RoadSense: a success?

Effects on behavioural intention and opinions

Colophon

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Content of the project:	This report presents a study that investigates the magnitude and nature of the road risk of young car passengers in the Netherlands. Questionnaires were held before and after participation of young passengers in the RoadSense programme, and questioned them about their behavioural intentions and opinions.
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Summary

Mercedes-Benz commissioned the present study in order to investigate the magnitude and nature of the road risk of young car passengers in the Netherlands, and to assess the effects of the RoadSense programme on their behavioural intentions and opinions. Using questionnaires, a before and after study without a control group, was carried out among 317 participants in the programme. These questionnaires were administered just before and immediately after participants had attended RoadSense. The results showed a significant number of young passengers to be exposed to dangerous driving, mostly speeding. Young males engaged more frequently in dangerous behaviour and also held more risky opinions than girls did. Also, youngsters who had been passengers with a drunk driver, expressed more risky opinions. After having completed the RoadSense course, participants had improved their behavioural intentions and opinions. The programme did not have an 'extra' effect on the high-risk groups, such as young males. However, such an extra effect was present in the group who had been riding with a drunk driver. The implications of the findings for programme development were discussed, whereby the limitations of the present study were taken into account. It was recommended to strengthen the programme's impact on high-risk groups, especially on young male passengers, to explore the theme of peer pressure, and to involve parents. To assess the effects on safety, an evaluation is required of the long-term effects of the programme on actual behaviour. Such an evaluation should not solely include a pre- and post-test but also include a control group.

Contents

1 Introduction

1.1 Problem statement

Adolescents love to hang out with friends. Sharing a ride and picking up friends on the way is part of the fun. Youngsters aged 14-16 do not possess a driving licence yet and therefore accept rides from their older friends. This would not be a matter of concern, were it not that these rides may have implications for their current and future safety. An overview of the current literature shows at least three reasons for concern. First, crash figures show that these car trips may expose young passengers to high risks. Young drivers have higher crash rates than experienced drivers, which also endangers their passengers (Vlakveld, 2005). In 2008, 17 passengers died in the car of a young driver in the Netherlands. The crash risk may be even higher when novice drivers carry peer group passengers. However, the evidence is not conclusive on this point. Studies from the US suggest that crash rates increase when passengers are present, but a study among Swedish novice drivers suggested that the presence of passengers has a protective effect (Engström et al., 2008). A second safety concern is that passengers by their presence and behaviour may contribute to the extra risk. For instance by being a source of distraction, by explicitly or implicitly putting pressure on the driver (Gardner & Steinberg, 2005; Steinberg & Monahan, 2007), or by the driver's desire to impress the passengers, and to be 'cool' (Caird & White, 2009). A third concern is the influence that regular exposure to risky driving may have on the formation of safety attitudes. Studies show that 'bad examples', in particular from 'relevant others', may reinforce the belief that risky driving is not so risky after all. Even high risk driving rarely results in a crash (Waylen & McKenna, 2002).

To date most studies and interventions in the Netherlands have focused on the risk of novice drivers, and almost none on the risks of young passenger in the age category 13-17. As a result no information is available on the nature and magnitude of the risk, the factors contributing to this risk, and the potential effects interventions may have.

RoadSense is one of the first programmes in the Netherlands that targets the behaviour of young passengers between 14 and 16 years of age. The programme aims to increase awareness of risks, to deepen the understanding of the complexity of the driving task, and to create an insight into the potentially positive and negative influences that peer group passengers have on the task performance of novice drivers. Although the programme addresses some relevant issues, little is known about the programme's impact on safety.

This study aims to study behaviour and attitudes of adolescents as passengers and the effects of RoadSense.

1.2 Objectives

The study has three objectives. The first objective is to gather information about the behaviour of young Dutch passengers, their exposure to risk, their opinions about these risks, and the factors that predict risky behaviours and opinions. The second objective is to assess the effects of the RoadSense programme on the behavioural intention and opinions of young passengers. The third objective is to study the role of background variables such as age, gender, school type, and previous exposure to risk, in relation to the effects of the RoadSense programme.

2 Method

2.1 Participants

Youngsters participating in the RoadSense programme were invited to also participate in the evaluation study. From 317 participants a pre- and post-test questionnaire was available that could be identified as being completed by the same individual. All analyses in the current study were based on these 317 individuals. 53.2% of the participants were boys, and the mean age was 14.9, *SD* = .7. Only 26% were from schools for vocational training, and 74% attended schools for theoretical higher education (havo and vwo). Participants ranged between 14 and 16 years of age: 34% were aged 14, 46% were 15 years old, and 18% were aged 16.
A significant number of participants reported to have been exposed to risky driving; 70% reported to have been a passenger of speeding parents, 45% of speeding friends, and 15% of drinking drivers.

2.2 Questionnaires

The questionnaires were based on those used in a Norwegian study on factors that affect the behaviour of adolescent passengers and their interactions with drivers (Ulleberg, 2004). The questionnaire used in the current study consisted of 8 items on behaviours and 6 items on opinions. A four-point scale was used for each item, and labelled as 'totally true', 'a bit true', 'untrue', and 'totally untrue". See *Table 2.1* for an overview of the content of the pre- and post-test questionnaires. Exposure to risky driving was measured for three conditions: " Having been a passenger of a speeding parent" , "Having been a passenger of a speeding friend" and "Having been a passenger of a drinking driver".

	Pre-test	Post-test
Actual behaviour as passengers (8 items)	Actual behaviour	Behavioural Intention
Exposure to risky driving (3 items)	Actual exposure	
Opinions (6 items)	Identical on both tests	
Demographics (age, school type gender)	Only on pre-test	
Appreciation of training		Only post-test

Table 2.1: *Elements of questionnaire on pre-test and post-test (Questionnaires are available in full in the Appendices 1 (pre-test) and 2 (post-test).*

2.3 Procedure

The questionnaires were administered just before the training and the same day immediately after the training. To ensure anonymity, codes were constructed to enable identification and merging of pre- and post-test questionnaires of the same individual.

2.4 Measures

Scales
To construct scales and to study the progress on the scales, the items were analysed on intentions (items 1, 2, 4, 7, 9, 10, 11, and 13). For instance, 'In future times I will not travel as a passenger with a driver who drives dangerously'. The internal consistency of the scale was acceptable (α = .73). See for the exact wording of the items *Table 3.1*. For each participant, the scores were totalled into the "Behaviour before RoadSense score" and the 'Behaviour intention after RoadSense score.

A second scale was constructed for opinions (items 3, 5, 6, 8, 12, 14). For instance, 'A driver who speeds is cooler than a driver who always obeys the rules'. For the exact wording of the items, see *Table 3.2*. The internal consistency of the 'opinions scale' was just below the norm (α = .63). The performance of each participant was calculated as the sum of scores on the items on the pre-test and as the sum of the scores on the post-test.

2.5 Analysis

A *t*-test was applied to compare the scores on the behaviour and opinion scales before and after RoadSense. For the analysis of the individual items within the scales, and for the effects of the course on different subgroups, ANOVA with repeated measures was applied.

In social sciences, two measures are relevant for interpreting the effect. The first is that of statistical significance that indicates the likelihood of a difference between the pre- and post-test being a result of pure chance. In this study significance level was set at $p < .05$, meaning a less than 5% chance that differences are a result of chance.

The second measure is that of effect size, indicating the magnitude of the effect. As a measure for effect size partial èta squared (η_P^2) was considered with $\eta_P^2 = .01$ as a small, $\eta_P^2 = .06$ as a medium, and $\eta_P^2 = .14$ as a large effect size (Cohen, 1988). We report the effects in five categories: These categories are presented in *Table 2.2:*

Effect size	Symbol	Interpretation
$\eta_P^2 \geq .14$	++	very strong positive effect
$\eta_P^2 < .14$ and $\eta_P^2 \geq .06$	+	strong positive effect
$\eta_P^2 < .06$ and $\eta_P^2 \geq .01$	□	positive effect
No significant effect	–	no effect
Significant effect in opposite direction	––	negative effect

Table 2.2: *Effect categories: effect size, symbols, and interpretation*.

2.6 Intervention

RoadSense is a programme developed by Mercedes-Benz to raise risk awareness among youngsters aged 13-16 by means of practical exercises. The programme has already been

applied in several countries (e.g. England, Germany). In those countries, the programme's main objective is to prepare pre-licence youngsters for their role as drivers. The objective of the Dutch version differs in that it aims to reduce the risks of young passengers by stimulating skill development that helps them to understand their own responsibilities, and by stimulating active coping strategies by means of group discussions. The programme offers practical exercises, such as driving on a test track, as well as group discussions.

3 Results

3.1 Prevalence and predictors

How often do youngsters in this age group expose themselves to risky conditions? Do they know how to cope with these conditions?

3.1.1 Risk behaviour

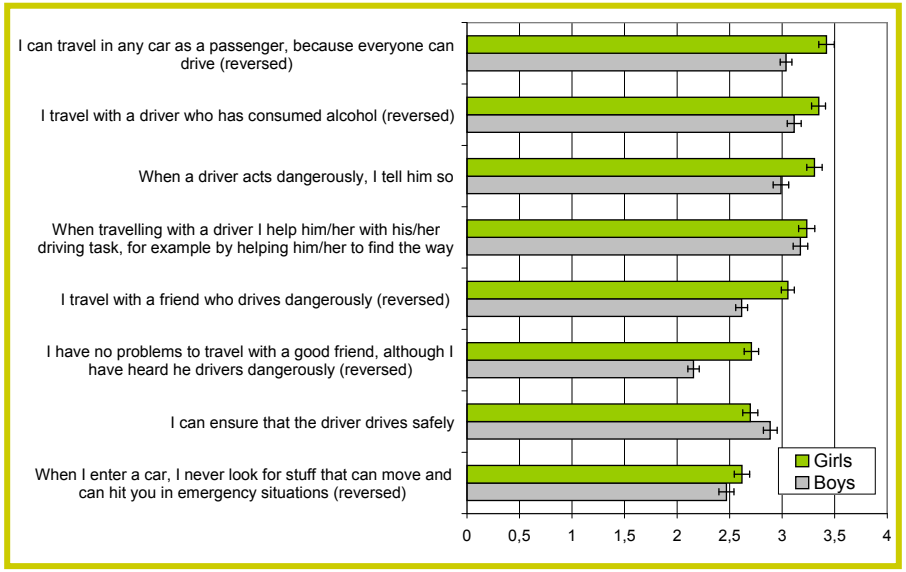

Figure 3.1: *Self reported behaviour of passengers by gender on pre-test. High scores mean safe behaviour. Min=1, Max=4. The error bars represent +/- 1 SE.*

Figure 3.1 shows self-reported behaviour of the participants before the start of the programme. In general, most youngsters are careful in their actions and in the acceptance of rides. They become less careful and more trusting if a driver is a friend. A *t*-test on the mean scores of item 1 (accepting a ride from a person who drives dangerously) and item 10 (accepting a ride from a friend who drives dangerously) shows this difference to be statistically significant (t (313) = -8.61, $p < .001$).
They have experienced that it is hard to make a driver drive safely, and do not check a car for objects that can pose a danger in an emergency. In general, boys are more careless in their actions than girls are. However, there is one exception. Boys find it easier to influence a driver than girls do.

3.1.2 Opinions

Figure 3.2 presents the scores on opinions of the participants before the start of the RoadSense programme. Young passengers do not hold clearly negative safety opinions, and there is not a lot of variation between the items. The largest gender differences appear on items such as "cool violating traffic rules', and 'not being cool asking a driver to be more careful'. One item stands out: the trust young passengers have in the driver, and the responsibility they assign to this driver for a safe ride. The question is whether this is a reliable reflection of how youngsters think, or whether there is 'something wrong' in how the question is phrased.

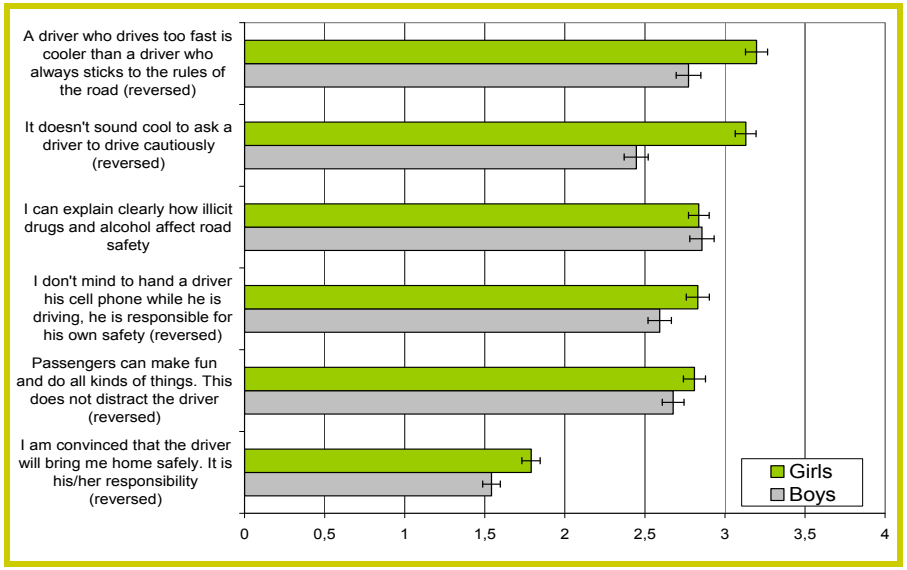

Figure 3.2: *Opinions of passengers by gender on pre-test. High scores mean safe opinions. Min =1, Max=4. The error bars represent +/- 1 SE.*

3.1.3 Predictors of risky behaviour and opinions

Youngsters differ on how they behave as passengers, and on how they think about risks. What predicts risky behaviour and risky opinions? To study this relationship, a hierarchical regression analysis was carried out with gender, age, school type and exposure to risk (riding with driver who has been drinking, with parents or friends who speed) as predictors.

The analyses showed that for the prediction of risky behaviour, gender was the strongest predictor explaining 9.5% of the variance. An additional 10.5% of the variance was explained by exposure to risk, especially 'having travelled as a passenger of a driver who had been drinking'. Other variables, such as age and school type, did not improve the predictions.

What predicts unsafe opinions? A hierarchical regression showed a strong effect of gender, explaining 9.5% of the variance in risky opinions. The exposition factor 'riding with a driver who had been drinking', and 'parents who speed', also significantly predicted risky opinions, explaining an additional variance of respectively 6.4% and 4.3%.

3.2 Effects of RoadSense

The analyses of the effects have focussed on three research questions.

- How large is the effect on behavioural intentions and opinions?
- On which items do participants improve? This gives a more detailed view of which items have actually changed.
- Have all subgroups indeed improved? This shows whether the course has a weaker or a stronger effect given the profile of a participant. Ideally a course like RoadSense should have the strongest effect on the groups that are most at risk.

3.2.1 Overall effect behavioural intentions and opinions

For this analysis, the scores on all items with regard to behavioural intentions and the scores on all items with regard to opinions were totalled. This resulted in four scores for each individual: a) pre-test behaviour, b) post-test behavioural intention c), pre-test opinions, and d) post-test opinions. *Figure 3.3* presents the mean scores for the pre- and post-test

on the sum of the behaviour items. Compared to the pre-test the average post-test score improved with a quarter point. This improvement is significant with a 'medium effect size' (+), $t(294) = -8{,}863$; $p < .001$; $r = .46$.

RoadSense also improved opinions (see *Figure 3.4*). Compared to the pre-test score the post-test score improved with about half a point. This is significant with a large effect size (++), $t\ (304) = -17.43$; $p < .001$; $r = .71$.

