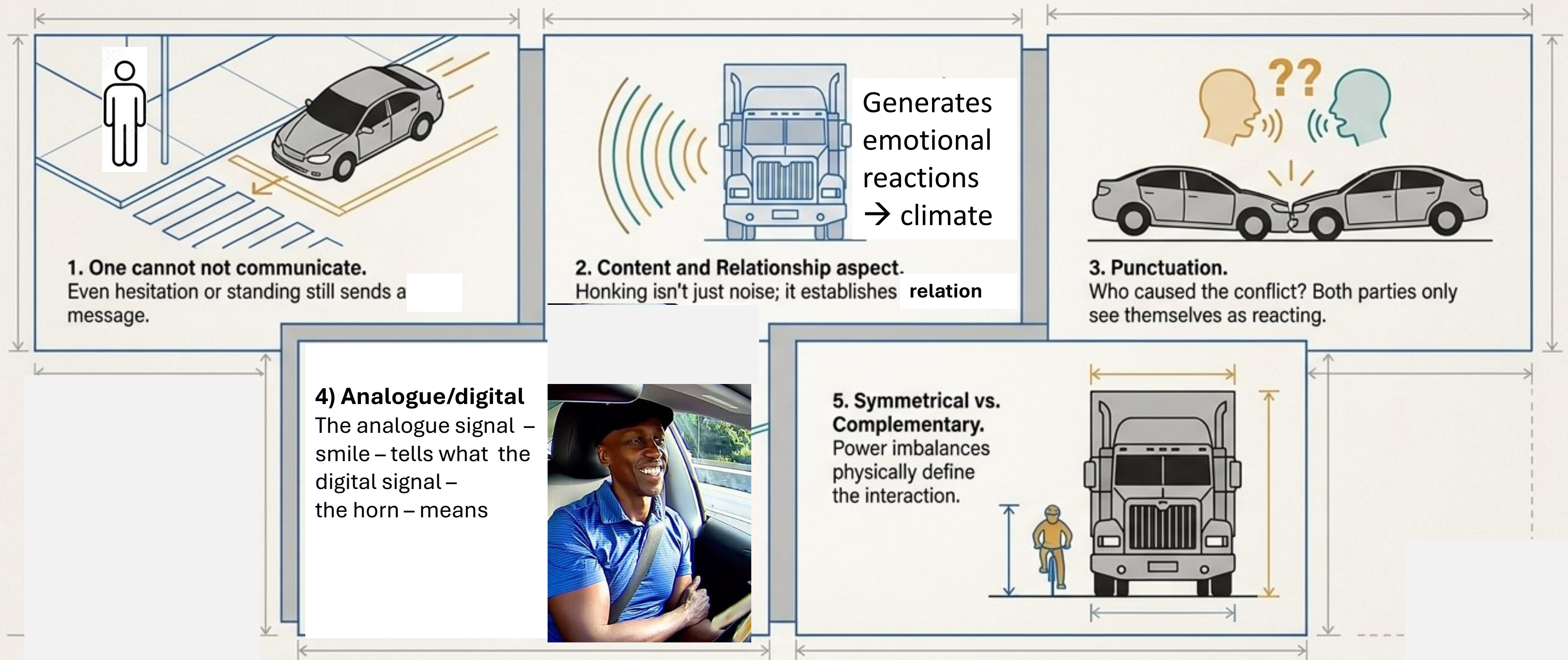
All road users send signals constantly

All road users are constantly exposed to signals & need to interpret and react

And vice versa



Watzlawick's 5 axioms of communication



Lack of meta-communication

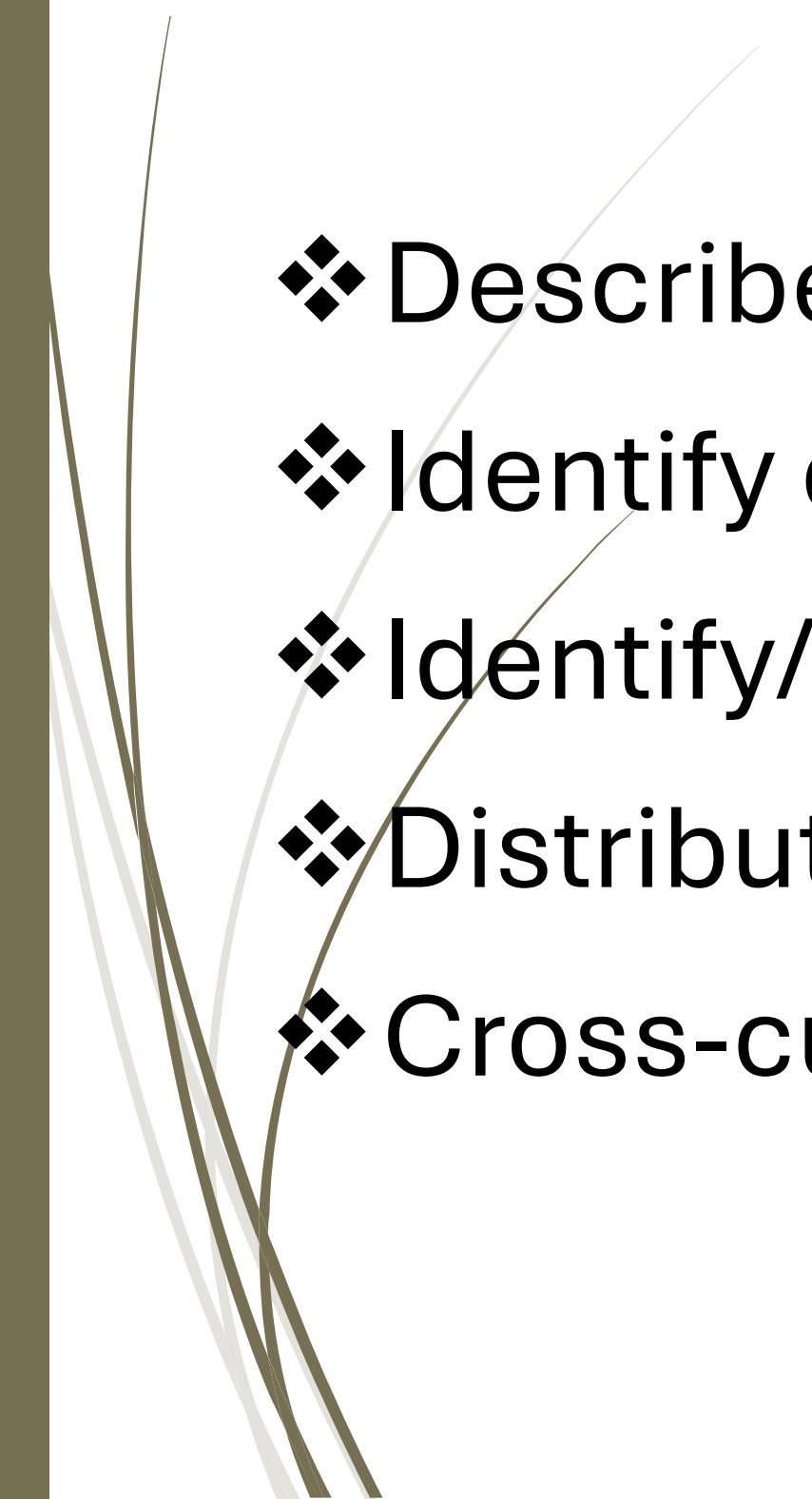


- ❖ Signals on the road are ambiguous.
- ❖ Metacommunication (e.g. by clarifying signs) is difficult or lacking.
- ❖ To learn by experience takes long time.

➔ **Teaching communication on the road is necessary**



What do we want to learn?

- ❖ Describe communication processes.
 - ❖ Identify communication styles → problems?
 - ❖ Identify/describe informal norms.
 - ❖ Distribution of communication-styles → climate.
 - ❖ Cross-cultural and demographic aspects.
- 

Signals & background

Overt signals

- Digital: Speech, fully clear signs (e.g. thumb up)
- Analogue: Body language, mimics, gestures
- Explicit: hand gestures, flashing headlights, horns
- Implicit: vehicle kinematics, walkers' movements

Background: Attitudes, motives, perceptions (mental states),
e.g. * how do people °look at other road users, °describe their own
communication, °interpret movements and gestures of others,
°experience or exert power, etc.

Autonomous vehicles → importance of communication becomes obvious

1

Autonomous vehicles → A push for communication research
→ necessary to understand communication processes and to model them in order to program autonomous vehicles appropriately

2

Missing Intent Recognition.

Humans rely on body language. A cyclist cannot derive social intention or yielding behavior from the physical stance of a machine.

What type of signals do non-equipped road users need (VRUs, drivers of older cars ...)

3

AV-Bullying

Humans rapidly learn to exploit the programmed defensive driving style of AV, unlawfully forcing right-of-way because they know the machine is hardcoded to yield.

How will AV cope with bullying?

Research methods

- ❖ Observations on site.
 - ❖ Video & sensor registrations.
 - ❖ In-vehicle observations like the Wiener Fahrprobe.
 - ❖ In-depth interviews, Focus group interviews, Semi-structured interviews, Questionnaires.
- ➔ Mixed methods = qualitative + quantitative.



Measures

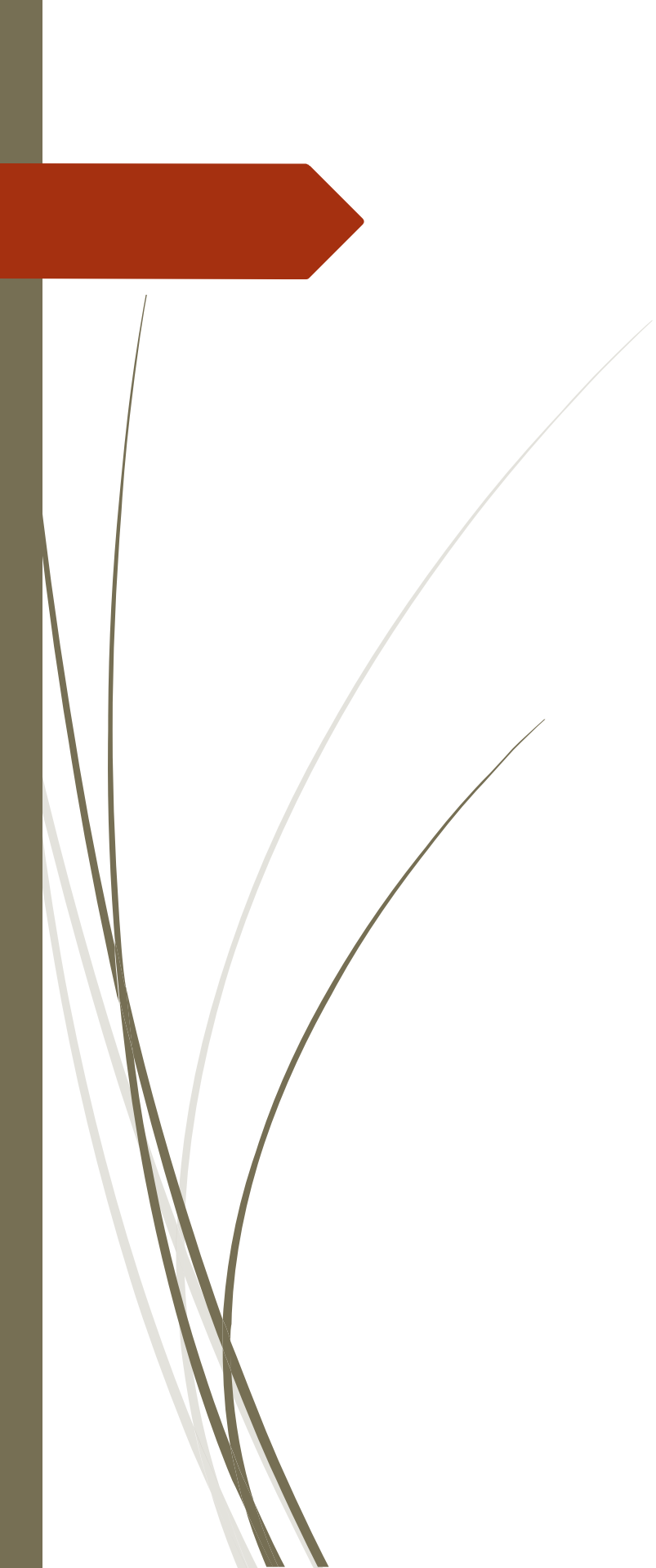
Measures/practical work

- ❖ Campaigns & commercials: how road users communicate.
- ❖ Education in kindergarten & schools.
- ❖ Education & Training of motor-vehicle drivers/riders:
 - Typical explicit & implicit communication processes.
 - What can I see & need to consider?
 - What will the others see from my side & will they understand what I mean?
 - Will others perceive certain communication as pleasant or unpleasant?
 - Consequences of pleasant or unpleasant communication.



