

Young Researchers Seminar 2009

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Car drivers perceptions of Electronic Stability Control (ESC) and Anti-lock Braking Systems (ABS)

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Background

- In Europe, about 40 000 people die as a consequence of road crashes each year.
- The EU has a target of halving the yearly number of road deaths between 2001 and 2010.
- Development of safer vehicles is one important area. New technical support systems in cars are at present under rapid development.
- Two common systems are Anti-lock Braking Systems (ABS) and Electronic Stability Control (ESC).

Background, cont

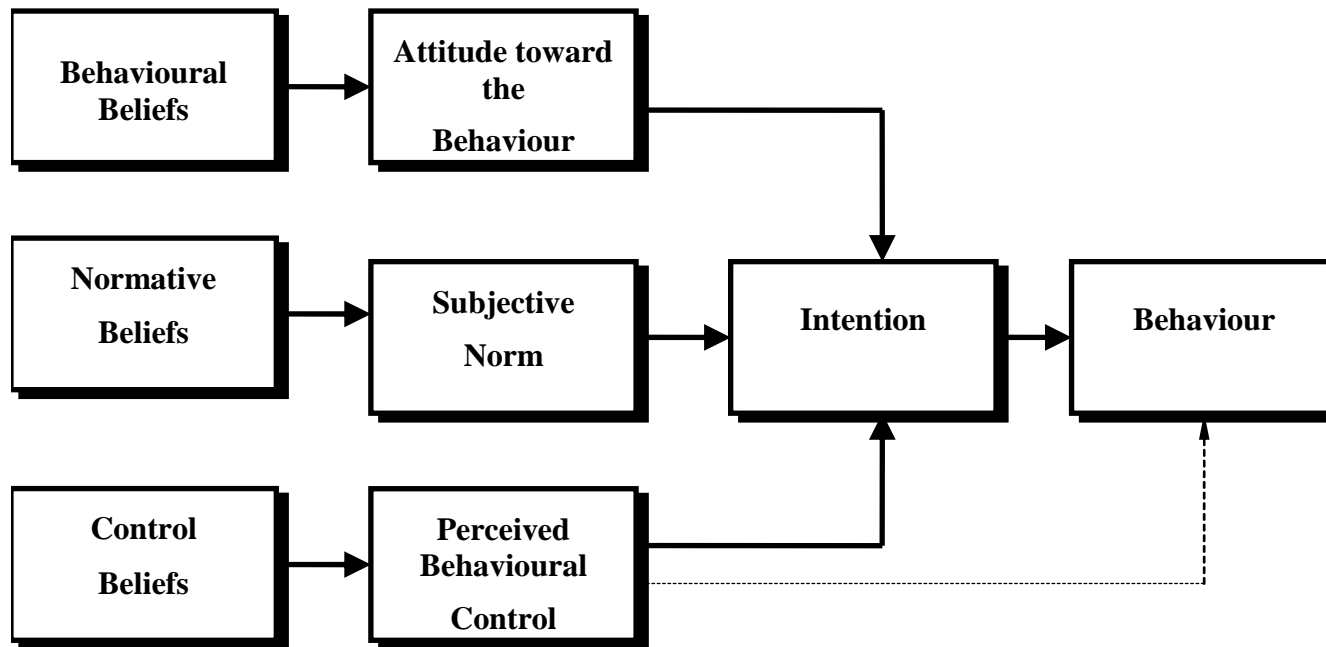
- Several studies have investigated the safety effects of ABS and ESC based on the outcome from accidents.
- On the average positive safety effects, especially from ESC, but
 - Many drivers lack knowledge of the function of ABS and ESC
 - More research is needed about how the systems affect the driver's willingness to perform dangerous or risky behaviour.

Objective

- Describe what knowledge, expectations and preconceptions drivers have of ABS and ESC;
 - Do drivers know what technical support systems their car is fitted with?
 - Differ their notions depending on whether they usually drive a car with or without ESC.
 - Does ABS/ESC affect their intended behaviour.
- Part of the study uses Theory of Planned Behaviour

Theory of Planned Behaviour

TPB predicts that behaviour is a function of intention which in turn is a function of attitude, subjective norm and perceived behavioural control



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Procedure

- A questionnaire survey sent by post in the autumn of 2008.
- Two stage selection:
 1. Stratified selection of vehicles from the vehicle register: 1000 vehicles with ESC and 1000 without (all selected cars have ABS)
 2. Selection of one person in the household who drive the car by a question in the covering letter.
- Population: *Drivers of cars with ESC and drivers of cars without ESC in Sweden.*

The questionnaire

1. Background questions about age, gender, education and driving experience.
2. Questions concerning three situations with risky behaviour. Questions based on TPB.
3. Questions regarding experiences of and notions concerning ESC and ABS.