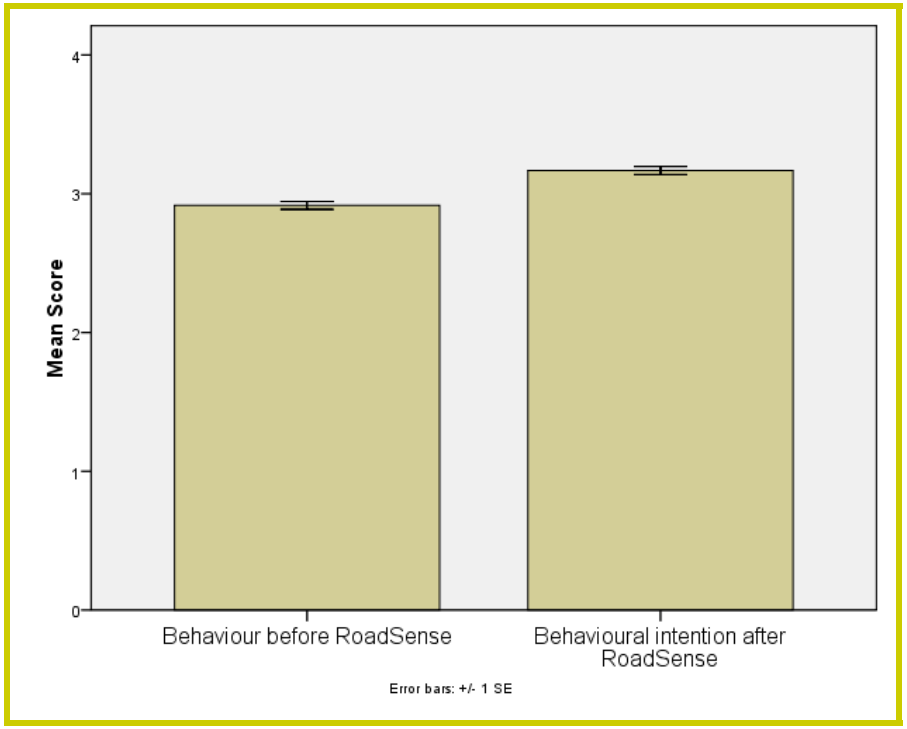

Figure 3.3: *Effect of RoadSense mean scores of behaviour on intention.*

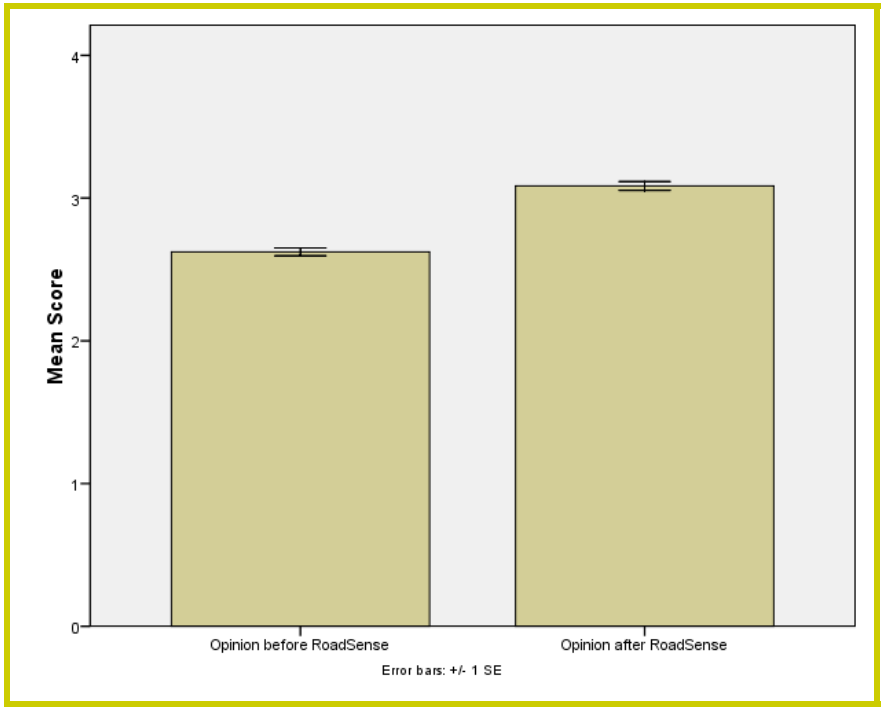

Figure 3.4: *Effect of RoadSense on mean scores of opinions.*

3.2.2 Effects per item

Behavioural intention

To understand on which items the participants improved, ANOVA's were carried out with repeated measures. The results are presented in *Table 3.1*. The table shows positive effects on all intentions. A plus indicates a positive safety effect.

Behaviour intention	Effect of RoadSense
I have no problems travelling with a good friend, although I have heard he drives dangerously	+
I can ensure that the driver drives safely	++
I travel in any car as a passenger, because everyone can drive	+
When travelling with a driver I help him/her with his/her driving task, for example by helping him/her to find the way	+
I travel with a friend who drives dangerously	□
When I enter a car, I never look for stuff that can move and can hit you in emergency situations	++
I travel with a driver who has consumed alcohol	–
When a driver acts dangerously, I tell him so	+

Table 3.1: *Items and effect size for behavioural intention. See for the meaning of the symbols Table 2.2.*

Reason for concern is the only minor effect of RoadSense on the intention to travel with a driver who has been drinking. Participants did not improve significantly on this items after completion of RoadSense.

Opinions

Table 3.2 presents the effects on opinions. All items show a positive effect of the course. The effect sizes are moderate. However, on one of the six items the improvement was not significant. Their opinion about whether or not a driver who drives too fast is cool did not improve significantly.

Opinions	Effect of RoadSense
I am convinced that the driver will bring me home safely. It is his/her responsibility	+
I don't mind to hand a driver his cell phone while he is driving, he is responsible for his own safety	+
A driver who drives too fast is cooler than a driver who always sticks to the rules of the road	–
I can explain clearly how illicit drugs and alcohol affect road safety	+
Passengers can make fun and do all kinds of things. This does not distract the driver	□
It doesn't sound cool to ask a driver to drive cautiously	+

Table 3.2: *Items and effect sizes for opinions. See for the meaning of the symbols Table 2.2.*

3.3 The influence of background variables on effects of RoadSense

Participants differed in background variables, such as gender, age, exposure to risk, and school type. To study whether RoadSense had a different effect on youngsters from different backgrounds, ANOVA's were carried out, with a background variable as a between subject variable, and pre- and post-test (time) as a within subjects variable. A main effect of the background variable indicates that these groups from different. A main effect of time indicates that the pre-test and post-test scores differ. This shows that RoadSense has an effect. An interaction between group and time indicates that the effects of RoadSense differ by group. The latter interaction is of

interest for the influence of background variables on the effects of the intervention.

3.3.1 Behaviour and opinion scales

Among the different subgroups, the passenger who had been riding with a drinking driver, benefited most from the course (see *Figure 3.5*). No differences existed between the other groups (exposed to speeding, age groups, gender, and school type)

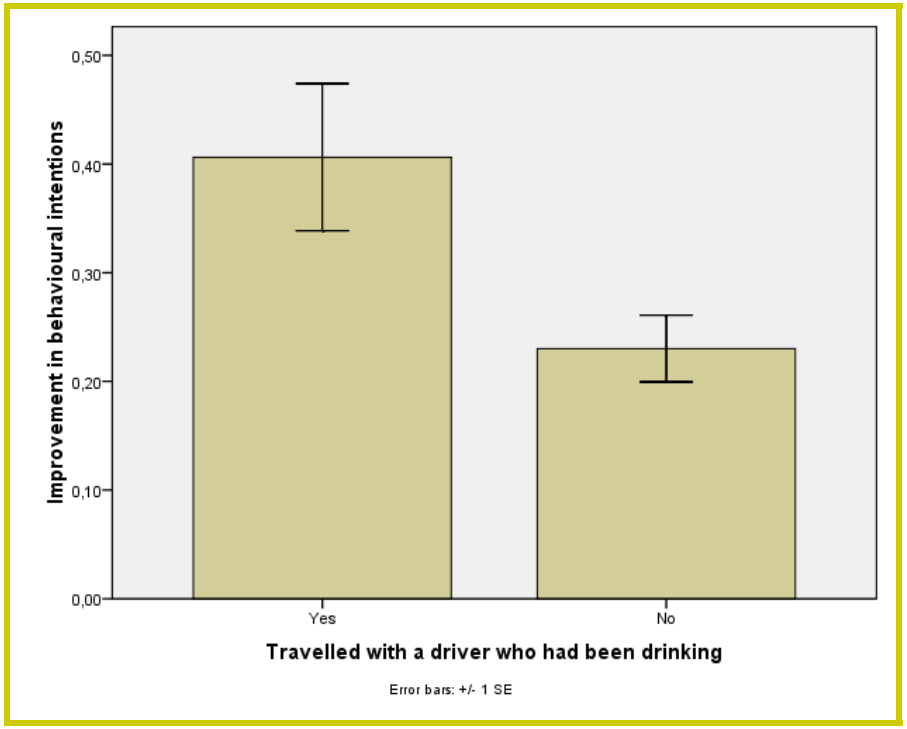

Figure 3.5: *Effect of RoadSense by exposure to drunk driving*.

3.3.2 Per item

Gender

With the exception of only two items ('I can ensure that the driver drives safely' ; and 'I can explain clearly how illicit drugs and alcohol affect road safety') boys report more safety compromising behaviours on the pre-test (*Figure 3.1*) and opinions (*Figure 3.2*) than girls do. However, further analyses of the differences between the pre- and post-test scores show interactions between time and gender on all but two items, indicating that RoadSense is equally effective for boys and for girls. But the course was more beneficial for girls on the items "I can ensure that the driver drives safely", and "I can explain clearly how illicit drugs and alcohol affect road safety".

Previous exposure

Table 3.3 shows the differences in risky behaviours grouped by previous exposure to risky driving (speeding parents and friends, and drinking drivers).

Only items that showed statistically significant main effects for group, indicating that the groups differed, are included in the table. The label "Risk" is used to indicate a main effect of group whereby the exposed group is more at risk than the non-exposed group. On 7 out of 14 items, exposed passengers reported more risky behaviours and opinions than unexposed passengers did. The interaction between time and group was not statistically significant, meaning that RoadSense did not have a larger effect on the risk group.

Items (behaviour and opinions)	Exposure		
	Speeding parents	Speeding friends	Drinking driver
I have no problems travelling with a good friend, although I have heard he drives dangerously	Risk	Risk	Risk
I travel in any car as a passenger, because everyone can drive	Risk	No	No
I don't mind handing a driver his cell phone while he is driving, he is responsible for his own safety	Risk	Risk	Risk
A driver who drives too fast is cooler than a driver who always sticks to the rules of the road	Risk	Risk	Risk
I travel with a friend who drives dangerously	Risk	Risk	Risk
I travel with a friend who has consumed alcohol	No	Risk	Risk
Passengers can make fun. This does not distract the driver	No	No	Risk

Table 3.3: *Items for which exposure to risk was associated with exposed youngsters responding in a more dangerous direction than non-exposed youngsters did (Risk). The interactions between course and exposure group were not significant.*

School type and Age

School type and age did make a difference on only 5 items (see *Table 3.4*). Compared to the youngsters in theoretical training, youngsters in vocational training were more safety oriented and the course resulted in greater changes.

Items (Behaviour and opinions)	Vocational more risky/ extra effect	Young age more risky/ extra effect
I have no problems travelling with a good friend, although I have heard he drives dangerously		Yes/no
I don't mind handing a driver his cell phone while he is driving, he is responsible for his own safety	Yes/no	
I travel with a friend who drives dangerously		Yes/no
I travel with a driver who has consumed alcohol	No[b]/yes[a]	
I t doesn't sound cool to ask a driver to drive cautiously	No[b]/yes	

Table 3.4: *Vocational n= 81; havo/vwo n= 231 [a] Course is more effective for vocational students. [b] Vocational students respond more safety minded*.

The younger the participants, the less safety oriented they were. The course did not have an extra effect on the younger age groups.

4 Discussion

4.1 Conclusions and implications

This study had three objectives: a) to gather information about the behaviour of young Dutch passengers, their exposure to risk, and their opinions about these risks; b) to assess the effects of the RoadSense programme on the behavioural intention of the young passengers and on their opinions; and c) to study the role of background variables such as age, gender, school type, and previous exposure to risk, in relation to the effects of RoadSense.

4.1.1 Are passengers at risk?

The results show that young passengers are indeed exposed to risky driving. Those participants that have been exposed to rides with drinking drivers, also hold more safety-compromising opinions and report more risky behaviour themselves. In general, boys behave more risky than girls do, and also hold more safety compromising attitudes. All other subgroups (Age, exposure to speeding, and school type) did not show differences.

Therefore, gender is the most important predictor of risk behaviour and risky opinions. This observation is in line with earlier studies. For instance, a meta-analysis on gender differences and risks in many different fields, shows males to be overrepresented in any possible risk behaviour (Byrnes, Miller & Schafer, 1999) .

The question is whether the exposure to risk is the cause of these safety compromising behaviours and opinions, or that the opinions are causing these unsafe conditions.

Coping skills are probably underdeveloped. Youngsters appear to have problems with speaking up, and correcting drivers. A further indication of the complexities involved is the fact that youngsters are cautious in accepting rides, but if the driver is a friend they still get in, even if they consider him to be a dangerous driver. Also they put a lot of trust in the competencies of drivers, and believe that only the driver is responsible for a safe trip.

Except for these issues, the study shows Dutch adolescents to be cautious and conscious of the risks involved. This raises the question whether an intervention that targets adolescent passengers is actually needed. Still, there are at least four reasons to support such an intervention. First of all, the purpose of an intervention is not only to change behaviour but also to protect the positive attitudes and to reinforce safe behaviour (Glanz, Rimer & Lewis, 2002). Secondly, peer group pressure is a strong influence, and an intervention may strengthen the norm of 'good' behaviour, especially if the intervention takes peer group influences into account. An example of such an influence of social norms among Dutch adolescents is the rejection of drink-driving (Vlakveld, 2005). Thirdly, young adolescents are impulsive, and may easily go with the flow, almost unaware of the

possible negative consequences of their actions (Arnett, 1992; Casey, Getz & Galvan, 2008). An intervention may prepare youngsters for such conditions and stimulate the development of protective skills. A fourth reason is that adolescents strive for new experiences, new environments and enjoy making new friends. These novel situations may also be novel in terms of the risks they may encounter. Early interventions, before the risk actually arises, may help them to cope with risks.
Thus, interventions directed at empowering youngsters to protect themselves against those risks may contribute significantly towards their safety.

4.1.2 Effects of RoadSense

The evaluation was conducted as a simple self-reported study, comparing scores on a pre- and post-test questionnaire, without a control group. The results show that the programme had an immediate effect. After the intervention, participants expressed strong intentions to behave more safely than they had done in the past. The programme also had a positive influence on most of the opinions with regard to road safety. Long-term effects and effects on actual behaviour were not studied.

4.1.3 The influence on background variables

Exposure
The course had an extra effect on the behavioural intentions of youngsters who had been exposed to the risk of riding with a driver who had been drinking. They improved more, than youngsters who had not been exposed. In contrast, the course did not have an extra effect on youngsters exposed to speeding. The present study was not sufficiently detailed to be able to explain this differential effect. A possible explanation could be that the course reinforced the social norm among youngsters that rejects drink-driving. Such a norm does not exist for speeding. The sheer magnitude of speed violations among Dutch drivers makes it almost impossible to get the message across that speeding is a killer, especially among novice drivers.

Age and gender
The results show a consistent effect of higher risks for boys than for girls on the pre-test. Nevertheless, the course was equally beneficial for boys and girls. Thus, after RoadSense boys still experience higher risks than girls do. In other words, the course did not do 'something extra" for them. Therefore, the programme's impact would increase, if it were to invest in the development of elements that are especially effective for this high-risk group.

In contrast to gender, age was not a strong predictor for risk behaviour and risky opinions. The effects of the course did not differ between the age groups.

