

**Accompanied driving in
the Netherlands:**
Who do participate
and why?

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Summary

In 2011, a six year accompanied driving experiment started in the Netherlands. This questionnaire study investigated which youngsters (intend to) participate and why, with the purpose of assessing whether there is a potential self-selection bias that can be relevant for the oncoming evaluation of its effect on road crash involvement.

A total of 1,474 respondents between 16 and 17.5 years old completed a digital questionnaire in four parts: (1) biographical characteristics; (2) familiarity with accompanied driving and intention to participate; (3) safety- and risk-mindedness and sensation seeking; (4) arguments in favour or against participation.

The most important reasons to choose accompanied driving relate to the fact that it allows for an earlier start to drive a car, followed by safety-related reasons. The accompanied driving group was found to be comparable to the intended reference group in terms of safety-mindedness and risk-mindedness. Boys are slightly overrepresented in the accompanied driving group as are youngsters receiving higher level education. Youngsters who want to start driving immediately after their 18th birthday, either through accompanied driving or through the regular licensing process at the age of 18, are more inclined to like risk and speed than those who want to start driving at a later stage or not at all.

Based on the current study, a self-selection bias is likely to be limited to gender and level of education. Especially gender is known to affect crash risk; the effect of the level of education is less clear. There were no indications for a self-selection bias in terms of safety- or risk-mindedness. Participating in the accompanied driving programme seems to be particularly inspired by mobility and fun arguments. This could mean that 'accompanied drivers' have more liking for car driving than the 'traditional drivers', resulting in a higher mileage once driving solo. This emphasizes the need for taking into account the distance travelled when assessing the road safety effect of accompanied driving. The difference between early and late starters in risk-mindedness needs further validation but could be an additional factor explaining the high risk of young drivers.

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1. Introduction

Worldwide, young car drivers have an increased risk of being involved in a serious road crash (OECD, 2006). This is also the case in the Netherlands. Dutch statistics show that the crash risk of young drivers (18-24 years of age) is five times higher than that of experienced drivers (30-59 years of age); the risk even being seven times higher for young males (SWOV, 2012). Lack of experience is one of the factors contributing to the higher risk for young driver risk, especially regarding the assessment of traffic risks (McCartt et al., 2009; Vlakveld, 2005). In general, youngsters seem to underestimate the requirements of the driving tasks, and to overestimate their skills in dealing with these requirements; an imbalance that is also known as a lack of calibration (De Craen et al., 2011).

To tackle the lack of experience, many countries introduced accompanied driving as part of the licensing process, either as a stand-alone measure (mainly in Europe) or as part of a wider approach to graduated licensing (mainly in Australia, Canada, New Zealand and the USA). Accompanied driving means that a novice driver is only allowed to drive a car when accompanied by an experienced driver. The overall aim is to ensure that young drivers are more experienced, both quantitatively (number of kilometres driven) and qualitatively (in a wider variety of driving circumstances) once they start driving solo.

Empirical evidence of the effects of accompanied driving on road safety in European countries is generally, but not exclusively, positive. Positive effects have been found, for example, in Sweden (Gregersen et al., 2000), Austria (Winkelbauer, 2004), Germany (Willmes-Lenz et al., 2010) and Norway (Elvik, 2008). Experiences in France, however, are less positive. Page et al. (2004) found no difference in crash involvement between an accompanied driving group and a traditionally trained group. The authors suggest that the lack of effect may be due to insufficient accompanied kilometres and insufficient variety of driving circumstances. This is also seen as one of the explanations why in Norway a further lowering of the minimum age for driving training from 17 to 16 years, aimed at increasing driving experience, did not result in further crash reduction (Sagberg, 2000; in OECD 2006). There are also indications that the quality of the supervisors/coaches affects the effectiveness of accompanied driving (OECD, 2006).