Participants

- Response rate: 48% (959 of 2000).
 - 53.3% among drivers of cars with ESC
 - 46.7% among drivers of cars without ESC
- 26% women and 74% men.
 - Swedish national travel pattern survey RES 05-06: 31% of the total traffic mileage performed by women.
- Mean age of investigated drivers was 52.6 years
 - RES 05-06: mean age 46.1 years.
- About 40 % drive between 10000 - 15000 km/year

Risk proneness (intention)

- The risk proneness (intention) measured by the question:
How likely is it that you would drive in this way?
- Asked twice for each situation:
 1. When the respondents imagine that they are driving a car fitted with ABS/ESC.
 2. When they imagine driving a car without ABS/ESC.
- Seven point scale ranging from **very likely** (1) to **not at all likely** (7)

Analysis of risk proneness (intention)

- Analysis of variance with factors:
 - *Gender*
 - *Age class (18-29, 30-49, 50-64, 65-)*
 - *Whether the driver is really driving a car with or without ESC*
 - *Whether the driver imagines that he/she is driving a car with or without ABS/ESC*
 - *Interaction effects*

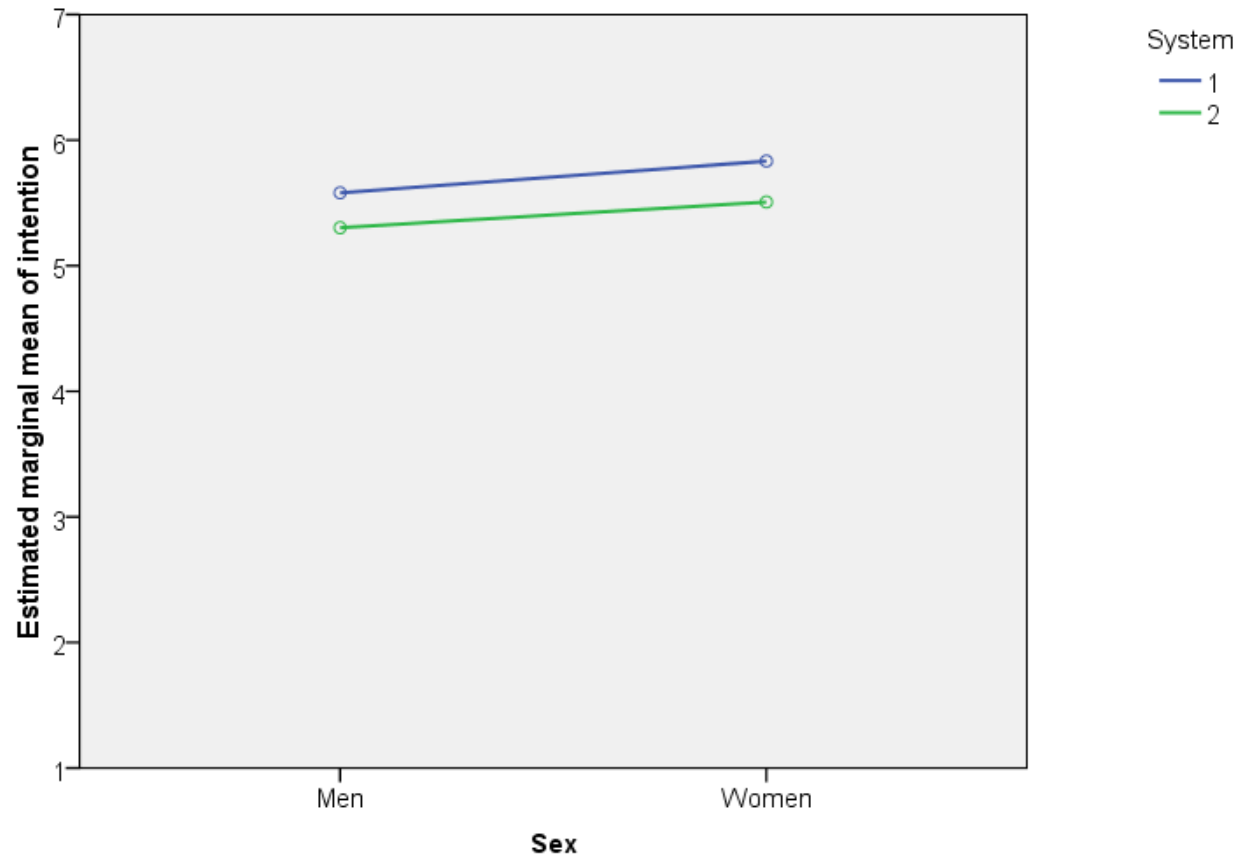
Situation 1

Imagine that it is raining and that you are driving along a rural road subject to a speed limit of 90 km/h. You are alone in the car and have come up to a car driving about 10 km/h more slowly than you. You are a little pressed for time, and it is very difficult to overtake. You come right up behind the car in front to make it increase speed.

For each question: imagine that you are driving a car with or without ABS.

Analysis of risk proneness (intention)

Situation 1



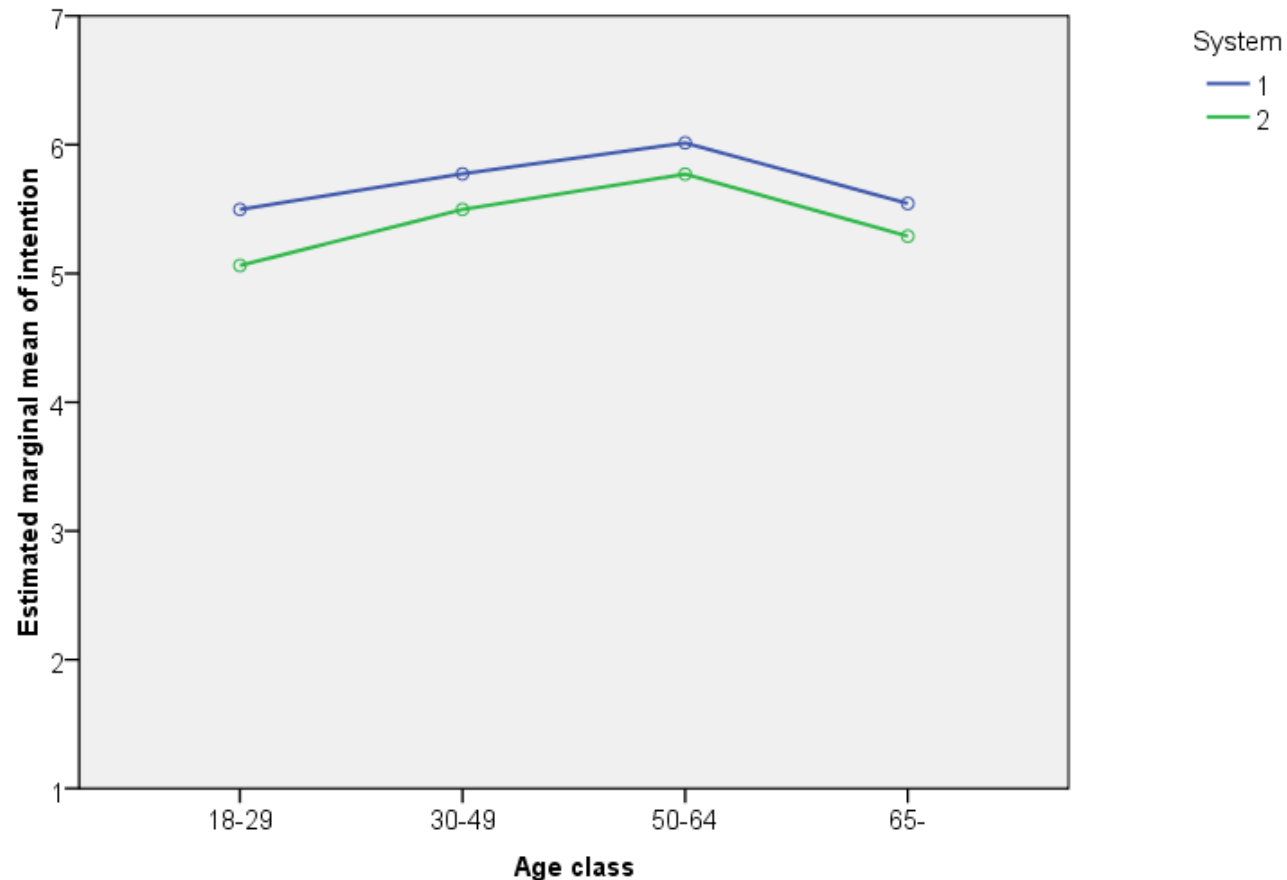
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Analysis of risk proneness (intention)

