

13. Traffic safety pillars: safe road users

Introduction

To reduce road crashes, traffic officials and researchers often refer to the 3E's-approach (*Education*, *Enforcement*, and *Engineering*). *Education* targets the road user and aims to change the attitudes and behaviour of individuals through various forms of communication. *Enforcement* refers to legal actions such as traffic enforcement, while *Engineering* focuses on improving the transport infrastructure and the vehicle. To achieve the greatest effect, the 3E's should be used in combination. However, this is not always the case. This module starts by identifying the problem, then shifts to human factors. It will then concentrate on one specific factor, closely linked to road crashes, focusing on the motives behind the actions. Finally, the module will conclude with strategies for changing risky road user behaviours.

Learning outcomes

After completing this module, the students should be able to:

- explain the notion that human factors are multifactorial
- define the principles behind designing effective methods for changing road users' behaviour
- explain the motives behind risky road user behaviours and the difference between error, lapses and violations
- define risk perception and how it affects road user behaviour
- apply different theories that can explain road user behaviour and theories which explain the process of change
- analyse the relationship between road user behaviour and subjective factors and how this influences safety outcomes
- suggest a road user behaviour which needs to be changed and discuss what the motives behind this action could be.

Key messages to learners

- Research has demonstrated that in the majority of road crashes human factors play a significant role. However, this information is not very useful unless we also try to understand which human factors are involved and how they contribute.
- Human failures can be divided into three categories: (i) errors, (ii) lapses, and (iii) violations. *Errors* include obvious and unintended failures such as not noticing an oncoming vehicle or misjudging its speed. *Lapses* refer to attention- or memory-related failures, such as selecting the wrong gear when starting the car or pressing the accelerator instead of the brake (right intention, wrong action). Finally, *violations* describe deliberate behaviours, such as speeding or overtaking another vehicle when visibility is poor and overtaking is not allowed (wrong intention, consequent action). Although all three types contribute to crashes, research has shown that violations have the greatest impact.
- Each type of failure requires different countermeasures. A driver who commits errors may need further training to improve perceptual skills and judgment. A driver who commits lapses is

typically a novice driver who has not yet developed stable routines and would benefit from more practice. Violations, however, differ from errors and lapses because they are intentional and influenced by social and motivational factors, such as attitudes and norms. In such cases, traditional driver training may inadvertently worsen the problem by increasing driver's feelings of control. Reducing violations requires a focus on the motivations underlying unsafe driving practices. These motivations must be understood, challenged, and changed to effectively influence deliberate risk-taking on the road.

- Various theories have been applied to predict behaviour, one of them is the Theory of Planned Behaviour (TPB). According to TPB, behavioural intention is considered the immediate antecedent of behaviour and reflects the individual's motivation to act.
- A person's intention to perform a behaviour is determined by three key factors: (i) attitudes toward the behaviour, (ii) subjective and descriptive norms, and (iii) perceived behavioural control. *Attitudes* generally refer to an internal state that predisposes an individual to respond favourably or unfavourably toward an 'attitude object' (e.g. an object, a person, or an event). *Subjective norms* describe an individual's perception of the expectations of significant others—in other words, whether important people in their life will approve or disapprove of the behaviour (i.e. what *should* be done). *Descriptive norms* measure an individual's belief about other people's behaviour (i.e. what *is* done rather than what should be done). *Perceived behavioural control* refers to a person's belief about own capability to perform a behaviour. Importantly, it concerns *perceived* rather than actual control. In the driving context, individuals frequently overestimate their skills and believe they are less likely to experience negative consequences. This inflated sense of ability can contribute to risky driving behaviour.
- A road user's internal state can play a crucial role in shaping his or her behaviour. Several key factors influencing this internal state are closely linked to the risk of road crashes. Some of them are relatively stable, such as personality traits (e.g. sensation seeking, aggressiveness). Others, such as attitudes, are less stable and may change over time. Still others are transient and situational, driven by short-term motivational states such as mood, stress, or anger. Additional transient factors relate to driving fitness, such as fatigue, drowsiness, health conditions, or the consumption of alcohol and drugs, which may themselves be influenced by underlying motivational factors. Regardless of whether these factors are stable, variable, or transient, they all have the potential to influence the decisions drivers make in different traffic situations.
- Many information campaigns have been developed to prevent or minimise traffic violations. However, some of them have shown little or no measurable effect. One possible conclusion could be that such investments are not worthwhile. Yet the more plausible explanation for these limited outcomes is that many campaigns are poorly designed and fail to use language that addresses the psychosocial processes underlying the behaviour they aim to change. To overcome these shortcomings, a sound theoretical model is essential.
- A behaviour is likely to be performed when individuals believe that it will lead to positive and valued consequences. For a new behaviour to be adopted, people must be convinced that it will produce a desirable outcome, that they possess the capability and resources to carry it out, and that significant others will approve of the change. These principles align closely with the foundations of the social marketing model, which emphasises understanding the target audience's motivations, barriers, perceived benefits before designing the message for the campaign.
- *Social marketing* is a technique used to influence a target audience to voluntarily accept, modify, or discontinue a behaviour for the benefit of individuals, groups, or society. The primary objective of social marketing is therefore to influence and change social behaviours in ways that benefit the target audience or society more broadly. In addition to promoting

