# *Methodological Procedures of Measuring the Effectiveness of Road Safety Education and Information Measures. Results of a systematic review of 36 international studies*

[1]Iris UTZMANN & [2]Jürgen GERLACH

[1]Forstmannstr. 8, 45239 Essen, Germany
Phone: 0174-7444350, Fax: 0201-8738314
E-mail: irisutzmann@gmail.com

[2]University of Wuppertal
E-mail: jgerlach@uni-wuppertal.de

## Introduction

Road safety education and information measures try to improve road safety by influencing human behaviour. They include a wide range of different types of measures like for example lessons, trainings and campaigns.

As it is well known, road safety education and information measures are regarded as one of three pillars in the field of road safety work (three E's). Nevertheless, there is a controversial discussion about the effectiveness of those measures. Evaluation studies in these fields are seldom. It can be stated generally that they are especially seldom in some areas, for example for seminars or one-day campaigns or programs for pedestrians (cf. Harre and Wrapson 2004, Duperrex 2003). Evaluation studies of road safety education measures differ a lot in respect of used methods. And they do often not meet the methodological requirements (cf. Elliot 1993, Duperrex 2003).

Furthermore, in Germany a guideline for effect-measuring in the field of road safety education and information does not exist.

Therefore a PhD-dissertation about those questions was conducted at the University of Wuppertal (Utzmann 2008). Within this paper some of the results of this dissertation are presented. Main part of the PhD-dissertation was a systematic review of 36 international studies.

## Aims of the systematic review

Most important aim of the systematic review was to follow, analyse and assess the methodological procedures in detail for different types of

road safety education and information measures (for example trainings, lessons, campaigns etc).

Further aim was to get knowledge about the practicability of methodological requirements in the field of road safety education and information. It also was intended to identify, how different criteria of the measures (like duration, geographical scope, target group etc.) influence the practicability of methodological standards.

## Contents of the systematic review

The first step of the systematic review was to look for suitable studies. International databases and libraries were sorted through. (for example the International Transport Research Documentation from the OECD).

Search criteria were:

- the language (German or English)
- published later than 2000
- The studies had to contain detailed information about the methodological issues to a certain extent (the different methodological steps should be described).
- Different types of measures (trainings, lessons, campaigns, advertisements etc) should be covered.

At the end 36 studies from 13 countries were regarded within the systematic review.

## Methodological steps

A short overview of the most relevant steps of effect-measuring in general will be given at first. Figure 1 shows the most important steps.

The steps can take place at the same time and not every step is relevant in every case.

## Aims of the measure

Clear defined targets and target groups are required for the process of effect-measuring. Even if the definition of targets and the description of the effect mechanism is a precondition, the evaluator should explicitly know and name them.

The systematic review shows that,

- In 11 studies the aims of the measures are not described.
- In 25 studies the aims of the measures are described, but more or less detailed.
- Only in 2 studies the aims are described quantitative.
- Only in 8 studies the mechanism / function of effect is described.

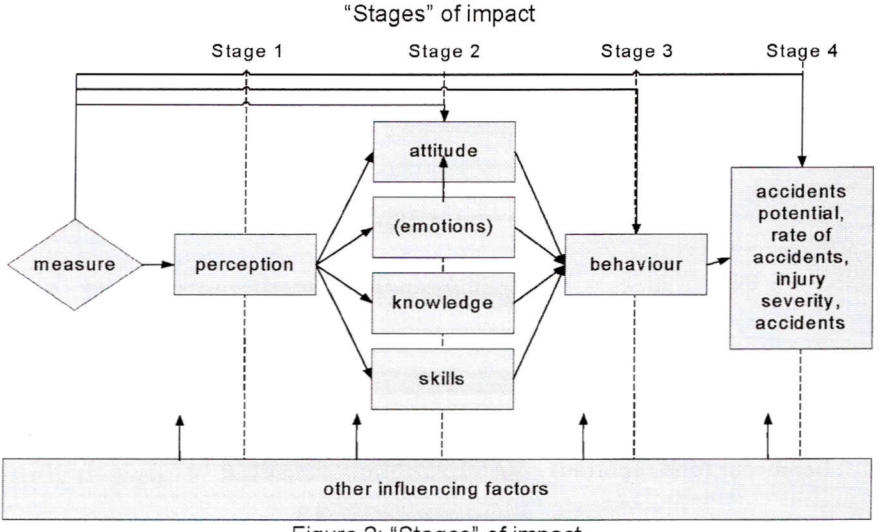


Figure 2: "Stages" of impact

In general there are different "stages" for measuring the effectiveness of road safety education and information measures. Figure 2 shows those different stages. The effects can be measured at the stage of "perception", the stage of attitudes, emotions, knowledge and skills; next "stage" is the behaviour and the most relevant stage: accidents and accident-related figures. It depends very much on the type of measure, which stage should be looked at. Often a combination is most meaningful. As already mentioned, in 25 studies, the aims of the measures are named. If you have

a closer look at those aims and look at the impact area those aims include you see that 37 "areas of impact" are named.

