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# Road safety education: What works?

J.P. Assailly

IFSTTAR (French National Institute of Transport Research), 11 Av Eglé, 78600 Maisons-Laffitte, France

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### ABSTRACT

*Objectives:* The objectives of the paper are:

- To present the main definitions and issues about road safety education (RSE) such as evaluation, historical evolutions and integration of RSE in Safe Systems Approaches.
- To present examples of good practices in RSE.

*Method:* Seminal papers, collaborative reports from traffic safety research institutes and books from experts have been used as materials. Very diverse fields of application are presented such as: the importance of emotional experience in interaction with traffic experiences; the efficiency of e-learning; the efficiency of simulators to improve hazard perception skills and calibration of one's driving competencies; the efficiency of social norms marketing at changing behaviors by correcting normative misperceptions; the usefulness of parents-based interventions to improve parental supervision; and finally the importance of multi-components programs due to their synergies.

*Conclusions:* Scientific evidence collected in this paper shows that RSE may have some positive effects if good practices are adopted, if it is part of a lifelong learning process and if transmits not only knowledge but also "life-skills" (or psycho-social competences).

*Implications:* for practice From each example, we will see the implications of the results for the implementation of RSE.

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## 1. Introduction

Road accidents are among the leading causes of mortality of youth worldwide: they account for approximately 35–40% of the injury-related mortality among teenagers and young adults in western countries [1].

Among the various causes of accidents, the human factor is the dominant one in the MVE system (man/vehicle/environment): a human behavioral factor is observed in 90% of crashes, an environment factor in 30% and a vehicle factor in 10%.<sup>1</sup> So, we have definitely to act on the behavioral component, now the question is "how?".

Road safety education (RSE) is one of the main strategies of traffic safety, one of the "four E's": education, enforcement, engineering, emergency systems. Education is certainly not the strategy bringing the quicker benefits: when you transform an "X crossroads" into a roundabout, you observe immediate positive

effects on crashes with the mechanical reduction of speeds and the suppression of lateral collisions, whereas an educational action in kindergartens may produce effects only twenty years later! In the same way, enforcement is generally judged as more efficient than education to reduce drunk driving for example and it is always advocated to accompany media campaigns with enforcement actions. However, we cannot put roundabouts everywhere, we cannot transform a country into a giant safe playground, we cannot have one policeman monitoring every driver, because of limited police resources and because of social acceptability, so, even if not the most efficient, we need education approaches to have a balanced and comprehensive traffic safety policy. Plus, education is what is allowing the social acceptability of the other strategies.

This paper is in two parts: in this first part, we will define what is road safety education, the adaptation of RSE to historical evolutions of traffic safety in Western countries, the integration of RSE in a "Safe system" approach and finally how RSE can be evaluated. In a second part, we will give examples of good practices, focusing on principles and methods having been evaluated positively with teenagers and young adults.

E-mail address: [jean-pascal.assailly@ifsttar.fr](mailto:jean-pascal.assailly@ifsttar.fr) (J.P. Assailly).

<sup>1</sup> The total exceeds 100% as you may find more than one factor in an accident.

## 2. Method

Seminal papers, collaborative reports from traffic safety research institutes and books from experts have been used as materials. Very diverse fields of application are presented such as: the importance of emotional experience in interaction with traffic experiences in order to raise concern; the efficiency of e-learning which allows many repetitions of training on the same topic without being confronted with the real traffic risk; the efficiency of simulators to improve hazard perception skills and calibration of one's driving competencies; the efficiency of social norms marketing at changing behaviors by correcting normative misperceptions; the usefulness of parents-based interventions to improve parental supervision; and finally the importance of multi-components programs due to their synergies.

## 3. Results

### 3.1. Definitions

What is RSE ?

RSE is built on three pillars [2]. It has three main objectives:

1. Promotion of **knowledge** and understanding of traffic rules and situations,
2. Improvement of **skills** through training and experience,
3. Strengthening and/or changing **attitudes** toward risk awareness, personal safety and the safety of other road users.

