TSR TRAFFIC SAFETY RESEARCH
AN INTERDISCIPLINARY JOURNAL

Research article

Increase road safety or reduce road danger: challenging the mainstream road safety discourse

Marco te Brömmelstroet[1]

[1]University of Amsterdam, the Netherlands

Handling editor: **Aliaksei Laureshyn**, Lund University, Sweden

Reviewers: **Rune Elvik**, Institute of Transport Economics, Norway
John Hickman, Berry College, the United States of America

Received: 11 April 2023; Accepted: 5 February 2024; Published: 5 March 2024

Abstract: The domain of road safety has a longstanding history in academic research and a well-established position in policy circles. In different contexts in different degrees, this has resulted in important and meaningful interventions that increased overall safety statistics. But are researchers and policy-makers in this domain also reflecting on the underlying values and worldviews on which these interventions are build? Do we fully grasp the choices that are embedded in those values and on how these then solidify into our guidelines, streetscapes and behaviour? In this position paper, I argue that those underlying choices are exactly what is holding back real radical change in making our roads and traffic safe. To do so, I discuss seven mechanisms in how road safety is currently studied, discussed and designed that might aggravate the inherent unsafety it aims to reduce. Building on this, the final part of the paper aims to open up the underlying values by proposing seven potential 'what-ifs' away from focusing on increasing road safety to instead explicitly focus on reducing the systemic danger.

Keywords: discourse, road danger, road safety, systemic violence, worldviews

1 Introduction

> 'Making an injury visible and public is often the first step in remedying it, and political change follows culture, as what was tolerated is seen to be intolerable, or what was overlooked becomes obvious.'
>
> *Rebecca Solnit (2010)*

Child died after accident in Ulft.
At a collision in Ulft, a 9-year old boy died.
The child came out of a garden and ran straight across the road.
He was hit by the car of a 27-year old car driver.
Because the child suddenly came out of the bushes, she could not prevent the collision.

Literally nobody is against road safety. But 'the language and information systems of an organization are not an objective means of describing an outside reality—they fundamentally structure the perceptions and actions of its members' (Kofman, 2018). Hence, the language we use to discuss road safety is not an objective mirror of reality. Instead, it profoundly shaped and shapes our contemporary mobility system, our streets and the ways we have to behave on them. And as such it will continue to shape our future. The concepts we use to approach, talk and think about road safety, the way we define it, and the approaches we use to do research strongly impacts how we define problems and where we look for solutions.

So, although literally nobody is against road safety, we should unpack these concepts. Here, this analysis is conducted first in terms of *system performance* (Meadows, 2008): how can variables of road safety be measured and what are the intrinsic limitations of our concepts (Elvik, 2008)? Second and third, I aim to unpack our road safety language in terms of *system purpose* (what do we define as the overall goal?) and *system boundary* (what are the limits of the

overall understanding of what road safety is?). To do this, below I first explain how such language is created and how that influences reality. Then, I discuss the key tenets of traffic engineering to sketch the context in which we think, study and talk about road safety. As a third step, I explore seven problematic mechanisms that are caused by this and end the paper by offering seven potential 'what-ifs' to explicitly open up the choices we make and can remake.

In a question often used for IQ testing we see a group of geese under a tree (Figure 1). A first question to ask the reader is: 'How many geese do you see? Look carefully—can you spot and count them all?'. Once you think that you counted all of them, a next question is: 'They are all facing life-threatening danger: how can we save the poor birds?'

Figure 1 The geese that are in danger

Having asked this in a variety of settings, I found that people first seem puzzled about what the danger actually is. And then start proposing strategies to scare the birds away, to scatter them or to raise their attention.

Language is a *necessary* simplification of reality: individuals and organizations need such simplification to be able to exchange thoughts and communicate with each other. In this process of simplification, choices have to be made (see examples of how this works in relation to metaphors in Lakoff & Johnson (2008), Morgan (2006) and Scott (1998)). The inherently *arbitrary choices* that are made in the development of a language become highly performative; they highlight certain characteristics of a complex phenomenon that fit with a narrative while obscuring others. A narrative here is a coherent story that provides consequential links between events or ideas and imposes meaningful patterns on what would otherwise be random and disconnected (Verkade & te Brömmelstroet, 2022; Riessman, 1993). In a narrative, important choices about how to understand a system's boundary (what variables are *in* and which are *out*), a system's purpose (what is it all for) and a system's performance (how to measure change) are made (Meadows, 2008).

Different narratives compete in periods of 'interpretive flexibility'. When one of these narratives starts dominating, we see 'interpretive closure'. A process of solidification starts in which the choices that are made in understanding a specific domain solidifies and a dominant 'discourse coalition' forms: a powerful group of actors that have shared interests and a linguistic basis that is based on an ensemble of ideas, concepts and categories through which meaning is given to ambiguous social circumstances (Hajer, 1993) [p.45].

While at the start, the arbitrary choices that underlie the original narrative remain front and centre and are politicized, over time they are no longer questioned and become taken-for-granted. It becomes a depoliticized 'radical monopoly' (Illich, 1974) that is completely taken for granted and no longer questioned.

The discourse then becomes a performative guide for the actions of all relevant mainstream agents—ranging from public administration, industry, the civil sector and academia. These actions, in turn, reinforce the discourse coalition to make experiences coherent fuelling a self-fulfilling prophecy with a strong path-dependency. This is how the discourse becomes increasingly performative.

2 The performativity of language

2.1 From primeval to production forests

We can see this path-dependency in the example of the reshaping of forests through government interventions (Scott, 1998). If we take the primeval forest as starting point, we can see how complex and diverse a forest ecosystem can become over time when it is not governed. Through a continuously changing balance of dynamic feedback loops, a primeval forest offers a suitable habitat for a diversity of flora and fauna. Different animals find optimal conditions

for hunting, hiding, nesting, playing and growing. Different trees and plants co-exist and benefit from each other. The diversity of the primeval forest also supported and co-existed with local communities by offering a commons of food, fuel, medicine and spiritual balance. But, as Scott argues, this all changed around the end of the 18^{th} century. Wood increasingly became a valuable resource, as building material and as fuel.

To support owners of forest in governing their land, a new language was required with new indicators that could guide decisions and interventions. The newly established domain of 'scientific forestry' developed the concept of the standard tree (Normalbaum)—an ideal-typical model of a tree that would be optimal for wood production.

Over time this new narrative changed the very nature of forests. With the standard tree as default, the standard tree helped owners to change their primeval forest into production forests. Large swaths of forests became seen as warehouses with a stock of growing wood. Rows and rows of standard trees, cleared from other plants and bushes to optimize maintenance and harvesting. This had disastrous social, cultural, economic and ecological effects due to the loss of a most former functions and purposes of the complex primeval forest. Especially all kinds of other flora and fauna came under pressure, How to hide, hunt or nest in a forest without bushes? How to survive without all the required feedback loops that makes biodiversity literally flourish. Many species of birds, insects and small game disappeared as a direct consequence.