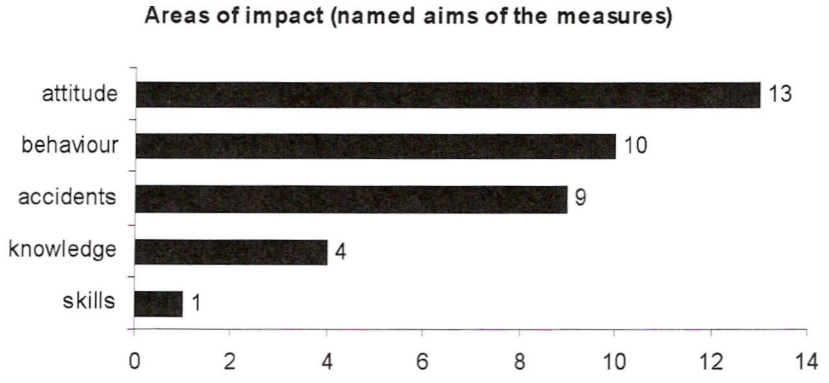


Figure 3: Areas of impact, n=37

If you look at the outcome indicators you see a more differentiated picture. Altogether 107 outcome indicators were analysed, approximately 3 indicators per study. As you can see, different "stages" were combined.

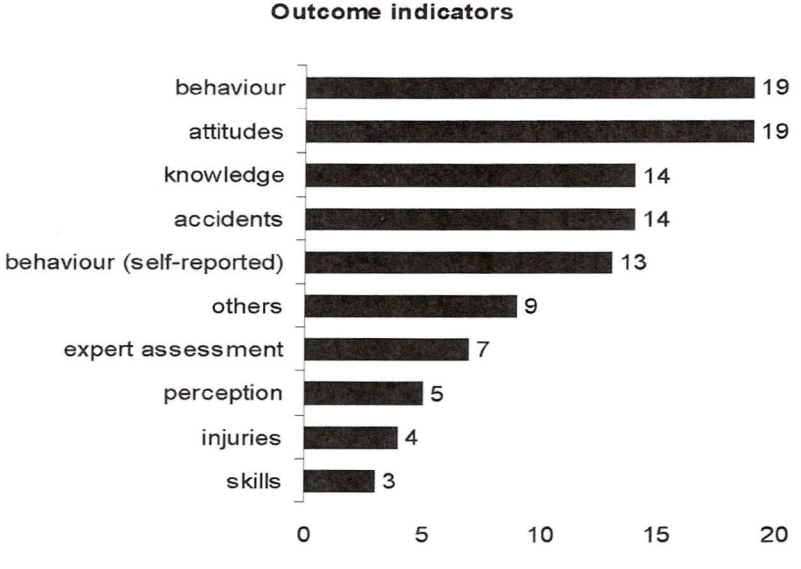


Figure 4: Outcome indicators, n=107

## Collection instrument

The collection instrument is very relevant in respect to the validity of the study. Within the studies on average two instruments per study are used. This is the reason why in the following it will be referred to the 36 studies and sometimes to the 63 methods that were used.

As you can see, the postal interrogation is used very often, while for example the observation is used seldom.

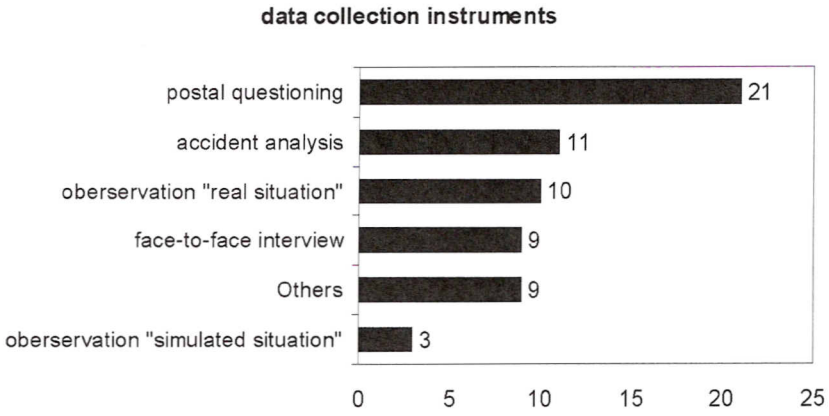


Figure 5: Data collection instruments, n=63

## Study design

If you look at the study designs (figure 6), you see that in a lot of the cases only one measurement took place, or there is no control group or site. To assess the methodological quality it is important to look deeper for example at the question, how the control group was created. A random building of the control group is conducted very seldom within the studies of the systematic review.