Indications of the effectiveness of accompanied driving can also be found when looking at the graduated driver licence in the USA. Even though the accompanied driving component cannot be considered separate from the other components of the graduated licensing system (e.g. night time curfews, limitations in driving with passengers, and a reduced/zero alcohol limit), the accompanied driving component is often considered to be one of the most important contributors to the positive effect on road safety (Shope, 2007). However, the effect appears to be mainly caused by a decrease of the risk of 16 year-old drivers who, before the introduction of the graduated licensing system, were allowed to drive solo at that age. The effect on the subsequent solo-driving stage appears to be limited or non-existent: as soon as the youngster is allowed to drive solo, there is a substantial increase in crash risk. This increase in risk is similar to the increase before the introduction of the graduated licensing system (e.g. Mayhew et al., 2003). In

a recent overview of the effects of the graduated licensing system and its various components, Williams et al. (2012) conclude that the contribution of the accompanied driving element it is not so clear anymore.

Early November 2011, the Netherlands introduced the option of accompanied driving as a six years experiment. Since then, Dutch youngsters have been able to choose between the traditional way of obtaining a driving licence and the accompanied driving option. Before November 2011, youngsters could take practical driving lessons from the age of 18; the theoretical driving exam could be taken from the age of 17.5. Since the introduction of the accompanied driving experiment, marketed under the name 2toDrive, youngsters can take the theoretical exam from the age of 16, and start taking practical driving lessons from the age of 16.5. The driving test can be taken from the age of 17 onwards. Having passed both the practical and theoretical exam, the novice driver is allowed to drive a car on the public road, but until the age of 18 this can only be done when accompanied by an experienced driver. It is still possible to take the driving test at the age of 18 and drive solo immediately after.

After six years, based on experiences and an effect evaluation, the Dutch government will decide whether or not the driving licence law will be changed permanently. The present questionnaire study among 16 and 17 year olds was a first step in the effect evaluation, aiming to get further insight in the motivations and characteristics of people who do or do not choose the accompanied driving approach. In the second step of the evaluation we assessed how the accompanied driving phase is put into practice in terms of mileage, frequency, driving circumstances, et cetera. The results of this study are available in a Dutch report with an English summary (Van Schagen & De Craen, 2014). In the third step the effects of the Dutch accompanied driving experiment are assessed based on self-reported crashes and traffic violations. Work on this is currently in progress and will be published later in 2015. As a last step we intend to evaluate the effects based on actual police recorded crashes of accompanied drivers and the young drivers who had a traditional training.

The main purpose of the study reported here was to identify factors that may potentially result in a self-selection bias which may distort the interpretation of the effect evaluation. Self-selection is a serious threat to the evaluation of road safety interventions such as accompanied driving. The ideal design of an evaluation study is a before-after design with random assignment to either the treatment condition or the non-treatment/control condition. However, for the evaluation of accompanied driving this design is not feasible. In the first place, by definition, a before measurement is not possible, since in the before situation people are not allowed to drive at all. Secondly, people cannot be randomly assigned to either the accompanied driving or the traditional learning approach, mainly because it is considered unethical to exclude some people deliberately from a possibly effective measure. The latter, however, can easily lead to self-selection, meaning that people who choose accompanied driving may be a different type of people with different attitudes, motivations and driving behaviour than those who choose traditional learning. In that case, differences in driving behaviour or crash involvement following one of the two approaches can be caused by these factors rather than by the type of driver training.

The present questionnaire study investigated to what extent (intended) participants differ from (intended) non-participants and, hence, may cause a self-selection bias. The main focus is on characteristics that are known to affect the intended outcome variables, in our case driving behaviour and crash involvement. The study therefore looked at some biographical characteristics, including gender, as well as motivational aspects in terms of safety-mindedness and the willingness to take risks.

2. Method

2.1. The sample

Data was gathered between the end of November and mid December 2012, one year after the introduction of the accompanied driving option. A survey organisation distributed the questionnaire through the internet to youngsters between 16 and 17.5 years old. Part of the addressees were member of a survey panel and part were approached directly because for this specific age group the size of the panel was too small to supply the intended 1,300 respondents. Eventually 1,302 persons completed the questionnaire and this sample was considered representative for Dutch youngsters. In order to increase the number of respondents that had actually started or were preparing to start accompanied driving, the questionnaire was also distributed among 1,399 16 and 17-year-old subscribers to a digital newsletter about 2toDrive, the name of the Dutch accompanied driving programme. A response percentage of 8.5% resulted in an additional sample of 287 youngsters, 172 of which fell in the required age category of 16 to 17.5 years old. This led to a total sample of 1,474 youngsters.