School type
The finding that youngsters in vocational training benefited more from the course than those in higher education, was quite unexpected. It should, however, be borne in mind that this conclusion was based on a relatively small, and probably non-representative sample.

4.2 Limitations of the study

The present study used short questionnaires to gather information on risky behaviours and opinions, and to assess the immediate effect of the intervention. This methodology has its limitations.
First, any intervention aiming to improve road safety should not only improve intentions and opinions, but should also improve actual behaviour. Although the literature has shown that changes in behavioural intentions also result in changes in behaviour, the actual strength of the relationship is rather weak. (Webb & Sheeran, 2006).
Related to this issue is the duration of the change. The present study only looked at the immediate effect, whereas road safety interventions, in order to be effective, should have a long(er) term effect.
The third limitation is that of the self-report method. This method does not exclude the possibility that response biases may be responsible for the observed differences between groups. For instance, the difference between boys and girls may be a result from their perspectives on "social desirability". For instance, to be 'real men' boys are expected to be risk-takers, whereas 'real girls' are expected to be risk-avoiders.
Finally, the absence of a control group also weakens the reliability of the results. The intervention may just have been effective because of the setting of doing something new and exciting and not so much because of the content of the programme.

The present study shows promising changes in intentions and opinions resulting from the RoadSense programme. To assess the effects on road safety, however, a "proper evaluation study" is required, studying long-term effects (e.g. after three months) on (self-reported) behaviour. To control for external influences, such a study should also include a control group.

4.3 Recommendations

Target group
- The focus on passengers is relevant. Learn more about the context of risky decision-making and the relevant coping skills.
- Communicate these findings to raise awareness, and to illustrate the necessity of interventions such as RoadSense.

Programme development
- Pay more attention to elements effective for young males.
- Differentiate the groups with respect to their previous exposure to risky driving, especially riding with drinking drivers.
- Include a topic on safety, friends, loyalty, peer pressure and coping skills.
- Raise awareness among parents about the relationship between exposure to risk, and risky behaviours and attitudes.

Evaluation
- Study the long term effects on behaviour.
- Include a control group.
- Validate the measurement instrument, so that answers really reflect behaviours and opinions, without interferences from social desirability.

4.4 Conclusions

The present study illustrates the vulnerability, ignorance, and inexperience of Dutch young adolescents in their role of car passengers. RoadSense, aims to raise risk awareness, and to improve their coping skills. The results show the programme to raise awareness and to improve behavioural intentions, when measured immediately after the course. The programme's impact could be strengthened if it has a greater influence on high risk groups such as young males. Furthermore, two themes could be explored further: the role of 'friends and group pressure', and the influence parents have on the behaviours and opinions of their teens. The question, whether the programme improves safety, can only be answered on the basis of a study on the long term effects on behaviour in which external influences are controlled for by the inclusion of a control group.

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Appendix 1 Pre-test questionnaire (in Dutch)

Beste deelnemer,

RoadSense is een verkeersprogramma voor scholieren zoals jij. Om dit programma goed op jou en je klasgenoten af te stemmen, moeten we weten hoe jullie over zaken in het verkeer denken. Daarvoor hebben we deze vragenlijst gemaakt. Wil jij onze vragen beantwoorden? Het kost ongeveer 3 minuten tijd. Alvast hartelijk dank!

Als je de vragenlijst invult, let dan op het volgende:

- **Beantwoord alle vragen**
- **Er bestaan geen goede of foute antwoorden**
- **Denk niet te lang na – het eerste antwoord dat in je opkomt, is meestal het beste!**
- **Kruis bij elke vraag maar één antwoord aan**
- **Als je twijfelt tussen twee antwoorden, kies dan het antwoord dat je het meeste ligt**

Deze vragenlijst is helemaal anoniem; je hoeft je naam niet aan ons door te geven.
Om jouw antwoorden aan elkaar te kunnen koppelen met de latere vragenlijst, vragen we je wel een persoonlijke code in te voeren:

- Je voornaam: de eerste 2 letters: bijv. **Mi**chael
- Je geboortedatum: je geboortedag: bijv. **08**0396
- De naam van je moeder de eerste 2 letters bijv. **Ka**rin

Voorbeeldcode	**M**	**I**	**0**	**8**	**K**	**A**
Jouw code						

Klaar? Vul dan nu de vragenlijst in!

Uitspraken over autorijden
Hieronder zie je uitspraken over autorijden. Lees elke uitspraak en kijk of je het met de uitspraak eens bent. Omcirkel de '4' als je het helemaal eens bent met de uitspraak en omcirkel de '1' als je het er juist helemaal *niet* mee eens bent.

		Klopt helemaal	Klopt een beetje	Klopt niet	Klopt helemaal niet
1	Ik stap wel bij een goede vriend in de auto, ook al heb ik gehoord dat hij gevaarlijk rijdt.	4	3	2	1
2	Ik kan ervoor zorgen dat een bestuurder veilig rijdt.	4	3	2	1
3	Ik vertrouw volledig op de bestuurder dat we veilig thuiskomen. Het is zijn/ haar verantwoordelijkheid.	4	3	2	1
4	Ik stap bij iedereen in de auto, autorijden kan toch iedereen…	4	3	2	1
5	Ik vind het geen probleem de bestuurder zijn mobiel te geven tijdens het rijden, hij is zelf verantwoordelijk voor zijn veiligheid.	4	3	2	1
6	Een bestuurder die te hard rijdt, vind ik stoerder dan een bestuurder die altijd de regels volgt.	4	3	2	1
7	Wanneer ik meerijd als passagier help ik de bestuurder door bijvoorbeeld de weg te vinden.	4	3	2	1
8	Ik kan goed uitleggen hoe drugs en alcohol de verkeersveiligheid beïnvloeden.	4	3	2	1
9	Ik let er nooit op waar spullen in de auto liggen.	4	3	2	1
10	Ik stap in een auto bij vrienden die onveilig rijden.	4	3	2	1
11	Ik stap in de auto bij een bestuurder die gedronken heeft.	4	3	2	1
12	Passagiers moeten gewoon lekker keten. Daar heeft de bestuurder geen last van.	4	3	2	1
13	Als de bestuurder zich gevaarlijk gedraagt, zeg ik daar iets van.	4	3	2	1
14	Het komt suf over om de bestuurder te vragen voorzichtig te rijden.	4	3	2	1

Wat heb jij meegemaakt?
Als passagier maak je van alles mee. Wat is jou overkomen? Denk aan de laatste 4 weken. Omcirkel het juiste antwoord, of vul de stippellijntjes in.

			Ja	Nee
12.a	**Heb je bij iemand in de auto gezeten die te hard reed?**		Ja	Nee
12 b	Zo ja, wie was dat?	• Eén van je ouders?	Ja	Nee
		• Eén van je vrienden?	Ja	Nee
		• Iemand anders, n.l.	.....	
12.c	Heb je daar toen iets van gezegd?		Ja	Nee
13.a	**Heb je bij iemand in de auto gezeten die teveel alcohol had gedronken?**		Ja	Nee
13.b	Zo ja, wie was dat?	• Eén van je ouders?	Ja	Nee
		• Eén van je vrienden?	Ja	Nee
		• Iemand anders, n.l.	.....	
13.c	Heb je daar toen iets van gezegd?		Ja	Nee
14.a	**Heb je weleens bij iemand in de auto gezeten die zo gevaarlijk reed, dat je je niet meer veilig voelde?**		Ja	Nee
14.b.	Zo ja, wie was dat?	• Eén van je ouders?	Ja	Nee
		• Eén van je vrienden?	Ja	Nee
		• Iemand anders, n.l.	.....	
14.c	Heb je daar toen iets van gezegd?		Ja	Nee

Tot slot graag nog even de volgende gegevens van jou:

Geslacht	□ man	□ vrouw
Leeftijd	☐ jaar	
School		
☐ vmbo	☐ havo	
☐ ROC	☐ vwo	

Hartelijk dank voor je antwoorden en veel plezier bij RoadSense!

Appendix 2 Post-test questionnaire (in Dutch)

Beste deelnemer,

Je hebt het RoadSense-programma afgerond. We willen graag weten wat je van het programma vond en of je er ook nog iets van hebt geleerd. Daarvoor hebben we nog een vragenlijst gemaakt. Wil jij ook deze vragen beantwoorden? Alvast bedankt!

Als je de vragenlijst invult, let dan op het volgende:

- **Beantwoord alle vragen**
- **Er bestaan geen goede of foute antwoorden**
- **Denk niet te lang na – het eerste antwoord dat in je opkomt, is meestal het beste!**
- **Kruis bij elke vraag maar één antwoord aan**
- **Als je twijfelt tussen twee antwoorden, kies dan het antwoord dat je het meeste ligt**

Om jouw antwoorden aan elkaar te kunnen koppelen met de eerdere vragenlijst, vragen we je wel hier nog een keer je persoonlijke code in te voeren:

- Je voornaam: de eerste 2 letters: bijv. **Mi**chael
- Je geboortedatum: je geboortedag: bijv. **08**0396
- De naam van je moeder de eerste 2 letters bijv. **Ka**rin

Voorbeeldcode	**M**	**I**	**0**	**8**	**K**	**A**
Jouw code						

Uitspraken over autorijden
Lees elke uitspraak en kijk of je het met de uitspraak eens bent. Omcirkel de '4' als je het helemaal eens bent met de uitspraak en omcirkel de '1' als je het er juist helemaal *niet* mee eens bent.

		Klopt helemaal	Klopt een beetje	Klopt niet	Klopt helemaal niet
1	Ik zou wel bij een goede vriend in de auto stappen ook al heb ik gehoord dat hij gevaarlijk rijdt.	4	3	2	1
2	Ik kan ervoor zorgen dat een bestuurder veilig rijdt.	4	3	2	1
3	Als passagier is het ook mijn plicht om ervoor te zorgen dat we veilig thuiskomen.	4	3	2	1
4	Ik zou erover nadenken of ik wel bij een vriend in de auto stap, die altijd hard en gevaarlijk rijdt.	4	3	2	1
5	Ik vind het geen probleem de bestuurder zijn mobiel te geven tijdens het rijden, hij is zelf verantwoordelijk voor zijn veiligheid.	4	3	2	1
6	Een bestuurder die te hard rijdt, vind ik stoerder dan een bestuurder die altijd de regels volgt.	4	3	2	1
7	Wanneer ik meerijd als passagier ben ik van plan om de bestuurder te helpen: bijvoorbeeld door de weg te helpen vinden of spullen op te bergen.	4	3	2	1
8	Ik kan goed uitleggen hoe drugs en alcohol de verkeersveiligheid beïnvloeden.	4	3	2	1
9	Ik ga erop letten of er spullen in de auto liggen die kunnen rondslingeren.	4	3	2	1
10	Ik ben van plan in een auto te stappen met vrienden waarvan ik weet dat ze onveilig rijden.	4	3	2	1
11	Ik ben van plan in de auto te stappen bij een bestuurder die gedronken heeft.	4	3	2	1
12	Als passagier kan ik gewoon lekker keten, daar heeft de bestuurder geen last van.	4	3	2	1
13	Als de bestuurder zich gevaarlijk gedraagt, ben ik van plan daar iets van te zeggen.	4	3	2	1
14	Als ik zou vragen de bestuurder voorzichtig te rijden, komt dat suf over.	4	3	2	1

Vragen over het programma

1. Vertel in één zin wat je van RoadSense hebt geleerd:

.....

.....

2. Wat vond je - naast het autorijden - het leukste en waarom?

.....

.....

3. Zou je RoadSense ook aan andere scholieren aanbevelen?

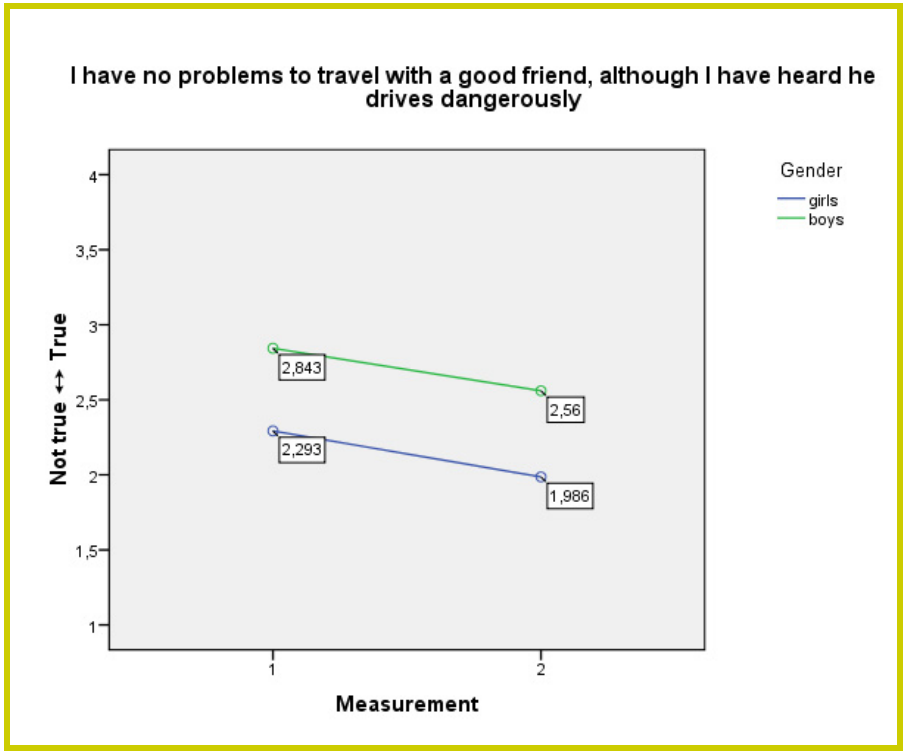
.....

.....

Hartelijk dank voor je antwoorden en je deelname aan RoadSense!

