DET NATIONALE FORSKNINGS-
OG ANALYSECENTER FOR VELFÆRD

A randomized controlled trial of “Sikker Trafik LIVE” (“Road Safety LIVE”) – Sub-report 2

Preventive educational intervention for production schools and vocational colleges

Helle Hansen & Anders Bojesen

A randomized controlled trial of “Sikker Trafik LIVE” (“Road Safety LIVE”) – Sub-report 2 – *Preventive educational intervention for production schools and vocational colleges*

e-ISBN: 978-87-7119-531-6
Cover photo: Danish Road Safety Council
Project: 100647

VIVE
The Danish Center for Social Science Research
Herluf Trolles Gade 11, DK-1052 Copenhagen K
www.vive.dk

VIVE was established on 1 July 2017, following a merger between the Danish Institute for Local and Regional Government Research (KORA) and the Danish National Centre for Social Research (SFI). The centre is an independent government institution, the aim of which is to provide knowledge to help develop the welfare system and the public sector. VIVE is engaged in the same fields of study and types of tasks as the two former organisations.

Preface

Road accidents are one of the most frequent causes of death among young people under the age of 25, and considering the share of the population they represent, young people in this age group are highly overrepresented in road accident statistics. Around one in five serious accidents involves a young person between 15 and 24 years old. In an attempt to break the statistics, in collaboration with TrygFonden, the Danish Road Safety Council has launched the “Sikker Trafik LIVE” (“Road Safety LIVE”) educational campaign. “Sikker Trafik LIVE” is an educational intervention in several different versions targeting pupils in the 8th-10th grade of primary and lower secondary school, students at production schools and vocational colleges, and students in general upper secondary education. Common to the different versions of the intervention is that they all include a personal story about a road accident as their focal point. At the production schools and vocational colleges in focus in this report, the ambassador is usually a person who lost a close relative in a road accident. The aim of the intervention is for young people to become involved and to reflect on the choices they make in traffic.

Since 2007, the Danish Road Safety Council has offered visits to production schools and vocational colleges throughout Denmark in a campaign entitled “Sikker Trafik LIVE” (“Road Safety LIVE”). In the 2016/2017 school year, “Sikker Trafik LIVE” visited 122 production schools and vocational colleges. The purpose of this report is to present the impact measurement of ”Sikker Trafik LIVE”. We examine whether students at production schools and vocational colleges acquire new knowledge, change their attitude to road safety and change their behaviour in traffic after the visit by a LIVE ambassador as part of the “Sikker Trafik LIVE” campaign. The impact measurement was designed as a randomised controlled trial.

We would like to express our warmest thanks to the contact persons and students at the participating schools for their significant contribution to the project and for making it possible to complete the impact measurement. Mette Møller, senior researcher at Transport DTU served as an external referee for the report, and Signe Boe Rayce, a researcher at VIVE – The Danish Center for Social Science Research, served as an internal referee. We are grateful for their valuable comments and additions to this report.

The report was written by senior consultant Helle Hansen and analyst Anders Bo Bojesen. The impact measurement was financed by the Danish Road Safety Council.

Kræn Blume Jensen
Head of research and analysis at VIVE Social
August 2018

Contents

Summary

This report presents the results of the impact measurement for “Sikker Trafik LIVE” (“Road Safety LIVE”), an educational intervention by the Danish Road Safety Council in collaboration with TrygFonden. This sub-report focuses on the impact of the intervention on students at production schools and vocational colleges. The impact measurement of the educational intervention for primary and lower secondary schools was reported in Sub-report 1.

The purpose of the LIVE intervention is to provide students with real-life insight into the causes and consequences of a serious road accident, and to link this insight to the students’ own daily life in traffic. The aim is that students exhibit safer behaviour in traffic, and that they take an active position on other people’s risky behaviour in traffic. LIVE is an educational intervention offered in different versions to pupils in the 8th-10th grade at primary and lower secondary schools, students at production schools and vocational colleges and students in general upper secondary education. Common to the different versions of the intervention is that the focal point of the intervention is a personal story about a traffic accident. At the production schools and vocational colleges in focus in this report, the ambassador is a person who lost a close relative in a road accident. The visit focuses particularly on road safety while driving a car. The behaviour of moped and bicycle users is only included if the ambassador considers it relevant in relation to the target group of the presentation in question.

The impact measurement was designed as a randomised controlled trial in which, by drawing lots, schools were assigned to receive a LIVE visit on different dates, depending on whether they were randomised as an intervention school or a control school. During the course of 2016 and 2017, the Danish Road Safety Council asked all of the schools wanting a visit by a LIVE ambassador if they wanted to participate in the evaluation. A total of 43 schools said they wanted to take part in the trial. Recruitment took place in two rounds, because a sufficient number of production schools and vocational colleges was not achieved in the first round.

The students’ knowledge, attitudes and behaviour with regard to road safety were measured before the intervention, and again after the intervention. Attitudes on road safety were measured through questions about the degree to which individual students think that various risky actions in traffic are okay. Behaviour in traffic was measured in two ways: Partly by asking students how often they wear a seat belt and use a bicycle helmet, or how often they perform a risky action, and partly by asking whether students have objected to another person’s risky behaviour. The hypothesis was that there would be a noticeable positive change in students at the intervention schools compared with students at the control schools in all three areas (knowledge, attitudes and behaviour) of the intervention.

Questionnaire responses from students were obtained in the period August 2016 to October 2017. A total of 2,063 student responses were included in the analysis: 1,450 at baseline and 613 at follow-up. 23 intervention schools and 21 control schools were included at baseline. 20 intervention schools and 20 control schools were included at follow-up. Despite the schools being randomised, the subsequent analysis revealed statistically significant differences between students at intervention schools and students at control schools with regard to gender, age, place of residence and parents’ socio-economic status at the start of the intervention. Consequently, it has been necessary to control

for these background factors, thus causing some uncertainty in relation to the results of the impact measurement due to the risk of selection bias.

Results of the impact measurement

The impact-measurement results showed that students in the intervention schools acquired significantly greater knowledge about which age group is most at risk of road accidents (15-24-year-olds), and about the factors most frequently leading to serious accidents (speeding, inattention, drink-driving and not wearing a seat belt).

The intervention had positive effects on students' attitudes towards not wearing a seat belt, drink-driving and using a phone while driving, i.e. more students disapproved of such behaviour after the intervention. There was no statistically significant effect on attitudes towards speeding.

Among students who have a driving licence for a car, a higher percentage of students in the intervention group than in the control group thought it was only okay to a minor extent or not at all okay not to wear a seat belt as a driver. The result is not statistically significant.

Finally, the results show a significantly positive change in students' behaviour in intervention schools. The percentage of students wearing a seat belt was already high, but the increase is nevertheless statistically significant. Furthermore, there was a statistically significant increase in the percentage of students objecting to drink-driving, as well as the percentage of students asking another cyclist not to use his or her mobile phone while riding a bicycle. However, with regard to the remaining questions about behaviour in traffic, there were no statistically significant effects of the intervention.

At follow-up, 52% of the respondents stated that they told a family member about the LIVE visit, and many of the students commenting in the open-comments fields indicated that this particular personal story from a close relative made a great impression on them. The story and the person serve as a point of reference that sticks to the memory, and that can encourage students to object to risky behaviour by others or to keep focus on the road.

In addition to the overall analysis, the impact of the LIVE visits has also been analysed separately for male and female students. Impact analysis for the two genders separately shows that the effects of the intervention are very much attributable to changes in the group of *female* students, where there are several statistically significant results. Changes in knowledge, attitudes and behaviour can also be observed in male students, but not to the same extent as the changes in female students. The results show that:

- Significantly more women in the intervention group knew which age group is the most vulnerable group of road users. The number of male students in the intervention group with this knowledge increased as well, but the increase was not statistically significant.
- Significantly more women in the intervention group than in the control group thought it was only okay to a minor extent or not at all okay to drive without a seat belt, to drive under the influence of alcohol, to speed or to text while driving. Similarly, a higher percentage of male students in the intervention group than in the control group thought it was not okay to drive without a seat belt or to text while driving.
- Significantly more women in the intervention group almost always or always wear a seat belt. The number of male students in the intervention group wearing a seat belt also increased after the LIVE visit. However, this increase was not statistically significant.

- With regard to women's behaviour in traffic, the results showed an increase in the use of mobile phones in the control group, while in the intervention group, the use of mobile phones declined.
- The results showed that more male students used their mobile phones in traffic. In the intervention group, the increase was statistically significant.
- More women in the intervention group had objected when someone wanted to drive even though he/she had drunk too much, while fewer female students both in the intervention group and in the control group had asked someone to wear a seat belt. However, this decline was significantly smaller in the intervention group.
- Compared with the control group, significantly more men in the intervention group thought it was okay to drive 100 km/h in an 80 km/h speed limit zone.

The results are associated with some uncertainty due to selection bias in the underlying data. There were statistical differences between the intervention schools and the control schools with regard to age and gender composition and parents' background. Furthermore, the dropout at follow-up was substantial, and relatively few students responded to the questionnaire twice. Thus, the results should be read with this in mind. This applies in particular to the analyses broken down by gender. Estimates from the analyses of responses from students responding to the questionnaire twice point in the same direction as the results described above. The changes are not statistically significant, but they support the trends described for the results.

Overall, the results show that the intervention had a positive effect on students' knowledge, attitudes and behaviour in traffic. They gained more knowledge about risk factors, they took a position on behaviour in traffic that may reduce the probability of accidents, and they behaved more safely in traffic after the intervention. However, it seems that LIVE visits to production schools and vocational colleges influence women more than men – something that should be taken into account when organising visits in the future.

1 Introduction

“Sikker Trafik LIVE” (“Road Safety LIVE”) is an educational intervention in which a personal story about a road accident is the focal point. In the intervention aimed at production schools and vocational colleges, the Danish Road Safety Council arranges visits to schools by people who have lost a close relative in a road accident. They are called “ambassadors”, and their role is to tell students about the accident that changed their life. The ambassadors visit schools together with a young teacher who acts both as a speaker and as a facilitator.

The purpose of the visits is to provide students with more insight into the risk factors and a better understanding of the consequences of a serious road accident, and to focus attention on the choices we all make in traffic. The young teacher tells students about the most important accident and injury factors and takes them through various dialogue-based exercises, while the personal stories from the ambassadors serve to open students’ eyes to the fact that they may actually become involved in an accident themselves. The aim is to motivate students to make safer choices in traffic, and to provide them with competencies that enable them to take care of themselves and to take action when confronted with risky behaviour by people around them.

The “Sikker Trafik LIVE” intervention does not actively use fear as a tool. The literature contains many examples of interventions based on fear appeal theory, i.e. interventions that appeal to students’ fear in an attempt to achieve a behavioural change (Glascoff, 2000). However, appealing through fear has turned out to have opposite - and thus negative - effects in several cases. Although the ambassadors’ personal stories may be frightening at times, the ambassadors are not supposed to scare students into making them behave more safely in traffic. Put simply, the success criterion for the LIVE intervention has always been that, after the visit, the students should actively conclude: *“I’m going to make sure, I don’t end up in the same situation as him/her!”*, rather than passively concluding: *“I’m glad I’m not that person!”*

Previous studies have documented that communicating a personal message may have an impact on road accident statistics (Institute of Transport Economics, 2012). Thus, the primary instrument is the emotional impact left by the ambassadors’ personal stories. It is difficult to disagree with the stories, and their level of detail makes it easy to remember them and relate to them. The audience can appreciate the consequences of the accident, and they can experience some of the same feelings that the ambassador had. Consequently, the visits serve to broaden the experience of the audience: They are the closest the students can get to experiencing an accident themselves without getting hurt. The visits are designed so that the emotional impact is coupled with a more factual message that will provide students with more knowledge about the injury and accident factors. Behavioural psychology indicates that emotional means appeal to the intuitive and subconscious parts of human decision-making processes (referred to in behavioural psychology literature as System 1 thinking, e.g. in Kahneman, 2011). This is where a person acts and makes decisions automatically and subconsciously: Actions and decisions are fast, intuitive and triggered by emotional impulses. This combination has previously shown good results (Warner & Forward, 2016).