The total sample consisted of 49.6% male and 50.4% female respondents. The mean age was 16.7 years old with a standard deviation of 0.43. Of the respondents, 43.1% were between 16 and 16.5 years old; 36% were aged between 16.5 and 17; and 20.2% were 17 and 17.5 years old. The distribution of respondents over the various Dutch regions (provinces) corresponded with that of the distribution in the Dutch population.

2.2. The questionnaire

The questionnaire consisted of four parts. Part 1 contained 13 questions about the biographical characteristics of the respondents and their social environment, including age, gender, own educational level and parental educational level. Part 2 focused on the familiarity with 2toDrive, sources of information, and the actions undertaken or their intentions to participate or not to participate. Part 3 aimed to assess the safety- and risk-mindedness. One subpart consisted of nine statements about car features (e.g. power, colour, the presence of airbags, maximum speed) asking to indicate on a 6-point Likert scale how important/unimportant they considered each feature, imagining they were going to buy their first car. The second subpart was a short version of the sensation seeking test (Hoyle et al., 2002), consisting of eight statements of the original sensation seeking test of Marvin Zuckerman (see e.g. Zuckerman, 1979), asking to indicate the level of agreement on a 5-point Likert scale. Part 4, the last part of the survey, focused on arguments against or in favour of participation. Those respondents who had indicated in Part 2 that they had started the accompanied driving trajectory or intended to do so shortly, were asked how important/unimportant (6-point Likert scale) eleven arguments in favour of participating had been for their decision. Those who had indicated that they (probably) would not participate had to rate thirteen arguments for not participating. And those who had indicated to still be in doubt had to rate the importance of ten arguments in favour of participation and seven arguments against participation.

The questionnaire took 15 to 20 minutes to complete.

2.3. Analyses

Statistical analyses were performed on the results of the total sample of 1,474 respondents. To analyse differences between two or more subgroups, chi-squared tests (χ^2) were applied using a significance level (p) equal to or smaller than 0.05. For scale construction, factor analysis was applied with Cronbach's alpha (α) as an indication of the internal consistency of the items. Correlations between scales are expressed as Pearson product-moment correlation coefficients (r).

The data resulting from the questions in Part 3 was processed and combined resulting in three composed variables: safety-mindedness, speed-mindedness and sensation seeking.

The first subpart of Part 3 concerned rating the importance of nine car features. Five of these features were safety-related:

1. presence of airbags;
2. high top speed;
3. high safety score;
4. high power/high acceleration;
5. sporty look.

The remaining four features (age of car, kilometres driven, colour, fuel consumption) were filler items. A factor analysis on the five safety-related factors, showed, after VARIMAX rotation, two factors that explained 79.0% of the variance between the respondents. The first factor consisted of the features 2, 4 and 5, explaining 45.7% of the variance, and having a Cronbach's alpha of 0.84. The second factor consisted of the features 1 and 3, explaining 33.3% of the variance, and having a Cronbach's alpha of 0.79. The alphas were considered sufficiently high to combine the respective factors into two variables. The first one was labelled "speed-mindedness"; the second "safety-mindedness". Both variables were dichotomized in a group below and a group above the median.

The second subpart of Part 3 was the short version of the sensation seeking test, consisting of eight items on a 5-point Likert Scale. The test had a Cronbach's alpha of .83. The scores were aggregated, per person resulting in a minimum score of 8 and a maximum score of 40. For this variable the sample was split into three groups: low level of sensation seeking (score 8-20); middle high level of sensation seeking (score 21-27) and high level of sensation seeking (score 28-40).