Appendix 3 Detailed analyses

Responses by gender



Main effect RoadSense: $F(1,311) = 35.2$; $p < .001$; $\eta_P^2 = .10$

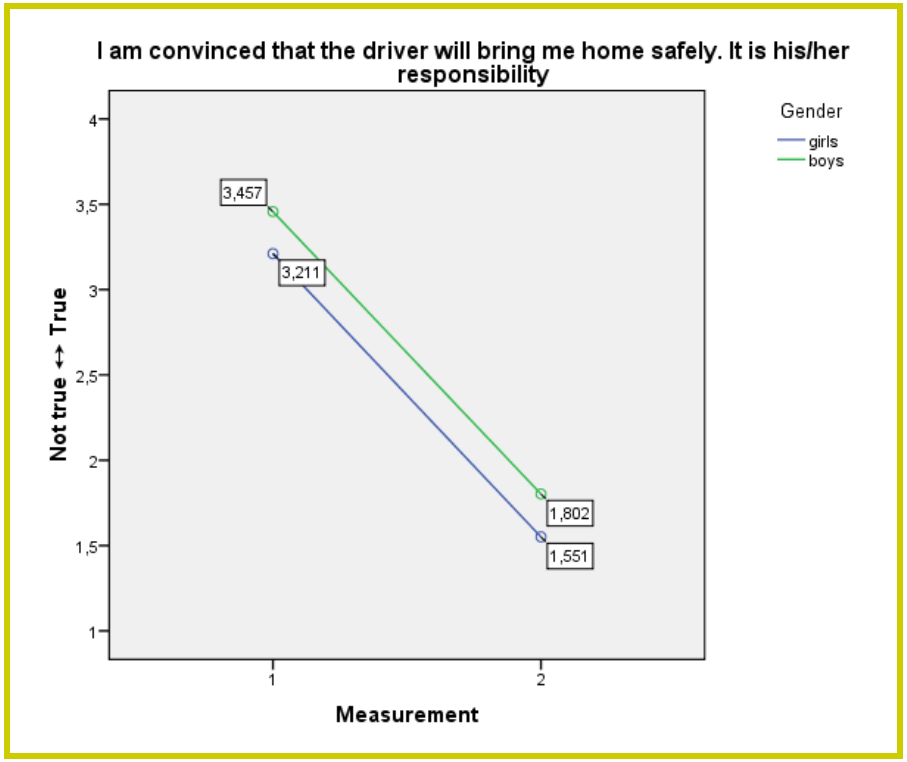
Main effect Gender: $F(1,311) = 37.1$; $p < .001$; $\eta_P^2 = .11$

Interaction effect RoadSense × Gender: $F(1,311) = 0.05$; $p = .82$

Main effect RoadSense: $F(1,310) = 60.0$; $p < .001$; $\eta_P^2 = .16$

Main effect Gender: $F(1,310) = .01$; $p = .93$

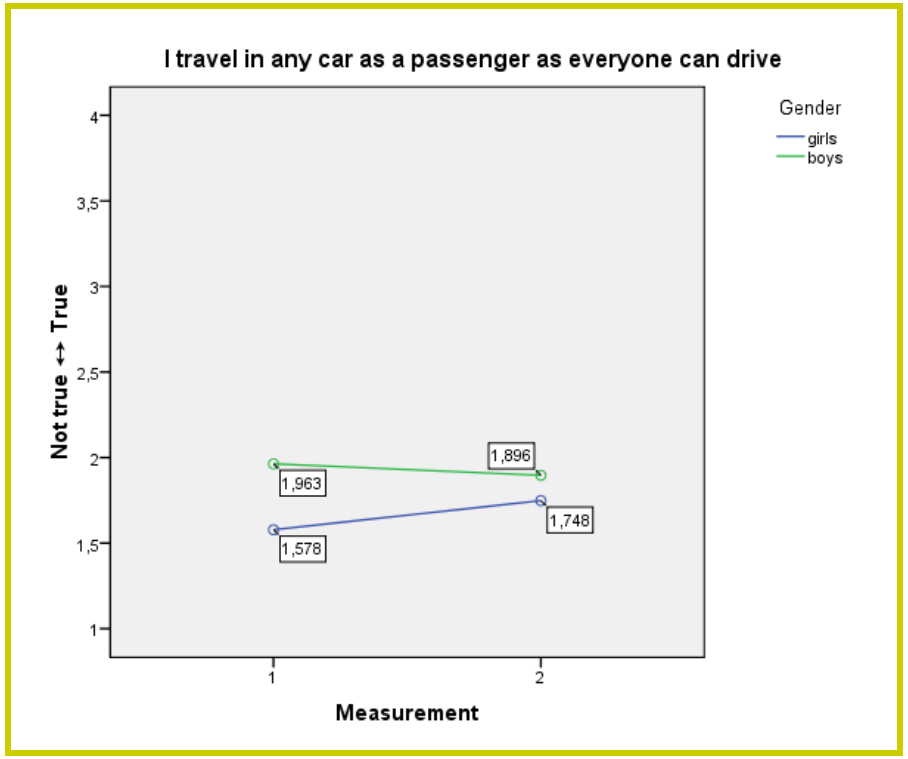
Interaction effect RoadSense × Gender: $F(1,310) = 11.6$; $p < .01$; $\eta_P^2 = .04$



Main effect RoadSense: $F(1,307) = 769.7$; $p < .0001$; $\eta_P^2 = .72$

Main effect Gender: $F(1,307) = 18.7$; $p < .001$; $\eta_P^2 = .06$

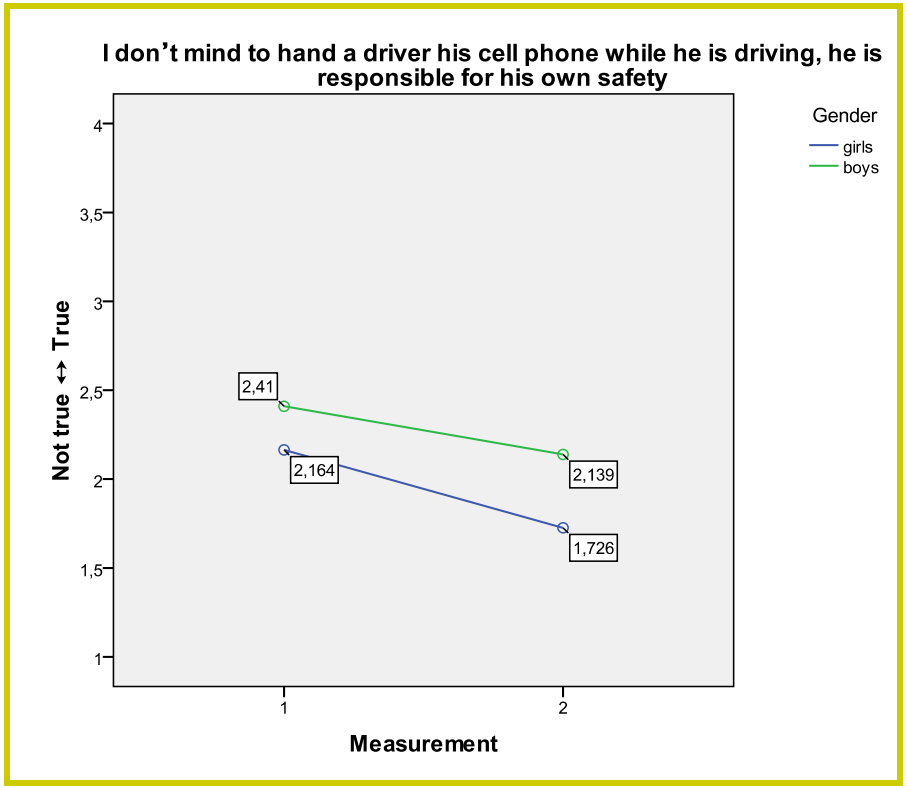
Interaction effect RoadSense × Gender: $F(1,307) = 0.002$; $p = .96$



Main effect RoadSense: $F(1,309) = 0.58$; $p = .45$

Main effect Gender: $F(1,309) = 14.2$; $p < .001$; $\eta_P^2 = .04$

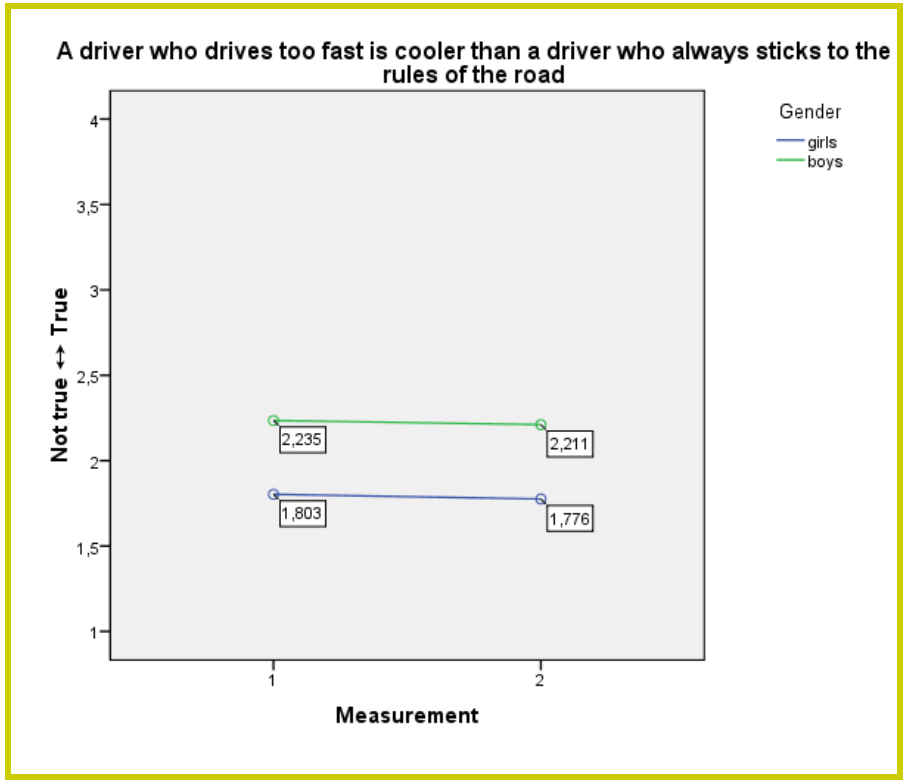
Interaction effect RoadSense × Gender: $F(1,309) = 3.05$; $p = .08$



Main effect RoadSense: $F(1,309) = 47.2$; $p < .001$; $\eta_P^2 = .13$

Main effect Gender: $F(1,309) = 13.13$; $p < .001$; $\eta_P^2 = .041$

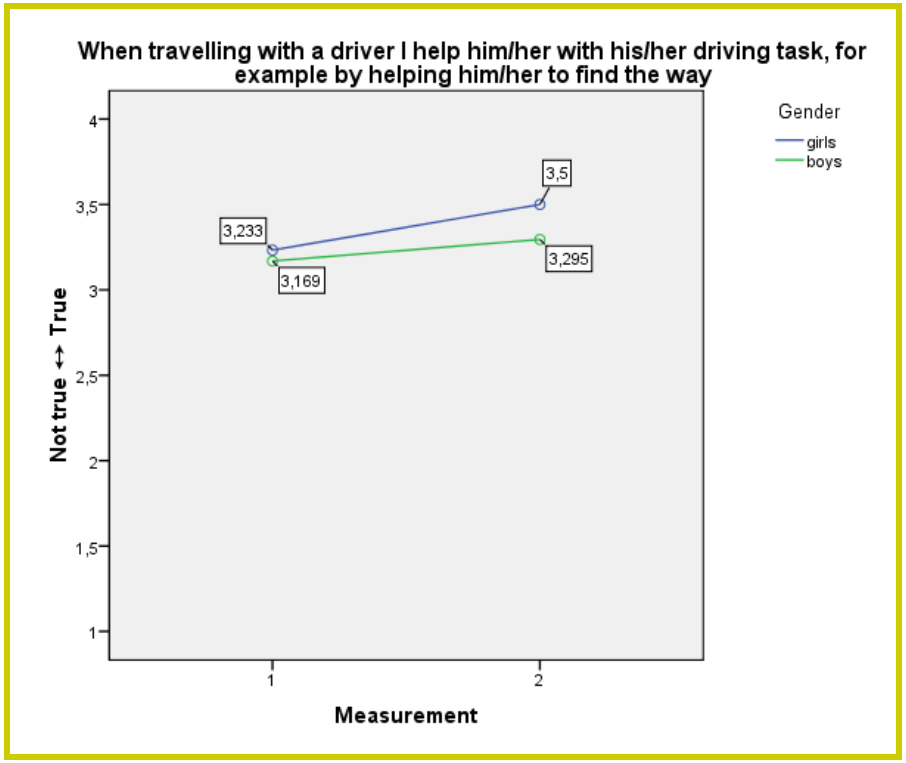
Interaction effect RoadSense × Gender: $F(1,309) = 2.62$; $p = .11$



Main effect RoadSense: $F(1,311) = 0.24$; $p = .627$

Main effect Gender: $F(1,311) = 22.5$; $p < .001$; $\eta_P^2 = .067$

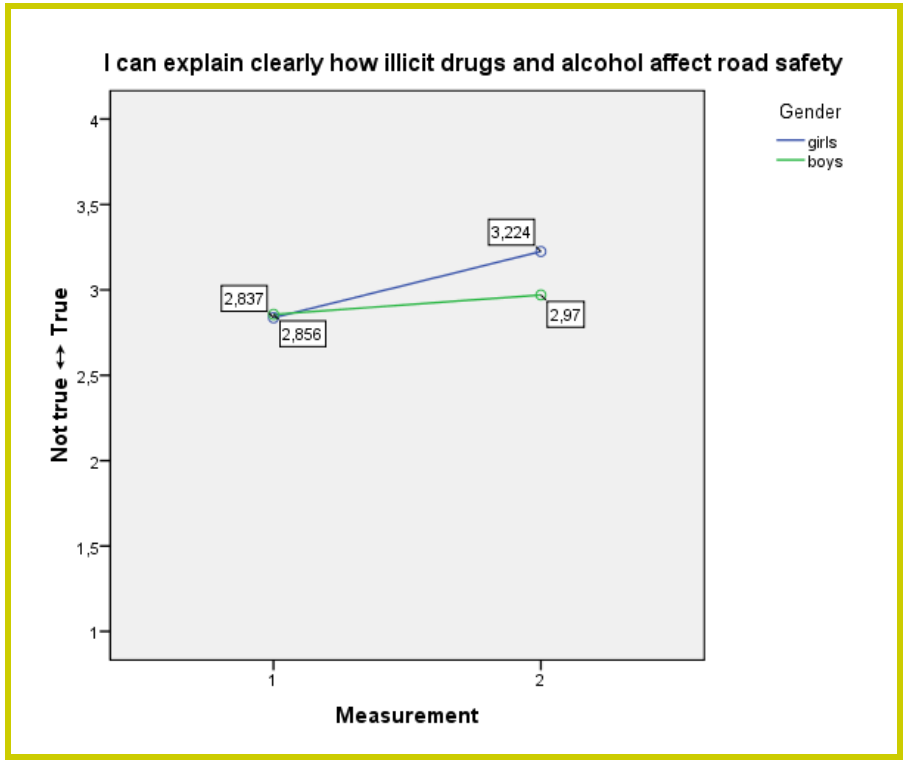
Interaction effect RoadSense × Gender: $F(1,311) = 0.001$; $p = .98$



Main effect RoadSense: $F(1,310) = 15.0$; $p < .001$; $\eta_P^2 = .046$

Main effect Gender: $F(1,310) = 4.11$; $p < .05$; $\eta_P^2 = .013$

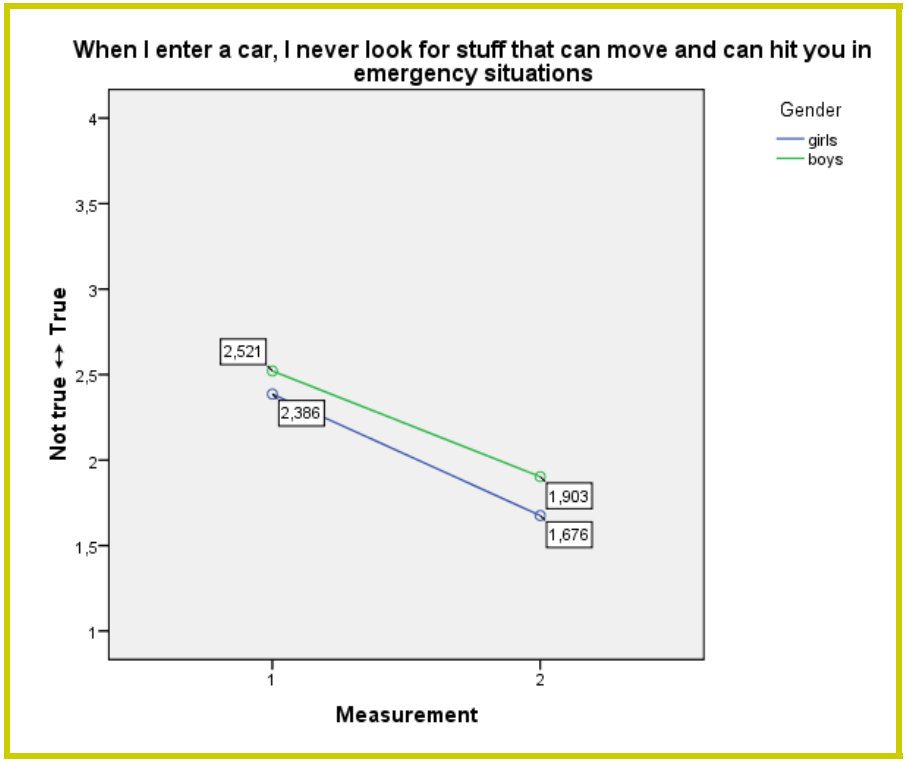
Interaction effect RoadSense × Gender: $F(1,310) = 1.91$; $p = .17$