The LIVE visits also include guidance on action for students. The challenge with such guidance is that the actions can be too complex and difficult for the students to realise. Guidance on action often presupposes rational and controlled decision-making processes (see for example Kahneman’s “System 2” thinking) in which decisions are made more slowly and are based on more analytical, patient and strategic thinking. However, the prefrontal cortex (the frontal lobe located at the front of the brain) is not fully developed until the age of 25. Consequently, the LIVE visits focus on providing students with simple and manageable guidance, so that it is not unrealistic for the young people to

make the changes. The relatively late development of the frontal lobe also stresses the importance of LIVE visits utilising the emotional impact on intuitive decision-making processes.

Furthermore, the Danish Road Safety Council has drawn inspiration for the intervention from developmental psychology (in particular from the Russian developmental psychologist Lev Vygotski) with regard to the importance of student participation, involvement and ability to put things into words as a prerequisite for each student to gain new insight. Consequently, dialogue and interaction in the classroom are essential didactic tools. This is ensured through the dialogue-based exercises carried out by the young teacher (Vygotski, 1982).

1.1 Structure of LIVE visits

Visits by "Sikker Trafik LIVE" ambassadors last three hours, and they are generally held for up to 40-50 students at a time. It is crucial that the number of students is kept down to facilitate dialogue and to provide a setting for establishing good contact between the teacher, the ambassador and the students.

The visits are structured according to the following teaching plan:

- **Introduction**

  The teacher and the ambassador briefly introduce themselves and tell the students why they have come: Because far too many young people are killed or injured in traffic, and because they want to prevent this from happening.
- **1-10 exercise**

  The teacher then asks the students to place themselves on an imaginary scale from 1-10, on the floor, according to how close they have been to a serious road accident. The teacher asks questions about the experience and allows individual students to talk about their own experience. The purpose is to show the students that this is an important topic, while at the same time showing students that this visit is about *them*, and that they will be involved.
- **Presentation of facts**

  The students are presented with the four most important accident and injury factors in traffic: speeding, drink-driving, inattention and not wearing a seat belt. If many students in the group are bicycle and/or moped users, facts in this area will included as well. Photographs and film clips are used to support the communication.
- **The "What if it were you" exercise**

  This exercise is based on a real accident in which a young man was severely injured in traffic. The teacher tells the students what happened, and who was involved in the accident or was close to the accident. Subsequently, the students try to put themselves in the position of some of the key persons. For example, how would they react if they were Nikolaj, who was driving under the influence of alcohol and was left paralysed after the accident? What would it be like to wake up in hospital and see his parents again? How would Nikolaj's parents feel about the friends who let him drive even though they knew he had been drinking? How would the students feel if they were Nikolaj's friends and were told that he had been in an accident? What if they were his sister who tried to stop him, but unsuccessfully? The teacher asks questions and facilitates the students' joint discussions and reflections.
- **The 4-corner exercise**

  In this exercise, the teacher describes a number of scenarios, all of which concern some of the primary accident factors. Subsequently, the students position themselves in the room according

to what they would do if they were in the situation described. When everyone has made a decision, the teacher asks about the students' choices and what it would take to make them change their minds.

- **The ambassador's story**

  45 minutes are allocated to the ambassador's personal story. The stories of the different ambassadors are structured in the same way and follow the same model, as described on the next page.

- **Evaluation form**

  Visits are briefly evaluated via a digital questionnaire completed by the students using their own mobile phones.

- **Rounding off**

  The teacher rounds off, repeats the main points and thanks the students for participating.

1.1.1 The ambassador's personal story

It is essential that a relatively large amount of time is allocated to the personal story. This will allow students to get to know the ambassador, and not least the person who died. Moreover, it leaves time to talk about all aspects of the accident, its causes and its consequences. However, it places demands on how the story is structured and composed. Consequently, the ambassadors' stories are always structured according to the same model:

- **Introduction**

  The ambassadors introduce themselves and tell the students why they have come to tell their story. The hope is that the students will take better care of themselves and avoid being in an accident like the one the ambassador is to tell them about.

- **Life before the accident**

  The ambassadors talk about the person they lost due to the accident; about the person's dreams of the future, school and leisure time, all of which resembles the lives of the students. The purpose of this is to enable the students to identify with the person and thereby link the ambassadors' stories to their own lives, and give them a feeling that what happened in the accident could also happen to them and their families. Many of the ambassadors' stories involve a car accident. Irrespective of whether the students have a driving licence or not, nearly all of them travel by car, and focussing on the choices that led to the accident creates a link to the students' own ways of transporting themselves. The ambassadors also stress that everyone has a responsibility. Not only when they transport themselves, but also when they sit in the backseat, for example.

- **The accident**

  The ambassadors describe the run-up to the accident and illustrate the choices made along the way which led to the accident. This highlights both the cause of the accident and the role of the person who was killed in the accident. What could have been done differently? Moreover, the ambassadors describe the accident itself, usually supported by photographs of the car and the scene of the accident.

- **Life after the accident**

  The ambassadors share with the students how they were informed about the accident, about the hospital, the funeral and the time after the accident. The ambassadors talk openly and sincerely about the consequences the accident has had on their lives today.

- **Questions**

The ambassadors answer the students' questions. They are willing to answer any question, and they are completely open and honest.

Not all persons who have lost a close relative in a road accident can become an ambassador. In order to allow students to identify themselves with the person who was killed, the person must have been young when the accident took place and, generally, he/she must have made risky choices which led to the accident or were crucial for the severity of the accident. They were not "merely" in the wrong place at the wrong time. If this was the case, the students could easily turn their focus on the "guilty", faceless person and on his/her punishment. The persons who were killed were speeding, under the influence of alcohol, inattentive, were not wearing a seat belt or were riding a moped illegally. Alternatively, they were passengers in a car knowing that wrong choices were being made without them making objections. Thus, their behaviour and decisions have had a statistically significant influence on the accident and/or the consequences of the accident.

The role as an ambassador requires that the person has come a long way in processing the accident. The ambassadors must have acknowledged their loss and must have learned how to cope with their grief. During the visits, they expose their true feelings and talk about the worst thing that ever happened to them. This is a difficult task, but it is important that the students can empathise with the ambassadors and put themselves in their place. The emotional aspect is an important mechanism. The stories are supported didactically by visual content in the form of a PowerPoint presentation with photographs and videos that substantiate what the ambassadors say.

Before new ambassadors start making their own school visits, they have to complete an introductory programme. They go on visits with one or several experienced ambassadors, and they take an introductory course in which they receive help to structure their story and to select the parts of their story to be included in their narrative at the schools. All ambassadors then participate in two annual weekend workshops, where they are prepared by professionals and they can share their knowledge and experience.

The intervention is quality-assured regularly. This is through a permanent structure in which all visits are evaluated by the students immediately after the visit in the form of students giving feedback on the presentation, and through regular monitoring which is a central part of the intervention. Monitoring entails that two employees from the Danish Road Safety Council attend and observe visits throughout Denmark. They provide feedback to the individual ambassadors and ensure that the ambassadors deliver the right messages, and that, in general, ambassadors provide high-quality visits.

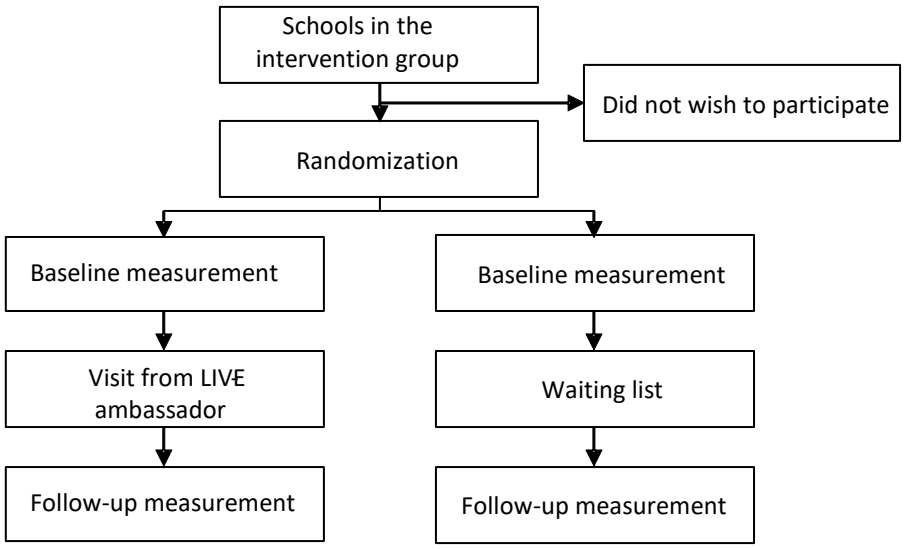
2 Study design and methodology

This chapter describes the methodological basis for the study. This includes a description of the most important elements in the design, such as the randomisation, measurement methods, statistical analyses and bias.

The design is a cluster-randomised waiting-list design at school level. This means that schools are randomly (i.e. by drawing lots) assigned to receive a visit by a LIVE ambassador on different dates depending on whether the schools are randomised for intervention or control. During the course of 2016 and 2017, the Danish Road Safety Council asked all of the schools wanting a visit by a LIVE ambassador if they wanted to participate in the evaluation. A total of 43 schools said they wanted to take part in the trial. Impact measurement was carried out in two rounds: The first round was carried out as part of the original plan which also included lower secondary schools, while the second round was added to include more production schools and vocational colleges. The visits were carried out in the period autumn 2016 to autumn of 2017, and data was obtained during the same period. Post-measurement was carried out after six months in round 1 but after 3 months in round 2, as we observed a large turnover of students at the schools. This has made the impact measurement for this target group more difficult. **Fejl! Henvisningskilde ikke fundet.** shows the design of the impact measurement.

The overall hypothesis of the impact measurement was that the LIVE intervention would: 1) enhance participants' knowledge about risks in traffic, 2) improve participants' attitudes to road safety, and 3) improve participants' behaviour in traffic. After the visits, a higher likelihood of seat belt use was expected among students at the intervention schools compared to the control schools.

Figure 2.1 Structure of the cluster-randomised waiting-list design for impact measurement of the LIVE intervention.



2.1 Randomisation

There will always be a possibility that the behaviour and attitudes of young people are influenced by personal or societal conditions not associated with a given intervention, or that they become more mature merely due to natural development. If we restrict our impact measurement to measurements before and after an intervention, a change in behaviour stemming from outside factors or natural development could therefore be misinterpreted as stemming from the intervention that we are evaluating. The most important prerequisite for ensuring that the impact of the LIVE intervention can be assessed is therefore that we can compare student responses from schools that are receiving the intervention with student responses from schools that have not yet received the intervention. In this way we can minimise the risk of interpreting natural changes, e.g. in students' attitudes to road safety, as an impact stemming from the intervention. The schools included were therefore randomised to receive the intervention straight away or to wait to receive the intervention until the impact measurement had been completed. Not until after this did the control schools receive visits from the LIVE ambassadors.

Some schools chose, in advance, not to participate in the impact measurement, among other things because they had already set aside time for a visit by a LIVE ambassador and could not change their plans to accommodate the measurement.

2.2 Measurement via questionnaire

Students at participating schools were asked at the beginning and at the end of the survey to answer a web-based questionnaire about their knowledge, attitudes and behaviour in traffic. The questionnaires were identical except that the first questionnaire included information about the students' gender, age and social background as well as the distance and route to their educational

institution. A link to the questionnaire was distributed to students by their teachers and the students could moreover request the link by submitting a text message to a specific mobile number, so they could answer the survey on their mobile phone.