Situation 1



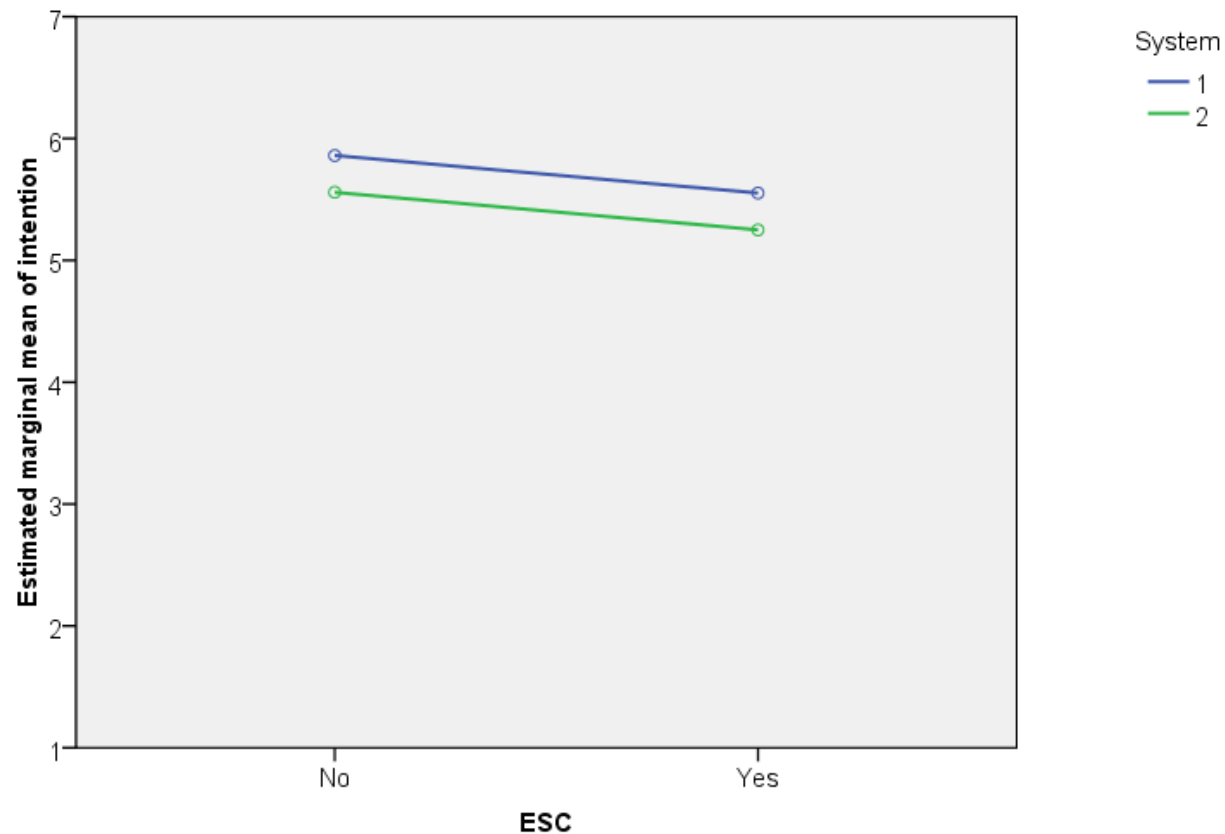
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Analysis of risk proneness (intention)