One suggestion for the future

- ❖ (More) work for understanding communication processes
 - by regular behaviour observations in the field combined with verbal data collection.
(see also under infrastructure!)



Society

Societal preconditions

Traffic behavior is a reflection of societal standards and the actions of those in power.



We inherit our driving culture.

Family and peers pass down habits and attitudes within existing social structures.



Leaders and media set the tone.

Politicians' statements and media reporting on traffic issues directly influence our attitudes



“Informal norms” often rule the road.

People often follow socially tolerated things “everybody does,” even if laws exist.



Public institutions act tolerantly towards rule infringements like speeding, texting & phoning behind the wheel etc.

Media shapes perception and normalises violence

Media discourse frames collisions as inevitable

Non-Agentive Grammar	Human Agency
 “A car hit a pedestrian.” • Removes human agency • Suggests an unavoidable mechanical malfunction • Frames event as if it happened by chance	 “A driver hit a pedestrian.” • Names human choice and responsibility But still does not refer to system aspects

The Societal Construction of the Road Space

Different approaches

The Justice Frame

The street is a shared space for moving for all, meeting and trading. Focuses on human interaction.



The Efficiency Frame

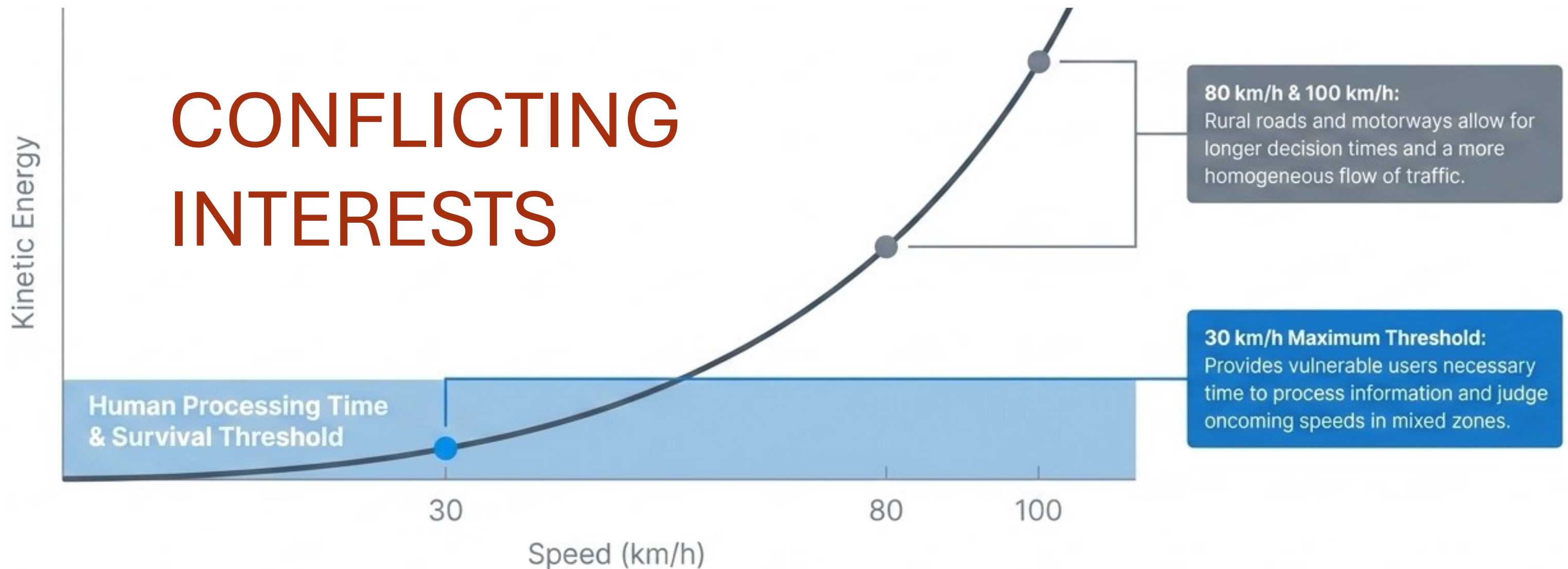
The street is prioritized for high-speed automobile flow. Laws are created to privilege motor vehicles over vulnerable bodies.



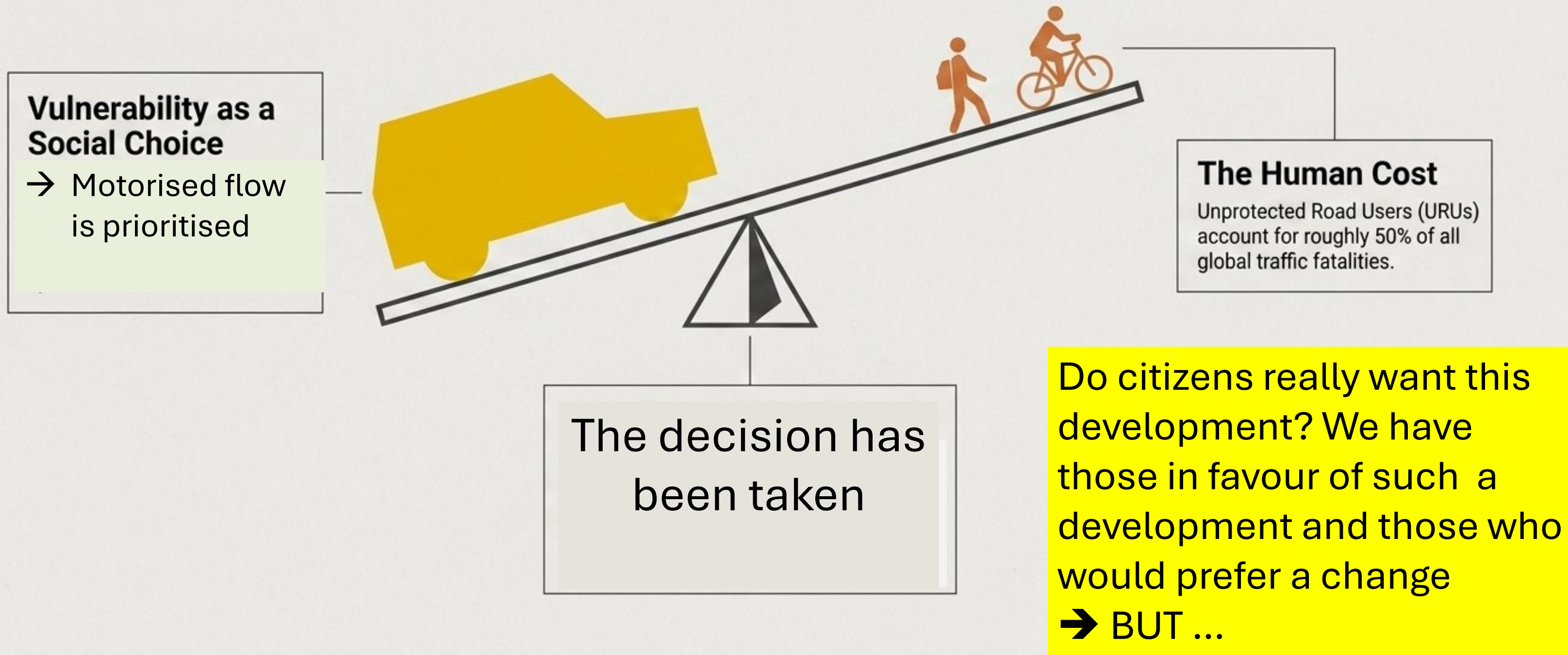
Lower speed limits save lives → fewer crashes and less severe injuries.

They also cut fuel use and air pollution (OECD/ITF 2018) → **Societal interest**

while slightly increasing travel times, possibly leading to driver frustration & non-compliance, enforcement costs may rise → **Ego interests (often of elites)**



So the winner is: The efficiency frame



Do politicians listen to the citizens?

- ❖ Opinion assessments are expensive, decision makers rely on random feedback, e.g. citizens who take contact.
- ❖ But citizens who reach out to authorities are usually unhappy while happy or neutral people usually stay silent.
- ❖ Equally, online shitstorms are frequently triggered by a small, highly active minority of users who may create a massive-looking storm.

!! Leaders tend to misjudge public mood & make wrong choices.

➔ Assessment of public opinion needs to be done professionally!



Measures and methods

Analyses and methods

We need to analyse ...



... Public opinion, pub talk, media reporting, politicians' statements, parents, peers, religion etc. and their impact on how road users think and act



Use Diverse Research Methods

Qualitative & quantitative interviews in combination (mixed methods), media analysis, literature studies, observations, expert talks etc.



Create a Central Body of Knowledge



Measures to be taken



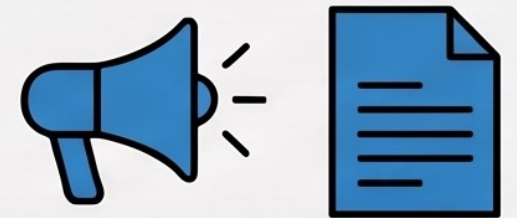
Planners and authorities need to take responsibility

?