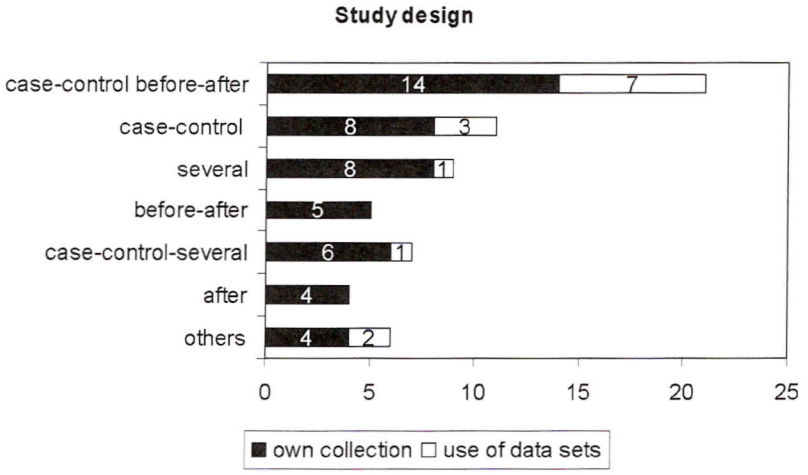


Figure 6: Study designs, n=63

## Sampling methods

Also if you look at the sample methods, you see that random building is very seldom, too. Very often the sample was built theoretically or an opportunity-sampling was used. This is quite problematic, because very often methods from statistical inference (hypothesis tests) are used later on.

## Statistical tools

In 31 studies 70 statistical procedures are applied. Well-know-procedures are used quite often (chi-square-test or t-test). One has to keep in mind that from a strict point of view statistical hypothesis tests should only be used when the sample was built randomly, which is not the case in many studies of the systematic review.

## Data interpretation

As the last result of the systematic review it is looked at the results and conclusions of the studies. It can be pointed out, that there is a critical reflexion at the end in most cases. In four studies it is even concluded that the measure didn't have an effect. In many cases the author is quite careful with the final assessment of the effectiveness of the measure.

## Results of the systematic review

- The studies often do not fit the methodological requirements from a strict point of view.
- The methodological procedures are not described deeply enough in every case and for all relevant aspects. This is particular relevant, because it was a criterion for study inclusion, that detailed information are given. So one can guess that others studies contain even less information.
- Often some methodological aspects are regarded very deeply, others are not.

## General results of the PhD-dissertation

It is possible to conduct an effect-measuring on a high level for all kind of measures, even if this would be expensive in most cases. Therefore the recommendation is rather to conduct a few evaluations on a high level (and publish the results) than to conduct a lot of evaluations on a low level.

## Outlook

Within the PhD-dissertation 22 standards were developed for conducting an effect-measuring of a road safety education or information measure.

These standards could be an effective quality assurance instrument and act as a guideline. Each standard should be regarded and if not, there should be an explanation, why it is not regarded.

In order to asses the results of an evaluation study it is necessary to know, which and how the methods are used. There should be documentation about the different aspects in every evaluation study.

## References

Duperrex, O.; Roberts, I.; Bunn, F. (2003). Safety education of pedestrians for injury prevention. In: The Cochrane Library, Issue 1. Oxford.

Elliott, B. (1993). Road Safety Mass Media Campaigns: A Meta Analysis. Sydney.

Harré, N.; Wrapson, W. (2004). The evaluation of a central-city pedestrian safety campaign. In: Rothengatter, J.A.; Groeger; J.A. (ed.). Transportation Research Part F. 2004/05. 7(3) Pp. 167 - 79. Pergamon.

Organisation for Economic Cooperation and Development (OECD) (ed.) (1986). Effectiveness of road safety education programmes. Paris.

Pfaff, M. et al. (1982). Methoden und Kriterien zur Überprüfung des Erfolgs von Aufklärungsmaßnahmen - Handbuch zur Durchführung von Wirksamkeitsanalysen. Bergisch Gladbach.

Utzmann, I. (2008). Summative Evaluation der Verkehrserziehung und -aufklärung. Methodische Vorgehensweisen bei der Wirkungsmessung von Maßnahmen der Verkehrserziehung und -aufklärung. Hamburg. Verlag Dr. Kovač