Table 2.1 provides an overview of the numbers and percentages of the respondents in the distinguished categories of safety-mindedness, speed-mindedness and sensation seeking. About 80% of the respondents scored high on safety-mindedness with more girls (84.1%) than boys (75.5%) (χ^2 (1, $N=1,474$) = 16.96, $p < 0.00$). Regarding the speed-mindedness, 42% of the respondents scored high, with more boys (56%) than girls (28.5%) (χ^2 (1, $N= 1,474$) = 113.61, $p < 0.00$). With 18.4% the high sensation category is least represented; the middle and low sensation seeking categories both have around 40% of the sample. There were no gender differences in sensation seeking. Sensation seeking slightly correlated with safety-mindedness in a negative direction ($r = -0.06$, $p < 0.02$) and somewhat more, and in a positive direction, with speed-mindedness ($r = 0.22$, $p < 0.00$).

		Number and percentage respondents
Safety-mindedness	High	n = 1177 (79.9%)
	Low	n = 297 (20.1%)
Speed-mindedness	High	n = 621 (42.1%)
	Low	n = 853 (57.9%)
Sensation Seeking	High	n = 271 (18.4%)
	Middle	n = 605 (41.0%)
	Low	n = 598 (40.6%)

Table 2.1. *Number (and percentage) of respondents with different levels of speed-mindedness, safety-mindedness, and level of sensation seeking.*

3. Results

3.1. Familiarity with and participation in 2toDrive

After having explained what 2toDrive/accompanied driving was, one third of the respondents (33.9%) indicated that they had never heard of it before. For those who had heard about the 2toDrive option, the most important source of information appeared to be the parent(s)/guardian(s). Around 45% mentioned them as one of the information sources. Friends and the internet were other important sources of information, with respectively 38.7% and 38.2% of the respondents mentioning those.

Figure 3.1 shows to what extent respondents participated or intended to participate in 2toDrive. About one third of the respondents indicated that they were already participating, or were making the necessary arrangements, or intended to start making these arrangements soon. About two thirds indicated that they would (probably) not participate or had not yet given it any thought. Just over half of this latter group (52.1%) wanted to start taking driving lessons as soon after their 18th birthday as possible; just over a quarter (27%) wanted to take driving lessons at some stage, but not immediately after their 18th birthday. Only a few (1.5%) respondents said that they did not want to take driving lessons at all. The remaining respondents were still in doubt (11.6%) or had not yet considered it (7.7%).

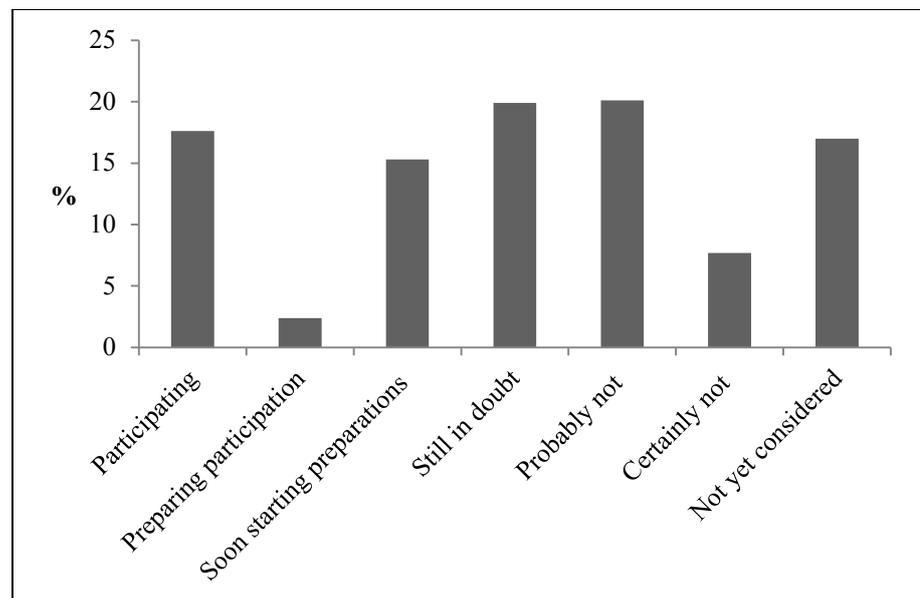


Figure 3.1. Percentage respondents (N=1,474) participating or not (yet) participating in accompanied driving.