- ❖ Show that vision of zero road fatalities is not Utopia.
- ❖ Describe advantages of such a development for individuals.
- ❖ Demonstrate that there is sufficient support in the population to achieve this goal:



Social marketing

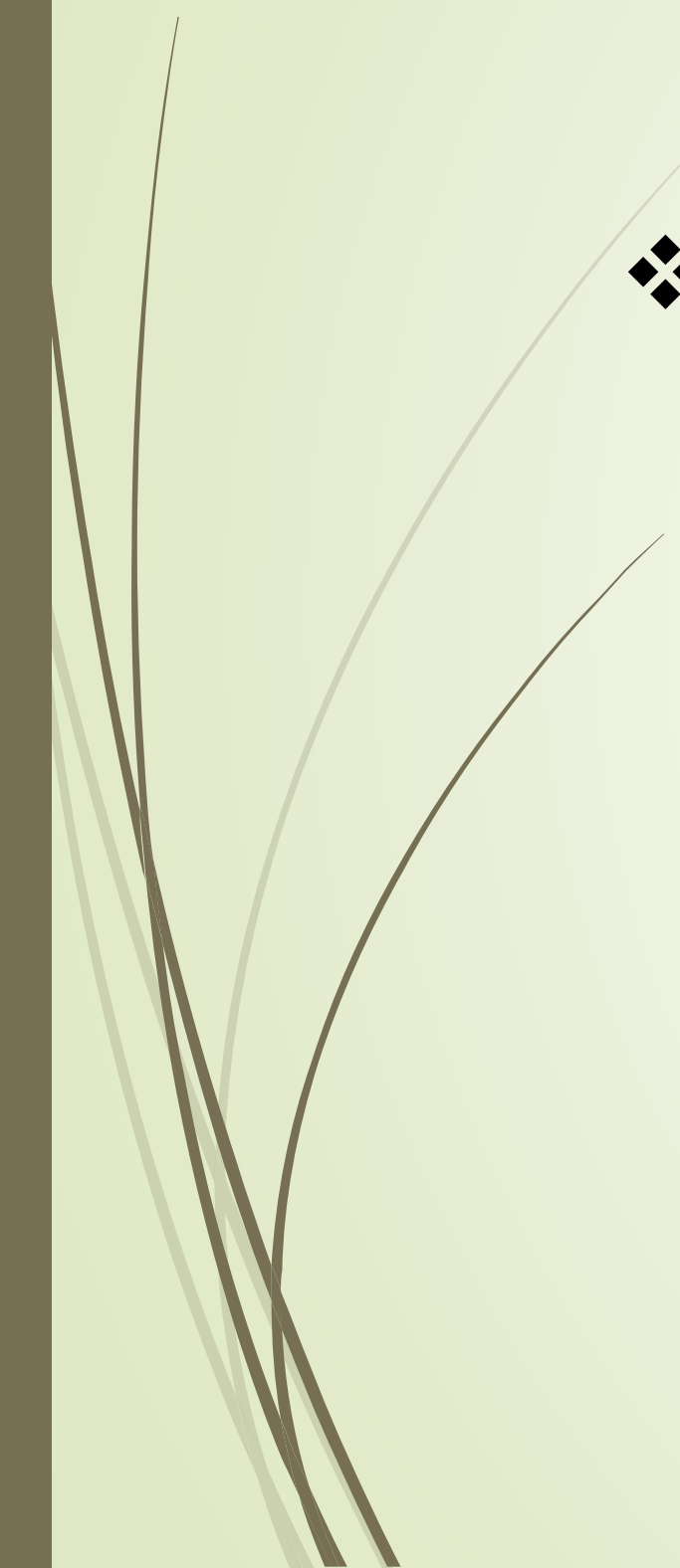


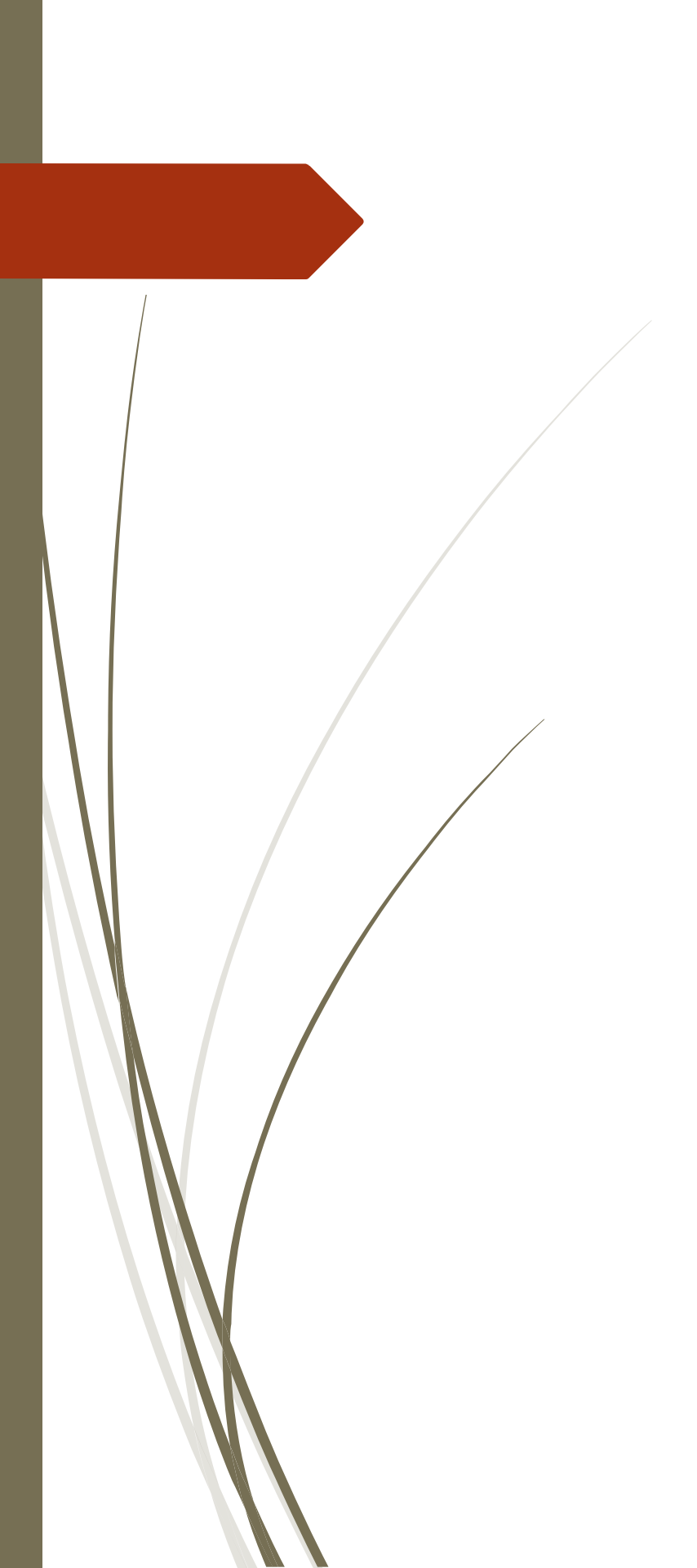
Give the public access to psychological & sociological knowledge

State of the art



One suggestion for the future

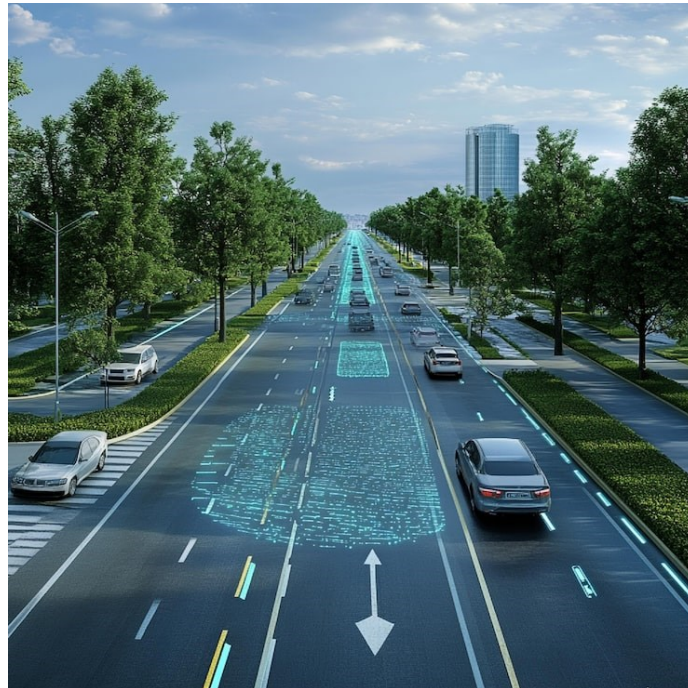
- ❖ Intensify social marketing & involve
 - psychologists with traffic and mobility experience,
or
 - traffic and mobility experts with a sound
psychological background.
- 



Infrastructure

**Infrastructure
dictates behaviour.**

Three zones of risk



Speed Inducers
(Road & Lane Design)



Hostile Pathways
(Sidewalk & Cycle Tracks)



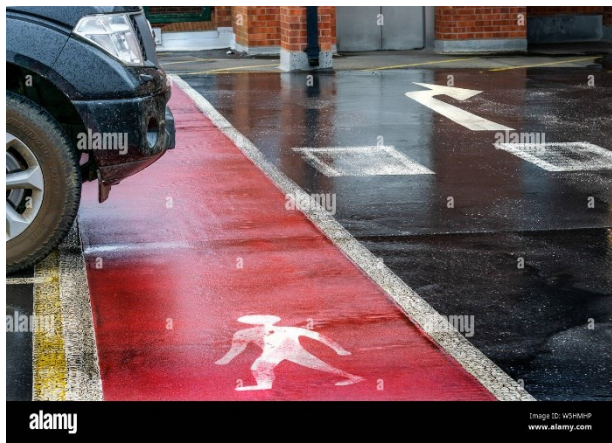
Dangerous Intersections
(Corners & Crossings)

Speed inducing design

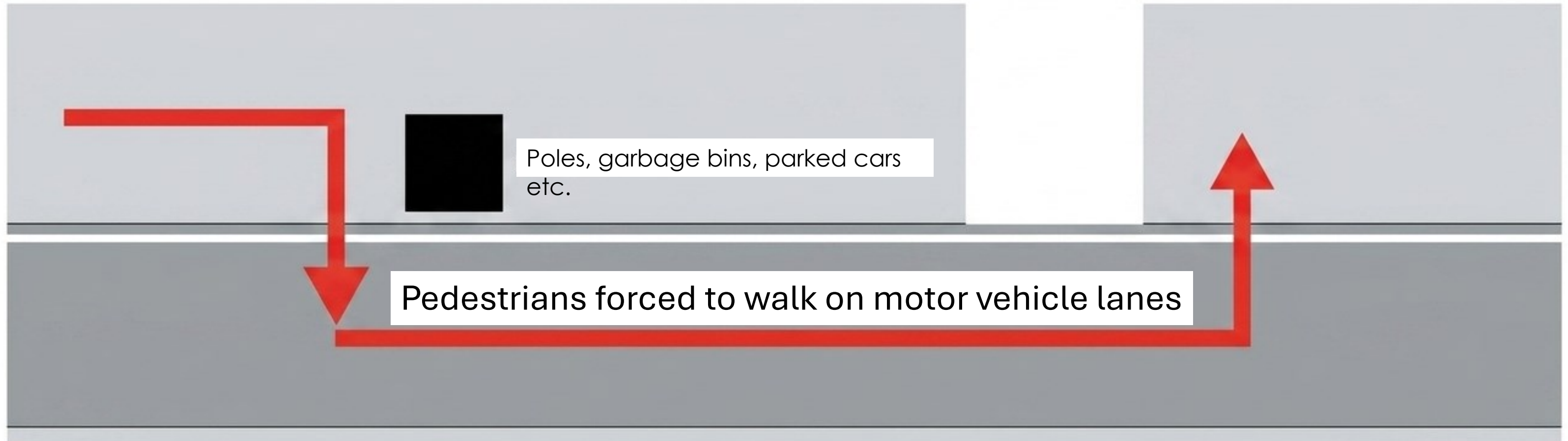
Speed contributes to 30–40% of all fatal crashes. But speed is dictated by environmental context, not just legal limits.