Situation 1



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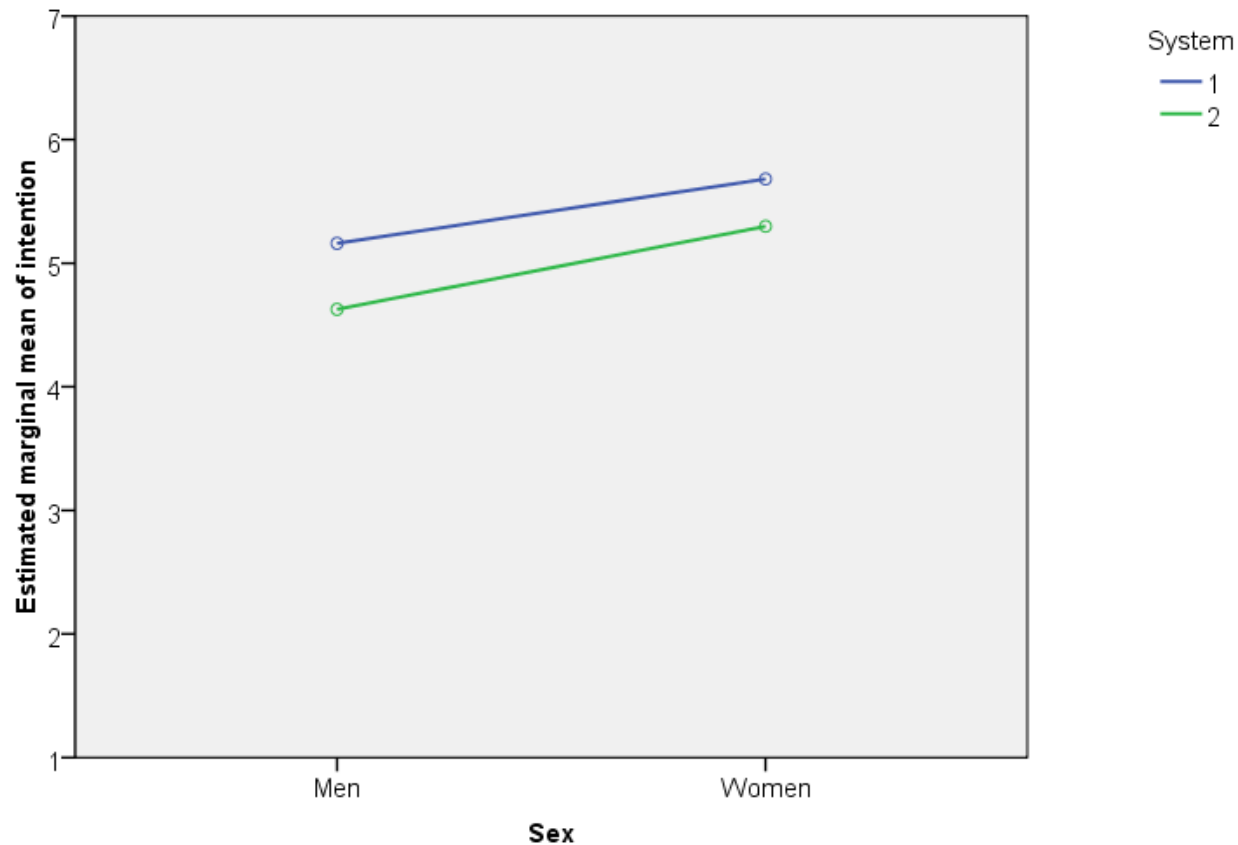
Situation 2

Imagine that you are driving along a rural road which is badly rutted and has a speed limit of 90 km/h. It is pouring down, and large puddles have formed on the road. You are alone in the car and decide to drive at 90 km/h.

For each question: imagine that you are driving a car with or without ESC.