Main effect RoadSense: $F(1,312) = 21.0$; $p < .001$; $\eta_P^2 = .063$

Main effect Gender: $F(1,312) = 2.2$; $p = .15$

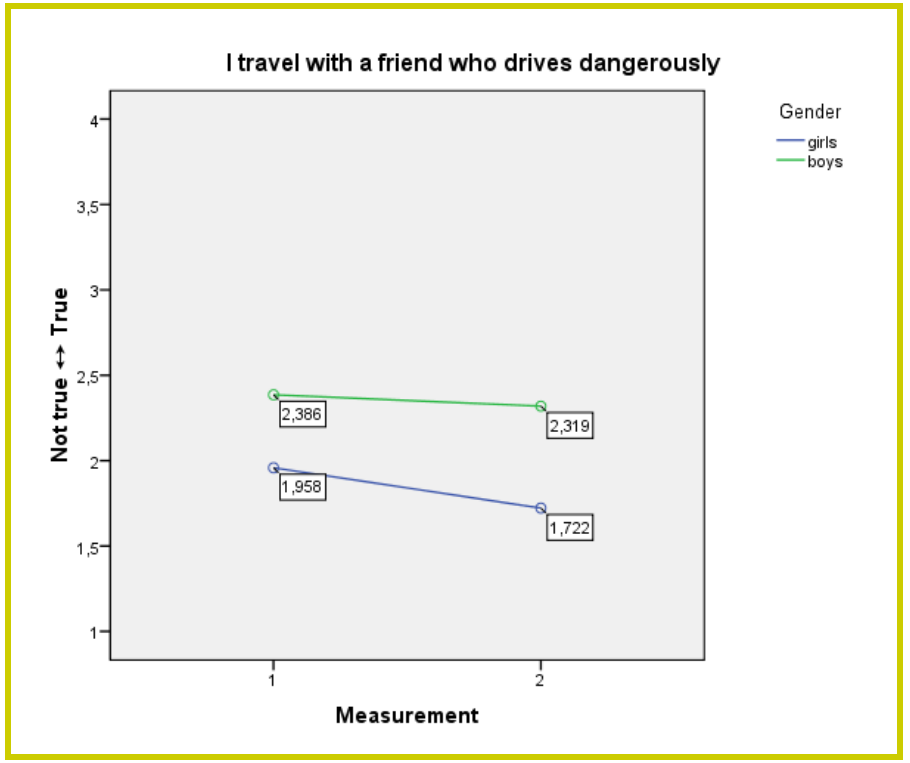
Interaction effect RoadSense × Gender: $F(1,312) = 6.28$; $p < .05$; $\eta_P^2 = .02$



Main effect RoadSense: $F(1,308) = 86.9$; $p < .001$; $\eta_P^2 = .22$

Main effect Gender: $F(1,308) = 6.95$; $p = .01$; $\eta_P^2 = .022$

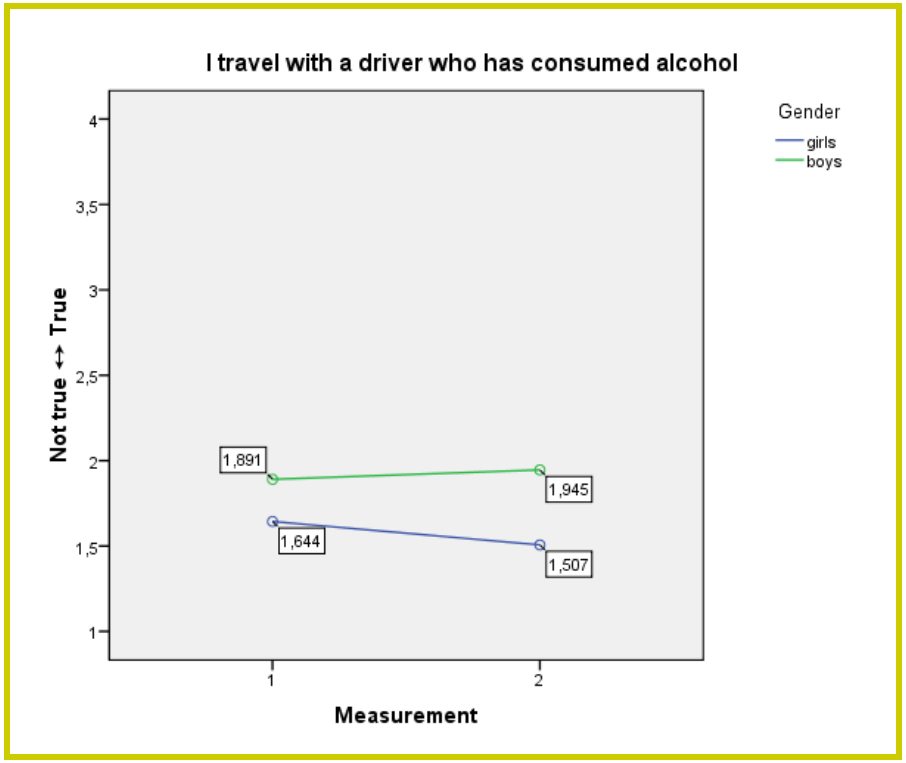
Interaction effect RoadSense × Gender: $F(1,308) = 0.42$; $p = .52$



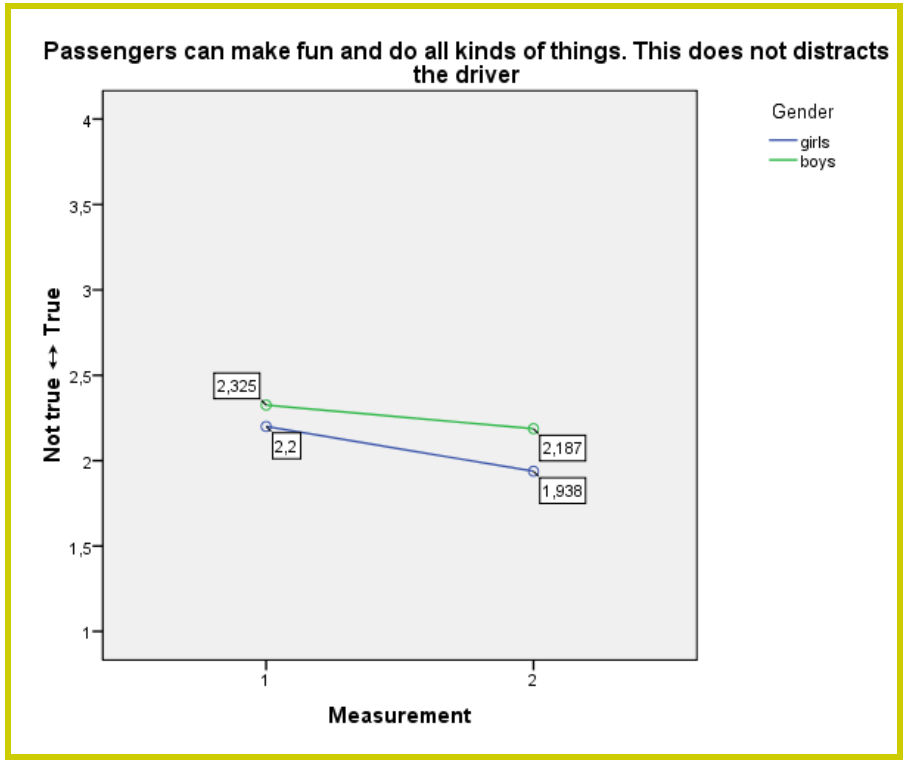
Main effect RoadSense: $F(1,308) = 7.98$; $p < .01$; $\eta_P^2 = .025$

Main effect Gender: $F(1,308) = 33.0$; $p < .001$; $\eta_P^2 = .097$

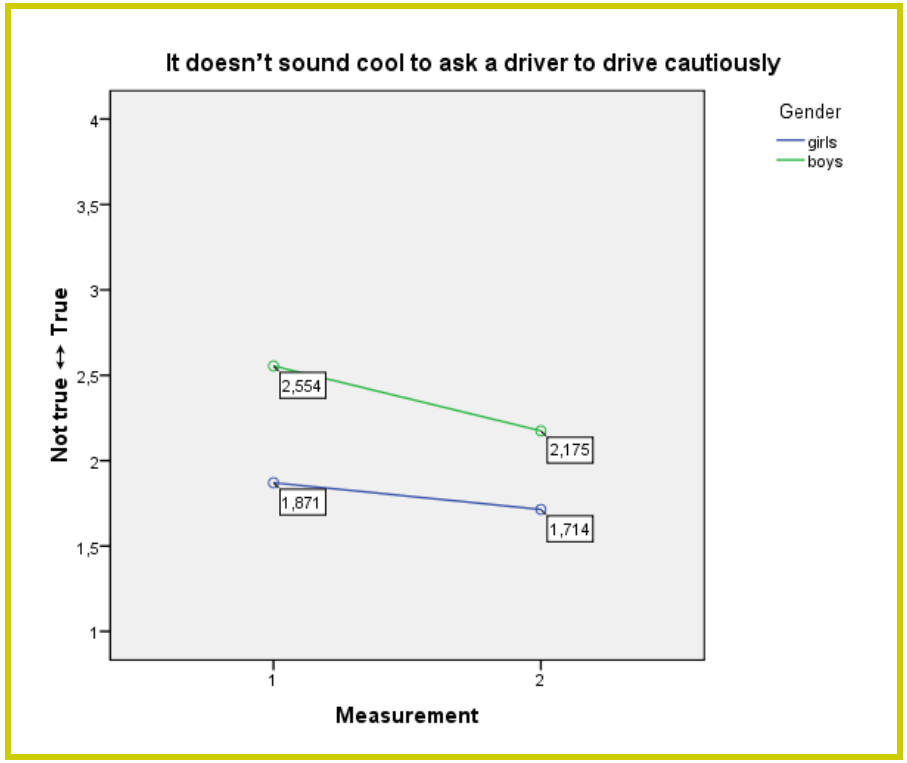
Interaction effect RoadSense × Gender: $F(1,308) = 2.52$; $p = .11$



Main effect RoadSense: $F(1,309) = 0.69$; $p = .41$
Main effect Gender: $F(1,309) = 16.2$; $p < .001$; $\eta^2_P = .05$
Interaction effect RoadSense × Gender: $F(1,309) = 3.72$; $p = .055$



Main effect RoadSense: $F(1,309) = 13.7$; $p < .001$; $\eta^2_P = .043$
Main effect Gender: $F(1,309) = 5.08$; $p < .05$; $\eta^2_P = .016$
Interaction effect RoadSense × Gender: $F(1,309) = 1.30$; $p = .25$



Main effect RoadSense: $F(1,310) = 37.2$; $p < .001$; $\eta^2_P = .107$

Main effect Gender: $F(1,310) = 17.98$; $p < .001$; $\eta^2_P = .055$

Interaction effect RoadSense × Gender: $F(1,310) = 0.31$; $p = .58$

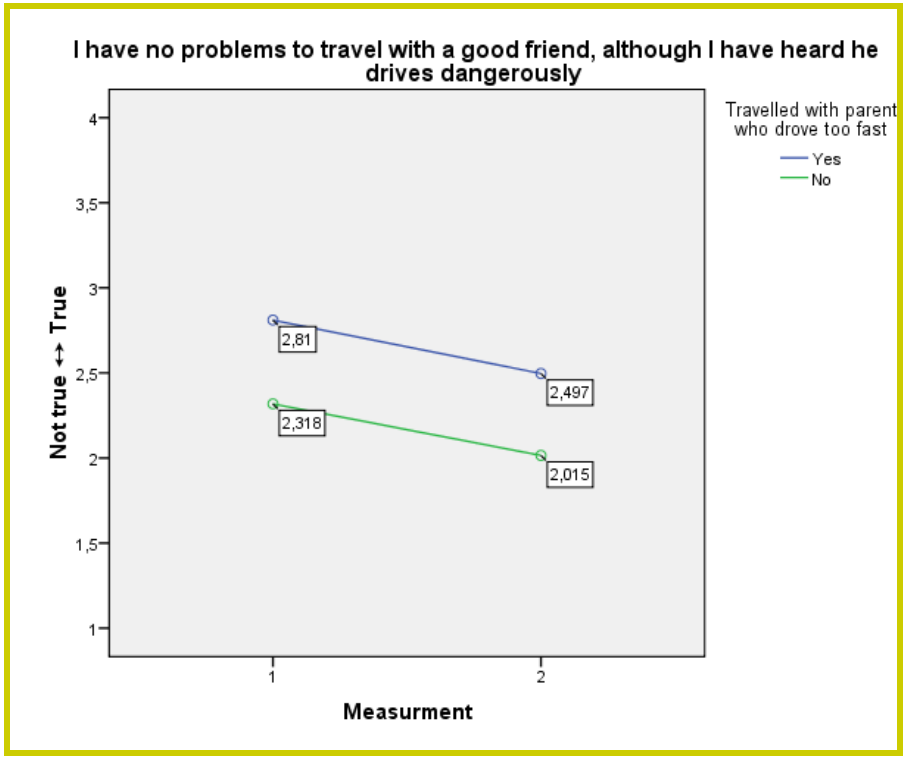
Main effect RoadSense: $F(1,311) = 19.43$; $p < .001$; $\eta^2_P = .06$

Main effect Gender: $F(1,311) = 50.48$; $p < .001$; $\eta^2_P = .14$

Interaction effect RoadSense × Gender: $F(1,311) = 1.94$; $p = .068$

Riding with parents who speeded

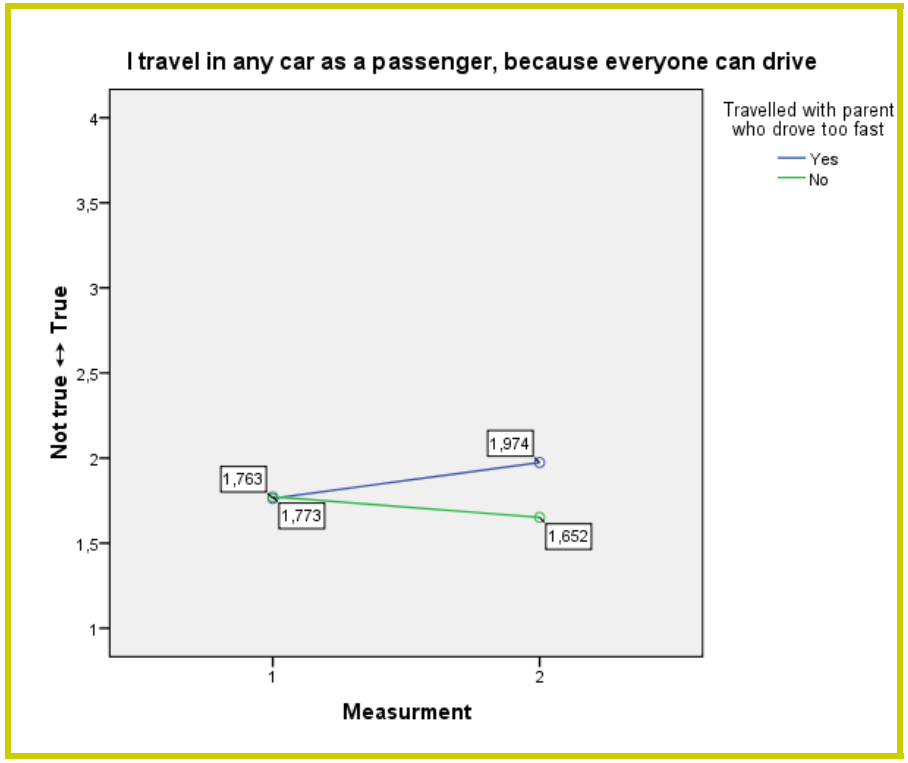
Yes = 153
No = 66



Main effect RoadSense: $F(1,217) = 22.02$; $p < .001$; $\eta_P^2 = .092$

Hoofdeffect Ouder die te hard reed: $F(1,217) = 17.66$; $p < .001$; $\eta_P^2 = .075$