2.2 From primeval to production streets

> 'The public street, like the urban landscape, is a material space and social construct. Streets are transport spaces and urban places, comprised not only of asphalt and vehicles, concrete and pedestrians, but also social interaction and meaning.'
>
> *David Prytherch (2018) [p. 13]*

Just as forests, our streets also used to be complex and diverse places that hosted a whole range of different functions. They grew over time in parallel with our cities and were regarded as 'the remaining spaces between buildings' (Solnit, 2001). They functioned as largely ungoverned public spaces, as commons used for many purposes: work, trade, play, socialising and transportation.

But just as swathes of our forests were repurposed for wood production and large parts of our countryside for farming, our city streets have been optimised for one goal: to move individuals, goods and information around as quickly as possible, unhindered by anyone using public space for other purposes. 'Like any true commons, the street itself was the result of people living there and making that space liveable … streets are no more for people. They are now roadways for automobiles, for buses, for taxis, cars, and trucks. People are barely tolerated on the streets unless they are on their way to a bus stop. If people now sat down or stopped on the street, they would become obstacles for traffic, and traffic would be dangerous to them. The road has been degraded from a commons to a simple resource for the circulation of vehicles. People can circulate no more on their own. Traffic has displaced their mobility. They can circulate only when they are strapped down and are moved.' (Illich, 1983)

The decisive decade for this was the 1920s when American cities were suddenly faced with a large number of mass-produced motorized vehicles. This innovation resulted in largescale disturbances of street life and most notably the death of large numbers of children. The language of the street that was formed over millennia became fluid under this urgent pressure.

Norton (2011) explains how this was first discussed in terms of justice, in which the new violence was seen as completely unacceptable by most. The intrinsic innocence of children was undisputed. But in a process of incremental changes, some intentional and some less so, the narrative shifted to one based on efficiency, order and the freedom of individual car drivers. Over time, and based on mainstream economic thinking, individuals were simplified into homo economicus that selfishly and isolated calculate how to minimize their individual travel time between their relevant As and Bs. Around the 1930s, these principles landed in a new language that since then solidified into a discourse coalition about streets: traffic engineering.

In the decades that followed these choices in values and worldviews further solidified. First it solidified into new road guidelines, designs and norms. Then, they solidified into traffic models, institutions and traffic laws. They solidified into rules, regulations and behaviour. And finally they solidified into asphalt, concrete and steel. Ultimately, the discourse coalition

of traffic engineering solidified our imagination and our thinking about the problems and solutions on our streets. We now take the efficiency of networks and the need to save individual travel time (or reduce generalized travel costs) for granted as ultimate goals of policies for our streets. And we listen to news about delays on our highways on all radio stations every half hour, 350 minutes a week!

3 Context of road safety language

To analyse and unpack a discourse coalition, we need to understand what basic entities are recognized/constructed, which assumptions are made about relationships, what are the key agents and their motives and what key metaphors and rhetorical devices are used.

3.1 The discourse coalition of traffic engineering

When traffic engineering first had to establish itself, the first metaphors were drawn from water engineering, which had shown to be able to provide efficient sewage and water systems for cities (Norton, 2011; te Brömmelstroet, 2021). Seeing streets as a hierarchy of smaller and bigger pipelines in which traffic would flow like water (Arnott, 2013). Where limiting access would lead to a 'waterbed effect'. And if you have to design pipelines, for instance for sewage water, you never want them to clog. So, you design the pipes to cope with maximum expected intensities. Overcapacity but for that one moment a year when it pours. Within this logic, any hint of blockage becomes a sign of malfunctioning, so important that it receives one minute radio time every half hour on almost every radio station around the world. 6 hours of free air time every week!

A second source of inspiration came from biology: seeing the city as a human body with the centre as the heart and streets as (one-directional) arteries that should—again—never silt up or be clogged. Whenever that happen, we speak about 'congestion', or a 'traffic infarct' and start making 'bypasses'. When this language was complemented with metaphors from physics, traffic engineers could model this body in a more mechanized way. In the mainstream four step model, city zones interact through a gravitational pull akin to planets (Erlander & Stewart, 1990). Humans were modelled as behaving like particles who collide instead of attract and biomechanics was and is used to think about their vulnerability (Ptak, 2019). Through water engineering, biology and physics the ultimate purpose of the traffic system became to offer *an efficient network that allow unimpeded flow of vehicles*.

The above metaphors were helpful in building out the first stages of the new transportation networks and rules for car-based mobility. But increasingly, there was a need to also simplify the human behaviour while underway in this network. The key metaphor for this was borrowed from economics. The human as homo economicus: an egoistic, cold, rational and isolated individual who calculates the optimal choices from all available options to optimize his own utility. Being underway was a disutility. Akin to Corbusiers ideas of a functional city (Scott, 1998), the utility of each individual is either at point A or point B. As a consequence, everything in between is a negative factor in the calculation to move, an impediment, friction.

From this, the second ultimate goal of interventions in the transportation system is *travel time savings for individual travellers*. Around the world, this is by far the biggest gain in societal cost benefit analyses on transport projects to date (Ferreira et al., 2012). Even though we empirically and conceptually know that travel time savings do not even exist (Marchetti, 1994). Also, and important for the argument here two egoistic and isolated individuals cannot negotiate about right of way or show altruistic behaviour (Schelling, 2006). Therefore, *every interaction between travellers is defined as a conflict*.

Once a public place discussed in terms of justice, with the new dominating narrative of traffic engineering, our primeval streets have become production streets. Not remaining spaces for 'life between buildings' (Gehl, 1987), but spaces for vehicular throughput discussed in terms of efficiency. Similar to the production forest, the production street was disastrous for any other purposes of the street. And just as in that forest, other uses and users disappeared.

3.2 Road safety embedded in the traffic engineering discourse coalition

It is within this discourse that we talk about road safety. So what do we see, and arguably more importantly what do we miss, when we think and talk about road safety within this context? Which stories do we tell and which do we not? Which variables are in and which are out of our common system boundary? And how has that shaped and will it shape our common reality?

We take it now for granted that—with the best intentions—we tell our children to no longer play on the streets, but only in their gated playgrounds (Verkade & te Brömmelstroet, 2022). And to look left-right-left when they cross the zebra-crossing for their own safety. And to not be distracted or run close to roads. To make eye contact. To be seen. To be always aware that it is dangerous out there and that they are—at least partially—also responsible for their own safety. Note that this position would have been completely unacceptable in the 1920s when the dominant discourse centred around justice (Norton, 2011), but is now mainstream. But it is thanks to this discourse that we can put road safety into models, attach an economic value to it and use it to make depoliticized trade-offs with other effects of traffic projects, such as trump-all benefit of saving individual travel time.