3.2. Arguments against or in favour of participation

Table 3.1 provides an overview of the presented arguments against or in favour of participation in 2toDrive and the percentage of respondents considering these arguments (very) important or unimportant.

	% respondents rating it as (very) important	% respondents rating it as (very) unimportant
Importance of arguments for those participating or intending to participate in 2toDrive (n=519)		
It makes independent driving possible immediately after 18	79.9	1.4
It is fun to be able to drive already now	70.9	2.7
It makes me more confident when later driving solo	56.1	7.3
It makes me safer when later driving solo	54.0	6.3
I can learn much from my supervisor	45.1	8.5
Licence B automatically means licence AM	35.9	36.4
It is fun to go out with my supervisor	34.1	14.9
My parents/guardians want me to participate	30.1	27.2
Just driving lessons provide insufficient experience	25.6	20.1
It makes me an eco-friendlier driver when later driving solo	18.5	32.3
Many of my friends participate as well	9.1	54.3
Importance of arguments for those not intending to participate in 2toDrive (n=410)		
There is enough time after 18 to get licence	54.9	9.7
It is too costly now for me and my parents/guardians	51.7	23.2
I don't feel any need yet to drive a car	43.7	19.3
I'll gain enough experience with normal driving lessons	34.1	20.7
I don't have time now	29.3	28.3
In the end, you learn most by experience while driving solo	27.5	23.9
I don't like having to go out with my supervisor all the time	24.4	35.9
My parents/guardians don't want me to participate	14.4	56.8
There is hardly ever a car available to practice	13.4	46.8
Most of my friends don't participate either	12.9	52.0
Once driving solo, supervisor's advices will be forgotten anyway	9.6	49.0
I wouldn't know who has to become my supervisor	9.3	54.4
I don't need anybody to tell how to behave safely in traffic	5.4	58.0

Table 3.1. Importance of arguments to participate or not to participate.

For the respondents who had indicated to participate or to prepare (soon) for this (N = 519) the most important reason to do so was that it would allow them to start driving independently immediately after their 18th birthday. It being fun to already drive a car already at the age of 17, was the second most important argument to participate. The third and fourth most important arguments to participate were related to driving behaviour and safety: accompanied driving would make them a more self-confident driver and a safer driver, once they were allowed to drive solo. The least important reason was the fact that friends participated as well.

For those respondents who had indicated that they would (probably) not participate in 2toDrive (N = 410), the most important argument was that there was sufficient time after their 18th birthday to get their driving licence. The second most important reason for not participating was that at the moment it was too costly for them and their parts/guardians. The third most important argument against participating in 2toDrive was the fact that the participant had not yet any need or wish to drive a car.

Those respondents who were still in doubt whether to participate or had not yet thought it over (N = 545) had to rate the importance of arguments in favour as well as arguments against participation. The relative importance of arguments was very much in line with the order of the other subgroups, be it that their ratings were less explicit and more often fell in the middle categories.

3.3. **Assessment of a potential self-selection bias**

In order to assess the likelihood of a self-selection bias, the results of those who had indicated to participate in 2toDrive, were preparing for participation or would soon start with preparations (N = 519) were compared with the results of those who probably or certainly would not participate but who wanted to start with driving lessons as soon as possible after their 18th birthday (N = 498). In the effect evaluation of 2toDrive, the latter group will be the reference/control group for assessing the effects of accompanied driving.

With respect to biographical variables, boys were slightly overrepresented in the group of participants ($\chi^2(1, N=1,474) = 3.87, p < 0.05$) as were the youngster who receive a higher level of education ($\chi^2(1, N=1,474) = 3.85, p < 0.05$). In absolute terms the differences were fairly small. The group of participants consisted of 53.8% of the boys, the group of non-participants of 47.6%. Of the group of participants, 54.7% received a higher level of education, of the group of non-participants this was 51.5%. There was no relationship with the level of education of the parents.