behavioural change directly, social marketing may also aim to increase knowledge and/or shift attitudes as intermediate steps toward influencing behaviour.

- It is popular to use *threat-based messages* in information campaigns. Messages that contain some form of intimidation need not be limited to physical threats of death or injury; they can also involve social, psychological, or economic threats. Social threats may include the risk of losing acceptance from significant others or even being ostracised. Economic threats can involve legal sanctions with financial consequences. Individuals respond differently to such threats, underscoring the importance of understanding the motivations of the target group before designing a message.
- There is, however, considerable debate about whether threat appeals should be used. The consensus is that if it should be used it must be applied cautiously and only when accompanied by clear information on how the undesirable behaviour can be avoided. Unfortunately, many campaigns fail because they neglect this essential component. Moreover, fear-based messages carry several risks: they may lead to fatalism, thereby reducing the likelihood that individuals will change their behaviour, or they may be so unpleasant or repulsive that the audience avoids processing the message altogether.
- A common mistake when evaluating interventions aimed at changing road users' behaviour is to measure only the behaviour before and after the intervention. This approach overlooks the fact that road user behaviours can be more or less automatic, and therefore difficult to change, especially when they are reinforced by positive attitudes and supportive social norms. Consequently, an intervention that succeeds in changing the target group's attitudes or norms should also be considered a success. This also emphasizes the importance of a long-term strategy. Based on this, it is essential to evaluate both primary and secondary objectives: (i) primary objectives define the specific behaviours that need to change in order to achieve the overall goal of the campaign; (ii) secondary objectives relate to the factors that contribute to achieving the primary behavioural goals (i.e. enabling the target audience to adopt the desired safe behaviour). These can be defined in terms of knowledge, beliefs, attitudes, perceptions, or other elements that influence the target audience's behaviour.
- The *Transtheoretical Model of Change (TMC)* highlights the importance of long-term planning in behaviour-change processes and why evaluations should include both primary and secondary factors. It describes six stages through which individuals typically progress before a new behaviour becomes fully established: (i) *precontemplation*—individuals have no intention of changing their behaviour; (ii) *contemplation*—they begin to consider change, but no decision is made because they do not yet perceive their current behaviour as particularly problematic; (iii) *preparation*—a decision to change is made and individuals start planning for change; at this point, they require information and support that help them carry out the intended behaviour; (iv) *action*—they actively initiate the new behaviour; (v) *maintenance*—it is only during this stage that the behaviour becomes more stable; (vi) the final stage, *termination*, represents the ultimate goal of behaviour change—the previous behaviour is no longer appealing, and the new behaviour feels fully integrated. However, individuals may sometimes regress to earlier stages if they encounter difficulties or obstacles in maintaining the new behaviour. Based on this theory, a campaign that succeeds in moving the target group from one stage to the next should be considered successful. Such progress should then be supported by follow-up campaigns that continue to guide individuals further along the change process.
- A communication campaign is not the only intervention that can reduce the number of road crashes. Other supportive activities such as enforcement, legislation, education, and engineering improvements can be used to support the campaign message. For instance, law enforcement helps to uphold society's expectations and standards, and imposes sanctions when laws are broken. If this is combined with a campaign, then the campaign message can increase

the acceptance of the rules. Campaigns in combination with improvements to the infrastructure could be used to inform road users why, for instance, a 30 km/h zone has been introduced.

Learning activity

Exercise

Design a local road safety campaign targeting a specific behavioural issue, for example: (i) professional drivers (taxi or delivery vehicles) frequently over-speeding; (ii) young people on mopeds/mc behaving recklessly in traffic. Then:

- define the target audience
- define the behaviour to be changed
- defined the desired behaviour (what to change to?)
- formulate the message to be delivered
- suggest options for delivering the message (format, media channel, etc.)
- discuss how to evaluate the campaign effects.