Analysis of risk proneness (intention)

Situation 2



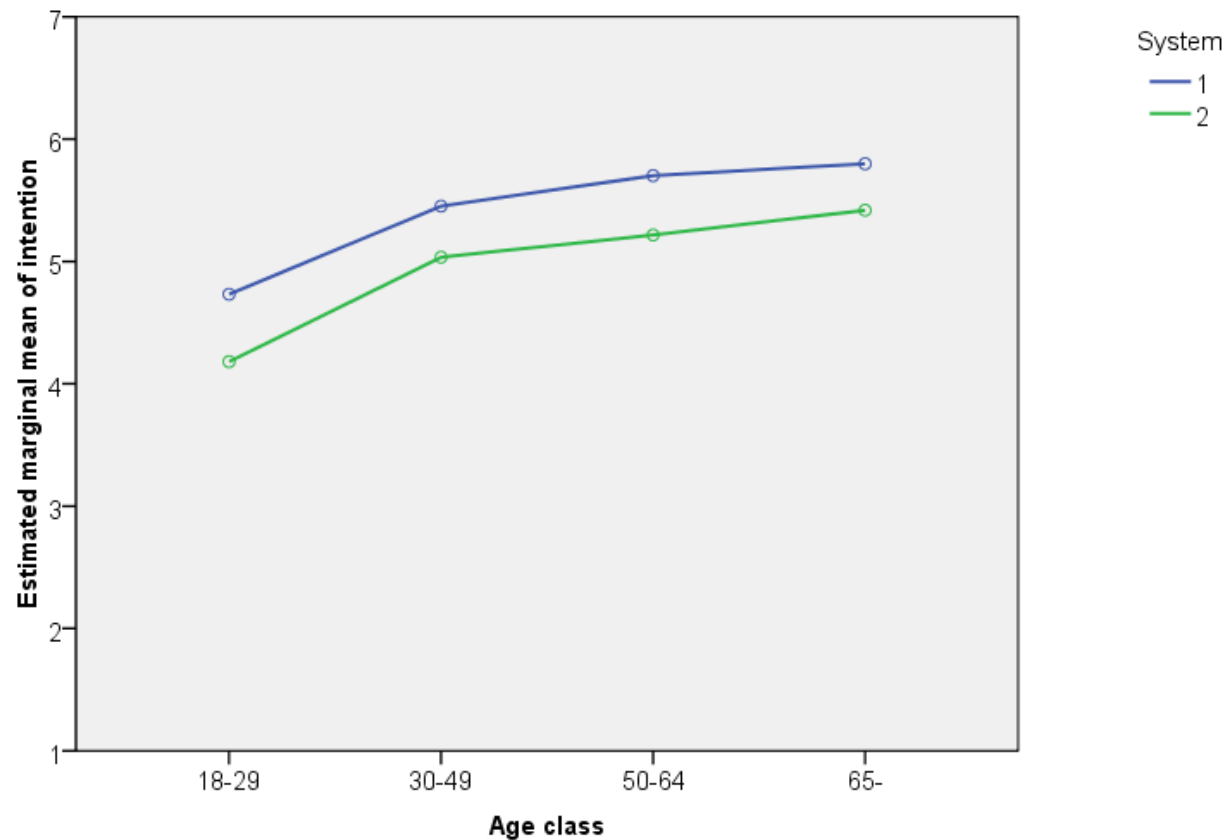
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Analysis of risk proneness (intention)