With respect to safety-mindedness, speed-mindedness and sensation seeking, no statistically significant differences were found between participants and the reference group of non-participants.

3.4. **Comparing characteristics of early starters and late starters**

Though not the main aim of the current study, there were indications of a systematic difference between youngsters who want to start driving as soon as possible (either through accompanied driving or at the age of 18 through the regular licensing procedure) and youngsters who were less in a hurry. This was a reason for more targeted analyses, comparing early starters (those who had indicated to participate in 2toDrive, having the intention to participate in 2toDrive, or having the intention to start driving lessons as soon as possible after their 18th birthday; N = 1,017) and late starters (those who had indicated to start with driving lessons at a later age or (maybe) not at all; N = 457).

The analyses showed that the girls and boys were equally represented in the groups of early and late starters. Youngsters receiving a lower level of education were slightly overrepresented in the group of late starters (χ^2 (1, N=1,466) = 4.08, $p < 0.05$). The level of parental education had no effect, nor had safety-mindedness. However, it was found that early starters more frequently scored high on both speed-mindedness (χ^2 (1, N=1,474) = 18.33, $p < 0.00$) and sensation seeking (χ^2 (2, N=1,474) = 12.01, $p < 0.00$) than late starters. *Figure 3.2* illustrates this.

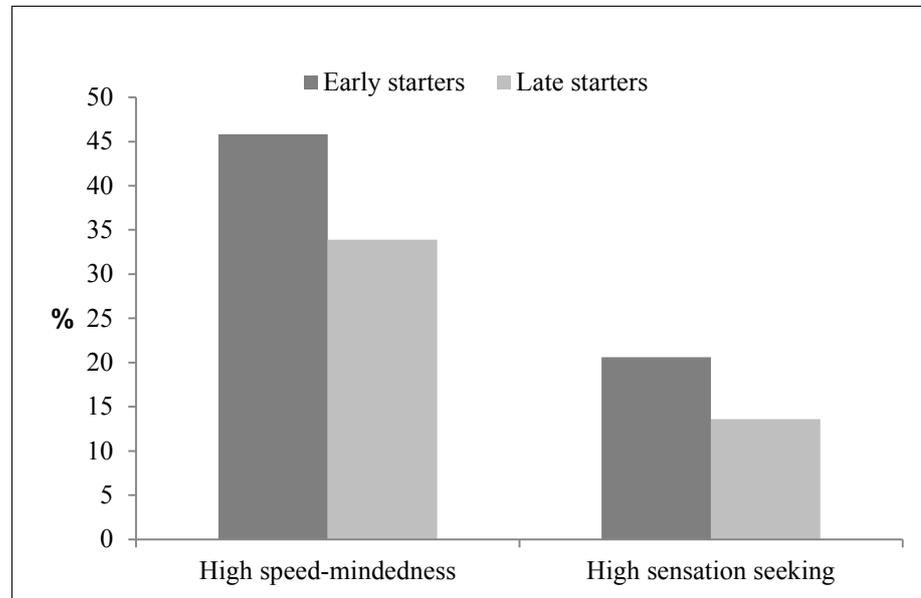


Figure 3.2. Percentage early and later starters with a high score of speed-mindedness and sensation seeking.

4. Conclusions and discussion

This study looked at several personal characteristics and arguments of Dutch youngsters between 16 and 17.5 years of age related to the participation (or not) in the accompanied driving programme. The main purpose was to investigate whether there are systematic differences between (likely) participants and non-participants which may be a source of self-selection bias in the planned effect evaluation of 2toDrive, the Dutch accompanied driving experiment.

One year after the introduction of 2toDrive, approximately one third of the 1,474 respondents stated that they had not heard of 2toDrive before. For those who had heard of it, parents had been the most frequent source of information, followed by the internet and friends.