It is within this discourse that we collect our road safety statistics, develop our well-intended road safety campaigns, meet on our annual road safety conferences and submit our work to the Journal of Road Safety.

But as unforeseen consequence of this discourse, we might have collectively slowly taken systemic traffic danger for granted. The danger that our traffic system brought and increasingly brings to our street has become normalized over time, because our language makes us look for problems and solutions elsewhere. Culver (2018) states that 'in combination with the fact that vehicular violence—as systemic violence—is not a concentrated but a spatio-temporally diffuse catastrophe, the naturalization and denial of vehicular violence have allowed car deaths to become largely invisible relative to their horrific ubiquity, shielding it from any substantial critique to this day' [p. 152].

So, if we accept that this discourse is not a mirror but a lens that frames what we see, how does this language shape the problems and solutions that we, in academic research, in the media and in the public and political debate, see? And, arguably more importantly, how can we shape a different lens that will help us shape a radically different future? Let's first explore some key mechanisms that stem from the language as introduced above.

4 Seven problematic mechanisms within road safety language

Below, I discuss a number of pertinent, problematic mechanisms in the language we use in the academic and popular debate about road safety that are holding back significant change.

4.1 We add up morally incompatible categories

With utility and efficiency as the defining characteristics for our road network, we are interested in general safety statistics that can be used to weigh safety against travel time savings. To do so, we collect statistics and add up categories that are similar from the point of view of efficiency, but completely incompatible in terms of justice. Our annual road safety statistics present to us the total amount of people who died or got (severely) injured on our roads: e.g. the total number of road fatalities/injured (Figure 2). But this lumps together people who died (by themselves) with people that got killed (by others). Although killing or maiming someone is almost always unintentional (as is dying), the difference between these categories in moral terms is far from trivial. Dying is a part of life, something that will eventually happen to all of us. Yes, people dying in traffic is as tragic as anywhere else, but such a tragedy is incomparable with situations where people get killed by others. There is no other domain of life where we would see these two types of events as similar.

When politicians discuss road safety policies based on these general statistics, they are inclined to look at the most effective ways to reduce those overall numbers. In this, it is much easier to focus on disciplining and protecting potential victims (i.e. via another road safety campaign) instead of addressing the problem that people are unintentionally killing and maiming each other. This offers a relatively easy way to seemingly address the problem without truly stirring the pot or challenging the underlying system itself. Who can possibly be against this?

To be clear, categorizing dying and being killed is not the end of it. These categories also need to be further unpacked to offer meaningful input to our policies. The category of unintentionally being killed for instance signifies that actions of multiple people are involved, but does not away with complex underlying issues of blame, responsibility and liability that play out in the various contexts of crashes. And similarly, the category

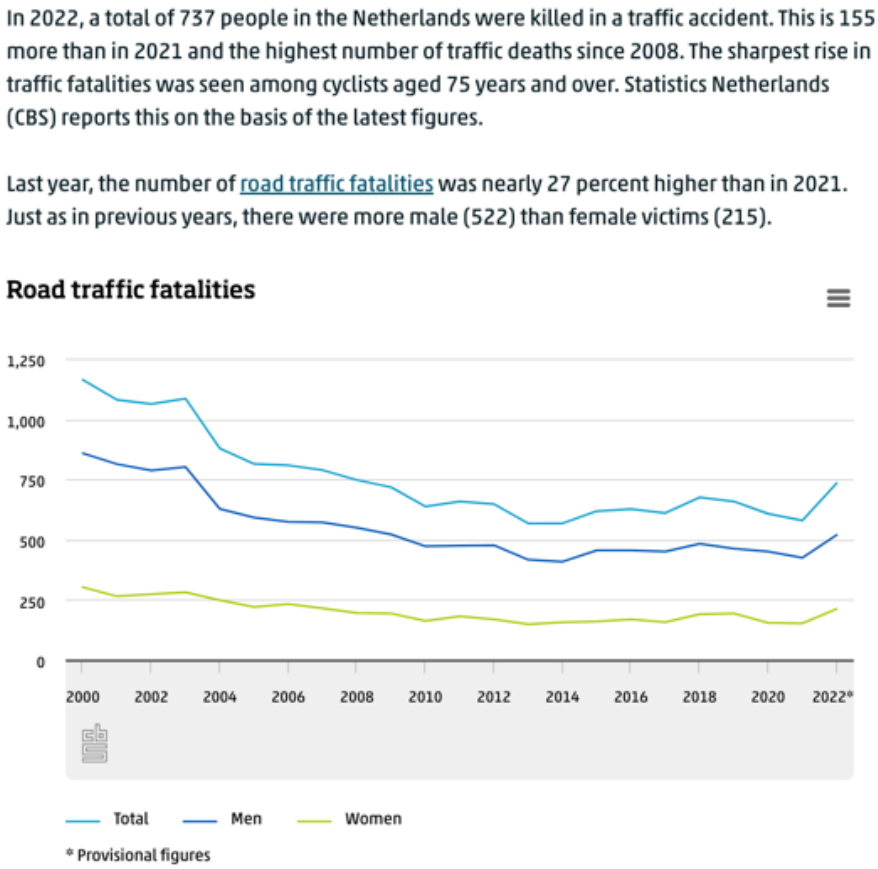

Figure 2 Typical output in reports on road safety statistics, showing the total road traffic fatalities by adding dying and being killed (CBS, the Netherlands)

of dying also still includes deaths that could be avoided with better infrastructure and deaths that are the result of other underlying causes.

So sure, we should keep developing forgiving infrastructure where the consequences of mistakes are minimized and preventable dying is addressed. But if we aim not for an efficient, but a just Vision Zero, we have to disentangle the category of dying from the category of unintentionally being killed. If the goal is zero, which can be questioned in its own terms (Elvik, 1999), we should not aim for Zero people dying in traffic but instead—first and foremost—for Zero people killing or maiming others.