To increase the incentive for students to respond to the questionnaire, students who participated in the survey also participated in a competition for one iPhone 7 and 20 cinema tickets for their class. If students answered the questionnaire both before and after the intervention, the teacher received DKK 500.

2.2.1 Outcome measures

We measured developments in student responses in three general areas in which the intervention was expected to influence students: 1) knowledge, 2) attitudes and 3) behaviour.

The students' *knowledge* was examined through the following two questions: "Which age group is most often seriously injured in traffic?" and "Which of the following causes the highest number of traffic-related deaths and injuries in Denmark?" The questions had fixed response categories.

The students' *attitudes* were surveyed through questions such as: "Do you think that it's okay to drive a car without wearing a seat belt?" and "Do you think that it's okay to drive at 100 km/h where the speed limit is 80 km/h?" The response categories followed a scale of options from ‘To a great extent' to ‘Not at all'.

The students' *behaviour* was surveyed through questions such as: "How often do you wear a seat belt when driving?" The response categories included a scale of options such as 'Always', 'Almost always', 'Occasionally' and 'Never' and also included the option 'I never drive'.

The students' *behaviour* was also measured more specifically for students who responded they had experienced risky behaviour in others. For example, these students were asked whether they had objected to someone exceeding the speed limit, or whether they had asked someone to put on their seat belt.

The results for outcome measures are in chapter 3. In addition to answering the specific questions with fixed response categories, the students could also provide open responses, in that, at follow-up, they were asked whether they still sometimes think about the LIVE visit; whether they have told friends or family about the visit; and whether they behave differently in traffic compared to before the visit.

2.3 Statistical method

We evaluated an intervention which is randomised at school level, but we used measurements at student level. We therefore used regression models with one random intercept parameter. These types of model take account of the fact that there are variations in outcome measures between individuals as well as between schools. It is important to make this distinction, as individual variation could otherwise appear as an impact at school level, or vice versa.

All outcome variables with only two response categories (e.g. 'No' vs. 'Yes') were modelled as binary outcomes (0 vs. 1) in a logistic regression model (Cox, 1958). Scaled outcomes were modelled in a proportional odds model (McCullagh, 1980)[1] which examined whether the general level of a variable

1. In both cases, a random intercept parameter was added at school level. The intercept was an average estimate per school to ensure that the variation between students at school level was separated from the variation between school averages for a

with scaled response categories (e.g. 1 = 'Never; 2 = ‘Occasionally'; 3 = 'Almost always'; and 4 = 'Always') was higher in the intervention group than in the control group. In some cases, this type of scaled variable was also examined in a two-part version in which several response categories were combined into one category. In the regression models we also controlled for gender composition, age distribution, parental occupational status, and student residential status as variables aggregated at school level.

The schools’ baseline values, measured before the intervention, for a given outcome variable were included in the model. This means that the results are based on the relative difference between intervention schools and control schools with regard to the change from baseline to follow-up. The model applied can be expressed as follows:

$$Outcome_{ij} = b_{0j} + b_1 Intervention + b_2 Time\ of\ Measurement + b_3(Intervention * Time\ of\ Measurement) + B_k Control\ variables_k + e_{ij}$$

The outcome is modelled as a consequence of intervention (0 = control, 1 = intervention), time of measurement (0 = before, 1 = after), intervention * time of measurement (effect estimate), as well as a number of control variables (*k*) aggregated at school level. Error terms are estimated at school level (*j*) and at individual student level (*i*). The parameter b_3 therefore expresses the effect of the intervention.

2.4 Bias

The randomized controlled design that we used is, as a general rule, the preferred choice when the objective is to demonstrate a causal effect of an intervention. Because schools have been randomly assigned dates for a LIVE visit, the observed differences should be attributable to the intervention and not to external factors. However, there is still a risk of selection bias and this could impair the quality of the knowledge that we extract from the results. Selection bias is a systematic distortion arising because specific sub-groups of students are more represented or less represented among questionnaire respondents.

Selection bias may occur because the students have to actively find the link to, and answer, the questionnaire. With regard to some responses, we can see that an entire class at a school completed the questionnaire during the same lesson, and this indicates that a teacher helped ensure the data collection. However, in other cases, it has been entirely up to the students themselves to answer the questionnaire outside of class. This constitutes a risk of selection bias, for example because the students with a strong interest in road safety will account for a relatively larger percentage of responses than students who are less interested in road safety. We do not know the percentage of unanswered questionnaires at the schools, because we did not measure the number of students in the target group at the individual school at the time of their LIVE visit. It is therefore difficult for us to assess the degree to which there is a systematic bias with regard to which students completed the questionnaire, and, thus, the extent to which this affects the results of the study. However, we see an around 50% reduction in the number of responses at follow-up relative to baseline, and that the size of this reduction differs between the intervention group and control group. This suggests a significantly reduced response rate at follow-up, which, in turn, suggests that the results could potentially be affected by selection bias.

---

given outcome. Due to convergence problems, standard errors were not corrected for dependence between individuals at baseline and follow-up, respectively. Instead, we estimated an independent, fixed effect for the group of individuals who answered the questionnaire in both measurements. A total of 188 students answered the questionnaire at both the baseline and follow-up.

Furthermore, there are indications that we have not been 100% successful in creating two homogenous comparison groups in our randomization. There are substantial and statistically very significant differences with regard to age composition, gender composition and parental background at intervention schools and control schools. Compared with the impact measurement of LIVE visits at primary and lower secondary schools (Hansen et al., 2017), there is a greater variance with regard to the student composition at the various production schools and vocational colleges included in this impact measurement, because the schools in this study have different specializations and focus areas. This could represent a selection bias in that students at some schools may be more likely to respond to the questionnaire than students at other schools. We have controlled for these observed differences, but they could be a sign that the schools are also different at baseline with regard to other parameters that we have not measured and that may have affected the result.

Overall, there is therefore a risk that the results have been affected by selection bias, both because the response pattern indicates a selection bias and because we have not been successful in controlling for differences at student level between schools. Consequently, the results of the study are subject to considerable uncertainty.

3 Results of the impact measurement

This chapter describes the students' background before the intervention, followed by a presentation of the results of the impact measurement. The analysis is structured thematically around the students' knowledge, attitudes and behaviour; i.e. the three areas in which the Danish Road Safety Council wants to influence students.

Table 3.1 shows the number of schools and students that provided responses in the measurement at baseline and follow-up, respectively. The table also shows the extent to which responses were excluded from further analysis. Some student responses did not state a school, or the school stated was not included in the impact measurement. These responses were excluded from the study. Furthermore, repeat responses from the same student and responses from students who were measured both at a control school and at an intervention school were also excluded (n = 13). Only relatively few students (n = 188) participated in both measurements, which means that many of the responses are independent at individual student level. In the responses, students are identified by their stated email address and telephone number.

As shown in table 3.1, there is useful data at baseline from 642 students at 23 intervention schools and 808 students at 21 control schools (n = 1,450). In the follow-up, analyses are based on 185 students at 20 intervention schools and 428 students at 20 control schools (n = 613).

Table 3.1 Number of schools and number of student responses from each school at baseline and follow-up, respectively. Number of observations (n), average, standard deviation and variation (min/max) in number of student responses per school.

	Baseline measurement					Follow-up				
	Schools	n	No. of responses on average (SD)		Variation	Schools	n	No. of responses on average (SD)		Variation
Intervention	23	642	27.9	(15.5)	1 / 62	20	185	9.3	(12.0)	1 / 46
Control	21	808	38.5	(45.5)	2 / 219	20	428	21.4	(27.9)	1 / 121
Total	**44**	**1,450**	**-**		**-**	**40**	**613**	**-**		**-**
Excluded responses:										
Unknown school		430					59			
Repeat responses		91					19			
Cross-responses[1]		13					13			
Total	53	2,304	-		-	48	739	-		-

Note: "Variation" shows the number of responses we received from the school with the fewest and the school with the most responses. Observations from non-randomized schools, unknown schools and repeat responses and cross-responses are excluded from further analysis.

Note: [1] Responses from students who change school and are therefore linked to both an intervention school and a control school in the two measurements.

Source: VIVE – The Danish Center for Social Science Research.

3.1 Students' background

This section compares the intervention and control groups with regard to sociodemographic conditions measured at baseline.

Table 3.2 shows statistically significant differences between the intervention and control schools with regard to gender, age, residential situation, as well as parental education and employment status. Students in the intervention group are generally older, more of them are female than in the control group, and fewer of them live with a/their parent(s). The mothers of students in the intervention group are less often in employment and generally have a lower level of education. The fathers of students in the intervention group are also less often in employment, while their level of education is more or less the same as that of fathers in the control group. Production schools and vocational colleges offer several different specializations and randomization does not necessarily ensure an equal number of carpenters or other specialist groups in each group. The impact measurement of the LIVE intervention at primary and lower secondary school was simpler in this respect, as the participants constituted a more homogenous group.

A total of 21.7% of students have a driving licence for a car and 24.8% have a driving licence for a moped. The students were also asked about the distance and route to their educational institution. There are no substantial differences between the control group and the intervention group. Overall, the majority (55.5%) of students live more than 10 km from their school, while for 20,4% the distance is between 5 and 10 km, and for 24.1% it is less than 5 km. The majority of students with a distance of less than 5 km walk or cycle to school (64.1%). In the group with more than 5 km to school, the majority use public transport (56.4%) to school, while the second largest percentage of students go to school by car (25.6%).

Of male students in the control group, 14.6% go by car (as drivers), while 9.3% ride a bike, and 13.2% go by moped. Of female students in the control group, the figures are 9.0%, 5.4%, and 2.3%, respectively. Of male students in the intervention group, 16.4% go by car (as drivers), while 12.9% ride a bike, 11.1% drive a moped. Of female students in the intervention group, the figures are 14.2%, 11.6%, and 3.7%, respectively. The differences in mode of transport between the intervention group and the control group are statistically significant for male students, but not for female students.

The most important objective with regard to randomizing the schools is to ensure that the intervention group and the control group resemble each other as much as possible on important baseline parameters. If the groups do not resemble each other, in principle we will not be able to distinguish between a possible effect of the intervention and an effect of the student composition at the school. We therefore statistically adjusted the results of the intervention for gender composition and age distribution, as well as for parental occupational status and parental level of education. We also adjusted for the percentage of students at the school who live with at least one parent. We did this by calculating this percentage (at school level) before the intervention and then allowing this variable to be included in our regression model.

Table 3.2 Students by parents' sociodemographic characteristics at baseline. Separately for intervention group and control group. Number of observations (n) and in per cent.

	Control (n = 808)		Intervention (n = 642)	
	n	Per cent	n	Per cent
Age ***				
15-18	647	80.2	391	60.9
19-22	129	16.0	193	30.1
23+	31	3.8	58	9.0
Gender ***				
Male	583	72.3	372	58.2
Female	223	27.7	267	41.8
Living with parents ***				
No	169	20.9	212	33.1
Yes	639	79.1	429	66.9
Occupational status, mother **				
In education	20	2.5	17	2.7
In a job	418	53.2	289	45.9
Without a job	137	17.5	142	22.5
Don't know	210	26.8	182	28.9
Educational level, mother ***				
Primary and lower secondary school	78	9.9	91	14.5
Upper secondary school	102	13.0	64	10.2
Vocational training	188	23.9	132	21.0
Short-cycle higher education	33	4.2	17	2.7
Medium-cycle higher education	67	8.5	57	9.1
Long-cycle higher education	26	3.3	16	2.5
Don't know	291	37.1	252	40.1
Occupational status, father **				
In education	3	0.4	2	0.3
In a job	488	62.2	328	52.1
Without a job	68	8.7	73	11.6
Don't know	226	28.8	226	35.9
Educational level, father ***				
Primary and lower secondary school	98	12.5	75	11.9
Upper secondary school	49	6.2	35	5.6
Vocational training	241	30.7	164	26.1
Short-cycle higher education	34	4.3	28	4.5
Medium-cycle higher education	30	3.8	21	3.3
Long-cycle higher education	21	2.7	18	2.9
Don't know	312	39.7	288	45.8

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. Inference based on χ^2 test of distributions.
Source: VIVE – The Danish Center for Social Science Research.