„A road that looks like a motorway will be used like a motorway“,
Jan Theeuwes





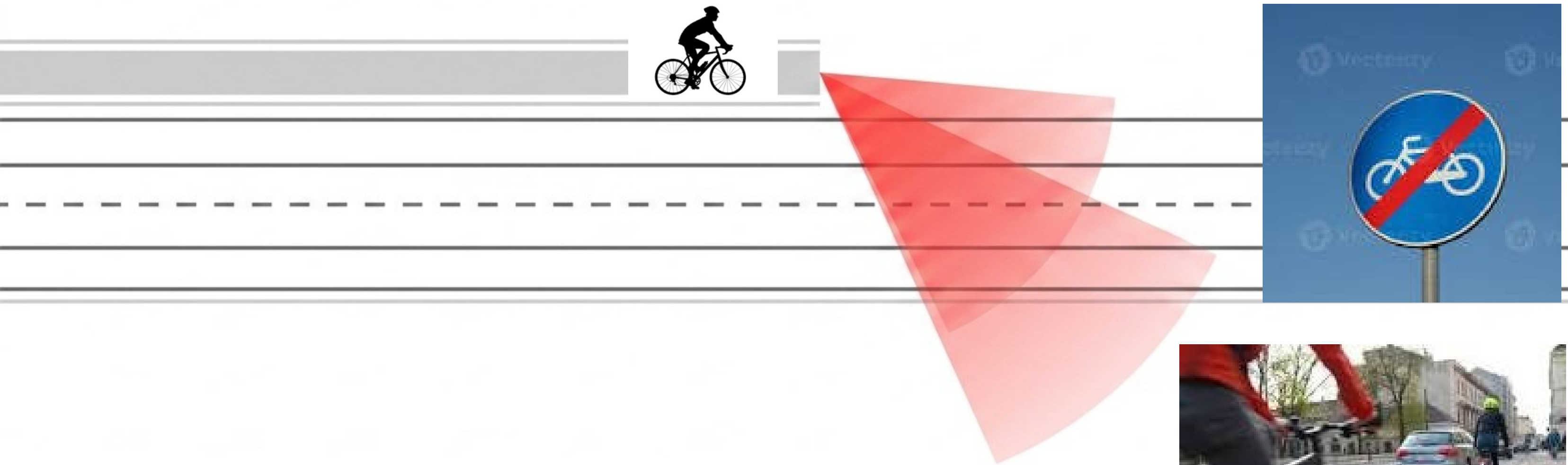
Walkers pushed into traffic



Pavements cluttered with structures or interrupted by gaps give pedestrians no choice but to step directly into vehicular traffic.



Bicycle paths or lanes suddenly ending



When dedicated bicycle infrastructure abruptly ends in areas of higher-speed vehicular traffic, it poses severe, immediate safety concerns for cyclists.



Flat curves vs. right angle curves



High-speed turn.

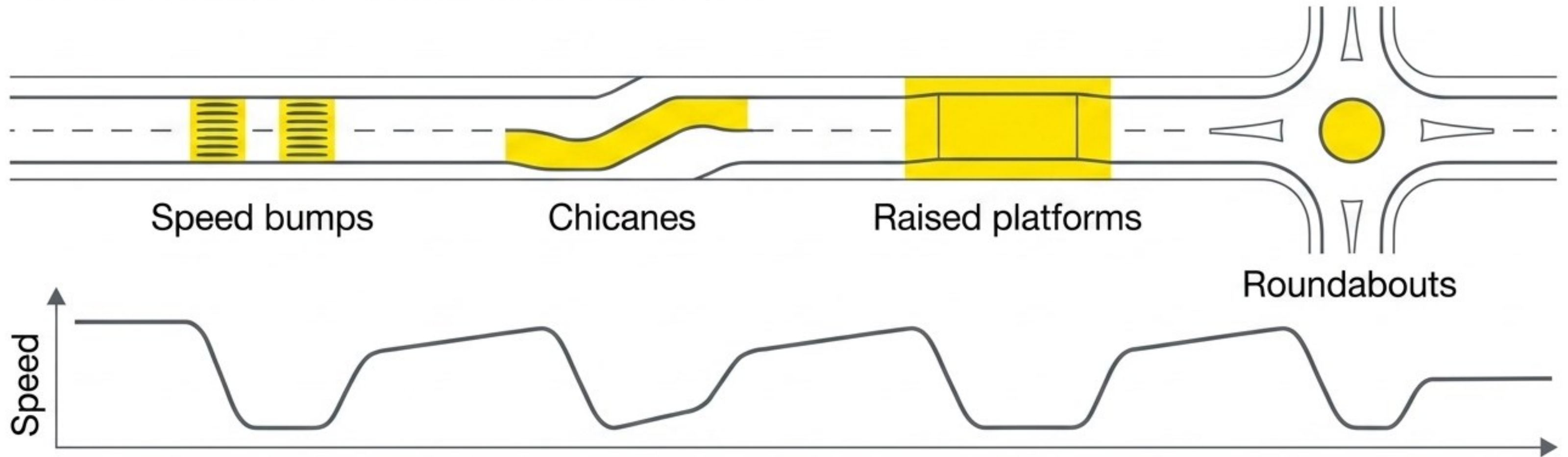


Low-speed turn.



Measures

Slowing Down Improves Communication



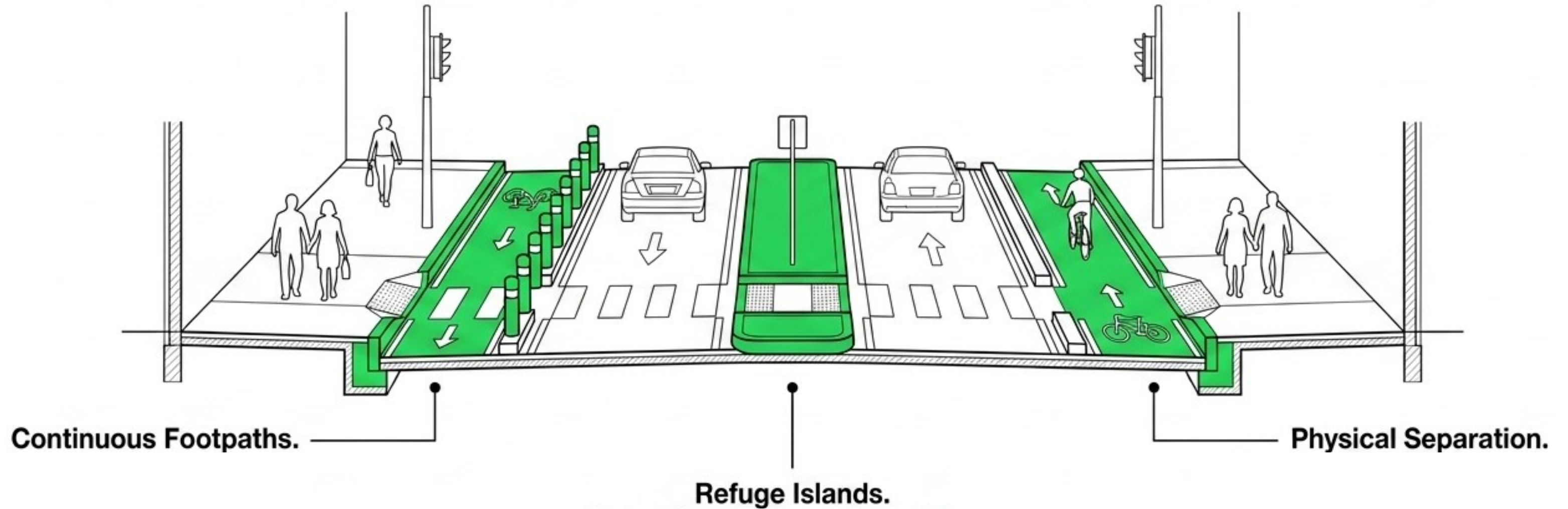
Physical traffic calming measures reduce mean driving speeds effectively and improve preconditions for communication among road users.

Elicit lower speeds on rural roads

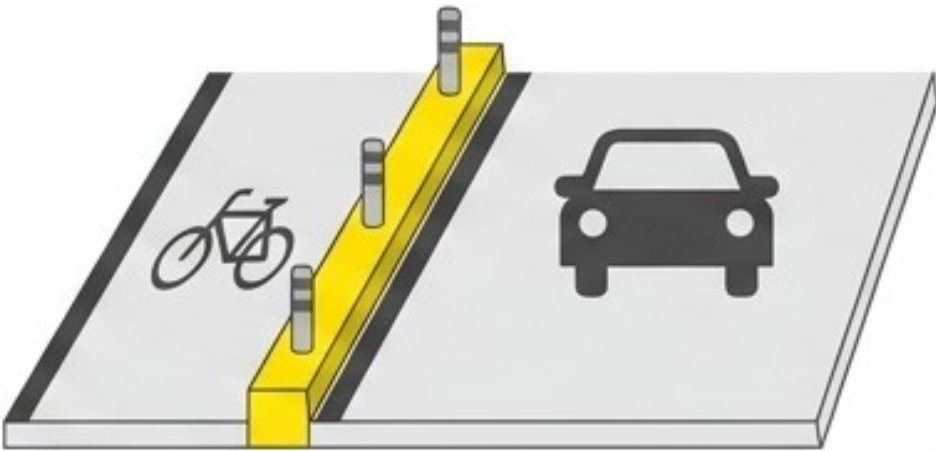
- Narrower lane widths
- Gentle continuous curves
- Optical chicanes
- Textured or unpaved shoulders
- Roundabouts
- Roadside friction like trees



Clearly dedicated space for everyone



Paint or barriers for bicycle tracks

Painted Bicycle Lanes	Physically Separated Cycle Tracks
• Pros: ◦ Alert drivers ◦ Make driving lane appear narrower • Cons: ◦ Needs case-by-case testing	• Features: ◦ Curbs, bollards, or medians • Pros: ◦ Significantly reduces accident risk
 A diagram showing a road with two lanes. The left lane is designated for bicycles, indicated by a white bicycle symbol on the pavement and white diagonal lines on the edges. A car is shown in the right lane, moving towards the right.	 A diagram showing a road with two lanes. The left lane is a cycle track, separated from the car lane by a raised yellow curb and several white bollards. A bicycle is shown in the cycle track, and a car is shown in the right lane, moving towards the right.



At intersections, measures must ensure cyclists from separated tracks are visible early so drivers can adjust actions and speed.



Methods

Behaviour observation + verbal data!!



Eye Tracking
Measures gaze dispersion to detect mental workload and stress.



Immersive VR
Safely tests human reactions to hazardous scenarios.



Risk Surveys
Compares perceived safety against objective crash data.



Speed Adaptation Models
Tracks how geometry naturally influences a driver's choice of speed.

Always also speak to the observed persons or to members of observed groups



One suggestion for the future

- ❖ When carrying out all types of road safety audits and inspections
 - involve persons with both traffic and mobility experience & psychological background,
 - and include **verbal data** in all analyses → i.e. the user perspective.
- (remember also „communication“ further above)



Mode use

Needs & problems of different groups

Pedestrians need safety from vehicles, continuous walking paths, safe crossings & short waiting times there, a network that provides shortest possible walking distances, protection from bad weather.



Cyclists need clear infrastructure & mutual respect from drivers. Top priorities: protected bike lanes + appropriate solutions at intersections, safe passing distances, & smooth road surfaces free of debris.