4.2 We confuse citizens with consumers to calculate the toll

To enable a trade-off between road safety and system efficiency in our Cost Benefit Analyses we have to operationalize these effects in the same terms. To do so, we monetize the 'value of travel time (VOT)' and the 'value of statistical life (VOSL)' to put both of them in a (social) cost benefit analysis. To express such abstract notions into monetary values, researchers use stated choice experiments in which individuals are asked to make several choices between two routes that differ in terms of travel time or risk (Bahamonde-Birke et al., 2015). Mouter and colleagues found that it really matters how these choices are framed (Mouter & Chorus, 2016; Mouter et al., 2017, 2018). When the language puts people in a consumer role ('which route would you choose?'), the calculated trade-off was between 2.5 and 5.4 minutes travel time savings per reduction of 1 traffic fatality. When they were put in a citizen role ('which route would you recommend to the government') this became 10.7 and 16.4 minutes. This 'empirical evidence indicates that the selection of a particular approach can substantially affect the results of an appraisal study' (Mouter et al., 2017) [p.348]. To some, such large inconsistency could lead to wildly incorrect conclusions and therefore should not be used it to support policy making (Hauer, 1994). We could even question whether the real objective value of statistical life can ever be found (Elvik, 2016).

4.3 We use cold statistics that dampen a sense of urgency

In media reports, traffic crashes are presented as glitches in the machine—dehumanized interferences with the overall functioning of a well-oiled machine, where effects on traffic flow trump the human tragedies for all people involved (te Brömmelstroet, 2020). The data in that study suggests that is more important to report that a road was temporarily closed than to describe the terrible effects of a violent event on everyone at the scene.

And this is not limited to media reports. We discuss road safety in terms of annual general statistics (see 4.1). Statistics that allows us to put it into our models, to put it into trade-offs with travel time savings (see 4.2). That makes us forget, or unaware, about the countless human trauma's and tragedies added every day. Our annual road safety statistics give the impression that traffic violence is a natural phenomenon that we simply have to deal with. Statistics that fluctuate a bit year by year. Background noise. In which people succumb and children just suddenly cross the road. 620 annual traffic fatalities in the Netherlands. When it jumps to 650 there is a big fuzz. When it drops to 610 we are celebrating that we are 'saving lives'.

This annual fuzz lasts for one day, maybe two, and then we return to business as usual. Globally, 1.3 million people die on roads annually, 20–30 million get severely injured, and it is the leading cause of death for adolescents. It is not these numbers that are shocking. It is the fact that society takes them for granted that should shock us. The urgency argument is never in itself a good reason to act, as it may force us into quick and risky actions (Rosling, 2018). However, the opposite also holds true. The focus on keeping a distanced track of the objective data can lull us into indefinite inaction: 'let's refrain from any measures and first wait until the final data comes in…'.

4.4 We forget to compare

Within these statistics cycling and walking is often represented as a dangerous activity and people are seen as 'vulnerable road users (VRU)'. In itself both of these phenomena already confuse the danger itself with the vulnerability to danger: a human in public space is not inherently vulnerable without others bringing in danger. Why do we not talk about 'dangerous road users (DRU)' instead?

And too often we forget to compare our safety statistics with other domains of life. If we want to compare the safety with background data, it would again make sense to divide those who were killed/injured by others from those who died (see 4.1). The former could then be compared to other forms of violence, such as gun violence and femicide (Minnema et al., 2022). While the latter, often referred to as single-sided crashes, should be compared to other causes of death, such as accidental falls. In the Netherlands the number of fatalities in that category is ten times as high.

Within both comparisons we should then debate both the necessity and the effectivity of policies to prevent it. Are cycling and walking in themselves intrinsically more dangerous than other activities? Does cycling itself cause more head trauma than other activities? Does it make sense to promote wearing protective gear while cycling aside from potential perverse negative effects as less cycling? Or should we target activities with more risk for head trauma instead?

4.5 We speak about accidents instead of systemic properties

Although still debated, there has been a lot of recent critique on the use of the word accident to describe traffic crashes in media reports (Ralph et al., 2019; Goddard et al., 2019; Singer, 2022; Ralph et al., 2022). There are now specific guides for journalists with the aim to ban the use of the word accidents to describe traffic crashes in the UK and USA. In the common sense, an accident implies that the event was unpredictable, unexpected and random. This might be true for the details of each individual crash, it however fails to create awareness of the systemic nature of their occurance. The call of the above scholars is that we need to acknowledge on that larger level that crashes are at least predictable and expected (see in 4.2 that they are actually internalized into policy decisions).

Using a different word like crash, or collision helps to avoid that problematic connotation. But even then we see that in the reporting on crashes, we tend to focus on incidents rather than the systemic patterns they represent: 'Why the driver went off the road is still under investigation'. Seldomly we see a crash being discussed as part of a larger pattern at a location, in the mobility system or over time, i.e. as a systemic property of the road or mobility system itself (te Brömmelstroet, 2020).

In unravelling the problematic notion that '95% of traffic crashes are caused by behaviour', Braun & Randell (2020) state: 'The construction of the facts begins with the initial formulation of the study, its parameters, purpose and scope; the construction of variables and their associated values; the development of a codebook for translating observations and responses into values for each variable; the investigative work at the scene of the crash; the assigning of causes under human, vehicle or environment variables; the recoding, analysis and interpretation of the data' [p. 5]. Within these constructed facts we are searching for individual causal factors that cause these crashes, but the larger car-centric mobility system—and the systemic nature of traffic violence—are no longer a factor in that analysis. But if humans err to such a degree, we should conclude that it is not human errors, but a species error that should have been accounted for when designing the road and mobility system (Norton, 2021).

4.6 We focus on victims instead of all parties involved

An obvious way how road safety statistics normalize the violence is through its focus on victims. In headlines and general statistics (see also 4.1 and Figure 2), the victim is almost always represented while information of other involved parties are often missing. This makes us automatically think of and focus on what the victims were doing, and how we can help them to not be involved in a crash. It is unimaginable that we would present rape victims in terms of which clothes they were wearing or which activities they were doing. We are getting distracted by distracted pedestrians (Ralph & Girardeau, 2020).

This skewed view of road safety statistics is also mirrored in newspaper reports on traffic crashes. In the majority of articles on crashes, a counterparty is not mentioned in a headline (te Brömmelstroet, 2020). If a counterparty is mentioned in the headline of a newspaper report in a crash, this is most often a vehicle and not a person. The grammar of most newspaper headlines are non-agentive, e.g. 'cyclist (50) severely injured after collision'. We see humans succumb, but we do not report on the violence itself as agentive. These patterns are supported by other studies (Hickman, 2023; Ralph et al., 2019; Connor & Wesolowski, 1999).

As Ennis (2023) states, 'this naïve and harmful pseudo-logic shifts blame from rigged structural environments to the "personal irresponsibility" of victims. We cruelly design structures that incentivize people to behave badly, then appeal to them not to behave badly, and ultimately neglect to change incentive structures.' [p. 97]. This is not a call to blame the other party (or: crash partner) involved. On the contrary, by including them more in describing and understanding a crash, it becomes apparent that all humans involved are in part victims of the larger system they are living in[1]. No person goes out with the idea to hurt or kill somebody else on the road. But why have we created a system in which a small, human mistake can be so lethal and causes so much misery on such a systemic level? The safe systems approach already acknowledges this (Job et al., 2022), and while it is used in many other domains of safety (i.e. workplace safety) it still represents a rather radical narrative in public discourse in many contexts.