3.2 Students' knowledge, attitudes and behaviour before the LIVE visit

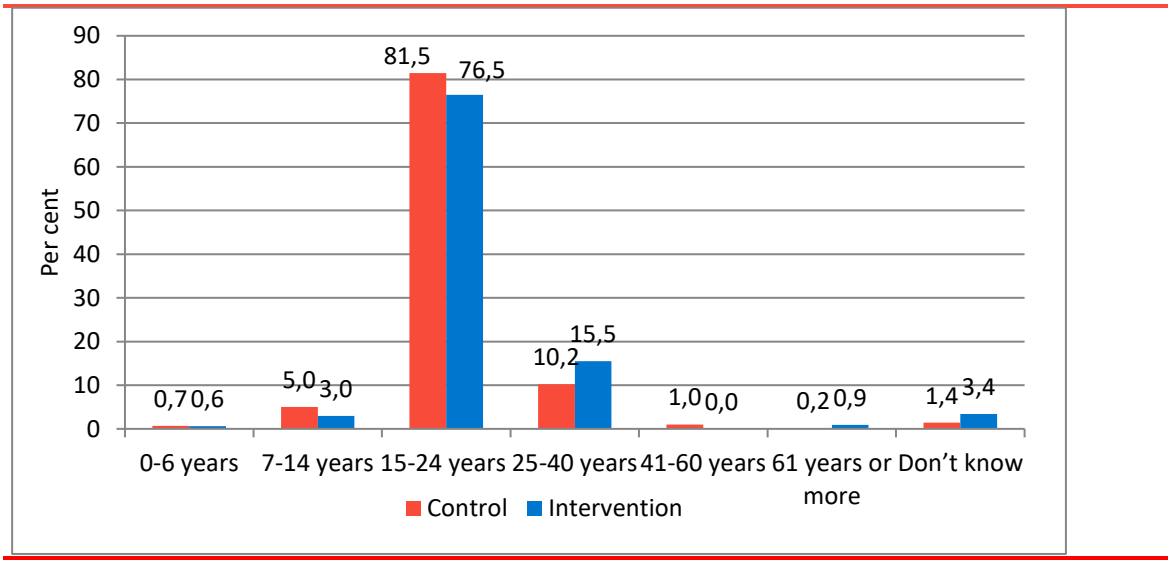
This section describes intervention and control schools with regard to students' knowledge, attitudes and behaviour before the LIVE visits.

3.2.1 Knowledge

Knowledge about risks in traffic is essential to change behaviour and avoid accidents. Therefore, as part of the intervention, students are presented with important knowledge about risks and safety in traffic. In the questionnaire, students are asked about which age group they think is most often involved in road accidents, and what aspects most often cause personal injury and death in traffic.

Fejl! Henvisningskilde ikke fundet. shows that the majority of young people in the intervention as well as in the control group at baseline answer correctly the question of what age group is most often involved in road accidents. However, having said that, significantly fewer young people answer this question correctly in the intervention group (76.6%) compared with the control group (81.5%).

Figure 3.1 Distribution of students according to their answers, at baseline, to the question about what age group is at greatest risk of being seriously injured or killed in traffic. Separately for intervention group and control group. Per cent.

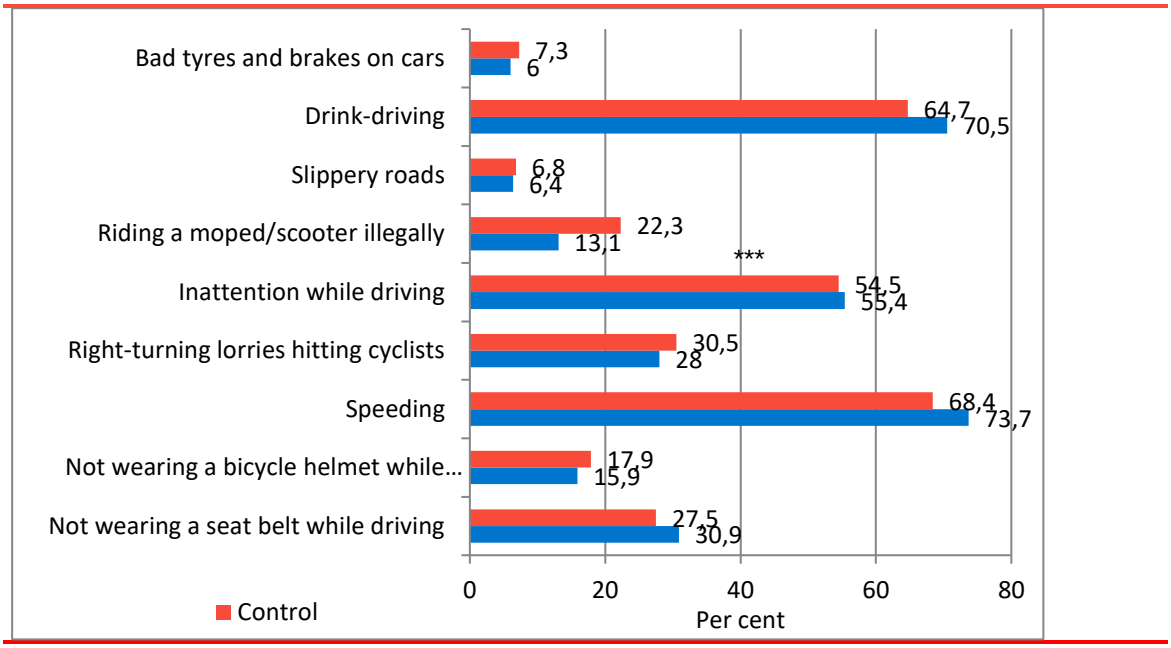


Note: Intervention group n = 644, Control group n = 808. The overall statistical test indicates a statistically significant difference between groups (χ^2 test). *** p < 0.01, ** p < 0.05, * p < 0.1.

Source: VIVE – The Danish Center for Social Science Research.

Figure 3.2 shows the students' responses to the question concerning the most important risk factors in traffic. The four factors with the greatest risk are: 1) speeding, 2) inattention while driving, 3) drink-driving and 4) not wearing a seat belt. The students could choose up to three of the response options mentioned. Students in the intervention group as well as in the control group largely chose correctly. However, the control group marginally overestimated the risk linked to lorries turning right. There are statistically significant, albeit small, differences between the groups with regard to how they assess the risks associated with drink-driving and speeding. Furthermore, the risk associated with driving a moped illegally was assessed very differently by the two groups. We took account of these differences in our impact analysis by looking at the relative change from baseline to follow-up and not at the simple, absolute difference observed at follow-up.

Figure 3.2 Percentage of students who, at baseline, consider that a specific factor is among the four commonest causes of injury and death in traffic. Separately for intervention group and control group. Per cent.



Note: Intervention group: n = 642, Control group: n = 808. *** p < 0.01, ** p < 0.05, * p < 0.1.
Source: VIVE – The Danish Center for Social Science Research.

At baseline, less than half of the students were able to identify three out of the four riskiest factors in traffic.

3.2.2 Attitudes

Attitudes are the second focus area the intervention aims to change. The questionnaire measured students' attitudes through questions with scaled response categories (‘Okay to a great extent’, ‘Okay to some extent', ‘Only okay to a minor extent’, 'Not at all okay'). In the analysis, we have combined the latter two categories into 'Don't think it's okay to ...'.

The results of the baseline measurement are in Table 3.3. Students generally have a very low degree of acceptance of risky behaviour such as not wearing a seat belt and driving when under the influence of alcohol. Speeding, on the other hand, as well as texting while cycling or while driving are considered more acceptable at both intervention and control schools. Furthermore, there are small differences between the groups, but some of these are nevertheless statistically significant. These differences have been taken into account in the impact analyses.

Among the students who have a driving licence for a car, the percentage who think it is only okay to a minor extent or not at all okay to drive without a seat belt is slightly lower than for the students on average. In the control group, 79.9% of students with a driving licence think that it is only okay to a minor extent or not at all okay to drive without a seat belt, while the figure is 81.4% for the intervention group. With regard to not wearing a seat belt as a passenger, 80.4% of students in the control group with a driving licence think that it is only okay to a minor extent or not at all okay, while this is 84.0% for the intervention group. To the question of whether it is okay to drive 100 km/h where the speed limit is 80 km/h, only 54% of students with a driving licence in both the control group and the intervention group think that this is only okay to a minor extent or not at all okay. This is fewer than

among students in general, as 66.5% of students in the control group and 72.3% of students in the intervention group think that this is only okay to a minor extent or not at all okay.

Table 3.3 Percentage of students who state that different forms of risky behaviour in traffic are 'To a minor extent' or 'Not at all okay'. Separately for intervention group and control group. Per cent.

	Control	Intervention	
Do not think it is okay to....			
Not wear a seat belt, driver	86.8	85.1	
Not wear a seat belt, passenger	88.1	84.0	**
Drive a car after drinking over the legal limit	95.0	95.1	
Drive a car at 100 km/h in an 80 km/h zone	66.5	72.3	**
Text while driving	90.6	89.3	
Text while cycling	65.7	71.7	**
Ride a moped/scooter after drinking over the legal limit	87.7	91.7	**
Ride a moped/scooter "tuned-up" to go more than 60 km/h	69.8	73.2	

Note: n = 642 for the intervention group, and n = 808 for the control group. *** p < 0.01, ** p < 0.05, * p < 0.1.
Source: VIVE – The Danish Center for Social Science Research.

3.2.3 Behaviour

Behaviour is the third and final focus area the intervention aims to influence. The questionnaire measured behaviour by asking the students about their habits in traffic and about their behaviour in traffic situations in which another person displayed risky behaviour. A system of scaled response categories is used, such as 'Always', 'Almost always', 'Occasionally' and 'Never'.

Table 3.4 indicates that wearing a seat belt is generally widespread, while bicycle helmets are rarely used. Crossing on a red light and texting or talking on a mobile phone while cycling occurs relatively rarely, while riding "tuned-up" mopeds and listening to music on a mobile while cycling is more common. There is a statistically significant difference between intervention schools and control schools at baseline for wearing a seat belt, wearing a bicycle helmet, and listening to music while cycling. These differences have been adjusted for in the impact analysis.

Table 3.4 Percentage of students who exhibit a specific behaviour in terms of risk situations in traffic. Separately for intervention group and control group. Baseline. Per cent.

	Control	Intervention	
Almost always wear a seat belt	95.8	93.4	**
Almost always wear a bicycle helmet	28.7	21.6	***
Only occasionally or never cross on a red light	88.0	88.2	
Only occasionally or never ride a "tuned-up" moped	71.2	78.2	
Only occasionally or never text while cycling	87.1	87.8	
Only occasionally or never listen to music while cycling	61.9	54.3	**
Only occasionally or never talk on a mobile phone while cycling	88.6	88.1	

Note: N = 642 for the intervention group and n = 808 for the control group. *** p < 0.01, ** p < 0.05, * p < 0.1.
Source: VIVE – The Danish Center for Social Science Research.

Table 3.5 shows how often students who have experienced the situation in question have objected or asked others to change their behaviour. This includes for instance asking other people to wear a

seat belt or put their mobile phone away while driving. The figures indicate that exceeding the speed limit and riding as a passenger on the back of a moped is tolerated to a far greater extent than drink-driving. Similarly, using a telephone is accepted to a greater extent than driving without a seat belt.

At baseline, there is a statistically significant difference between the intervention and control groups with regard to acceptance of drink-driving and the proportion of respondents who ask others not to use their telephone while driving. Adjustments have been made for these differences at baseline level in the impact analysis.

Table 3.5 Students who objected or asked someone to change their behaviour in risk situations in traffic. Number of observations and percentage.