Participating in the accompanied driving programme seems to be more inspired by mobility and fun arguments than by safety arguments. For approximately three quarters of the young people, the opportunity to already drive a car before their 18th birthday and to drive solo immediately after, were (very) important reasons to participate. This could mean that 'accompanied drivers' have more liking for car driving than the 'traditionally licensed drivers' and, as a consequence, may have a higher mileage once driving solo. Mileage is something that could not be studied with this questionnaire study, but this result emphasizes the need for controlling for distance travelled when assessing the effect of accompanied driving on road crash involvement. Though substantially less important, safety-related arguments also played a role for more than half of the likely participants. These results are very similar to what Willmes-Lenz and colleagues (2010) found in Germany. The German study did not look at arguments for not participating. In our study we found that a lack of necessity or interest to start driving at an early age as well as the costs involved were the most important reasons for not participating.

According to the youngsters their choice to participate or not to participate was barely affected by their friends. Only about 10% said that the participation or non-participation of friends was a (very) important reason to participate or not participate themselves. This is interesting because there are many studies that have found that especially young people are influenced by the behaviour and choices of peers (e.g. Lerner & Steinberg, 2009; Brechwald & Prinstein, 2011). At the same time, however, it has been reported that people tend to underestimate the influence of their social environment (Cialdini, 2005). The actual influence of peers may therefore be larger than the current results suggest.

Based on the current study, the self-selection bias is likely to be limited to gender and level of education. Accompanied driving attracts slightly more boys than girls. Given the higher crash risk of boys, this means that the accompanied driving participants have a higher crash rate than the comparison group from the very beginning. Hence, the effects of accompanied driving need to be assessed separately for boys and girls. Regarding level of education, we found that accompanied driving attracted

somewhat more youngsters with a higher education level than with a lower level of education. The parents' level of education had no effect. In Germany, Willmes-Lenz et al. (2010) looked at a combined level of education of the family and found that young people from higher education families were overrepresented amongst participants. There were indications, however, that this difference disappeared when accompanied driving had existed for a longer period (Willmes-Lenz, personal communication).

For two reasons we believe it is not essential to correct for the level of education in the evaluation study. Firstly, in an absolute sense, the difference in level of education between the participants and non-participants is very small. Secondly, the relationship between level of education and crash rate is not clear. For example, Lourens, Vissers & Jessurun (1999) studied Dutch car drivers of all ages and concluded that there was no relationship between the drivers' education level and their crash rate. More recently, this was confirmed by Vlakoveld (2011). He found that differences in (self-reported) crash rates between young Dutch drivers (18-25 years of age) with lower vocational training, higher non-academic education and academic education were statistically not significant. A Swedish study (Murray, 1998) did find a relationship between educational level and crash rate with lower levels going together with higher crash rates. However, the relationship was very weak.

Possibly a bit counterintuitive, 2toDrive participants and non-participants who wanted to start driving lessons at 18 did not differ in safety-mindedness nor in speed-mindedness and sensation seeking. This study did not find indications that young people who choose accompanied driving are more inclined to behave safely, nor the other way around, that they are more inclined to like risky activities. Hence, when comparing the behaviour and crash involvement of 2toDrive participants with that of non-participants of the same age, it is not necessary to correct for this type of factors. Given that there was quite some differences in the level of safety-mindedness and in particular in risk-taking between young people, it would be interesting to assess whether accompanied driving has a differential effect for safety-minded or risk-minded participants.

Though not directly relevant for the evaluation, this study indicated that 'early starters', i.e. youngsters who want to drive solo as soon as possible after their 18th birthday, be it through accompanied driving or through traditional licensing, are people who tend to engage in risky activities relatively more frequently, and are more speed-minded than 'late starters', i.e. people who are not so much in a hurry to get their licence. Whereas lack of experience and young age-related characteristics, including risk taking, are two important factors that contribute to the high crash rate of youngsters, this finding suggests a third factor: those young people who choose to start driving early, are not the average youngster, but are those who especially like risky and speedy activities. This finding needs to be explored further and be validated.

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