4.7 We teach our children to behave safely and normalize road violence

Instead of problematizing the situation on our roads, and instead of seeing the danger inflicted on our children as something unacceptable, we teach our children to take responsibility for their own safety. This already started in the 1920s when parents started to ask the schools of their children to at least increase their awareness for the new hazard on their roads (Norton, 2011). In the Netherlands, our children get trained from the early age of four. Ready-made packages are provided to about half of all elementary schools by the national organisation Veilig Verkeer Nederland 'Safe Traffic Netherlands' (VVN). Sponsored by the car and oil industry, their products teach young children to cope with the danger on our streets, to learn the rules and take some responsibility for their own safety. A strong and performative message to discipline our children, without any evidence of its effectiveness in term of road safety.

Historically, this approach was challenged in the Netherlands in the 1970s and 1980s, based on the famous Stop the Child Murder movement. The main goal of them was to challenge the notion that the danger on the roads simply existed and instead called for teaching how we could take that away. This

[1] see also this recent piece in The New York Times: Meko (2023).

alternative was actively marginalised by a forced fusion with VVN (Verkade & te Brömmelstroet, 2022). When elementary schools now want to work on road safety, the go-to material comes from VVN that normalizes the violence, as if it is similar to water (learn to swim) or nature (learn to deal with natural hazards).

5 Is current road safety discourse still useful?

In all these decades many of the systemic properties that underlie the violence did not improve but worsened: where cars introduced a high number of safety features for the rider; the number of heavy vehicles increased; they became faster and have more powerful acceleration; they became bigger with SUV's now being the dominant car being sold; they became heavier with e-cars adding significant weight and kinetic energy in a crash; and drivers became more distracted (partly perversely caused by making their machines less dangerous for themselves). An average Dutch(wo)man who lives for 80 years, experiences the violent death of 50 000 fellow Dutchmen during his/her lifetime on our roads. Another 1 million people will be severely injured. Think about the enormous loss experienced by so many people on a day-to-day basis. As Dorothee Bär stated as German Secretary for Traffic and Infrastructure: 'When somebody dies in a traffic crash, on average 11 family members, 4 close friends, 56 friends and acquaintances, and 42 rescue workers are permanently affected by this heavy fate.'

Child died after accident in Ulft.
At a collision in Ulft, a 9-year old boy died.
The child came out of a garden and ran straight across the road.
He was hit by the car of a 27-year old car driver.
Because the child suddenly came out of the bushes, she could not prevent the collision.

This 9 year old boy was Dion. Dion was my best friend. And I was less than a meter away from him when this happened. Coincidently, his mother and his little brother came by bike only a few minutes later. His life ended violently and abruptly. His mother's live was destroyed. His brother, his father live in constant fear. Me, as 9 year old boy. My mother. My father. My sisters. All our lives changed ever since. Our classmates and teacher. Our soccer friends. The neighbours and bystanders who heard the crash and my ice cold screams. The police officers, medics. The driver of the car and her family. This stays behind our cold statistics, behind the dehumanized news articles where a child 'ran across the road'.

Let's revisit the question I asked you in the introduction. On the picture (Figure 1) we can spot a group of eight geese. So, how to save all of them from a life-threatening danger? When our attention goes to 'saving lives' we tend to focus on instructing the victims and to change their individual behaviour. But then we forget to see and address the actual source of the danger. Most people also fail to spot it in the picture of the geese. If you did; go back and look in the tree. Do you see it? It is not pollution, or global warming. But did you see … the wolf in the tree?

5.1 Discourse on road danger opens up choices

Literally nobody is against road safety. But the language we use is not an objective mirror of reality. It is a lens that profoundly shaped and shapes how we define the problem of road safety and which solutions directions we seek. The current road safety discourse makes us complacent in the ongoing and growing carnage in transport systems. A discourse that did not minimize the systemic violent properties of the mobility system. On the contrary, it removed the traffic system itself and the foundations on which it is built from the realm of possible critique. Because when the system itself is the cause, then the only solution is currently unthinkable: for reducing systemic traffic danger we then have to radically change the traffic system itself. And not only the infrastructure, but curbing the dangerous functioning of motorized vehicles.

What if we would really want to work on effective solutions? That requires a shift of system purpose from 'increasing road safety' to 'reducing road danger' and challenging our system boundary to also bring back elements of justice. The first make it easier to spot the wolf instead of targeting the geese, while the second helps us asking not only if or how a certain intervention might work, but also if the potential outcomes are even desirable. Instead of limiting the discussion to (f)utility of road danger interventions to also include more sensitivity to their potential jeopardy and perversity (Hirschman, 1991).

The way we talk and think about our roads is a choice. Our choice. So, what if we start to challenge the choices that underlie it! What if we stopped talking about Road Safety and instead rename our field by referring to the actual problem we are trying to solve: Road

Danger. What if we rename our journals to *Journals of Road Danger*, together go to annual *Reducing Road Danger* conferences and present *Road Danger Reduction* schemes to the responsible politicians. What would happen if instead of talking about increasing safety, we would problematize and reduce the systemic danger itself? In Table 1, I illustrate with 7 'what-ifs' how the seven mechanisms could be questioned to open up the underlying choices in system purpose and system boundary.

Re-politicizing these choices might reveal more popular support for interventions than we currently find. If we manage to present the reduction of road danger not as taking away privileges from car drivers, but as giving back privileges to so many others (Gössling, 2020). Not lowering speeds, but opening streets. Especially for our children. In many countries (e.g. in Japan, Spain, Wales, the Netherlands), cities are already lowering speed limits across the board. Often making 30 km/h the new norm, but in Barcelona superblocks it is even lowered to 10 km/h (Nello-Deakin, 2022). Mayors that take such seemingly unpopular steps are often re-elected because their popularity rises after the intervention is experienced. And we don't only have to look at road design and policing either. If we want to take the violence out of the system, we can actually now limit the maximum speed of vehicles. Intelligent Speed Assistance combined with geofencing can give us back control over the acceptable levels of violence in our public spaces, in which society can decide on the accepted maximum speed that than simply cannot be overruled (Hansen et al., 2022).