To reach good practice, that is evidence-based practice, there are principles to respect that we have learnt from evaluative works [2]:

- Any RSE action must be adapted to the level of development and maturity of the pupil (you do not teach pedestrian safety in the same way to 6- and to 12 years-olds);
- Any RSE action must be based on a sound knowledge of the accidentology of the target (who is more at risk? How crashes happen, what are their mechanisms? Etc.). Without this fitness between education and accident causes, RSE would not be efficient;
- There are interactions between individual (genetic, social) factors and the impact of preventive actions (more generally, we need to match type of person/type of program);
- There is a so-called "Saint Thomas paradox" (difficulty to reach the real "at risk" group, for example, when girls benefit more from the actions than boys);
- There is a necessity to adapt education to cultural and socio-demographic predictors of traffic accidents involvement (for example, fatalism and invulnerability feelings in Africa or Asia).
- The consequence for RSE of the association of risk behaviors in various aspects of youth life (traffic, psycho-active substances, unprotected sex, school problems, etc.) is the need of an integrated approach: because risk behavior is not limited to the road, but also occurs in other domains of life of young people, a more integrated approach may be needed. A more integrated approach might also lead to more effective prevention programs. Peters et al. [8] for instance, evaluated the effects of a curriculum at secondary schools that addressed the psychosocial determinants and behaviors in the domains of smoking and safe sex. The programs not only had an effect on these targeted behaviors, but also had an effect on determinants and behaviors in three domains about which no lessons were taught (consumption of alcohol, fruit and breakfast). For the moment, there are no evaluation studies that considered these potential "transfer effects" on road behavior but a theoretical

model like the GDE matrix, especially the 4th level, leads to this idea of integration of programs (for example, health prevention programs on alcohol and illicit drugs have logical connections and transfer effects on traffic safety of young people).

### 3.2. The adaptation of RSE to historical evolutions

Concerning mobility and children, the main trend concerning age groups and mode of traffic participation is the historical shift from pedestrian mobility in the last century to car passengers mobility today (with some differences between the E.U. countries, for example, U.K. and Netherlands are still motivating parents and children to go to school walking or cycling, whereas France gives more importance to car passenger mobility).

This reflects on the traffic mortality structure of children (0–14 years-old), for example in France [9]:

- In the 50's, 60's, 70's, 7 children on 10 killed were pedestrians, 3 were car passengers.
- Today, 3 on 10 are killed as pedestrians, 7 as passengers.

So, RSE has obviously to adapt to this shift: RSE now must not be focused entirely on pedestrian mobility as in the past, but must deal mainly with the parents' responsibility. More generally, if we want to impulse the "sharing of the road", RSE has to be as precocious as possible. If we know quite a lot about child pedestrian accidents, the main gaps today are about the influence of parents, the influence of the social environment on accidents and education, the influence of emotions and of affective development on accident involvement, and the use of emotions in RSE.

Concerning strategy orientations, there is an ongoing debate which originated in Sweden many years ago about the content of RSE: education or exposure reduction?

On the one hand, Swedish experts recommend the schools to teach and train their pupils how to make changes in their close surroundings, i.e. by influencing the local authority to reduce the speed limit outside the school for example by collecting and reporting statistics. They advocate the idea that children cannot be taught a safe behavior and that the responsibility of safety cannot be put on the children. This policy orientation comes from previous and pioneering research works by Swedish psychologist Tina Standels [10,11] in a Piagetian<sup>2</sup> perspective which concluded that pedestrian safety is not possible before adolescence, due to the cognitive and perceptual limitations of children; it would thus be counterproductive to try to educate children, as they could not adapt to traffic before 11 years-old, the only solutions should therefore be risk exposure reduction by traffic regulations and city planning.

On the other hand, some Swedish actors claim that there is a need both for traditional RSE and for actions on exposure. Indeed, to rely only on protection and not at all on education may have perverse effects: as the age of first unaccompanied trips to school is raising due to this orientation toward exposure reduction, pedestrian accidents rates will remain important between 10 and 14 years-old as we have produced inexperienced pedestrian teenagers.

Furthermore, taking the children off the roads and the streets may have also other perverse side effects: lack of physical exercise and health consequences, traffic pollution, time consuming "taxi

<sup>2</sup> Piaget is one of the most famous child psychology theorists who has studied and explained the cognitive development from birth to adulthood, how "the mind of the child assimilates and adapts to the world".

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