	Control		Intervention		
	n	Per cent	n	Per cent	
Objected in a situation in which someone...					
Wanted to drive even though he/she had drunk too much	244	77.0	188	69.9	*
Was speeding	226	37.3	192	40.5	
Wanted you to ride as a passenger on their moped/scooter	192	41.0	139	41.4	
Asked someone to...					
Wear a seat belt	504	76.9	434	79.1	
Stop talking on their phone or texting while driving	397	61.2	357	67.4	**
Stop talking on their phone or texting while cycling	17	17.0	36	18.8	

Note: The number of observations is relatively low compared with the survey N, as only students who have been in the situation are able to respond to the question concerning whether they objected. *** p < 0.01, ** p < 0.05, * p < 0.1.

Source: VIVE – The Danish Center for Social Science Research.

3.2.4 Comparison of dissimilar groups

As is evident from the descriptions in the preceding sections, in some areas there was a large and statistically significant difference between the intervention and control schools, even before the intervention was tested. This is a problem if we want to understand the extent to which the intervention brings about a change among students. The problem arises for two reasons: 1) There is a difference between student composition (age, gender and parents' socioeconomic status) between the intervention and control schools: 2) There is a difference between the point of departure for the students at the intervention and control schools as regards some of the outcomes according to which the intervention is assessed.

The discrepancies between the intervention and control schools are handled in two ways: 1) The student composition is taken into account in the calculation such that the final results are adjusted for the observed differences in gender, age and parents' socioeconomic circumstances and the proportion of students who live with at least one parent: 2) The outcome measures are taken both at baseline and of course at the follow-up. This allows us to control for the point of departure as regards e.g. the proportion of students who wear bicycle helmets when we want to see whether the intervention results in a higher percentage of students wearing bicycle helmets. As such, the impact of the intervention is assessed as the observed change to an outcome measure at the intervention schools *compared with* the natural change which is simultaneously observed at the control schools.

3.3 Impacts of the intervention: the students' knowledge, attitudes and behaviour following the LIVE visit

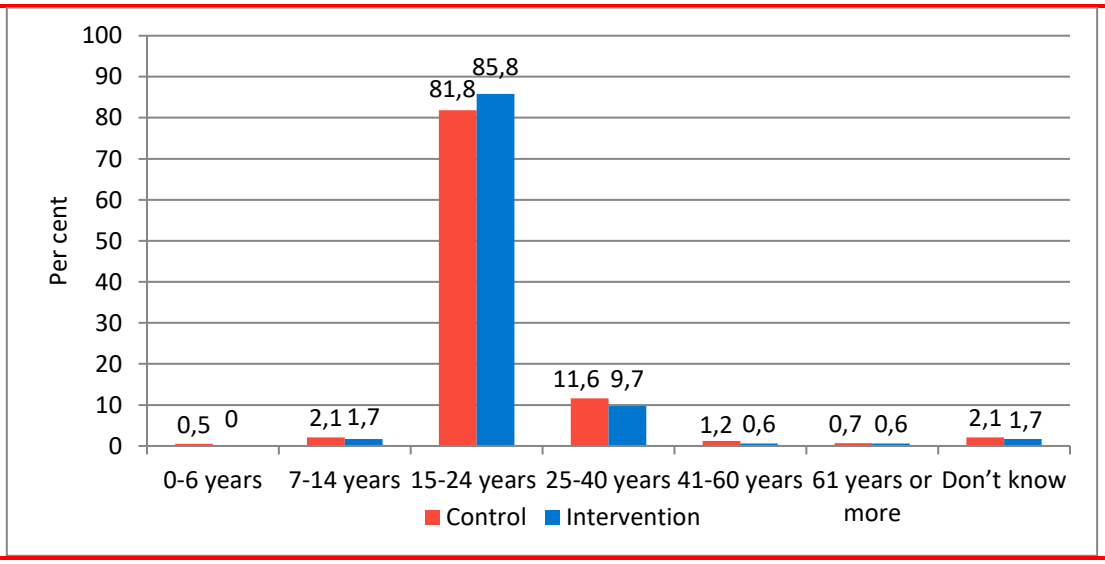
This section presents the outcome of the intervention in these three areas: knowledge, attitudes and behaviour. The expectation is that the intervention has had a positive influence on all three. Finally, we also investigate the specific impacts for male and female students separately.

In all of the analyses we take into account the schools' point of departure with respect to the individual outcome variables. Thus, when e.g. 77% of the students at the control schools, but only 69.9% of the students at the intervention schools, have objected to drink-driving at baseline, this difference is taken into account in the analysis. This means that the difference between the intervention and the control schools' *relative* improvements is tested. Gender and age distribution at the individual schools, the distribution of parents' socioeconomic backgrounds, and the proportion of students who live at home are all controlled for. Excerpts from the students' qualitative elaborations in the open response categories are also included.

3.3.1 Knowledge

The impact on the students' knowledge about risks in traffic is measured via questions about which age group is most frequently injured and what circumstances most often lead to accidents. Figure 3.3 shows the distribution of students' responses at follow-up, to a question about what age group is most frequently injured or killed in traffic. There are no statistically significant differences, overall, between the two groups' responses. By far the majority of students are aware, however, that their own age group (15-24) is at the highest risk of being involved in a traffic accident. Nonetheless, an improvement is observed in the percentage of the intervention group which gives the correct answer. Moreover, this improvement is statistically significant after taking into account the students' starting point at baseline and the student composition at the school.

Figure 3.3 Distribution of students according to their answers, at follow-up, to the question about what age group is at the greatest risk of serious injury or being killed in traffic. Separately for intervention group and control group. Per cent.

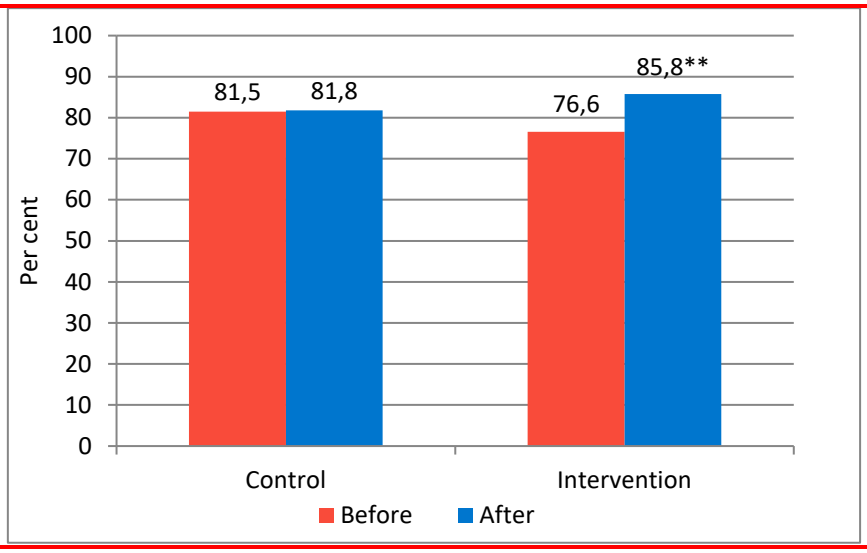


Note: Intervention group: n = 642, Control group: n = 808. *** p < 0.01, ** p < 0.05, * p < 0.1. The overall statistical test does not indicate any statistically significant difference between groups (χ^2 test). *** p < 0.01, ** p < 0.05, * p < 0.1.

Source: VIVE – The Danish Center for Social Science Research.

Figure 3.4 shows the change in the proportion of students who correctly answered the question concerning the most vulnerable age group. Note that there is no change in the control group, while the proportion of students who answer correctly rises in the intervention group. The relative change is statistically significant.

Figure 3.4 Percentage of students who know which age group is most at risk of being seriously injured or killed in a road accident. Separately for the intervention group and the control group and for baseline and follow-up. Per cent.

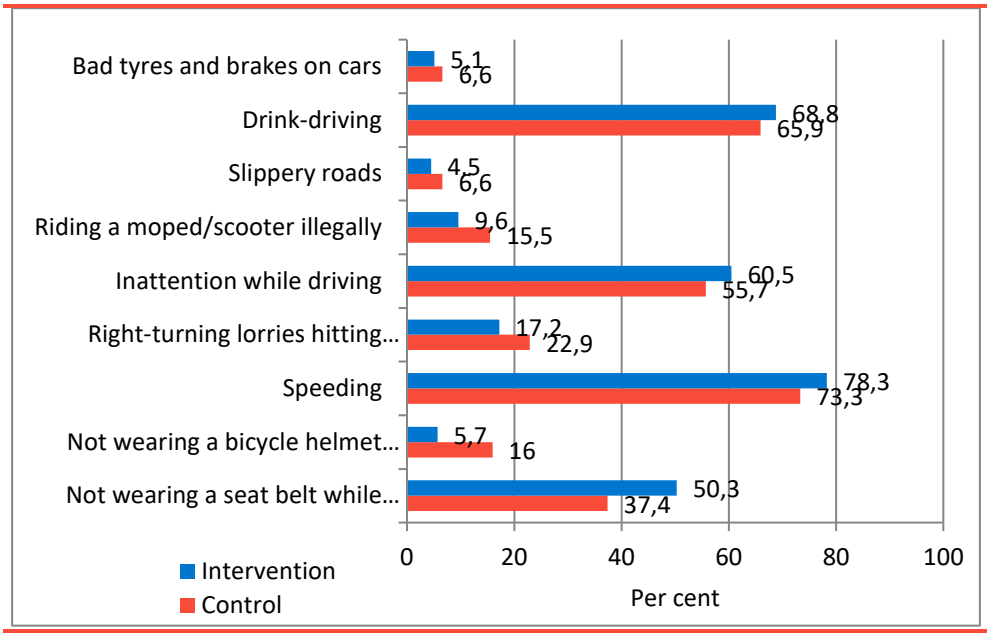


Note: Intervention group: n = 642, Control group: n = 808. *** p < 0.01, ** p < 0.05, * p < 0.1. The change is statistically significant after controlling for student composition.

Source: VIVE – The Danish Center for Social Science Research.

Figure 3.5 shows the students' responses to the question concerning the most important risk factors in traffic at follow-up. The four factors with the greatest risk are: 1) speeding, 2) inattention while driving, 3) drink-driving and 4) not wearing a seat belt. Since the students were asked to choose only three factors, in the analysis we decided only to include responses from students who stated three factors. In addition, the questionnaire includes five other options which are not characterized as particularly risky. As can be seen in the figure, the intervention group as a whole identifies the four most important risk factors. Furthermore, the intervention group performs somewhat better than the control group, which was also the case at baseline.

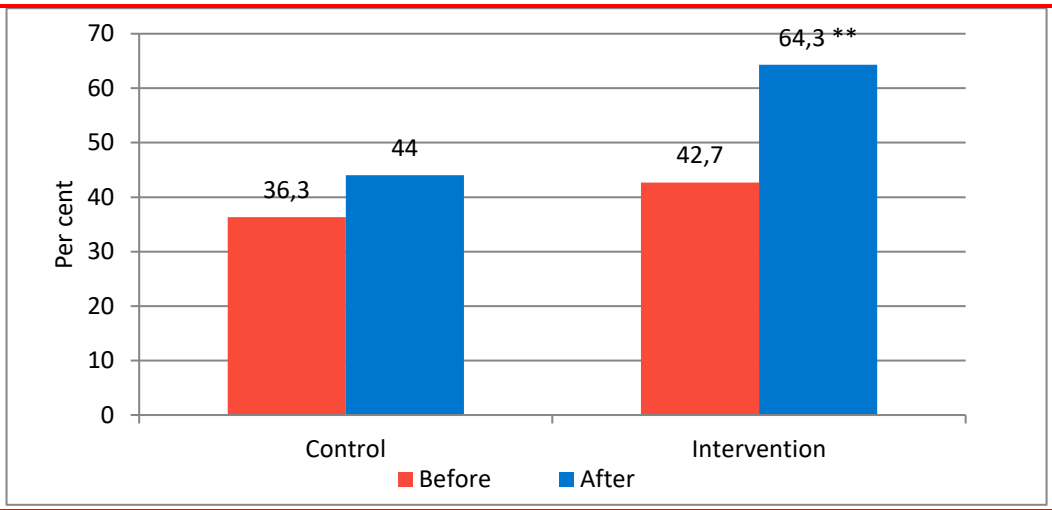
Figure 3.5 Percentage of students who, at follow-up, consider that a specific factor is among the four commonest causes of injury and death in traffic. Separately for intervention group and control group. Per cent.