Situation 2



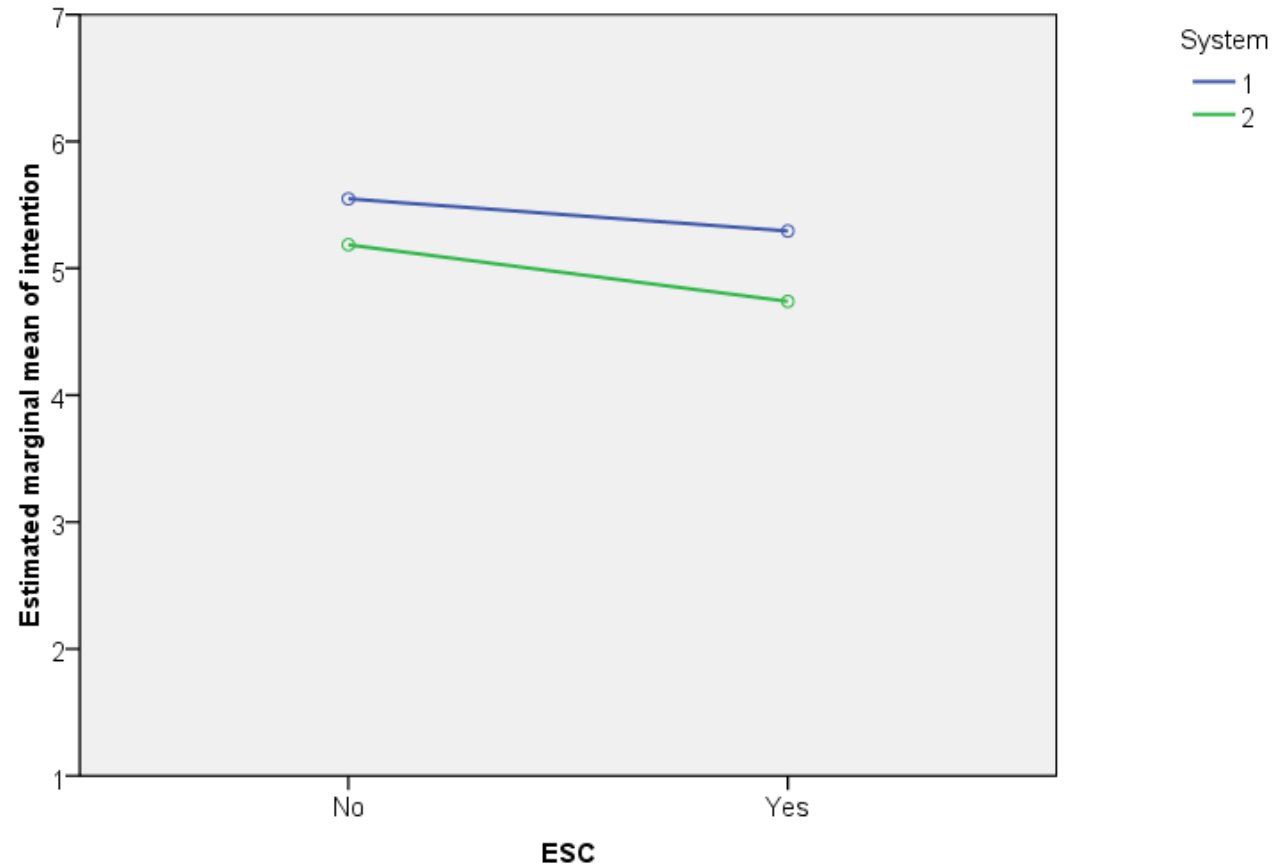
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Analysis of risk proneness (intention)

Situation 2



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Conclusions

- It is more likely that the drivers would drive according to the risky behaviour of the situations if they imagine they are driving a car with ABS/ESC than without.
- The increased tendency to take risks is approximately the same for the two situations.
- As regards age, there is a consistent pattern that the youngest age group is always represented in the age group or groups which have the highest tendency to take risks.

Theory of Planned Behaviour

Situation 1:

- Perceived feeling of control is the factor which best explains the drivers' intention, followed by attitude and subjective norm.
 - The driver's control over behaviour is decisive
- The model explains 47% of the drivers' intention (imagine driving with ABS) and 41% when imagine driving without ABS.
- When *descriptive norm* is added in the model (Stage 2), explanatory power does not increase.