Next to opening up the choices within the dominant discourse by exploring the seven alternative mechanisms, I close with four direct strategies that we can consider:

1. **Change our educational programs.** From the early days of car traffic, parents asked schools to educate their children about the new dangers on the street and how to avoid them. To this day, professional organisations offer elementary schools all kinds of off-the-shelf programs. In the Netherlands, about 50% of all elementary schools have traffic lessons on their curriculum and spend about 1 hour per week on it. The largest package that is used by most is the VVN material addressed above. There is little to no evidence that they work. Each package focuses on disciplining children and normalizing danger. Let's work instead on developing alternative educational programs that teach our children (and their parents) how the danger on our streets has been constructed and how they can actively work towards improving this situation. Let's also find ways to fund this that do not include the car and oil industry.
2. **Crash matrixes as the way to represent the problem.** Instead of statistics of victims we can present the same data by also showing the other party. In doing this, we should actively denounce the idea that this representations shows blame or liability. Crash matrixes give a visual overview of how different modes are involved in crashes in which people die and get injured and have been used from the start of road safety statistics. More recently they are recently discussed by others (Elvik, 2008), but are not a very central part in our communication in academic, policy and popular circles. Crash matrices have been recently reintroduced in several countries and the EU. The website Roaddanger.org (n/d) offers an open source citizen-science platform that allows volunteers to develop such crash matrices through categorizing local newspaper reports (Figure 3).
3. **Talk about human tragedies instead of glitches in the machine**. We have taken for granted that traffic crashes are presented as a natural occurrence, with statistics and newspaper reports that resemble the daily weather forecast. We need to talk again much more about the human tragedies they involve, as currently is increasingly done in Australian mainstream media. It is only through looking the beast in the mouth that we can hope for transformative change (Virilio & Ruby, 1998). Training journalists to make different editorial choices is a necessary but not sufficient condition for this. We find that the complexity of the violent incidents cannot be captured in good vs. bad linguistic choices (Kwakman et al., 2023). We need to treat every crash as any other violent incident and report on it accordingly. If most radio stations now spend 1 minute per half hour to update us all on congestion, this means that we can start by repurposing these 350 minutes every week to have a more meaningful discussion.
4. **A relentless focus on the systemic nature.** Godwin's law predicts that as an online discussion grows longer, the probability of a comparison to Nazis or Adolf Hitler approaches 1. A similar law could be introduced for how conversations

Table 1 Seven mechanisms of current road safety language and potentials for change

We talk about increasing road safety	What if we talk about decreasing road danger?
1. We add up morally incompatible categories.	→ What if we distinguish between dying and being killed?
2. We confuse citizens with consumers to calculate the toll.	→ What if we see road danger reduction as a question for citizens?
3. We use cold statistics that dampen a sense of urgency.	→ What if we combine statistics with a deeper understanding of human tragedy?
4. We forget to compare.	→ What if we always compare different activities to assess the effectiveness of solutions?
5. We speak about accidents instead of systemic properties.	→ What if we keep our eye on systemic properties of road danger over time and space?
6. We focus on victims instead of all parties involved.	→ What if we have a more holistic view that includes all humans involved?
7. We teach our children road safety and normalize road violence.	→ What if elementary schools can also teach children and their parents how to challenge and reduce road safety?

about traffic crashes slip into a blame-game: are all humans involved clearly mentioned? Do we know who ignored traffic rules? Who is victim and who is culprit? Are there other characteristics of those people such as age, occupation or type of bicycle they ride? Are there behavioural clues that can be blamed, such as alcohol, drugs, distraction or tiredness? We need to restrain ourselves. Yes, we should dive deeper into details as part of describing the tragedy. But we should always keep our eye on the ball: it is the system itself that produced landscapes of fear and anxiety (Culver, 2018) [p. 162]. And that produces the sheer violence to which we are all exposed. We should keep a relentless focus on how the intrinsic nature of system violence is a phenomenon that can only be seen across space and time (see Figure 4 as illustration).

CRediT contribution statement

Marco te Brömmelstroet: Conceptualization, Writing—original draft, Writing—review & editing.

Declaration of competing interests

There are no competing interests to declare.

Funding

This work received no funding.

Acknowledgements

I would like to express my sincere gratitude to those who have contributed to the completion of this position paper. I am especially thankful to Aliaksei Laureshyn who invited me to turn a keynote into a paper and who supported this process with constructive feedback. I am also grateful to my colleagues and peers for their helpful discussions, suggestions, and encouragement throughout this endeavor and to John Hickman and Rune Elvik for their comments and suggestions.

References

Arnott, R. (2013), 'A bathtub model of downtown traffic congestion', *Journal of Urban Economics*, 76, 110–121, https://doi.org/10.1016/j.jue.2013.01.001.

Bahamonde-Birke, F. J., U. Kunert, H. Link (2015), 'The value of a statistical life in a road safety context-A review of the current literature', *Transport Reviews*, 35(4), 488–511, https://doi.org/10.1080/01441647.2015.1025454.

Braun, R., R. Randell (2020), 'Futuramas of the present: the "driver problem" in the autonomous vehicle sociotechnical imaginary', *Humanities and Social Sciences Communications*, 7(1), 1–10, https://doi.org/10.1057/s41599-020-00655-z.

Connor, S. M., K. Wesolowski (1999), 'Newspaper framing of fatal motor vehicle crashes in four Midwestern cities in the United States', *Injury Prevention*, 10(3), 149–153, https://doi.org/10.1136/ip.2003.003376.

Culver, G. (2018), 'Death and the car: On (auto) mobility, violence, and injustice', *An International Journal for Critical Geographies*, 17(1), 144–170, https://doi.org/0000-0002-1939-413X.

Elvik, R. (1999), 'Can injury prevention efforts go too far?: Reflections on some possible implications of Vision Zero for road accident fatalities', *Accident Analysis*

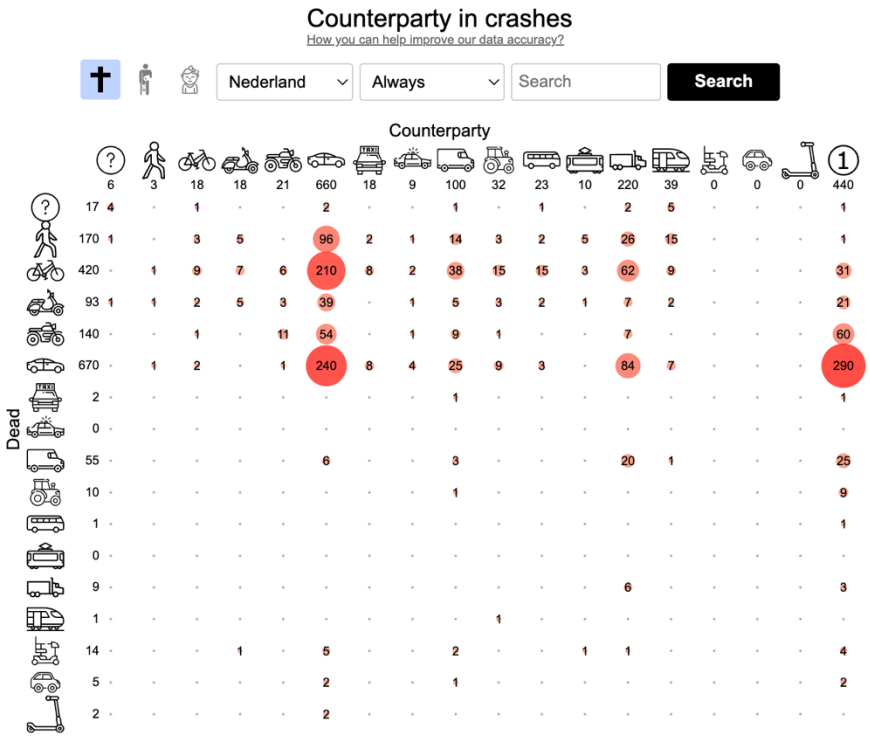

Figure 3 A crash matrix based on a citizen science platform (Roaddanger.org, n/d)