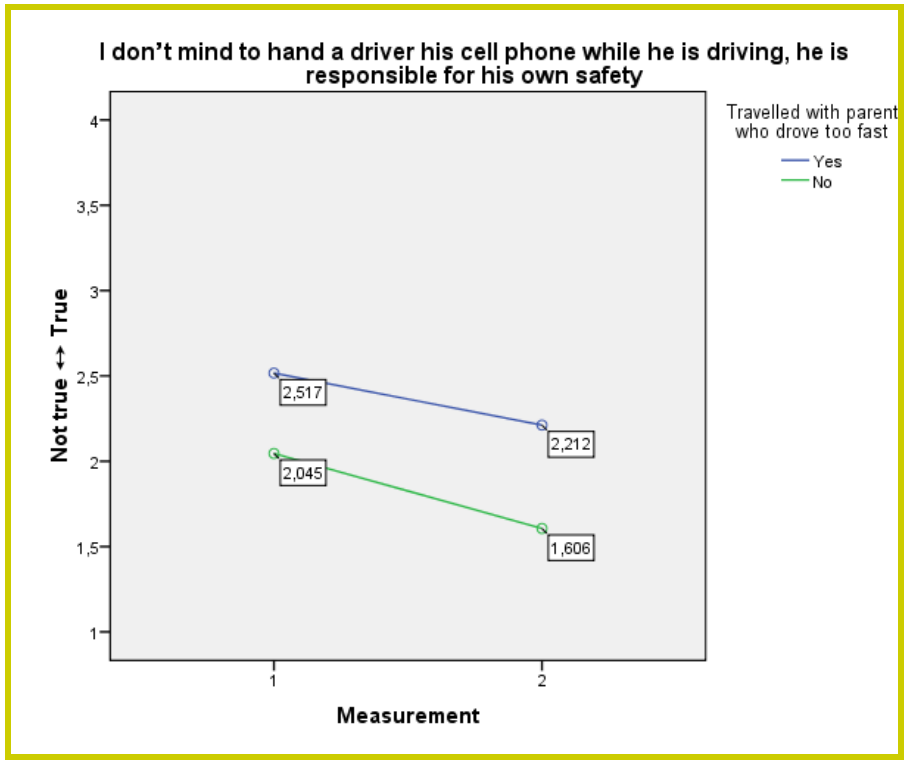
Interaction effect RoadSense × Parent that drove too fast: $F(1,217) = 0.007$; $p = .94$



Main effect RoadSense: $F(1,216) = 0.28$; $p = .60$

Main effect Parent that drove too fast: $F(1,216) = 3.88$; $p = .05$; $\eta_P^2 = .018$

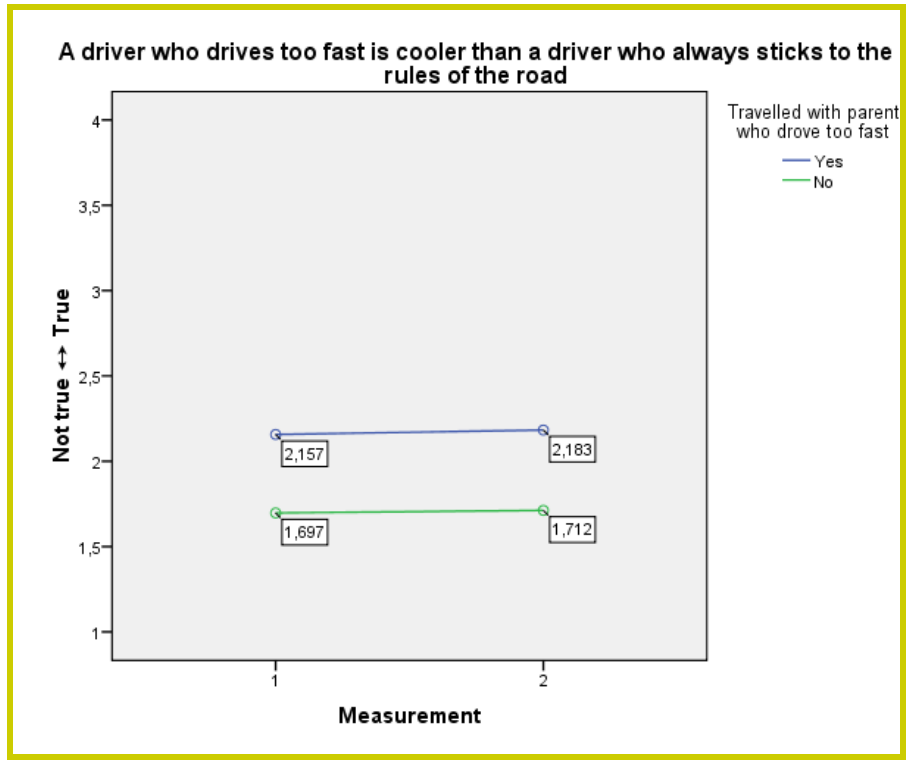
Interaction effect RoadSense × Parent that drove too fast: $F(1,216) = 2.88$; $p = .09$; $\eta_P^2 = .013$



Main effect RoadSense: $F(1,215) = 29.35$; $p < .001$; $\eta_P^2 = .12$

Main effect Parent that drove too fast: $F(1,215) = 21.66$; $p < .001$; $\eta_P^2 = .09$

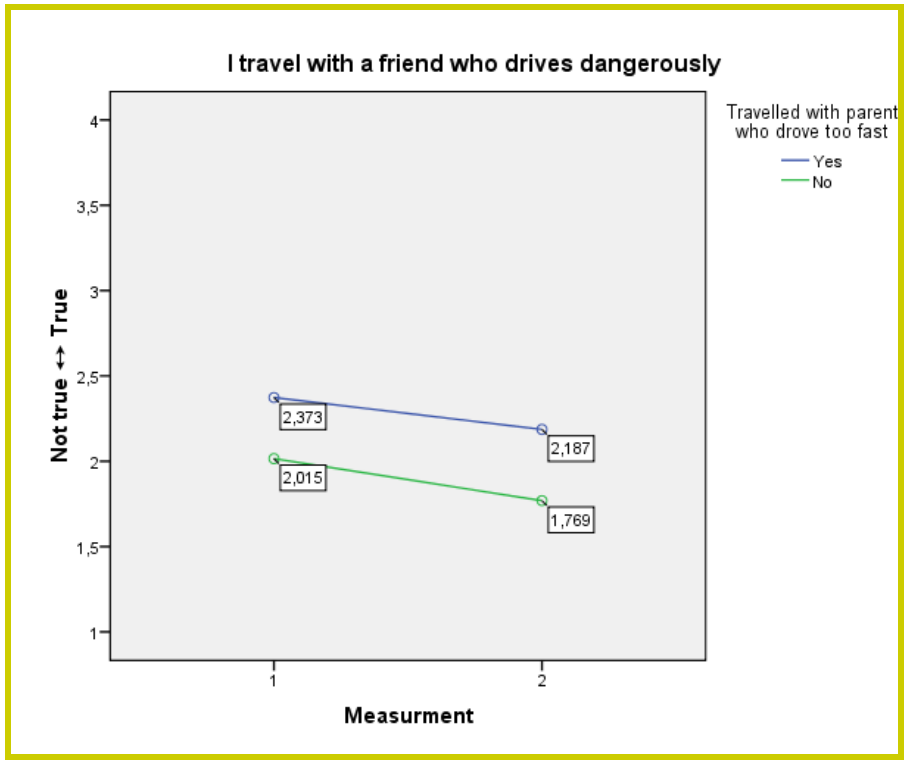
Interaction effect RoadSense × Parent that drove too fast: $F(1,215) = 0.96$; $p = 0.33$



Main effect RoadSense: $F(1,217) = 0.99$; $p = .75$

Main effect Parent that drive too fast: $F(1,217) = 15.3$; $p < .001$; $\eta_P^2 = .066$

Interaction effect RoadSense × Parent that drove too fast: $F(1,217) = 0.007$; $p = .93$



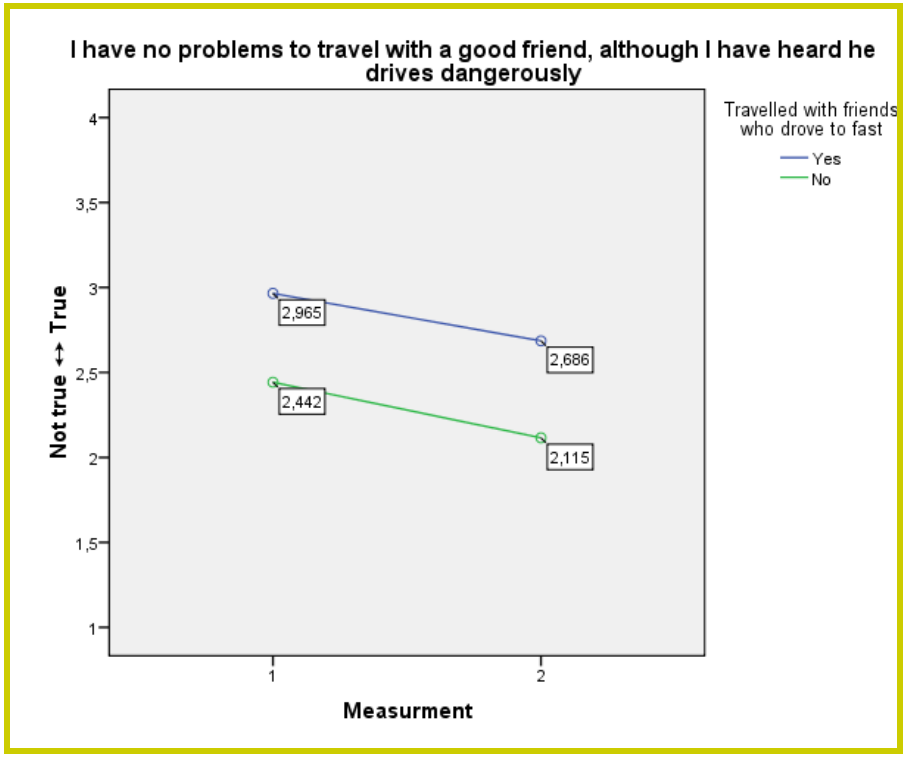
Main effect RoadSense: $F(1,213) = 9.01$; $p < .01$; $\eta_P^2 = .041$

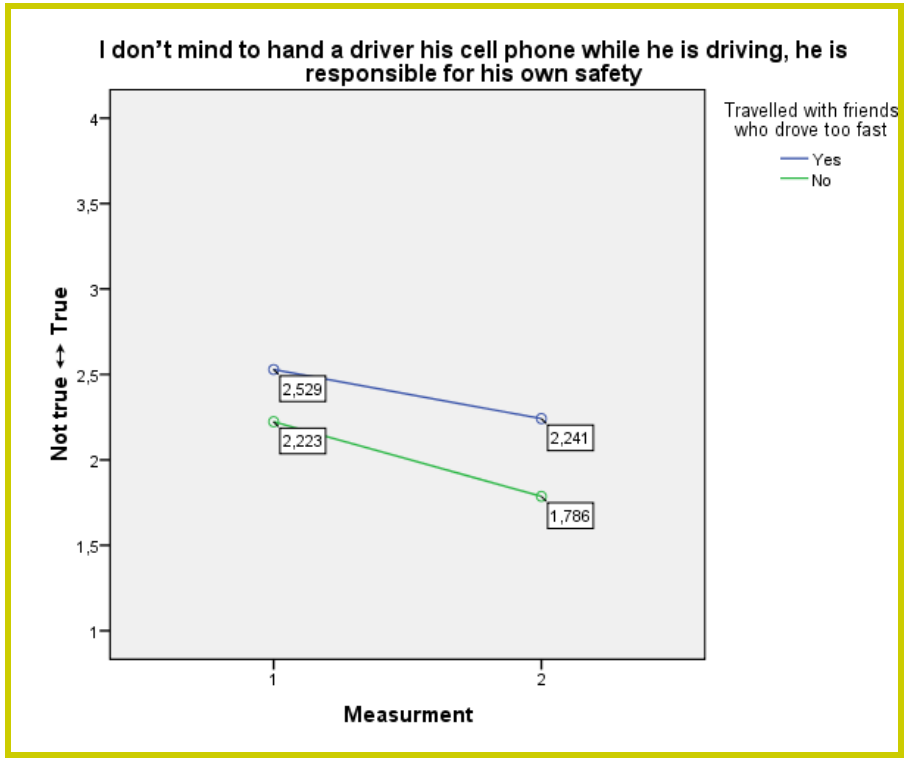
Main effect Parent that drive too fast: $F(1,213) = 11.0$; $p < .01$; $\eta_P^2 = .049$

Interaction effect RoadSense × Parent that drove too fast: $F(1,213) = 0.17$; $p = .68$

Riding with friends who speed

Yes = 86
No= 104





Main effect RoadSense: $F(1,188) = 22.86$; $p < .01$; $\eta^2_P = .108$

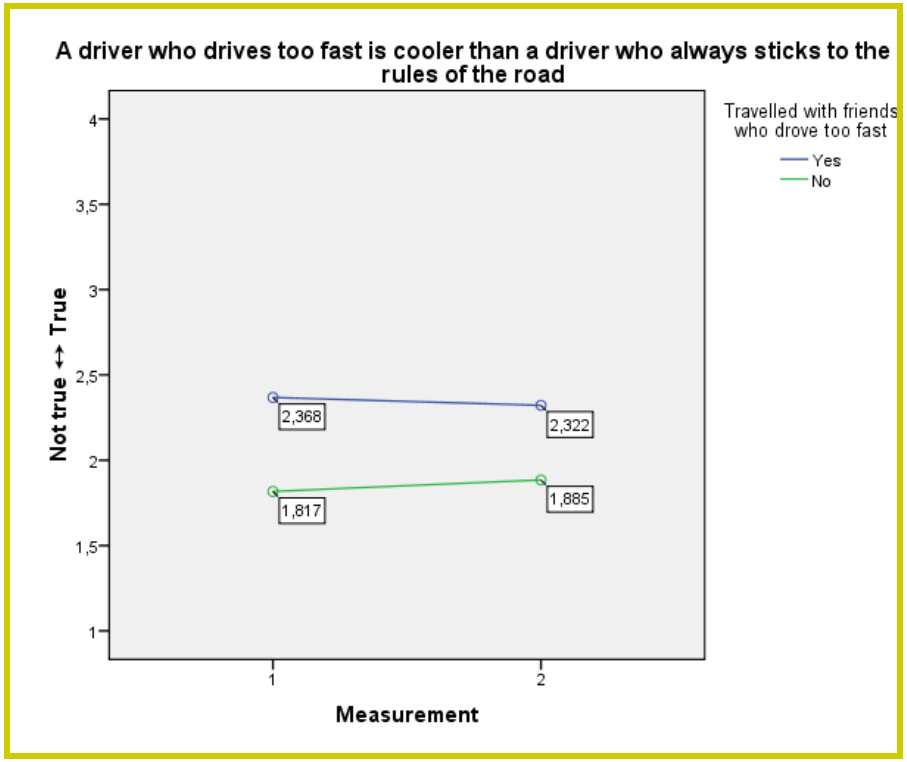
Main effect Friend that drove too fast: $F(1,188) = 21.80$; $p < .01$; $\eta^2_P = .104$

Interaction effect RoadSense × Friend that drove too fast: $F(1,188) = 0.14$; $p = .71$

Main effect RoadSense: $F(1,188) = 22.16$; $p < .01$; $\eta^2_P = .130$

Main effect Friend that drove too fast: $F(1,188) = 11.14$; $p < .01$; $\eta^2_P = .056$

Interaction effect RoadSense × Friend that drove too fast: $F(1,188) = 1.20$; $p = .28$