Public transport users: Top priorities are reliability, frequent service, safety, affordability, and clear information. Riders want trains and buses to arrive on time & easy updates about delay, to feel secure during travel,



Senior citizens and people with impairments: Have problems with physical, infrastructural, and operational hurdles preventing them from travelling safely. They lament ageism & a lack of respect & patience.



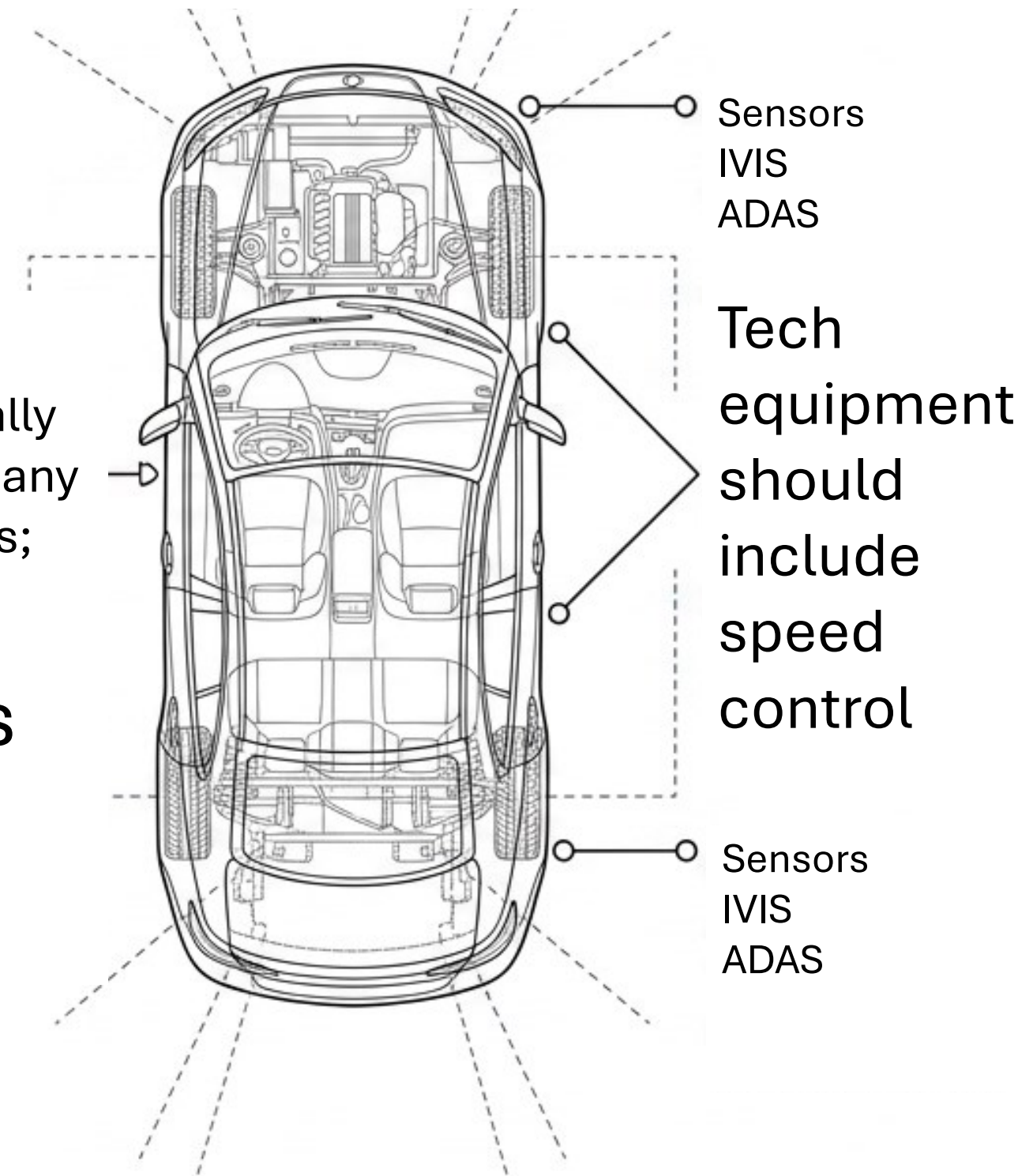
What motorists need even if they do not know it

- Drivers resist lower speeds
 - but habituating to them creates a physiological comfort zone
- reduces stress after a short time of habituation

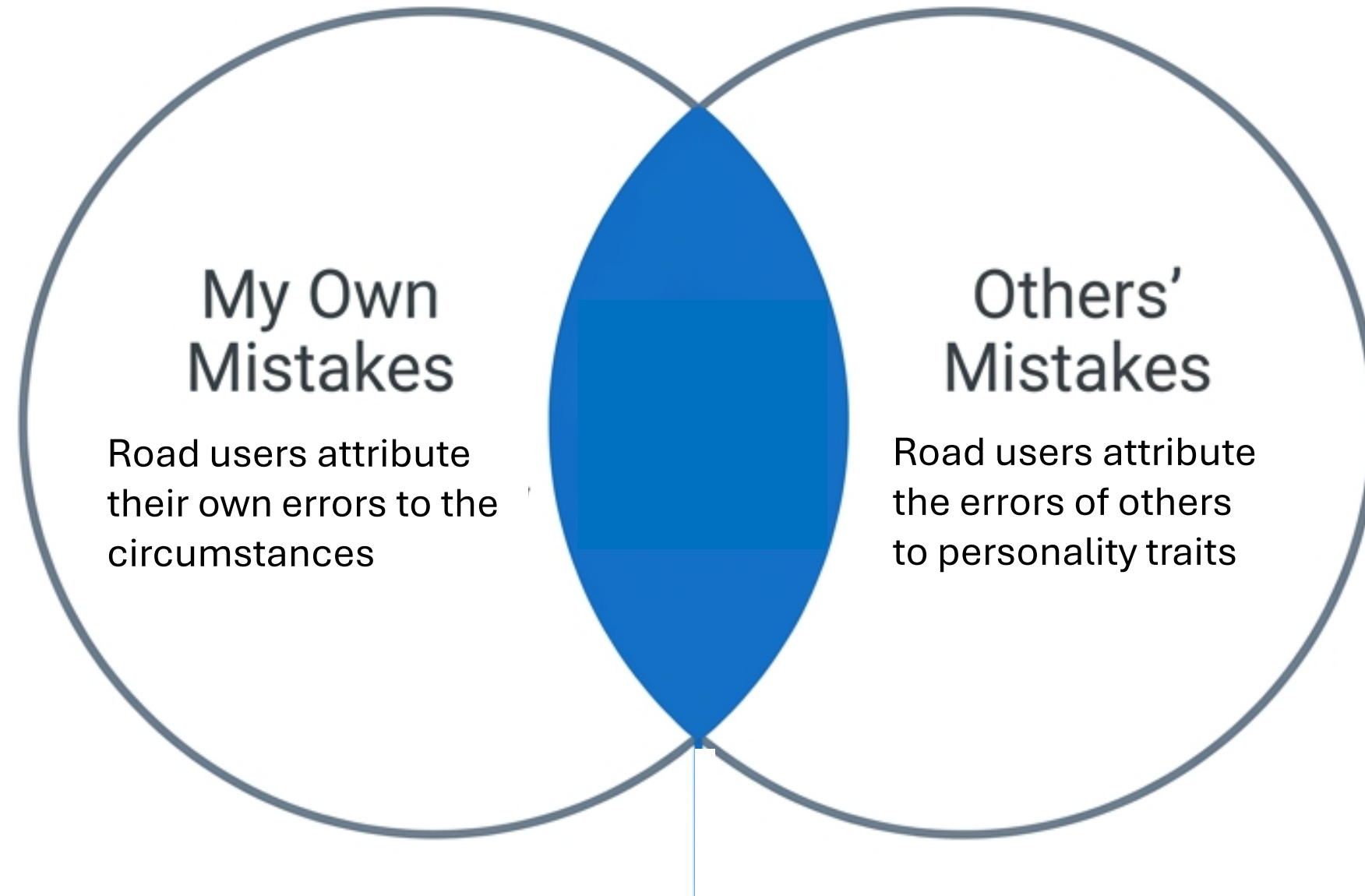
Attention:

Drivers do usually not experience any safety problems;

→ Safety appeals do not work



The attribution error



Subjective aspects dictate behaviour

→ How we perceive and interpret situations and facts steers our behaviour.



Objective Danger
(Actual crash statistics)

Perceived Danger

→ E.g. children brought by car if parents perceive their routes as unsafe

Subjective vs. objective risk



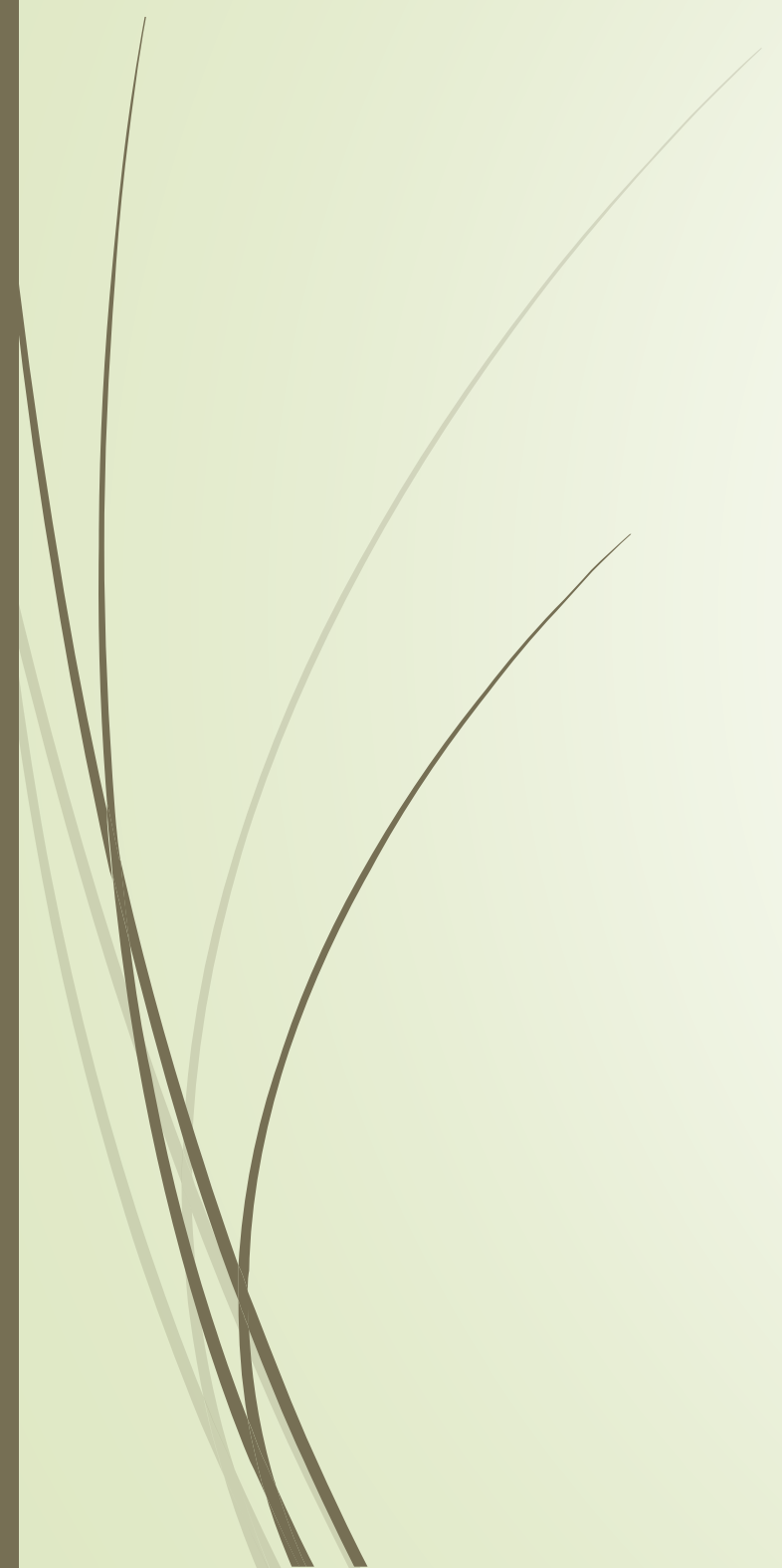
Children



Cognitive Limits: Children are not small adults. They cannot multitask complex traffic cues, accurately judge vehicle speed, or localise sound.