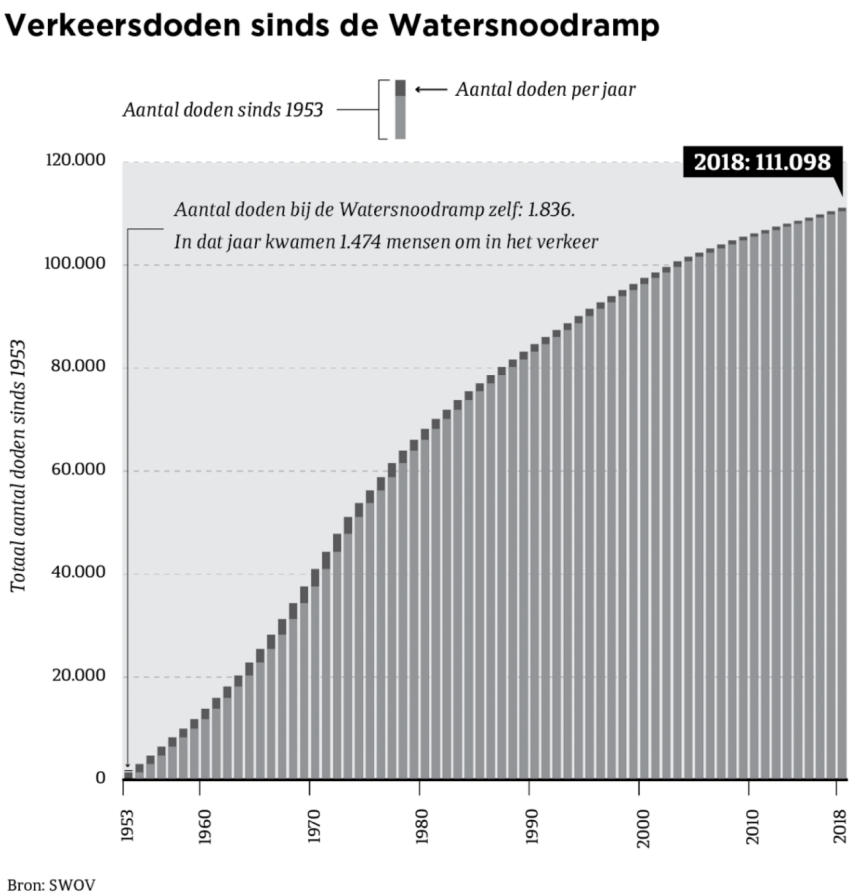

Figure 4 Traffic fatalities depicted on a cumulative graph, showing the systemic nature. In the Netherlands over 111 000 people died in traffic since 1953. As a reference: the big national flooding disaster in that year killed 1 836).

& Prevention, 31(3), 265–286, https://doi.org/10.1016/S0001-4575(98)00079-7.

Elvik, R. (2008), 'Dimensions of road safety problems and their measurement', *Accident Analysis & Prevention*, 40(3), 1200–1210, https://doi.org/10.1016/j.aap.2008.01.004.

Elvik, R. (2016), 'The Value of Life - The Rise and Fall of a Scientific Research Programme', Institute of Transport Economics, Norwegian Centre for Transport Research, TØI Report 1531/2016, https://www.toi.no/getfile.php?mmfileid=44020.

Ennis, G. (2023), *Dark PR: How Corporate Disinformation Harms Our Health and the Environment* (Québec, Canada: Daraja Press).

Erlander, S., N. F. Stewart (1990), in and others (ed.), *The Gravity Model in Transportation Analysis* (Utrecht, Netherlands: VSP BV).

Ferreira, A., E. Beukers, M. te Brömmelstroet (2012), 'Accessibility is gold, mobility is not: A proposal for the improvement of Dutch transport-related cost-benefit analysis', *Environment and Planning B: Planning and Design*, 39(4), 683–697, https://doi.org/10.1068/b38073.

Gehl, J. (1987), *Life between buildings* (New York, USA: Van Nostrand Reinhold).

Goddard, T., K. Ralph, C. G. Thigpen, E. Iacobucci (2019), 'Does news coverage of traffic crashes affect perceived blame and preferred solutions? Evidence from an experiment', *Transportation Research Interdisciplinary Perspectives*, 3, 100073, https://doi.org/10.1016/j.trip.2019.100073.

Gössling, S. (2020), 'Why cities need to take road space from cars-and how this could be done', *Journal of Urban Design*, 25(4), 443–448, https://doi.org/10.1080/13574809.2020.1727318.

Hajer, M. A. (1993), 'Discourse coalitions and the institutionalization of practice: The case of acid rain in Great Britain', in Fischer, F., & Forester, J. (eds), *The argumentative turn in policy analysis and planning* (London, UK: Duke University Press), https://doi.org/10.2307/j.ctv1220k4f.5.

Hansen, L., H. Seter, Ø. M. Tveit (2022), 'Regulating connected and automated vehicles: how do drivers experience being automatically regulated by digital traffic rules', *Transportation Research Interdisciplinary Perspectives*, 14, 100611, https://doi.org/10.1016/j.trip.2022.100611.

Hauer, E. (1994), 'Can one estimate the value of life or is it better to be dead than stuck in traffic?', *Transportation Research Part A: Policy and Practice*, 28(2), 109–118, https://doi.org/10.1016/0965-8564(94)90032-9.

Hickman, J. (2023), 'Windshield bias is real: 2019 news coverage of pedestrian traffic fatalities in the United States', *Traffic Safety Research*, 5, 000034, https://doi.org/10.55329/vfjb6171.

Hirschman, A. O. (1991), in and others (ed.), *The Rhetoric of Reaction: Perversity, Futility, Jeopardy* (Cambridge, USA: Harvard University Press).

Illich, I. (1974), *Energy and Equity* (Richmond, UK: Calder & Boyars).