Note: Intervention group: n = 642, Control group: n = 808. *** p < 0.01, ** p < 0.05, * p < 0.1.
Source: VIVE – The Danish Center for Social Science Research.

At baseline, less than half of the students were able to identify three out of the four most risky factors in traffic from nine possible response options. The percentage changed considerably in connection with the intervention, such that almost two-thirds of the students in the intervention group were able to identify the riskiest factors following the intervention. Figure 3.6 shows that significantly more students in the intervention group than in the control group know what the most common causes of road fatalities or injuries are. The change is statistically significant after controlling for student composition. Among students in the control group the percentage is virtually unchanged.

Figure 3.6 Percentage of students who provided three correct answers as regards which factors led to most injuries and fatalities in traffic. Separately for the intervention group and the control group and for baseline and follow-up. Per cent.



Note: Intervention group: n = 642, Control group: n = 808. *** p < 0.01, ** p < 0.05, * p < 0.1. The change is statistically significant after controlling for student composition. Since the students were asked to choose only three factors, in the analysis we decided only to include responses from students who stated three factors. The correct answers are: 1) speeding, 2) inattention while driving, 3) drink-driving and 4) not wearing a seat belt. In addition, the questionnaire includes five other options which are not characterized as particularly risky.

Source: VIVE – The Danish Center for Social Science Research.

3.3.2 Attitudes

The other focal point in the intervention was the students' attitude to various types of risky behaviour in traffic. The measurement was carried out with the aid of scaled response categories ('To a great extent', 'To some extent', 'To a minor extent' and 'Not at all'). The results in Table 3.6 are calculated as the percentage of students who respond, 'Only okay to a minor extent' or 'Not at all okay' with respect to various types of behaviour. The impact was tested both in the graded version and in the bipartite version, where 'Only okay to a minor extent' or 'Not at all okay' are combined into one.

Prior to the survey, there was already a widespread disapproval of not wearing a seat belt and driving under the influence of alcohol or while using a phone. Nonetheless, a statistically significant improvement is observed in the percentage of students who disapprove of not wearing a seat belt and using a telephone while driving a car. The improvements are in the magnitude of 5 to 10 percentage points on what were already high percentages.

When the analysis is carried out with the grading intact, statistically significant improvements are also seen in the intervention group with respect to disapproval of drink-driving. This is due to the fact that a smaller number of respondents respond 'Only okay to a minor extent' and a greater number respond 'Not at all okay' (the two categories which are otherwise combined), which – in contrast to the bipartite analysis – the graded analysis is able to distinguish between.

A positive change of attitude is observed for the intervention group, where more disapprove of risky behaviour in cars and on mopeds. LIVE for production schools and vocational colleges focuses on car drivers, while the behaviour of moped and bicycle users is only included if the ambassador considers it relevant with respect to the target group for the presentation in question. In line with this focus in the presentation, statistically significant positive changes are observed in attitudes to risky behaviour in a car. A significantly larger number of students in the intervention group think it is not okay drive without a seat belt, to drive after having drunk alcohol or to text while driving. Likewise, a

larger number of students in the intervention group do not think it is okay to ride a "tuned-up" moped or to ride a moped after drinking more than the legal amount of alcohol.

Table 3.6 Percentage of students who state that different forms of risky behaviour in traffic are 'Only okay to a minor extent' or 'Not at all okay'. Separately for baseline and follow-up, and the change from before to after the LIVE intervention. Separately for the intervention group and the control group. Per cent and percentage points.

	Control			Intervention			
	Before	After	Change	Before	After	Change	
Think that it is only okay to a minor extent or not at all okay to:							
Not wear a seat belt, driver	86.8	86.9	0.1	85.1	95.4	10.3	***
Not wear a seat belt, passenger	88.1	85.2	-2.9	84.0	92.0	8.0	***
Drive a car after drinking over the legal limit	95.0	92.8	-2.2	95.1	96.0	0.9	(**)
Drive a car at 100 km/h in an 80 km/h zone	66.5	72.3	5.8	72.3	74.1	1.8	
Text while driving	90.6	87.8	-2.8	89.3	94.3	5.0	**
Text while cycling	65.7	71.8	6.1	71.7	71.3	-0.4	
Ride a moped/scooter after drinking over the legal limit	87.7	88.8	1.1	91.7	92.5	0.8	
Ride a moped/scooter "tuned-up" to go more than 60 km/h	69.8	76.6	6.8	73.2	79.9	6.7	

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on logical regression for the recoded, binary variables and ordinal logistic regression for the original, graded versions of each individual variable. Statistical significance in parentheses indicates that the difference is only statistically significant in the graded model. Both models take into account student composition.

Source: VIVE – The Danish Center for Social Science Research.

Among students who have a driving licence for a car, considerably more students respond at follow-up that it is only okay to a minor extent or not at all okay not to wear a seat belt. Neither as a driver nor as a passenger. In the intervention group, 92.6% were of the opinion that it is only okay to a minor extent or not at all okay not to wear a seat belt. The proportion was 81.4% at baseline. In the control group, the proportion has increased from 79.7% to 84%. There are significantly more students in the intervention group who disapprove of this form of risky behaviour. The same applies with respect to the question about not wearing a seat belt as a passenger. Here the proportion of students who state that it is only okay to a minor extent or not at all okay to be a passenger in a car without wearing a seat belt rises from 84% to 92.6% in the intervention group, while it rises from 80.3% to 82.7% in the control group. With respect to driving at 100 km/h in an 80 km/h zone, 54% of both the intervention group and the control group responded that this is only okay to a minor extent or not at all okay. At follow-up, 61.9% of the intervention group responded that it is only okay to a minor extent or not at all okay, while the proportion in the control group is 57.4%. The changes are statistically significant.

At follow-up, the students were asked whether they sometimes think about the LIVE visit, and if so what their thoughts were. The answers may also illuminate how changes of attitude can come about. A number of students stated that they occasionally reflect on the stories from the LIVE visit:

> *They come to mind if I'm inattentive in traffic.*

> *After hearing about how serious a small error can be, I've been very aware of how I behave in traffic.*

The students were also asked whether they have spoken with friends and family about the visit. Among the 185 students in the intervention group who responded at follow-up, 52% responded that they had told their family about the visit. 12.8% had spoken with friends, while 5.1% had spoken with other people about the LIVE visit. This may indicate that the LIVE visit also influences attitudes and behaviour in students' social circles. To the question about what they told their friends and family, the students responded as follows:

One said: *"It's important to remember to put your seat belt on, even if you are sitting on the back seat, because it can affect other people in the car."*

Another student told his family *"what I could remember, and the father's story. The stuff that stuck in my mind."*

A third student responded: *"I've told my boyfriend that he shouldn't talk on his phone while he's driving and [that] he always needs to remember to put on his seat belt."*

The students' answers illustrate how, in some cases, the intervention has functioned as intended in terms of influencing the students and their friends and family to take greater care in traffic.

3.3.3 Behaviour

The final area which the intervention aims to influence is the students' behaviour in traffic. As part of the survey, we measured the students' behaviour and habits in traffic as well as the students' actions towards other people's risky behaviour.

Table 3.7 illustrates the students' responses when asked about their behaviour and habits in traffic. Percentages are given for the intervention and control groups both before and after intervention. The change is calculated in percentage points. The changes amount to only a few percentage points, and it is only with regard to wearing a seat belt that a statistically significant improvement is observed in the intervention group. Only responses from students who have experience of the specific situations are included. Students who have responded e.g. that they never cycle are not included in the question about how often they text while cycling.

Table 3.7 Percentage of students showing specific behaviour in relation to risk situations in traffic. Broken down by intervention group and control group and by before and after the LIVE intervention, and showing the change from before to after the intervention. Percentage and percentage points.

	Control					Intervention				
	Before		After		Change	Before		After		Change
	n	per cent	n	per cent		n	per cent	n	per cent	
Almost always or always wear a seat belt	756	95.8	388	94.6	-1.2	584	93.4	168	96.6	3.2 *
Almost always or always wear a bicycle helmet	185	28.7	96	30.1	1.4	111	21.6	32	23.0	1.4
Only occasionally or never cross on a red light	705	88.0	357	85.2	-2.8	563	88.2	147	84.0	-4.2
Only occasionally or never ride a "tuned-up" moped	203	71.2	92	69.7	-1.5	122	78.2	34	73.9	-4.3

	Control					Intervention				
Only occasionally or never text while cycling	529	87.1	251	86.3	-0.8	423	87.8	105	84.0	-3.8
Only occasionally or never listen to music while cycling	381	61.9	164	54.8	-7.1	265	54.3	64	49.6	-4.7
Only occasionally or never talk on a mobile phone while cycling	545	88.6	252	85.4	-3.2	430	88.1	110	87.3	-0.8

Note: Only students with a moped driving licence were asked the question about mopeds. Consequently, the number of observations is considerably lower for this question than for the others. *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on mixed effects logistic regression, controlling for student composition.

Source: VIVE – The Danish Center for Social Science Research.

Table 3.8 presents the figures for the students' tendency to object in risk situations in traffic. At baseline the students were asked whether they had been in the situation in question, and if so, how they had dealt with the situation. At follow-up the students were asked whether they had been in the situation in question in the past two months, and if so, how they had dealt with the situation. This wording was chosen so that the follow-up would only contain new events in which the students have had the opportunity to act differently. The table indicates a relatively large and statistically significant improvement in the intervention group as regards students who have objected in a situation in which there was a risk of drink-driving. A smaller, but statistically significant improvement is observed among students in the intervention group who have asked others not to use a phone while cycling.

Table 3.8 Percentage of students who objected or asked someone to behave differently in risk situations in traffic. Broken down by intervention group and control group and by before and after the LIVE intervention, and showing the change from before to after the intervention. Number, percentage and changes in percentage points.

	Control					Intervention				
	Before		After		Change	Before		After		Change
	n	per cent	n	per cent		n	per cent	n	per cent	
Objected in a situation in which someone...										
Wanted to drive even though he/she had drunk too much	244	77.0	93	66.9	-10.1	187	69.9	37	78.7	8.8 **
Was speeding	226	37.3	86	33.7	-3.6	191	40.5	35	33.7	-6.8
Wanted you to ride as a passenger on their moped/scooter	192	41.0	70	40.7	-0.3	137	41.4	19	30.2	-11.2
Asked someone to...										
Wear a seat belt	504	76.9	170	59.4	-17.5	434	79.1	78	65.0	-14.1
Stop talking on their phone or texting while driving	397	61.2	146	52.0	-9.2	357	67.4	69	58.5	-8.9
Stop talking on their phone or texting while cycling	17	17.0	41	20.0	3.0	36	18.8	25	25.0	6.2 *

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on mixed effects logistic regression, controlling for student composition. The total number of responses can be derived for the individual questions by multiplying the number (n) by (100/percentage). For example, 244 (77.0%) in the first cell is derived from 244*(100/77.0) = 317 responses.

Source: VIVE – The Danish Center for Social Science Research.

As such, the intervention is assessed as having had a positive impact on some areas of the students' behaviour in traffic. For many of the parameters studied, however, it is not possible to identify any impact from the intervention.

In the open responses to the question about whether the students have changed their behaviour in traffic since the LIVE visit, a number of students respond that they wear seat belts and bicycle helmets more consistently:

I wear a bicycle helmet more often; I always wear a seat belt if I am a passenger and sitting on the backseat, which is something I haven't always done in the past; I remember to wear a seat belt; I always put on a seat belt.