Main effect RoadSense: $F(1,189) = 0.03$; $p = .86$

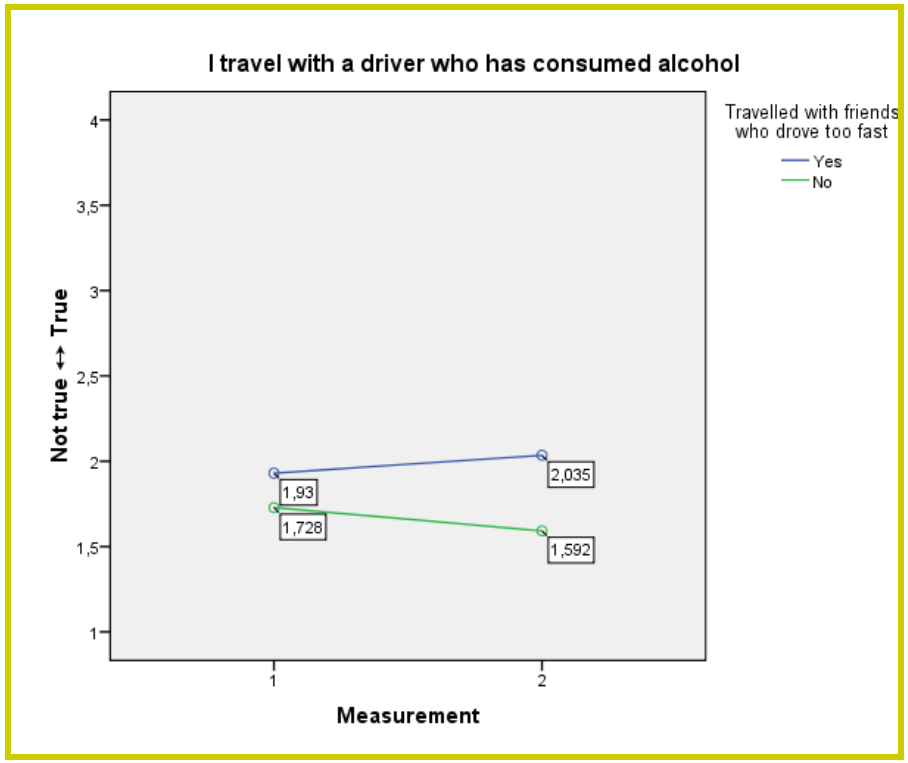
Main effect Friend that drove too fast: $F(1,189) = 17.74$; $p < .01$; $\eta_P^2 = .086$

Interaction effect RoadSense × Friend that drove too fast: $F(1,189) = 0.86$; $p = .36$

Main effect RoadSense: $F(1,185) = 3.81$; $p = .053$

Main effect Friend that drove too fast: $F(1,185) = 19.68$; $p < .001$; $\eta_P^2 = .096$

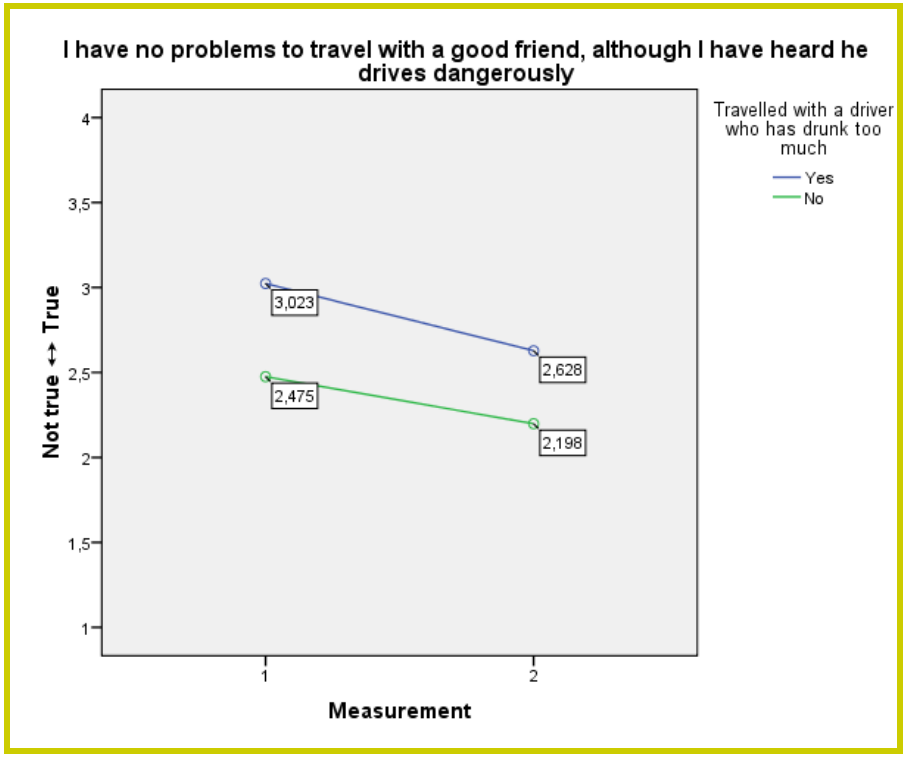
Interaction effect RoadSense × Friend that drove too fast: $F(1,185) = 0.50$; $p = .48$

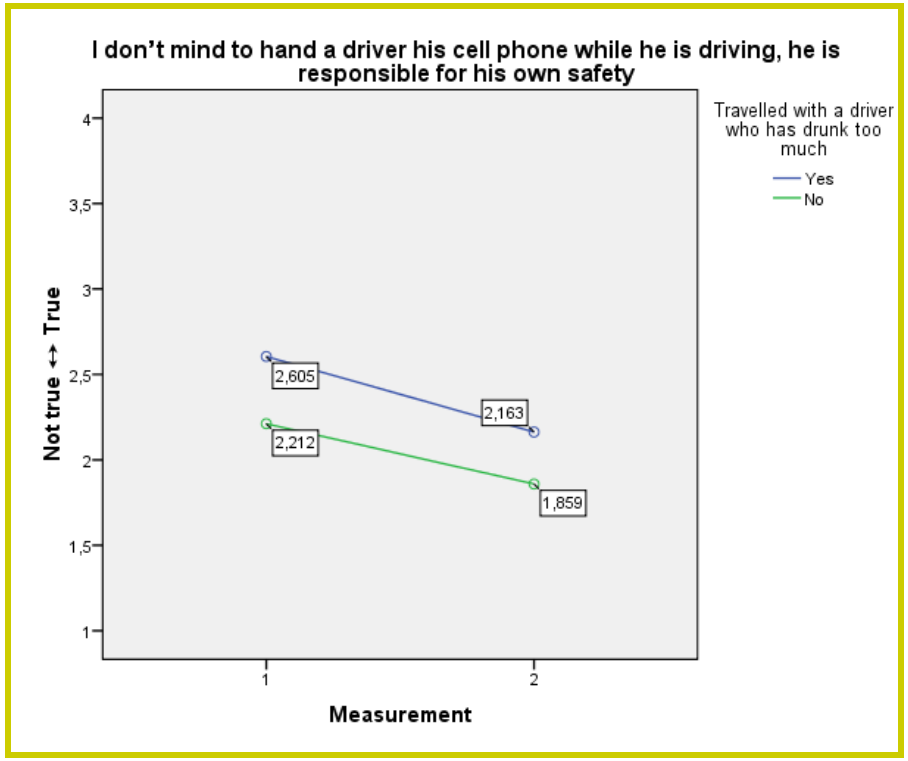


Main effect RoadSense: $F(1,187) = 0.05$; $p = .83$
Main effect Friend that drove too fast: $F(1,187) = 9.03$; $p < .01$; $\eta_P^2 = .046$
Interaction effect RoadSense × Friend that drove too fast: $F(1,187) = 2.88$; $p = .09$; $\eta_P^2 = .02$

Riding with driver who had been drinking too much

Yes = 42
No= 243





Main effect RoadSense: $F(1,283) = 22.40$; $p < .001$; $\eta_P^2 = .073$

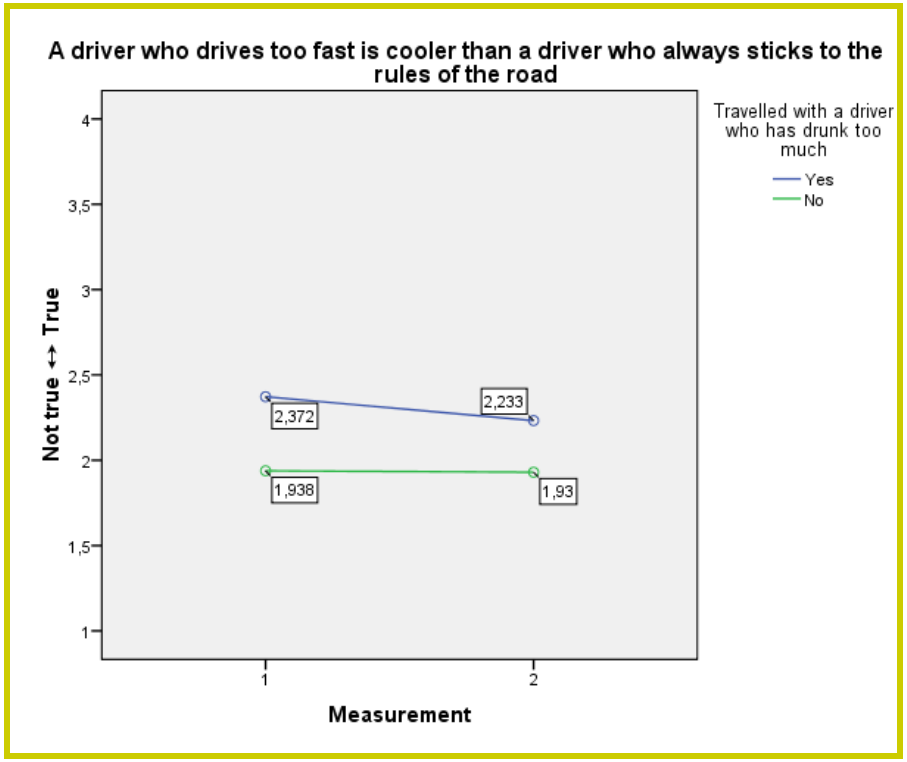
Main effect Drunk driver: $F(1,283) = 12.49$; $p < .01$; $\eta_P^2 = .042$

Interaction effect RoadSense × Drunk driver: $F(1,283) = 0.70$; $p = .41$

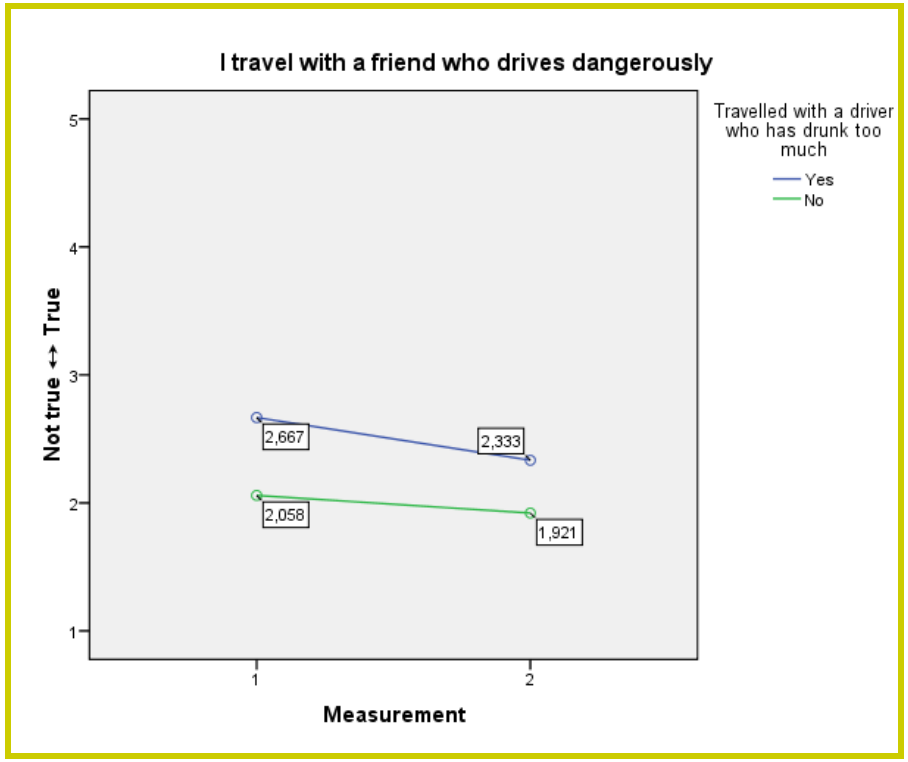
Main effect RoadSense: $F(1,282) = 28.79$; $p < .001$; $\eta_P^2 = .093$

Main effect Drunk driver: $F(1,282) = 7.04$; $p < .01$; $\eta_P^2 = .024$

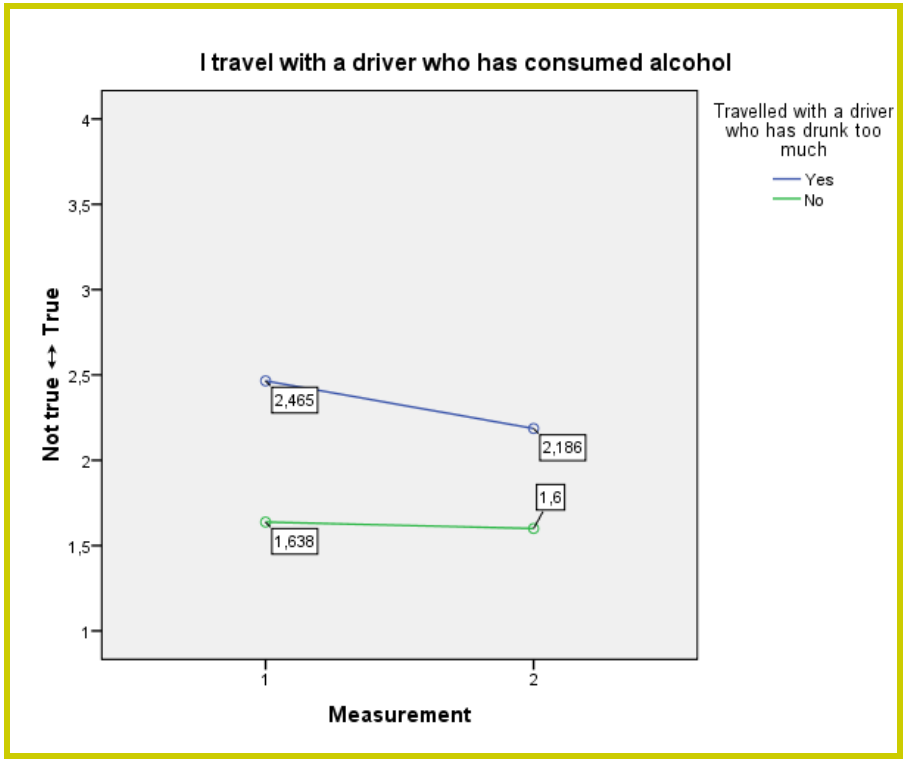
Interaction effect RoadSense × Drunk driver: $F(1,282) = 0.36$; $p = .55$