Illich, I. (1983), 'Silence is a commons', *CoEvolution Quarterly*, 40(winter), https://wholeearth.info/p/coevolution-quarterly-winter-1983.

Job, R. F. S., J. Truong, C. Sakashita (2022), 'The Ultimate Safe System: Redefining the Safe System Approach for Road Safety', *Sustainability*, 14(5), 2978, https://doi.org/10.3390/su14052978.

Kofman, F. (2018), 'Double-loop accounting: A language for the learning organization', The Systems Thinker, https://thesystemsthinker.com/double-loop-accounting-a-language-for-the-learning-organization/, accessed 2024-02-09.

Kwakman, E., M. te Brömmelstroet, A. van Emmerik (2023), ' "In the name, she lives on" : Responsibilities and rehumanization in survivor narratives of vehicular violence', *Mobilities*, (under review).

Lakoff, G., M. Johnson (2008), *Metaphors We Live By* (Chicago, USA: University of Chicago Press).

Marchetti, C. (1994), 'Anthropological invariants in travel behavior', *Technological forecasting and social change*, 47(1), 75–88, https://doi.org/10.1016/0040-1625(94)90041-8.

Meadows, D. (2008), *Thinking in systems: A primer* (Vermont, USA: Chelsea green publishing).

Meko, H. (2023), 'Car crash victims seek justice in a new way: talking to the drivers', *The New York Times*, 29 November 2023, https://www.nytimes.com/2023/11/27/nyregion/circles-safe-streets-traffic-deaths.html.

Minnema, G., G. Ruggiero, M. Bartl, S. Gemelli, T. Caselli, C. Zanchi, V. Patti, M. te Brömmelstroet, M. Nissim (2022), 'Responsibility Framing under the Magnifying Lens of NLP: The Case of Gender-based Violence and Traffic Danger', *Computational Linguistics in the Netherlands Journal*, 12, 207–233, https://www.clinjournal.org/clinj/article/view/155/163.

Morgan, G. (2006), 'Images of organization' (Thousand Oaks, CA, USA: SAGE Publications).

Mouter, N., C. Chorus (2016), 'Value of time: A citizen perspective', *Transportation Research Part A: Policy and Practice*, 91, 317–329, https://doi.org/10.1016/j.tra.2016.02.014.

Mouter, N., S. Van Cranenburgh, B. Van Wee (2017), 'Do individuals have different preferences as consumer and citizen? The trade-off between travel time and safety', *Transportation Research Part A: Policy and Practice*, 106, 333–349, https://doi.org/10.1016/j.tra.2017.10.003.

Mouter, N., S. Van Cranenburgh, B. Van Wee (2018), 'The consumer-citizen duality: Ten reasons why citizens prefer safety and drivers desire speed', *Accident Analysis & Prevention*, 121, 53–63, https://doi.org/10.1016/j.aap.2018.08.027.

Nello-Deakin, S. (2022), 'Exploring traffic evaporation: Findings from tactical urbanism interventions in Barcelona', *Case Studies on Transport Policy*, 10(4),

2430–2442, https://doi.org/10.1016/j.cstp.2022.11.003.
Norton, P. D. (2011), *Fighting traffic: the dawn of the motor age in the American city* (Cambridge, MA, USA: MIT Press).
Norton, P. D. (2021), *Autonorama: the illusory promise of high-tech driving* (Washington D.C., USA: Island Press).
Prytherch, D. (2018), *Law, engineering, and the American right-of-way: Imagining a more just street* (Cham, Switzerland: Springer), https://doi.org/10.1007/978-3-319-75705-6.
Ptak, M. (2019), 'Method to assess and enhance vulnerable road user safety during impact loading', *Applied Sciences*, 9(5), 1000, https://doi.org/10.3390/app9051000.
Ralph, K., I. Girardeau (2020), 'Distracted by "distracted pedestrians"?', *Transportation Research Interdisciplinary Perspectives*, 5, 100118, https://doi.org/10.1016/j.trip.2020.100118.
Ralph, K., T. Goddard, C. Thigpen, R. Davis (2022), 'Intervening at the blotter, not the broadcast: improving crash coverage by targeting police press releases. Transportation research interdisciplinary perspectives', *Transportation Research Interdisciplinary Perspectives*, 15, 100669, https://doi.org/10.1016/j.trip.2022.100669.
Ralph, K., E. Iacobucci, C. G. Thigpen, T. Goddard (2019), 'Editorial patterns in bicyclist and pedestrian crash reporting', *Transportation Research Record*, 2673(2), 663–671, https://doi.org/10.1177/0361198119825637.
Riessman, C. K. (1993), 'Doing narrative analysis', *Narrative Analysis* (London, UK: Sage Publications).
Roaddanger.org (n/d), https://www.roaddanger.org/, accessed 2024-02-21.
Rosling, H. (2018), *Factfulness: Ten Reasons We're Wrong About the World - and Why Things Are Better Than You Think* (London, UK: Sceptre).
Schelling, T. C. (2006), *Micromotives and macrobehavior* (New York, USA: WW Norton & Company).
Scott, J. C. (1998), *Seeing like a state: How certain schemes to improve the human condition have failed* (New Haven, CT, USA: Yale University Press), https://www.jstor.org/stable/j.ctt1nq3vk.
Singer, J. (2022), *There are no accidents: The deadly rise of injury and disaster-who profits and who pays the price* (New York, USA: Simon and Schuster).
Solnit, R. (2001), *Wanderlust: A history of walking* (London, UK: Penguin).
Solnit, R. (2010), *Hope in the dark: The untold history of people power* (Edinburgh, UK: Canongate Books).
te Brömmelstroet, M. (2020), 'Framing systemic traffic violence: Media coverage of Dutch traffic crashes', *Transportation Research Interdisciplinary Perspectives*, 5, 100109, https://doi.org/10.1016/j.trip.2020.100109.
te Brömmelstroet, M. (2021), 'Mobility Language Matters', *De Correspondent, Amsterdam*.
Verkade, T., M. te Brömmelstroet (2022), *Movement: How to take back our streets and transform our lives* (London, UK: Scribe Publications).
Virilio, P., A. Ruby (1998), 'Surfing the accident: Interview with Paul Virilio by Andreas Ruby', in Brouwer, J., & Mulder, A. (eds), *The Art of the Accident* (Rotterdam, the Netherlands: NAI Publishcers), https://v2.nl/articles/surfing-the-accident.

About the authors

Marco te Brömmelstroet holds the chair of Urban Mobility Futures at the University of Amsterdam. He is the founding academic director of The Lab of Thought and chairman of the Urban Cycling Institute. His research centers on the worldviews that underlie our mobility thinking and he actively explores alternatives.