Theory of Planned Behaviour

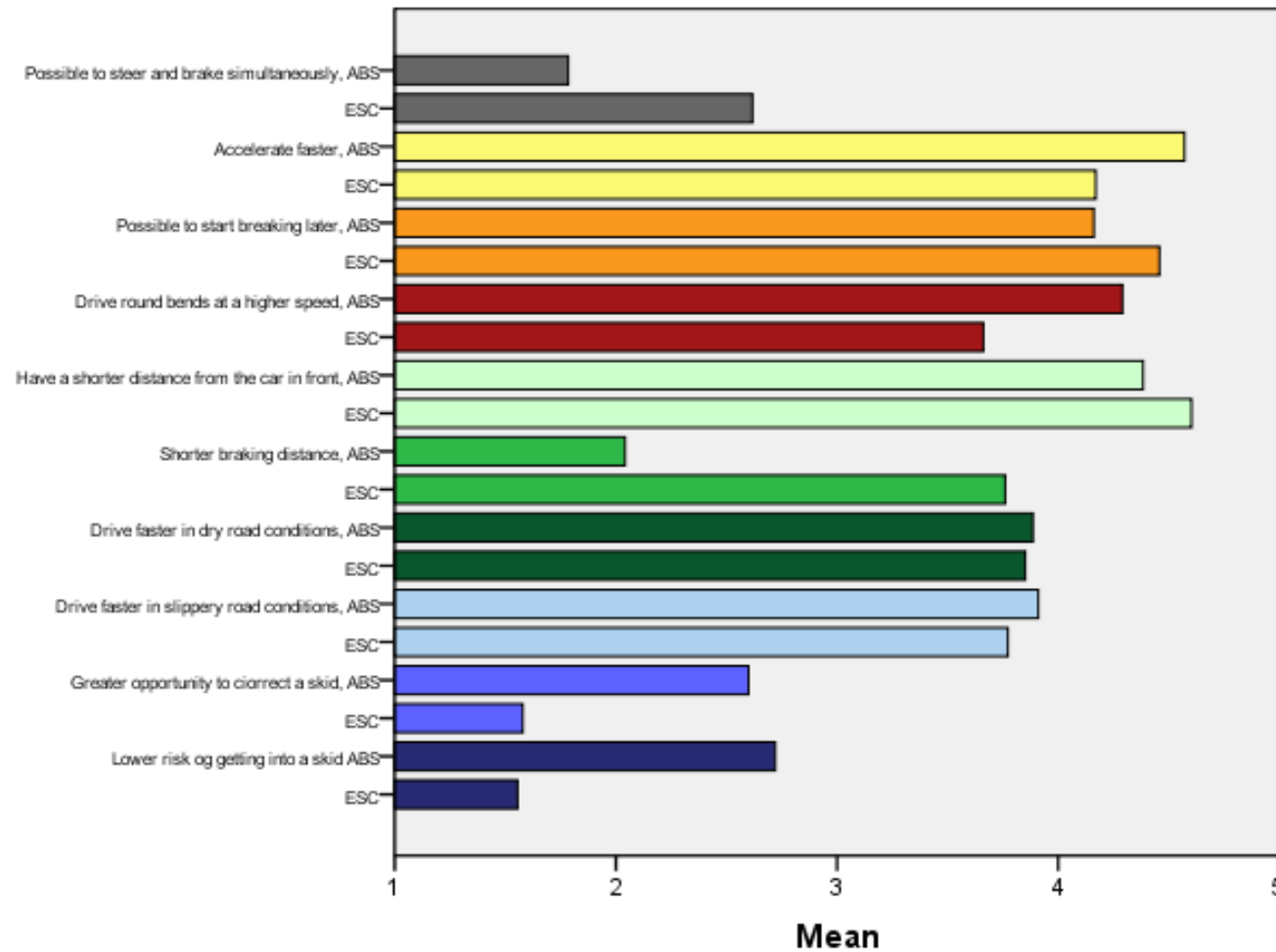
Situation 2:

- The model explains 62% of the drivers' intention, both when they are driving with and without ESC.
- *Attitude* has the greatest influence on intention followed by perceived control and subjective norm .
 - The way the consequence of the behaviour is perceived is of decisive significance.
- *Descriptive norm* is statistically significant.

Experience and notions of ESC and ABS

- 90% of drivers of cars with ESC knew that the car was fitted with the system.
- Among drivers of cars without ESC, **more** than 35% **wrongly** stated that the car was fitted with ESC
- Drivers believes:
 - the greatest benefit of ESC is on a snowy/icy carriageway and in connection with overtaking
 - that ABS confers the greatest benefit on a snowy/icy carriageway and when the driver had braked hard.
- Mainly experience of systems on wet and snowy/icy carriageways

Drivers' notions of differences between systems



1 = fully agree
5 = absolutely disagree

Cases weighted by w

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Conclusions

- Drivers answer that they are more likely to take risks when they imagine that they have ESC/ABS than when they imagine not.
- Analyses of drivers' intention shows that young drivers (18-29) are the more risk prone age group.
- Men are significantly more likely to take risks than women in situation 2.

Conclusions

- Statements of how it is to drive a car with/without ESC/ABS - drivers have relatively realistic expectations of both ABS and ESC.
- We have not observed real behaviour of drivers, only self-reported - indication of an elevated level of risk proneness might also reflect a notion of how the system should be used.
- Further research needed about real behaviour

Thank you!

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