A number of the respondents also say that they have become more mindful of drink-driving, are fully focused on the traffic, and that they have a greater sense of the consequences of speed:

I've become more aware that other people don't drink-drive; I don't fiddle with the GPS or eat while I'm driving a car; I really notice if people break the speed limit, and I say that they should drive more slowly if they drive too fast.

The students' comments suggest that at least some of the students have taken the message of the LIVE visit to heart. The changes in behaviour that the students report reflect the themes which make up the LIVE ambassadors' narratives. At the same time, they reflect the risk factors which most commonly lead to injury and death, and which are presented in the LIVE visit (speeding, drink-driving, inattention and seat belts).

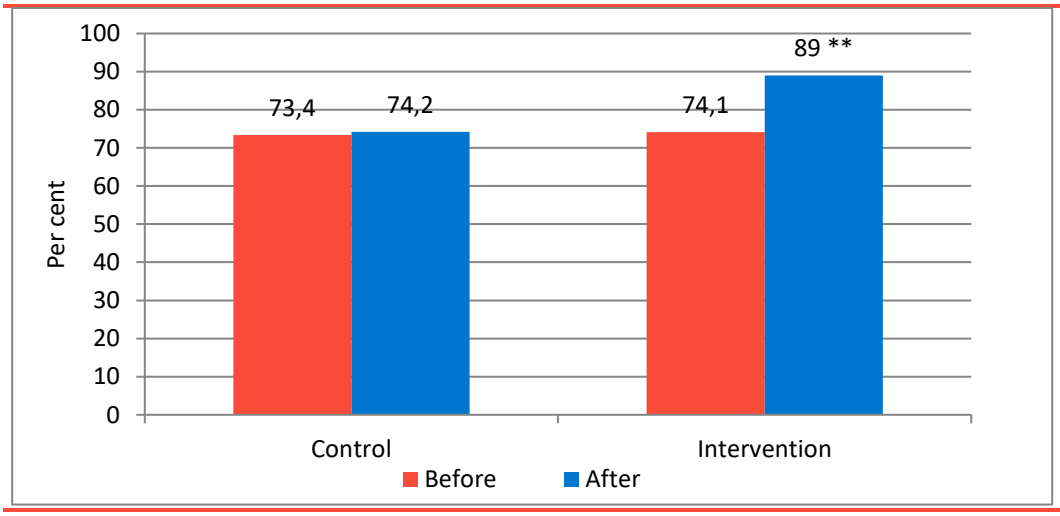
3.3.4 Impact by gender

In addition to the overall analysis, the impact of the LIVE visits has also been analysed separately for male and female students. The question addressed here is: Does the intervention have a different impact on women than on men? The analysis is carried out by estimating an impact for male and female students, after which the two impact estimates are compared in order to establish whether the impact for women is different than the impact for men. It is apparent that in a number of cases female students experience a greater impact than male students.

3.3.4.1 Knowledge

Figure 3.7 shows the proportion of female students who answered correctly when asked which age group is most at risk of being seriously injured or killed in a road accident. At follow-up, significantly more students in the intervention group than in the control group gave the correct answer.

Figure 3.7 Percentage of female students who know which age group is most at risk of being seriously injured or killed in a road accident. Separately for the intervention group and the control group and for baseline and follow-up. Per cent.

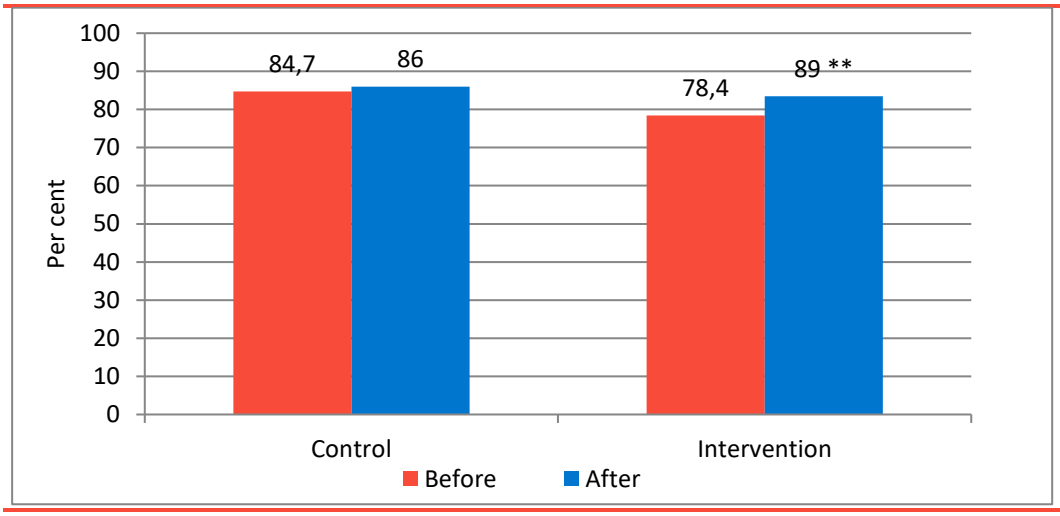


Note: *** p < 0.01, ** p < 0.05, * p < 0.1. The total number of observations (n) is 163, 112, 197 and 65, respectively, for the four columns.

Source: VIVE – The Danish Center for Social Science Research.

Likewise, at follow-up, a greater number of male students answered correctly regarding which age group is the most vulnerable when it comes to road accidents. The changes are however not statistically significant. The percentage who answered correctly at follow-up is largest in the control group, even though there is a greater positive change in the intervention group.

Figure 3.8 Percentage of male students who know which age group is most at risk of being seriously injured or killed in a road accident. Separately for the intervention group and the control group and for baseline and follow-up. Per cent.



Note: The total number of observations (n) is 494, 233, 290 and 86, respectively, for the four columns.
Source: VIVE – The Danish Center for Social Science Research.

Regarding the question about the most important risk factors in traffic,[2] the changes in the proportions among female and male students in the intervention group are more or less identical. At baseline, 43.2% of the female students in the intervention group gave three correct answers, while the same figure for male students was 42.3%. At follow-up 65.2% of the female students in the intervention group gave three correct answers, while the same figure for male students was 63.7%. At baseline, 34.4% of the female students in the control group gave three correct answers, while the same figure for male students was 37.1%. At follow-up, this had risen to respectively 40.4% among the female students and 46% among male students. The changes are not statistically significant.

3.3.4.2 Attitudes

Table 3.9 shows the female students' attitudes to various types of risky behaviour in traffic. Among women in the intervention group, when responding to almost all of the questions, a statistically significant positive change is observed in attitudes to road safety. This means that a greater number of women in the intervention group responded that the behaviour described is only okay to a minor extent or not at all okay, when compared with the control group.

Table 3.9 Percentage of female students who state that different forms of risky behaviour in traffic are 'Only okay to a minor extent' or 'Not at all okay'. Separately for baseline and follow-up and the change from before to after the LIVE intervention. Separately for the intervention group and the control group. Per cent and percentage points.

[2] The four most risky factors are: 1) speeding, 2) inattention while driving, 3) drink-driving and 4) not wearing a seat belt.

	Control					Intervention					
	Before		After		Change	Before		After		Change	
	n	per cent	n	per cent		n	per cent	n	per cent		
Think that it is only okay to a minor extent or not at all okay to:											
Not wear a seat belt, driver	209	95.9	135	90.6	-5.3	244	92.1	70	98.6	6.5	**
Not wear a seat belt, passenger	210	96.3	135	90.6	-5.7	239	90.2	68	95.8	5.6	**
Drive a car after drinking over the legal limit	215	98.6	143	96.0	-2.6	253	95.5	70	98.6	3.1	*
Drive a car at 100 km/h in an 80 km/h zone	191	87.6	120	80.5	-7.1	226	85.6	65	91.5	5.9	**
Text while driving	212	97.2	135	90.6	-6.6	244	92.1	70	98.6	6.5	***
Text while cycling	171	78.4	118	79.2	0.8	197	74.6	56	78.9	4.3	
Ride a moped/scooter after drinking over the legal limit	214	98.2	143	96.6	-1.6	253	95.5	69	98.6	3.1	(**)
Ride a moped/scooter “tuned-up” to go more than 60 km/h.	201	92.2	135	90.6	-1.6	231	87.2	67	94.4	7.2	(***)

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on logical regression for the recoded, binary variables and ordinal logistic regression for the original, graded versions of each individual variable. Statistical significance in parentheses indicates that the difference is only significant in the graded model. Both models take into account student composition.

Source: VIVE – The Danish Center for Social Science Research.

Among the male students a significantly higher proportion in the intervention group, compared with the control group disapprove of not wearing a seat belt, both as a driver and as a passenger. With regard to driving at 100 km/h in an 80 km/h zone, a significantly higher proportion in the control group disapprove of this compared with the intervention group. In addition, there is also a significantly higher percentage in the control group, compared with the intervention group, who think that it is only okay to a minor extent or not at all okay to text while cycling. For texting while driving a car, however, the male students in the intervention group show a positive trend, such that more think that it is not okay.

Table 3.10 Percentage of male students who state that different forms of risky behaviour in traffic are 'Only okay to a minor extent' or 'Not at all okay'. Separately for baseline and follow-up and the change from before to after the LIVE intervention. Separately for the intervention group and the control group. Per cent and percentage points.

	Control					Intervention				
	Before		After		Change	Before		After		Change
	n	per cent	n	per cent		n	per cent	n	per cent	
Think that it is only okay to a minor extent or not at all okay to:										
Not wear a seat belt, driver	479	83.3	229	84.8	1.5	297	80.5	96	93.2	12.7 **
Not wear a seat belt, passenger	487	85.0	221	82.2	-2.8	295	79.9	92	89.3	9.4 **
Drive a car after drinking over the legal limit	537	93.6	246	91.1	-2.5	350	94.9	97	94.2	-0.7
Drive a car at 100 km/h in an 80 km/h zone	336	58.5	183	67.8	9.3	232	63	64	62.1	-0.9 (*)
Text while driving	506	88.0	233	86.3	-1.7	322	87.5	94	91.3	3.8
Text while cycling	349	60.8	183	67.8	7.0	258	69.9	68	66.0	-3.9 *
Ride a moped/scooter after drinking over the legal limit	480	83.6	228	84.4	0.8	328	88.9	91	88.3	-0.6
Ride a moped/scooter "tuned-up" to go more than 60 km/h.	351	61.1	186	68.9	7.8	234	63.4	72	69.9	6.5

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on logical regression for the recoded, binary variables and ordinal logistic regression for the original, graded versions of each individual variable. Statistical significance in parentheses indicates that the difference is only statistically significant in the graded model. Both models take into account student composition.

Source: VIVE – The Danish Center for Social Science Research.

3.3.4.3 Behaviour

The final area which the intervention aims to influence is the students' behaviour in traffic. Among the female students in the intervention group there are significantly more who almost always or always wear a seat belt, compared with the control group. The percentage of female students in the control group who almost always or always wear a seat belt fell from baseline to follow-up. Of the female students in the intervention group who have a driving licence, all responded that they almost always or always wear a seat belt. Both at baseline and at follow-up. In the control group, the percentage of female students with a driving licence who almost always or always wear a seat belt as drivers fell from 96.9% to 90.6%.

As regards risky behaviour when cycling, at follow-up, there were more students in both the control group and the intervention group who listen to music while cycling, compared with baseline. However, the percentage who do so is smaller in the intervention group than in the control group. Compared with the control group, there are significantly fewer women in the intervention group who only occasionally or never talk on a mobile phone while cycling.

The questions concerning whether they wear a bicycle helmet and ride a "tuned-up" moped were removed given that fewer than 15 female students in the intervention group responded to these questions at follow-up. The non-gender-segregated results for these questions are shown in Table 3.7.