The Dash-Out: Unpredictability is biologically hardwired into children, necessitating environments that forgive impulsive errors.

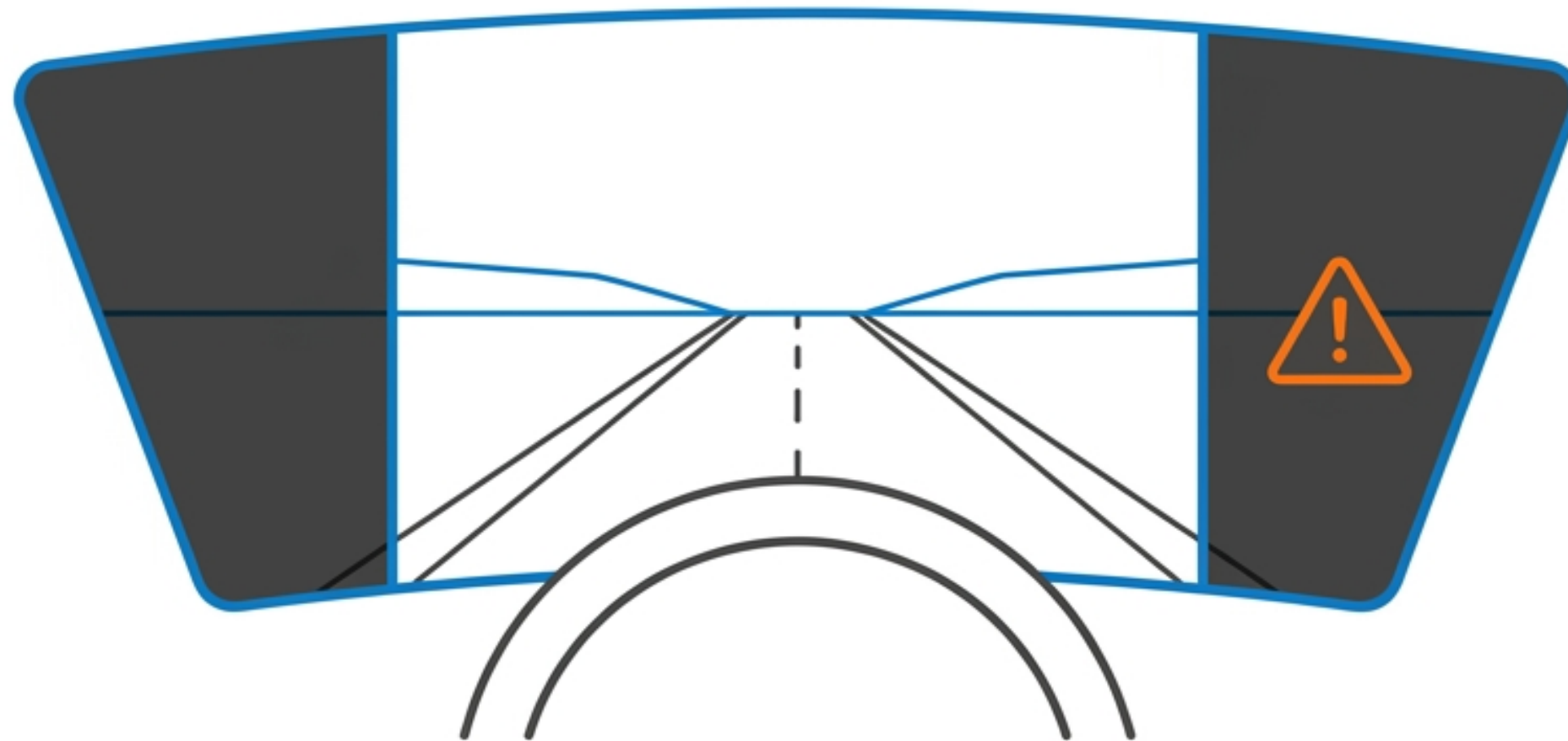
Capping speeds at 30 km/h provides vehicle drivers with more time to react & immensely increases survival rates in case of crashes.



Methods for analysis

Simulators & VR-environments

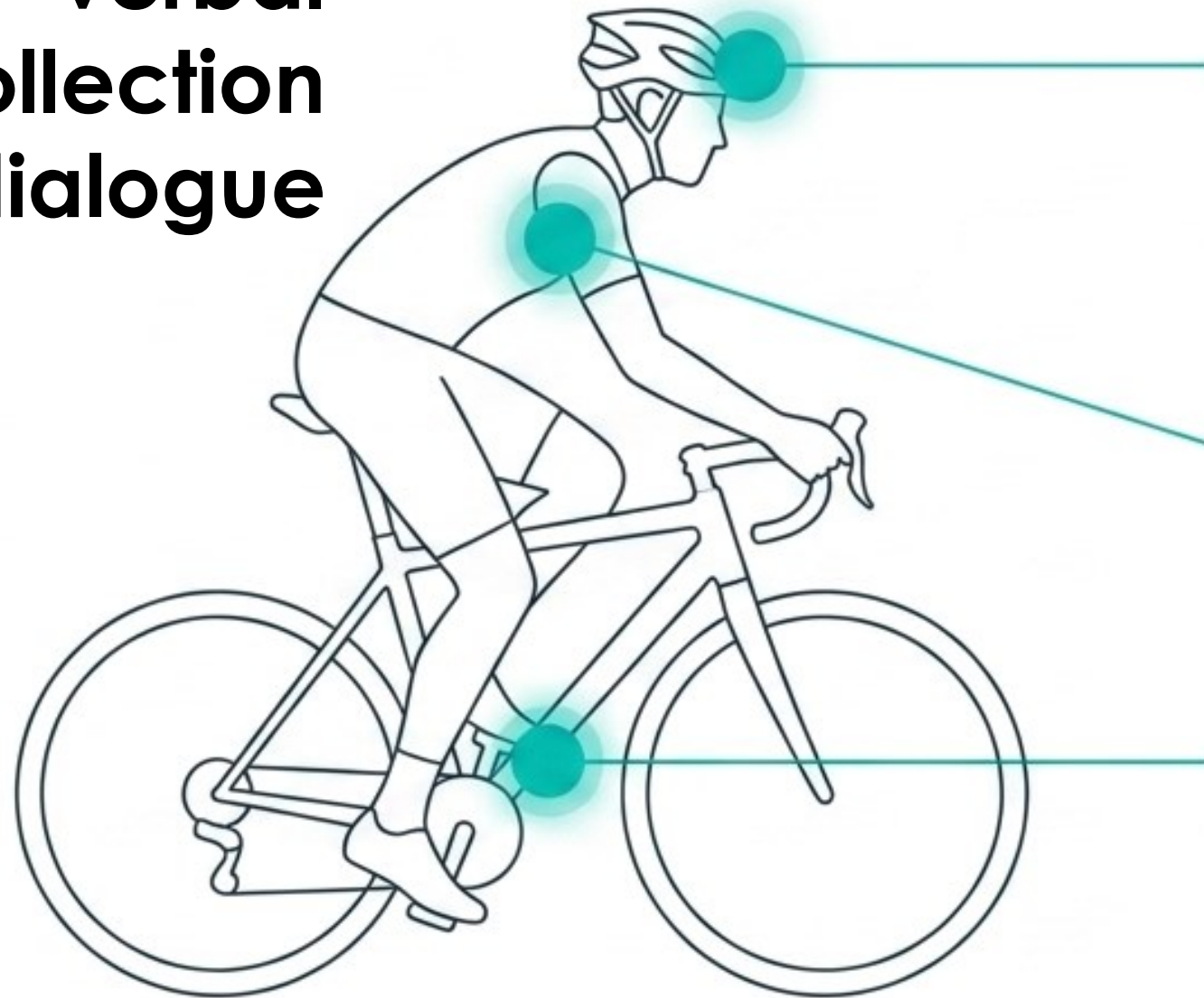
... allow to safely test age-related deteriorations of different physical and psychological functions.



But we need to consider simulator sickness!

Wearable telemetry

**+ verbal
data collection
= dialogue**



Gyro Sensors & Cameras

- Measures “Searching Behaviour” (head movements to check for traffic)

Heart Rate

- Biometric stress tracking

GPS

- Path and riding position mapping

These technological field observation methods allow for thorough assessment of the subjective & objective problems met.

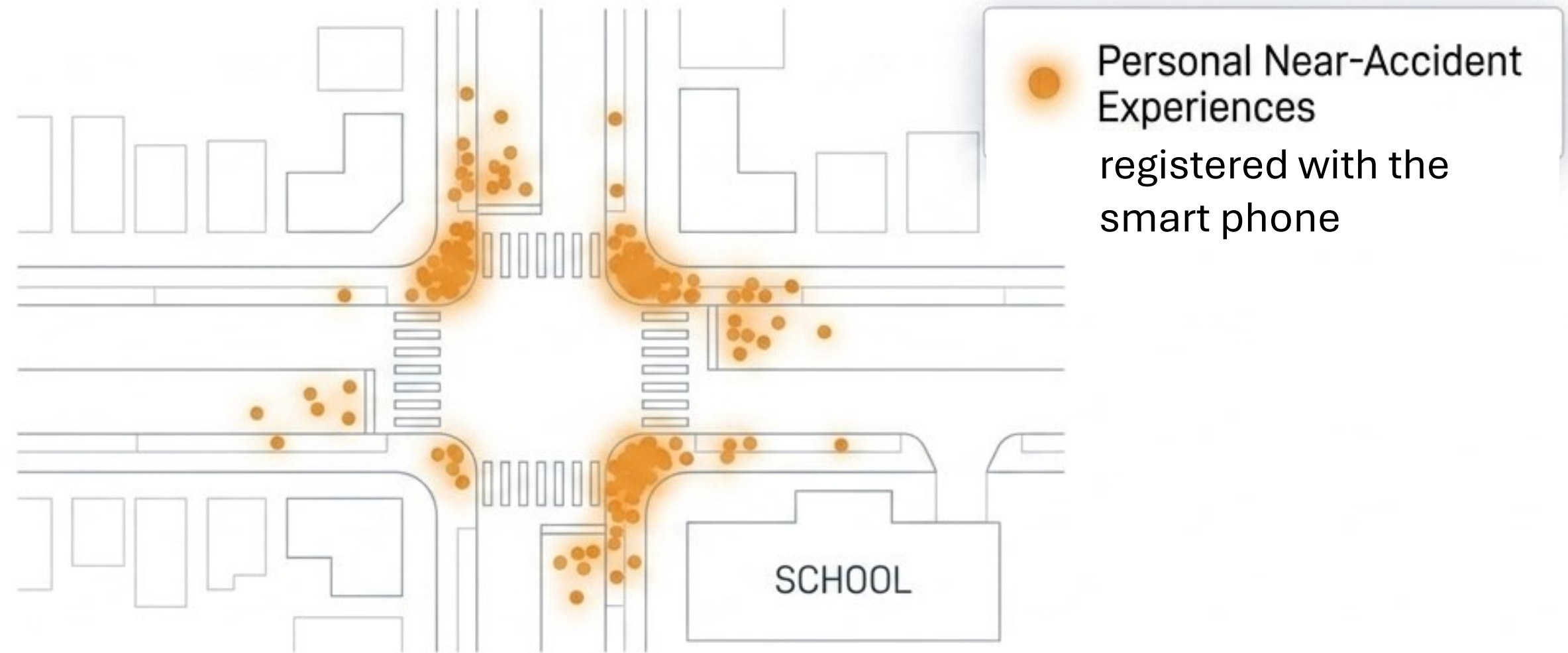
Co-design to detect barriers

Expert Design → Target Group Input → Unmet Needs Revealed



Small barriers and hazards become transparent only when members of the target group are involved