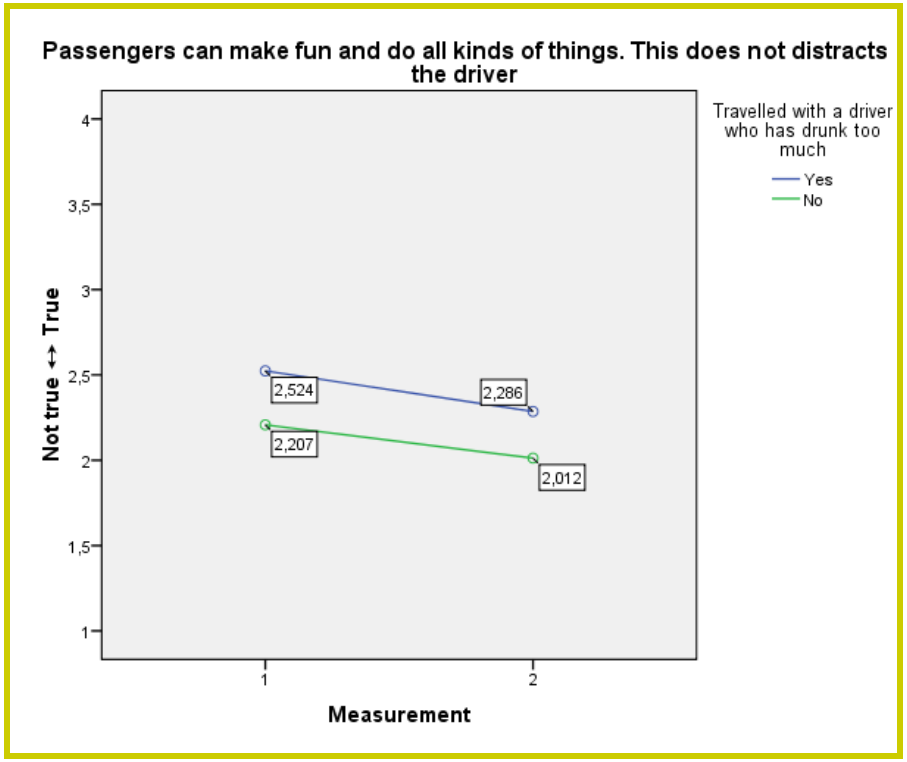


Main effect RoadSense: $F(1,283) = 0.95$; $p = .33$
Main effect Drunk driver: $F(1,283) = 7.40$; $p < .01$; $\eta^2_P = .025$
Interaction effect RoadSense × Drunk driver: $F(1,283) = 0.75$; $p = .39$



Main effect RoadSense: $F(1,280) = 9.33$; $p < .01$; $\eta^2_P = .032$
Main effect Drunk driver: $F(1,280) = 15.41$; $p < .01$; $\eta^2_P = .052$
Interaction effect RoadSense × Drunk driver: $F(1,280) = 1.61$; $p = .21$





Main effect RoadSense: $F(1,281) = 5.05$; $p < .05$; $\eta^2_P = .018$

Main effect Drunk driver: $F(1,281) = 38.12$; $p < .001$; $\eta^2_P = .12$

Interaction effect RoadSense × Drunk driver: $F(1,281) = 2.94$; $p = .09$; $\eta^2_P = .01$

Main effect RoadSense: $F(1,281) = 7.62$; $p < .01$; $\eta^2_P = .026$

Main effect Drunk driver: $F(1,281) = 38.12$; $p < .01$; $\eta^2_P = .021$

Interaction effect RoadSense × Drunk driver: $F(1,281) = 0.075$; $p = .78$

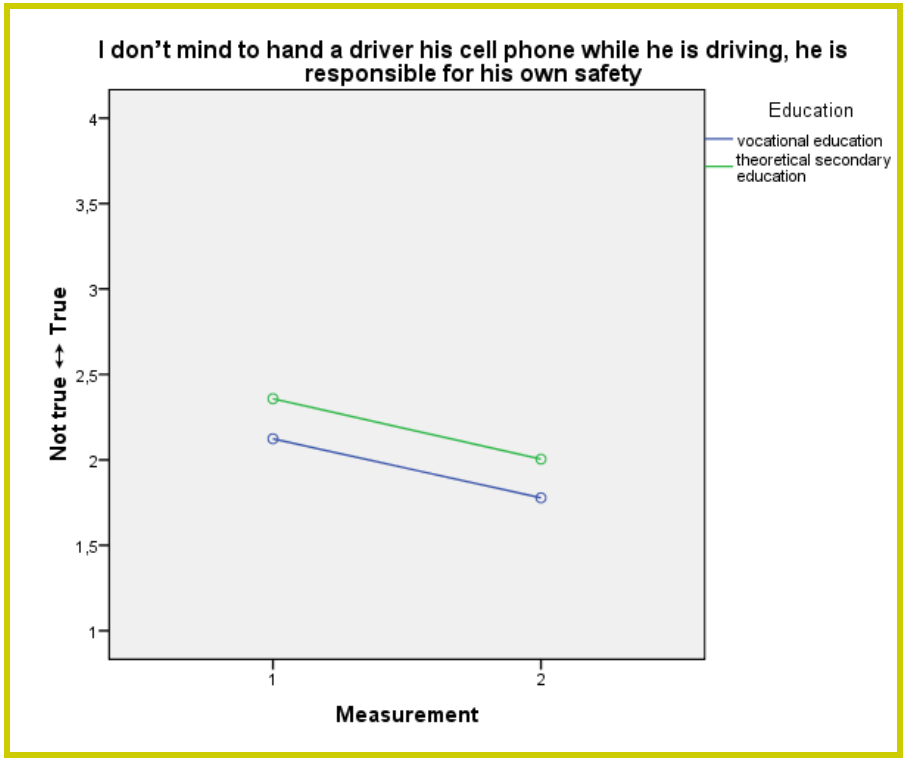
Riding with driver who drove dangerously

Yes = 59
No= 238

No significant difference between groups

Education

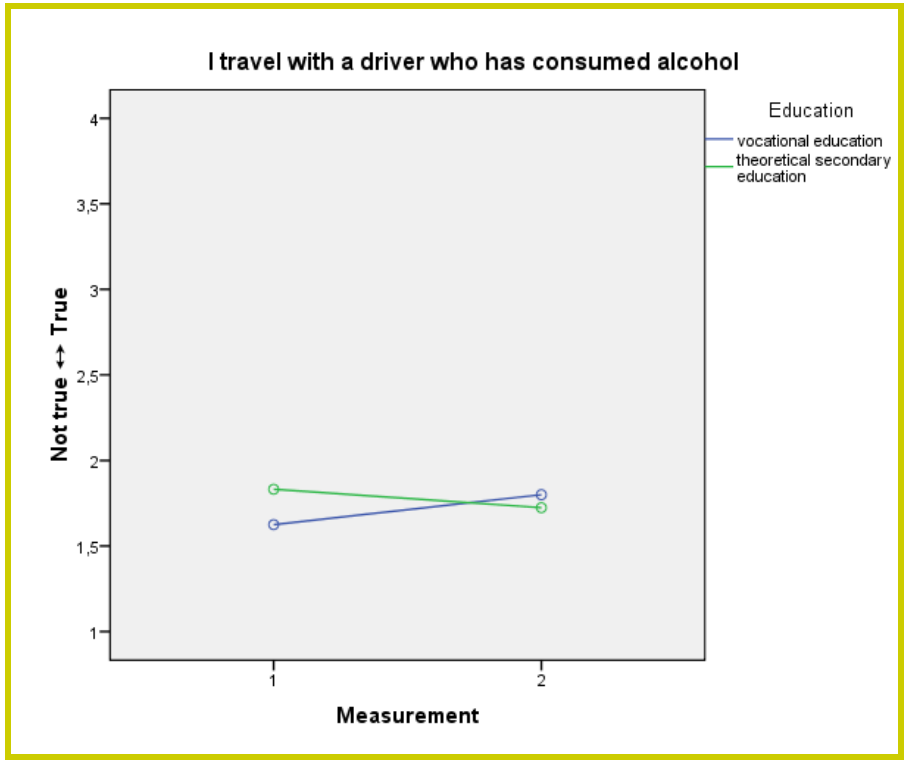
VMBO (vocational education) = 81
havo/vwo (theoretical secondary education)= 231



Main effect RoadSense: $F(1,311) = 35.19$; $p < .001$; $\eta_P^2 = .102$

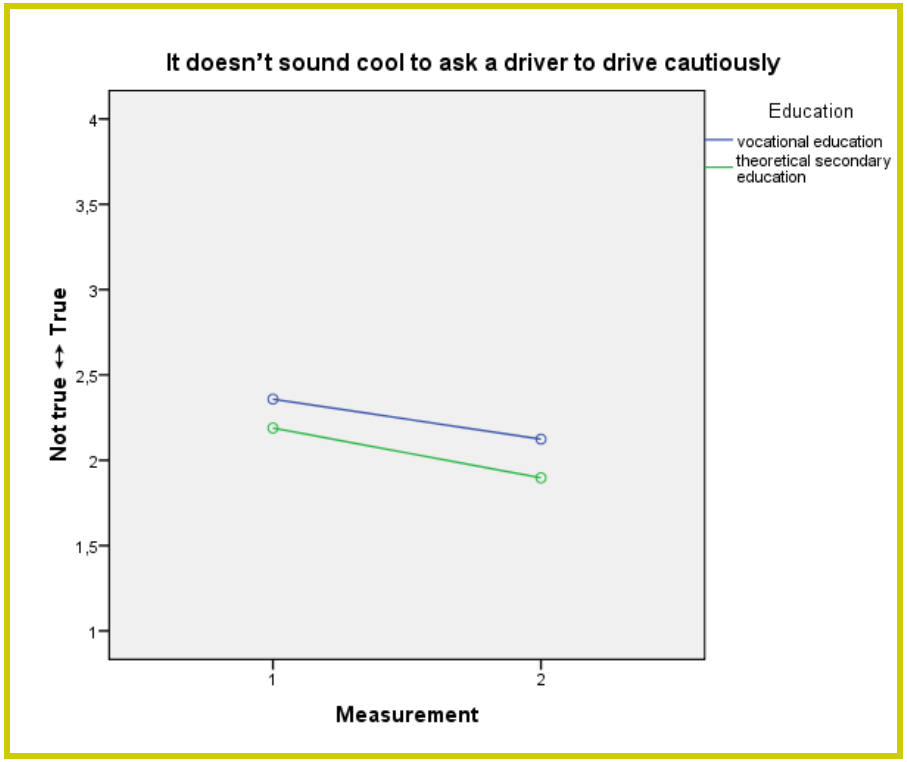
Main effect Education: $F(1,311) = 6,38$; $p < .05$; $\eta_P^2 = .015$

Interaction effect RoadSense × Education: $F(1,311) = 0.004$; $p = 0.95$



Main effect RoadSense: $F(1,310) = 0.36$; $p = .55$
Main effect Education: $F(1,310) = 0.43$; $p = .51$

Interaction effect RoadSense × Education: $F(1,310) = 6.305$; $p < .01$; $\eta_P^2 = .020$

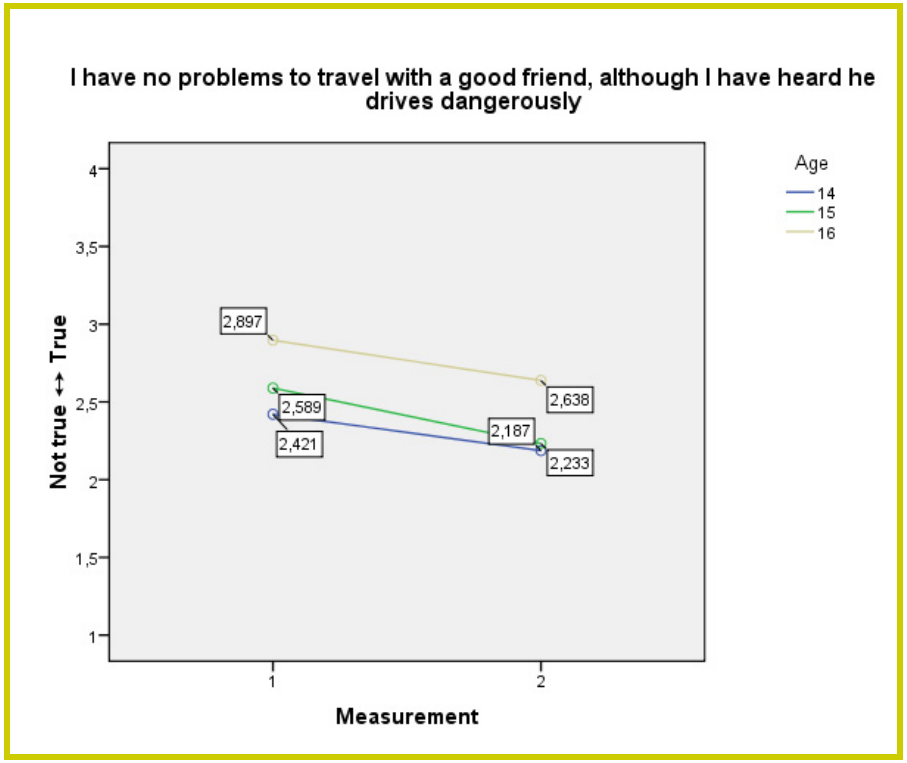


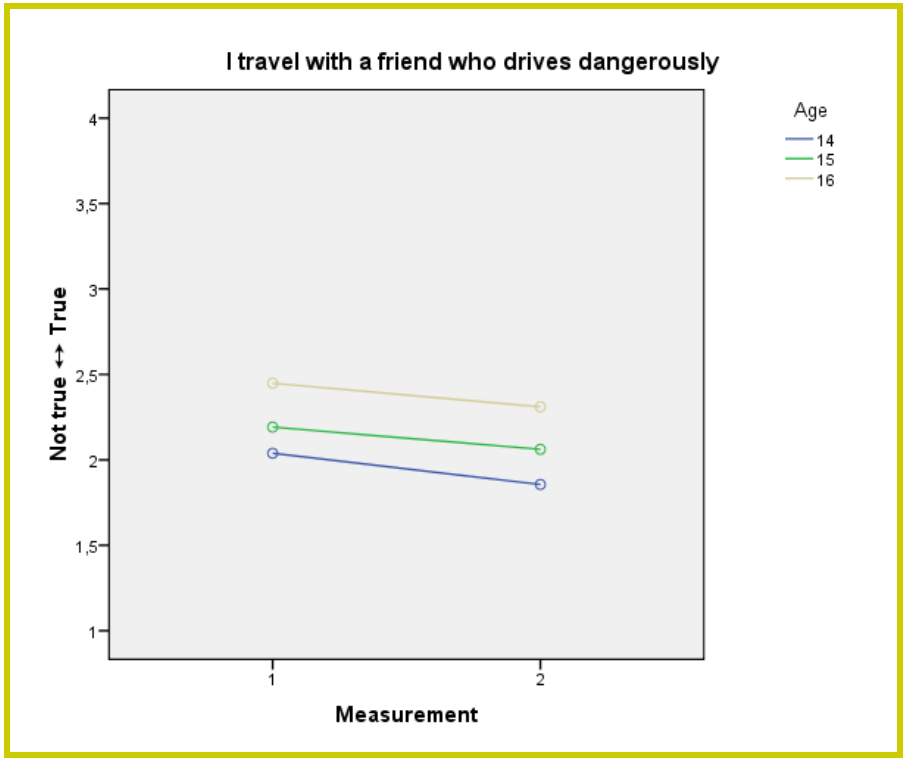
Main effect RoadSense: $F(1,312) = 14.33$; $p < .001$; $\eta_P^2 = .044$

Main effect Education: $F(1,312) = 4.063$; $p < .05$; $\eta_P^2 = .044$

Interaction effect RoadSense × Education: $F(1,312) = 0.17$; $p = .68$

Age





Main effect RoadSense: $F(1,308) = 27.89$; $p < .001$; $\eta_P^2 = .083$

Main effect Age: $F(2,308) = 5.88$; $p < .01$; $\eta_P^2 = .036$

Interaction effect RoadSense × Age: $F(2,308) = 0.664$; $p = 0.52$

Main effect RoadSense: $F(1,305) = 6.74$; $p < .05$; $\eta_P^2 = .022$

Main effect Age: $F(2,305) = 5.37$; $p < .01$; $\eta_P^2 = .034$

Interaction effect RoadSense × Age: $F(2,305) = 0.10$; $p = .91$

Differences in course effect in relation to gender, age, and exposure