Table 3.11 Percentage of female students who exhibit specific behaviour in risk situations in traffic. Broken down by intervention group and control group and by before and after the LIVE intervention, and showing the change from before to after the intervention. Percentage and percentage points.

	Control					Intervention				
	Before		After		Change	Before		After		Change
	n	per cent	n	per cent		n	per cent	n	per cent	
Almost always or always wear a seat belt	215	97.7	137	94.5	-3.2	249	94.3	69	97.2	2.9*
Only occasionally or never cross on a red light	206	93.2	127	85.2	-8.0	243	91.4	63	87.5	-3.9(**)
Only occasionally or never text while cycling	160	95.2	99	94.3	-0.9	182	89.2	46	92.0	2.8
Only occasionally or never listen to music while cycling	110	65.1	57	54.8	-10.3	113	54.9	24	47.1	-7.8
Only occasionally or never talk on a mobile phone while cycling	161	94.7	89	87.3	-7.4	186	89.9	47	92.2	2.3 *

Note: The questions concerning whether they wear a bicycle helmet and ride a "tuned-up" moped were removed given that fewer than 15 students in the intervention group had responded to these questions at follow-up. *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on mixed effects logistic regression, controlling for student composition.

Source: VIVE – The Danish Center for Social Science Research.

Table 3.12 shows that among the male students there are likewise more in the intervention group who almost always or always wear a seat belt, compared with the control group. This change is however not statistically significant. Looking solely at the male students who have driving licences, the percentage in the intervention group who almost always or always wear a seat belt fell from 97% to 95.5%, while the proportion in the control group increased from 91.4% to 92.3%.

Table 3.12 Percentage of male students who exhibit specific behaviour in risk situations in traffic. Broken down by intervention group and control group and by before and after the LIVE intervention, and showing the change from before to after the intervention. Percentage and percentage points.

	Control					Intervention				
	Before		After		Change	Before		After		Change
	n	per cent	n	per cent		n	per cent	n	per cent	
Almost always or always wear a seat belt	540	95.1	251	94.7	-0.4	332	92.7	99	96.1	3.4
Almost always or always wear a bicycle helmet	116	25.1	58	28.2	3.1	66	22.8	18	21.4	-1.4
Only occasionally or never cross on a red light	497	86.0	230	85.2	-0.8	318	86.2	84	81.6	-4.6
Only occasionally or never ride a "tuned-up" moped	172	68.5	70	65.4	-3.1	92	76.0	27	71.1	-4.9
Only occasionally or never text while cycling	367	84.0	152	81.7	-2.3	238	86.5	59	78.7	-7.8(*)
Only occasionally or never listen to music while cycling	270	60.7	107	54.9	-5.8	150	53.8	40	51.3	-2.5
Only occasionally or never talk on a mobile phone while cycling	382	86.2	163	84.5	-1.7	241	86.7	63	84.0	-2.7

Note: Only students with a moped driving licence were asked the question about mopeds. Consequently, the number of observations is considerably lower for this question than for the others. *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on mixed effects logistic regression, controlling for student composition.

Source: VIVE – The Danish Center for Social Science Research

Furthermore, the results show that male students' behaviour became more risky from baseline to follow-up. An exception to this is the use of bicycle helmets, where more students in the control group almost always or always wear a bicycle helmet at follow-up compared with baseline. Apart from this, more male students exhibit risky behaviour. Significantly more male students in the intervention group than in the control group text while cycling. However, the decline is larger in the intervention group than in the control group, which means that after the LIVE visit, fewer male students text while cycling compared with before the visit.

Table 3.13 shows the extent to which female students object in risky situations in traffic. At follow-up the students were asked whether they had been in the situation in question in the past two months, and if so, how they had dealt with the situation. The results show that significantly more women in the intervention group objected when someone wanted to drive even though the person had been drinking. Compared with the control group, more women in the intervention group had objected when someone wanted them to ride as a passenger on a moped, or had asked someone not to talk on their phone or text while cycling. The difference is not statistically significant. Both in the intervention group and in the control group, fewer female students had asked someone to wear a seat belt. However, this decline is significantly smaller in the intervention group than in the control group.

Table 3.13 Percentage of female students who objected or asked someone to behave differently in risk situations in traffic. Broken down by intervention group and control group and by before and after the LIVE intervention, and showing the change from before to after the intervention. Number, percentage and changes in percentage points.

	Control					Intervention				
	Before		After		Change	Before		After		Change
	n	per cent	n	per cent		n	per cent	n	per cent	
Objected in a situation in which someone...										
Wanted to drive even though he/she had drunk too much	75	90.4	29	67.4	-23	89	75.4	16	94.1	18.7***
Was speeding	100	61.7	42	43.8	-17.9	105	53.6	18	51.4	-2.2
Wanted you to ride as a passenger on their moped/scooter	58	51.3	25	46.3	-5.0	68	51.5	12	70.6	19.1
Asked someone to...										
Wear a seat belt	157	88.7	65	61.3	-27.4	190	83	31	73.8	-9.2 **
Stop talking on their phone or texting while driving	126	73.3	62	58.5	-14.8	159	71.9	28	70.0	-1.9
Stop talking on their phone or texting while cycling	6	20.7	11	15.1	-5.6	15	20.8	12	36.4	15.6

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on mixed effects logistic regression, controlling for student composition. The total number of responses can be derived for the individual questions by multiplying the number (n) by (100/percentage). For example, 75 (90.4%) in the first cell is derived from 75*(100/90.4) = 83 responses.

Source: VIVE – The Danish Center for Social Science Research.

Table 3.14 shows the percentage of male students who objected or asked someone to behave differently in risk situations in traffic. At follow-up the students were asked whether they had been in the situation in question in the past two months, and if so, how they had dealt with the situation. The question about whether they had objected in a situation in which someone wanted them to ride as a passenger on their moped/scooter has been excluded due to an insufficient number of responses. At follow-up, more students in the intervention group than in the control group had objected in a situation in which someone wanted to drive, even though the person had been drinking too much. Both in the intervention group and in the control group, fewer students at follow-up had objected if someone was speeding, had asked someone to wear a seat belt or to stop talking on their phone while driving. The largest decline is in the intervention group.

Table 3.14 Percentage of male students who objected or asked someone to behave differently in risk situations in traffic. Broken down by intervention group and control group and by before and after the LIVE intervention, and showing the change from before to after the intervention. Number, percentage and changes in percentage points.

	Control					Intervention				
	Before		After		Change	Before		After		Change
	n	per cent	n	per cent		n	per cent	n	per cent	
Objected in a situation in which someone...										
Wanted to drive even though he/she had drunk too much	169	72.5	64	66.7	-5.8	98	65.8	21	70.0	4.2
Was speeding	126	28.4	44	27.7	-0.7	86	31.3	17	24.6	-6.7
Asked someone to...										
Wear a seat belt	345	72.5	105	58.3	-14.2	242	76.1	47	60.3	-15.8
Stop talking on their phone or texting while driving	270	56.8	84	48.0	-8.8	196	63.8	41	52.6	-11.2
Stop talking on their phone or texting while cycling	11	15.5	30	22.7	7.2	21	17.5	13	19.4	1.9

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. P values are based on mixed effects logistic regression, controlling for student composition. The total number of responses can be derived for the individual questions by multiplying the number (n) by (100/percentage). For example, 244 (77.0%) in the first cell is derived from 244*(100/77.0) = 317 responses.

Source: VIVE – The Danish Center for Social Science Research.

The results are associated with some uncertainty due to the high dropout at follow-up, and because relatively few students responded to the questionnaire twice. Thus, the results should be read with this in mind. This applies in particular to the analyses broken down by gender. The analyses were also carried out for the 188 students who responded to the questionnaire twice. The results of these analyses support the trends described, but changes from baseline to follow-up are not statistically significant.

3.4 Summary of results

The results show that the LIVE intervention overall had a statistically significant and positive effect in several areas related to students' knowledge, attitudes and behaviour. In relation to *knowledge*, it could be seen that:

- At follow-up, a significantly higher number of students receiving the LIVE intervention know which age group of road users is the most vulnerable.
- Furthermore, significantly more students in the intervention group know which three factors cause the most road fatalities or injuries, compared with students who did not attend the talk.

The results show statistically significant changes in students' *attitudes* to road safety:

- More students find it unacceptable, to a greater extent, not to wear a seat belt
- More students disapprove of drink-driving to a greater extent
- More students disapprove of texting while driving to a greater extent.

Moreover, the results show statistically significant changes in students' *behaviour* in traffic:

- The students wear a seat belt to a greater extent
- The students are more likely to object to drink-driving
- The students object to a greater extent to others using their phone while cycling.

However, impact analysis for the two genders separately shows that with regard to several of the questions, the overall effects of the intervention are attributable to changes in the group of female students, as this group was influenced more than the group of male students on several parameters. The male students in the intervention group were influenced in some areas, but not to the same extent as the female students.

With regard to *knowledge*, the following statistically significant changes could be observed:

- More women in the intervention group know which age group is the most vulnerable group of road users. The number of male students in the intervention group with this knowledge increased as well, but this increase is not statistically significant.

The analysis broken down by gender shows the following statistically significant changes in *attitudes*:

- Compared with female students in the control group, more female students in the intervention group think it is only okay to a minor extent or not at all okay to drive without a seat belt, to drive under the influence of alcohol, to speed or to text while driving.
- More male students in the intervention group than in the control group do not think it is okay to drive without a seat belt.
- Compared with the intervention group, significantly more men in the control group think it is only okay to a minor extent or not at all okay to drive 100 km/h in an 80 km/h speed limit zone, and to use a mobile phone while cycling.

The analysis broken down by gender shows the following statistically significant changes in *behaviour*:

- More women in the intervention group almost always or always wear a seat belt. The percentage of male students in the intervention group wearing a seat belt also increased after the LIVE visit, but this increase is not statistically significant.
- Fewer women in the control group use their mobile phone while cycling compared with the intervention group. For male students, the opposite is the case: More men in the intervention group than in the control group text while cycling.
- More women in the intervention group had objected when someone wanted to drive, even though he/she had drunk too much.
- Fewer female students both in the intervention group and in the control group had asked someone to wear a seat belt. However, this decline is significantly smaller in the intervention group.

The results are associated with some uncertainty due to the high dropout at follow-up, and because relatively few students responded to the questionnaire twice. Thus, the results should be read with this in mind. However, overall it seems that LIVE visits to production schools and vocational colleges influence women more than men – something that should be taken into account when organising visits in the future.

Literature

Cox, D. (1958): ”The Regression Analysis of Binary Sequences”. *Journal of the Royal Statistical Society*, Series B (Methodological), 20(2), p. 215-242.

Glascoff, D.W. (2000): ”A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns”. *Marketing Health Services*, 20(4), p. 35-60.

Hansen, H., T.M. Sandoy & C.L. Kristensen (2017): *Effektmåling af Sikker Trafik LIVE – Delrapport 1. En undervisningsindsats til folkeskoler. (A randomized controlled trial of “Sikker Trafik LIVE” (“Road Safety LIVE”) -– Sub-report 1)* Copenhagen: VIVE - The Danish Center for Social Science Research.

Kahneman, D. (2011): *Thinking fast and slow.* New York: Farrar, Straus & Giroux.

McCullagh, P. (1980): ”Regression Models for Ordinal Data”. *Journal of the Royal Statistical Society*, Series B (Methodological), 42(2), p. 109-142.

Transportøkonomisk Institutt (2012): *Trafikkopplæring i Danmark ”fra vugge til rat”*. Oslo: Transportøkonomisk Institutt.

Vygotskij, L.S. (1982):*Tænkning og sprog*. Copenhagen: Hans Reitzel.

Warner, H.W. & S. Forward (2016): ”The Effectiveness of Road Safety Interventions using three Different Messages: Emotional, Factual or a Combination of both Messages”. *Transportation Research*, Part F 36, p. 25-34.