Mapping critical events by road users



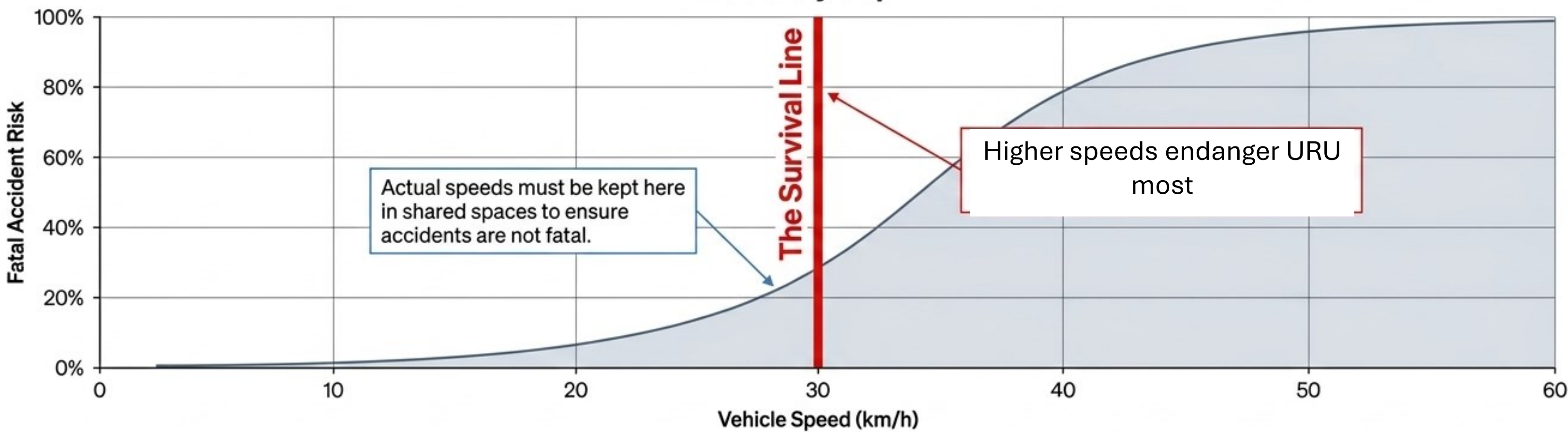
Benefit: Allows to identify site-related problems – e.g. outside a school – ad-hoc immediately. At the same time it enhances personal motivation



Measures

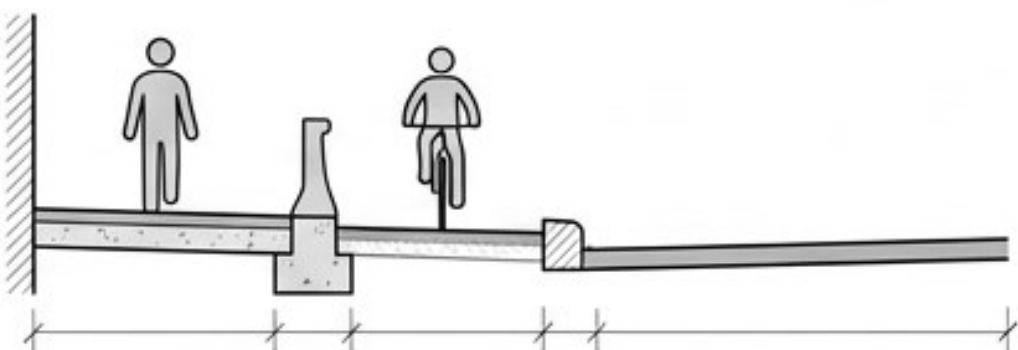
Protecting the Vulnerable: Space and Speed

The Safety Gap



Physical Separation

Sidewalks and bike lanes to block kinetic energy.



Safe Crossings

Refuge islands and elevated paths to reduce speed and aid communication.

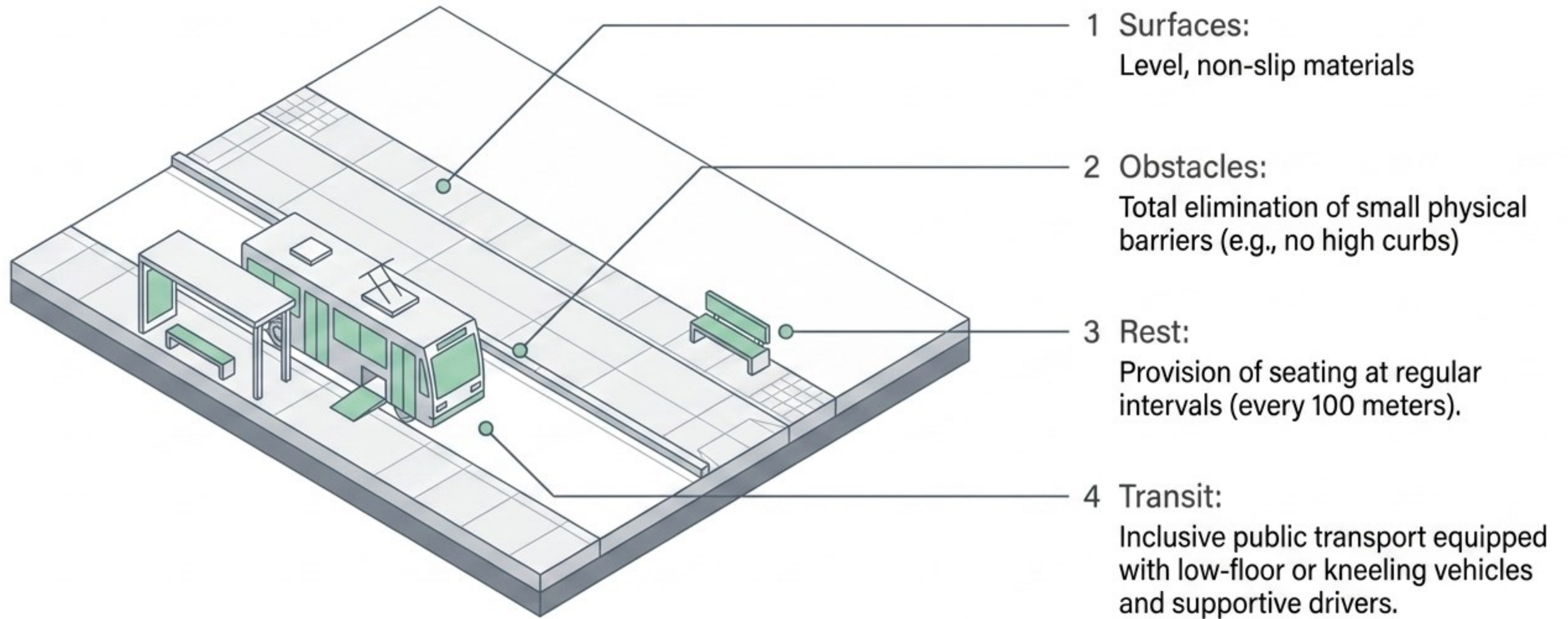


Visibility

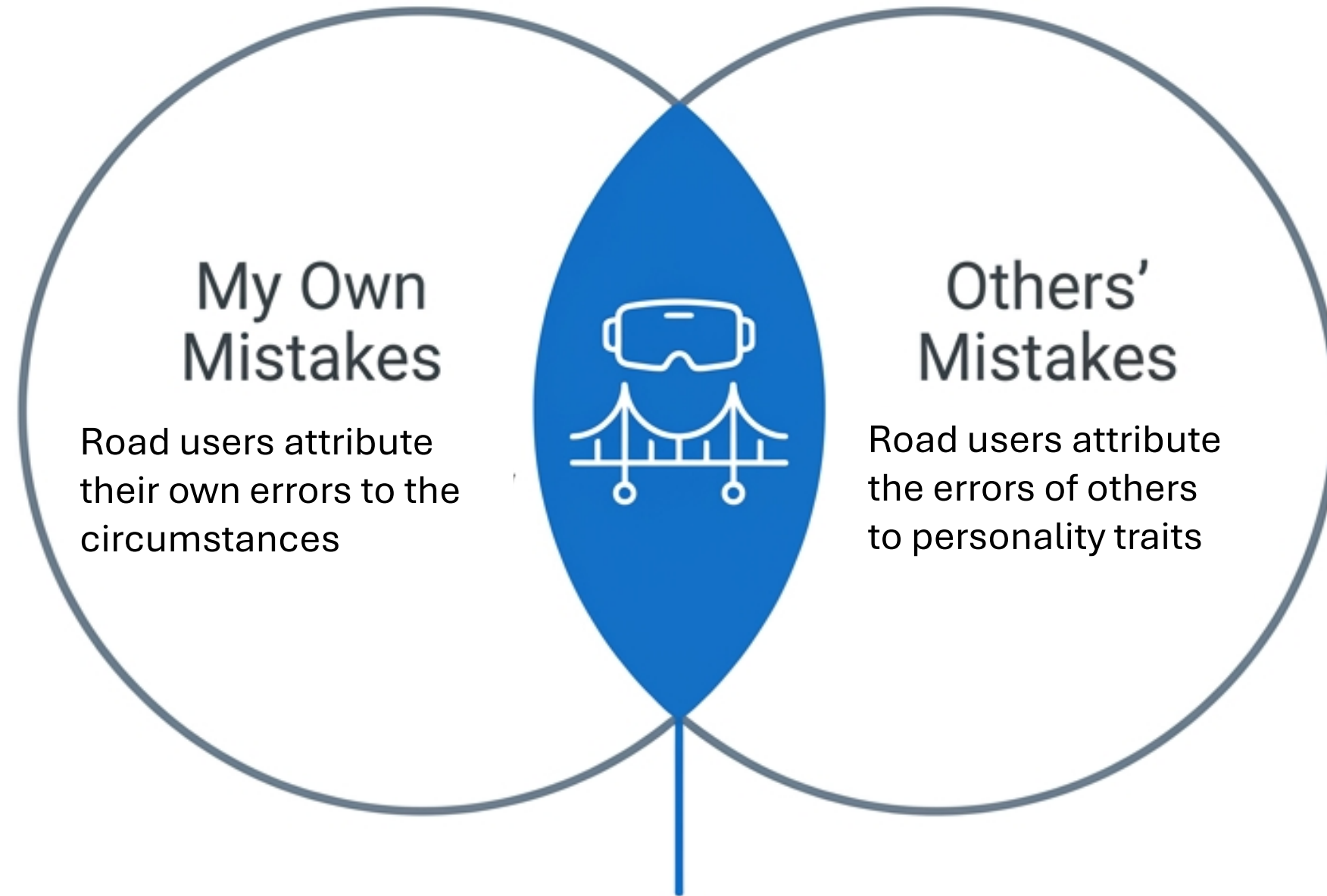
Roadway lighting and reflective materials so users can see and be seen.