Assessment quiz

Question 1

Which one of the following can be described as lapses?

- a. misjudge speed of oncoming vehicle (**incorrect**)
- b. attempt to leave a parking space in the wrong gear (**correct**)
- c. drive especially close to or flash the car in front of you (**incorrect**)

Comment (shown after the answer has been given): None.

Question 2

How does risk perception influence road safety behaviour?

- a. It does not, because crashes is the consequence of mistakes, not risk (**incorrect**)
- b. It ensures that only older drivers are cautious (**incorrect**)
- c. Misjudging risk can lead to dangerous behaviours like speeding or phone use while driving (**correct**)

Comment (shown after the answer has been given): Individuals who underestimate risks are more likely to engage in unsafe behaviours. Educational and information campaigns aim to adjust these perceptions for improved safety.

Question 3

According to the Transtheoretical Model of Change, what are the stages preceding the actual change in the behaviour:

- a. Precontemplation → Contemplation → Preparation (**correct**)
- b. Disengagement → Mitigation → Motivation (**incorrect**)
- c. Warm-up → Acceleration → Cool-down (**incorrect**)

Comment (shown after the answer has been given): According to the Transtheoretical Model of Change, an individual progresses through six stages of establishing a new behaviour: (i) precontemplation, (ii) contemplation, (iii) preparation, (iv) action (new behaviour is initiated), (v) maintenance, and (vi) termination (new behaviour is fully integrated).

Question 4

What is the aim of social marketing?

- achieving a ‘social good’ (correct)
- sell a product (incorrect)
- sell products using social media (incorrect)

Comment (shown after the answer has been given): Social marketing uses marketing principles to influence voluntary behaviour change for the benefit of individuals, groups, or society. Its goal is to promote positive social behaviours, often by increasing knowledge or shifting attitudes to encourage healthier or more responsible actions.

Question 5

In a public campaign directed against usage of mobile phones while driving, what could be described as a ‘secondary objective’?

- the number of people who speed (incorrect)
- the number of drivers who use a handheld telephone (incorrect)
- the attitude towards using a handheld telephone (correct)

Comment (shown after the answer has been given): ‘Secondary objectives’ support the main goal of changing the target behaviour. They focus on influencing factors like knowledge, beliefs, and other elements that shape how the target audience behaves, helping guide them toward adopting safer or more beneficial actions. Thus, reducing number of drivers using mobiles is the primary objective, while changing the attitudes towards the usage is the secondary objective.

Recommended reading and resources for students

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Delhomme, P., De Dobbeleer, W., Forward, S., Simões, A., Adamos, G., Areal, A., Chappé, J., Eyssartier, C., Loukopoulos, P., Nathanail, T., Nordbakke, S., Peters, H., Phillips, R., Pinto, M., Ranucci, M.-F., Sardi, G. M., Trigo, J., Vaa, T., Veisten, K., & Walter, E. (2009). *Manual for designing, implementing, and evaluating road safety communication campaigns*. <https://www.vias.be/storage/main/cast-wp3-deliverable-3.2a.pdf>
- Forward, S. E. (2024). *Rethinking how driver training can contribute to safer road traffic*. AfroSAFE Academy webinar, 27 September 2024. <https://www.ictct.net/afrosafe/afrosafe-webinar-september-2024>
- Furian, G., Kaiser, S., & Soteropoulos, A. (2024). *Subjective safety and risk perception* (2024-R-19-EN). ESRA project (E-Survey of Road users’ Attitudes). <https://www.esranet.eu/storage/minisites/esra2023thematicreportno2subjectivesafetyandriskperception.pdf>
- Parker, D., Reason, J. T., Manstead, A. S. R., & Stradling, S. G. (1995). Driving errors, driving violations and accident involvement. *Ergonomics*, 38(5), 1036–1048. <https://doi.org/10.1080/00140139508925170>
- Sam, E. F., Akansor, J., & Agyemang, W. (2018). Understanding road traffic risks from the street hawker's perspective. *International Journal of Injury Control and Safety Promotion*, 26(1), 92–98. <https://doi.org/10.1080/17457300.2018.1482925>

Recommended (additional) reading for teacher

- Deffenbacher, J. L., Huff, M. E., Lynch, R. S., Oetting, E. R., & Salvatore, N. F. (2000). Characteristics and treatment of high-anger drivers. *Journal of Counseling Psychology*, 47(1), 5–17. <https://doi.org/10.1037/0022-0167.47.1.5>
- Elliott, M. A., McCartan, R., Brewster, S. E., Coyle, D., Emerson, L., & Gibson, K. (2017). An application of the prototype willingness model to drivers' speeding behaviour. *European Journal of Social Psychology*, 47(6), 735–747. <https://doi.org/10.1002/ejsp.2268>
- Forward, S. E. (2010). Intention to speed in a rural area: reasoned but not reasonable. *Transportation Research Part F: Traffic Psychology and Behaviour*, 13(4), 223–232. <https://doi.org/10.1016/j.trf.2010.04.002>
- Forward, S. E. (2015). Driver anger: experienced and expressed. *Journal of Ergonomics*, S3. <https://doi.org/10.4172/2165-7556.S3-017>
- Hansson, S. O. (2023). Liberty, paternalism, and road safety. In K. Edvardsson Björnberg, S. O. Hansson, M.-Å. Belin, & C. Tingvall (Eds.), *The Vision Zero handbook: theory, technology and management for a zero casualty policy*. Springer. https://doi.org/10.1007/978-3-030-23176-7_6-2
- Hennessy, D. A., & Wiesenthal, D. L. (2001). Gender, driver aggression, and driver violence: an applied evaluation. *Sex Roles*, 44(11), 661–676. <https://doi.org/10.1023/A:1012246213617>
- Kaye, S.-A., Lewis, I., Algie, J., & White, M. J. (2016). Young drivers' responses to anti-speeding advertisements: comparison of self-report and objective measures of persuasive processing and outcomes. *Traffic Injury Prevention*, 17(4), 352–358. <https://doi.org/10.1080/15389588.2015.1084419>
- Kristianssen, A.-C. (2023). Establishing Vision Zero in New York city: the story of a pioneer. In K. Edvardsson Björnberg, S. O. Hansson, M.-Å. Belin, & C. Tingvall (Eds.), *The Vision Zero handbook: theory, technology and management for a zero casualty policy*. Springer. https://doi.org/10.1007/978-3-030-76505-7_20
- Lawton, R., Parker, D., Stradling, S. G., & Manstead, A. S. R. (1997). Predicting road traffic accidents: The role of social deviance and violations. *British Journal of Psychology*, 88(2), 249–262. <https://doi.org/10.1111/j.2044-8295.1997.tb02633.x>
- Lewis, I., Watson, B., Tay, R., & White, K. M. (2007). The role of fear appeals in improving driver safety: a review of the effectiveness of fear-arousing (threat) appeals in road safety advertising. *International Journal of Behavioral Consultation and Therapy*, 3(2), 203–222. <https://doi.org/10.1037/h0100799>
- Manstead, A. S. R., Parker, D., Stradling, S. G., Reason, J. T., & Baxter, J. S. (1992). Perceived Consensus in Estimates of the Prevalence of Driving Errors and Violations. *Journal of Applied Social Psychology*, 22(7), 509–530. <https://doi.org/10.1111/j.1559-1816.1992.tb00987.x>
- Memarian, M., Lazuras, L., Rowe, R., & Karimipour, M. (2023). Impulsivity and self-regulation: a dual-process model of risky driving in young drivers in Iran. *Accident Analysis & Prevention*, 187, 107055. <https://doi.org/10.1016/j.aap.2023.107055>
- Parker, D., West, R., Stradling, S., & Manstead, A. S. R. (1995). Behavioural characteristics and involvement in different types of traffic accident. *Accident Analysis & Prevention*, 27(4), 571–581. [https://doi.org/10.1016/0001-4575\(95\)00005-K](https://doi.org/10.1016/0001-4575(95)00005-K)

- Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51(3), 390–395. <https://doi.org/10.1037/0022-006X.51.3.390>
- Torfs, K., & Meesmann, U. (2019). How do vulnerable road users look at road safety? International comparison based on ESRA data from 25 countries. *Transportation Research Part F: Traffic Psychology and Behaviour*, 63, 144–152. <https://doi.org/10.1016/j.trf.2019.04.001>
- Ward, N. J., Watson, B., & Fleming-Vogl, K. (2019). *Traffic safety culture: definition, foundation, and application*. Emerald Publishing Limited.

Prepared by expert

In case you have specific questions, need a discussion partner, or just want feedback on your lecture materials, you may reach out the author(s) of this module. Please, put ‘AfroSAFE curriculum’ in the email subject.



Sonja Forward

Swedish National Road and Transport Research Institute (VTI)
Sweden

sonja.forward@vti.se