A barrier-free environment



The attribution error



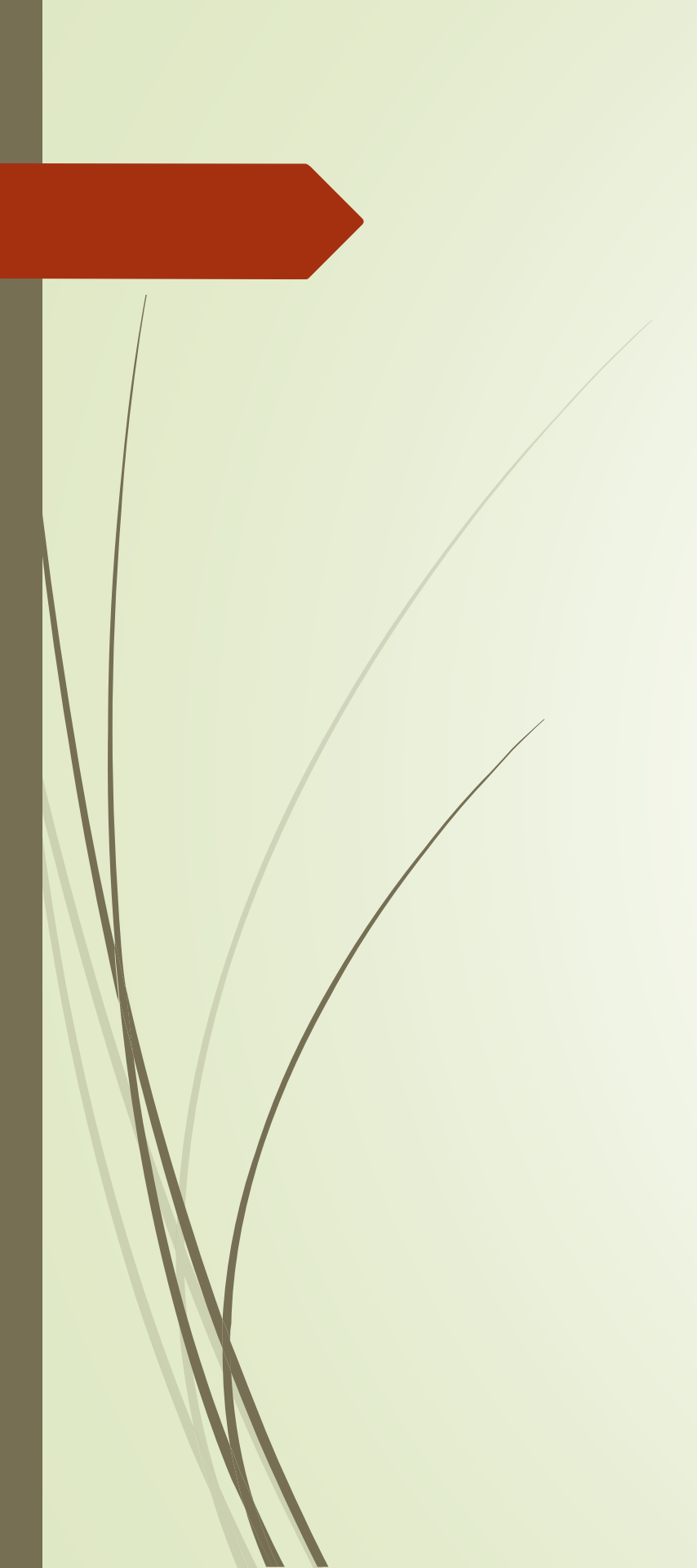
The Bridge: VR Empathy Training

... as an integral part of driver education



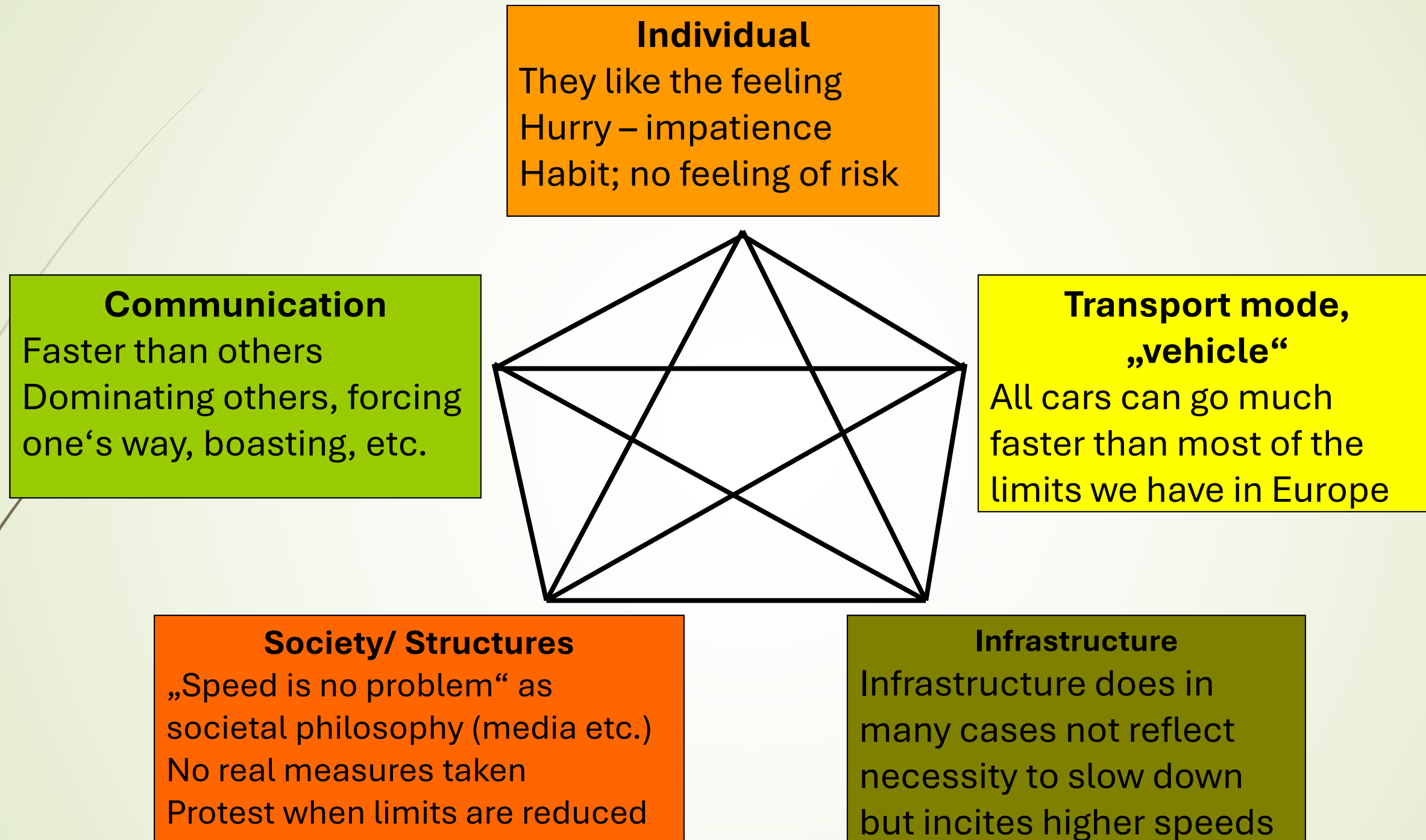
One suggestion for the future

- ❖ Deal systematically with
 - conflicts of interests between road user groups,
 - and how to resolve them.



Speed as an example

Speeding car drivers



➔ **Car drivers need help**

The Humanization of the Street

[Engineering]

(traffic management & physical improvement)

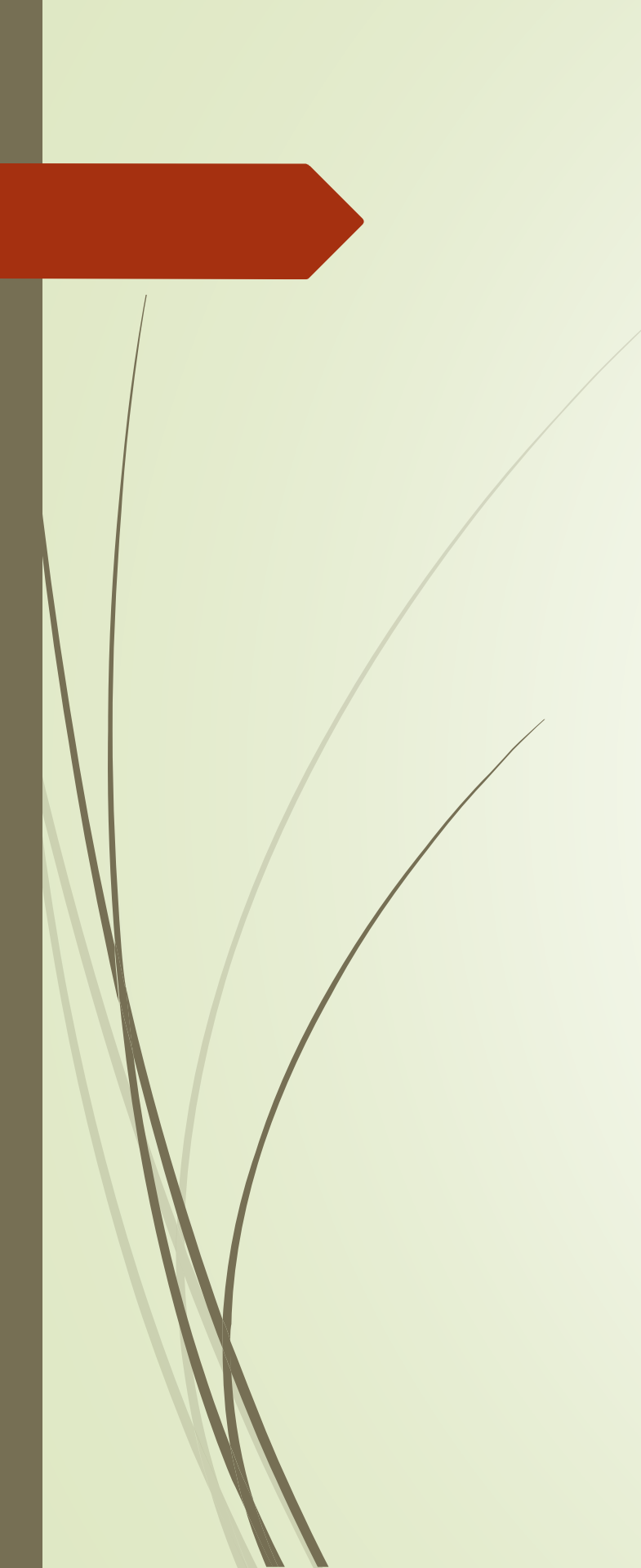
+

[Psychology]

(risk tolerance, habituation, perception)

=

TRUE TRAFFIC SAFETY



Thank you for your attention!

Do you have any comments
or questions?