

Managing the Telematics Use during Drive – What does Driver Wants?

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Many devices



No integration



Or Integrated



Distractions caused by performing secondary tasks inside the car

Physical distraction

Psychological distraction

Visual distraction

.....



WHAT ELSE DISTRACTIONS?



A lot of roadside advertisements



Thanks to the **ITS**





How should the integrated system manage workload?

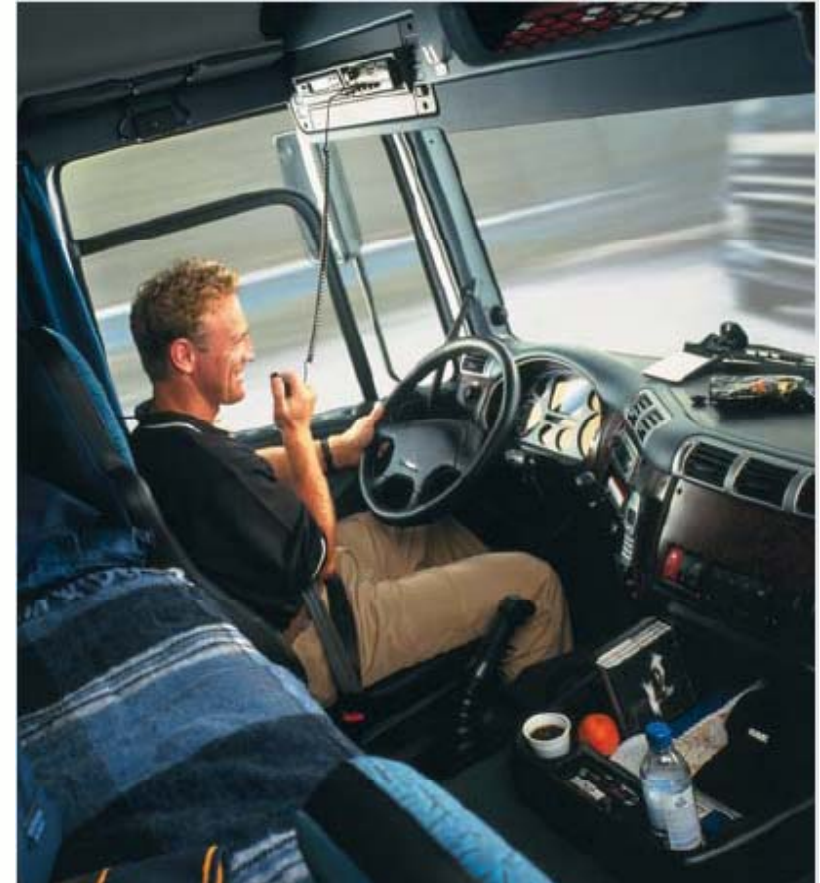
Driving parameter systems

One approach is to limit their use according to the amount of workload that the driving task requires. Functions can be automatically disabled in conditions where the demands on the driver are high and re-enabled when it becomes lower.

The majority of the systems developed so far estimate the demands on the driver by measuring a series of driving parameters – things such as speed, lateral deviation, speed variation, amount of braking etc. The greater these parameters are, the less functionality is available.

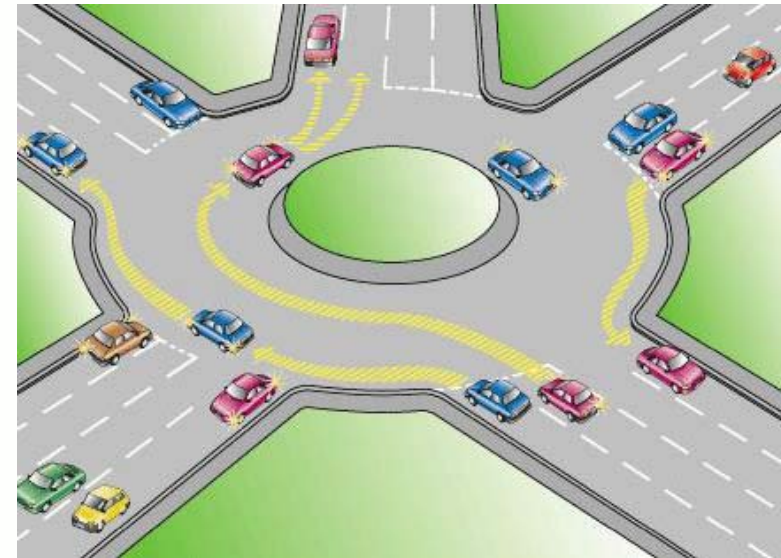
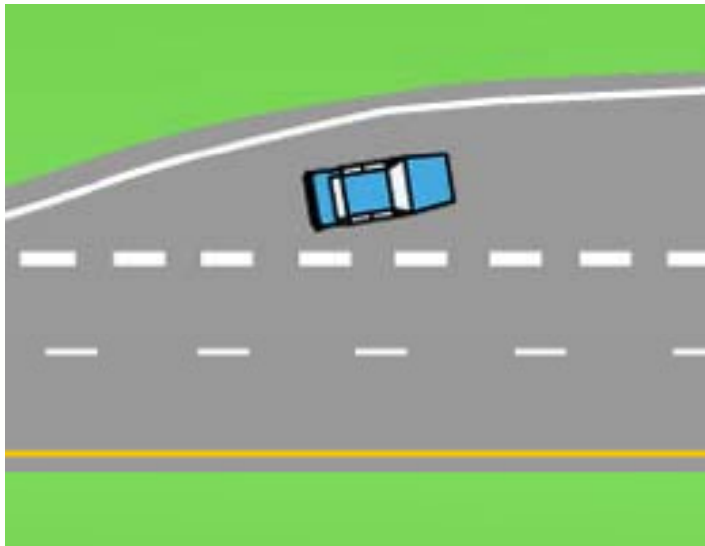
Limitations of parameter systems

- They are open to 'manipulation' as drivers may change their driving style in order to keep as many functions enabled as possible.

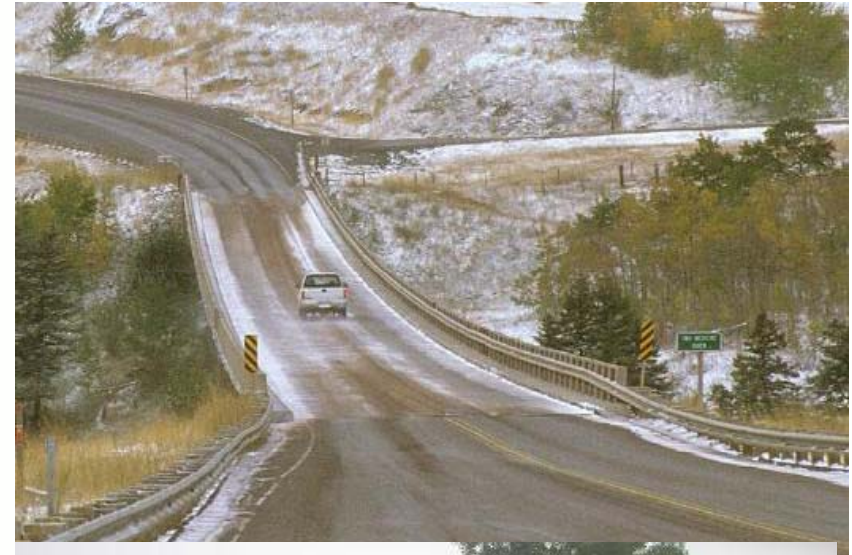


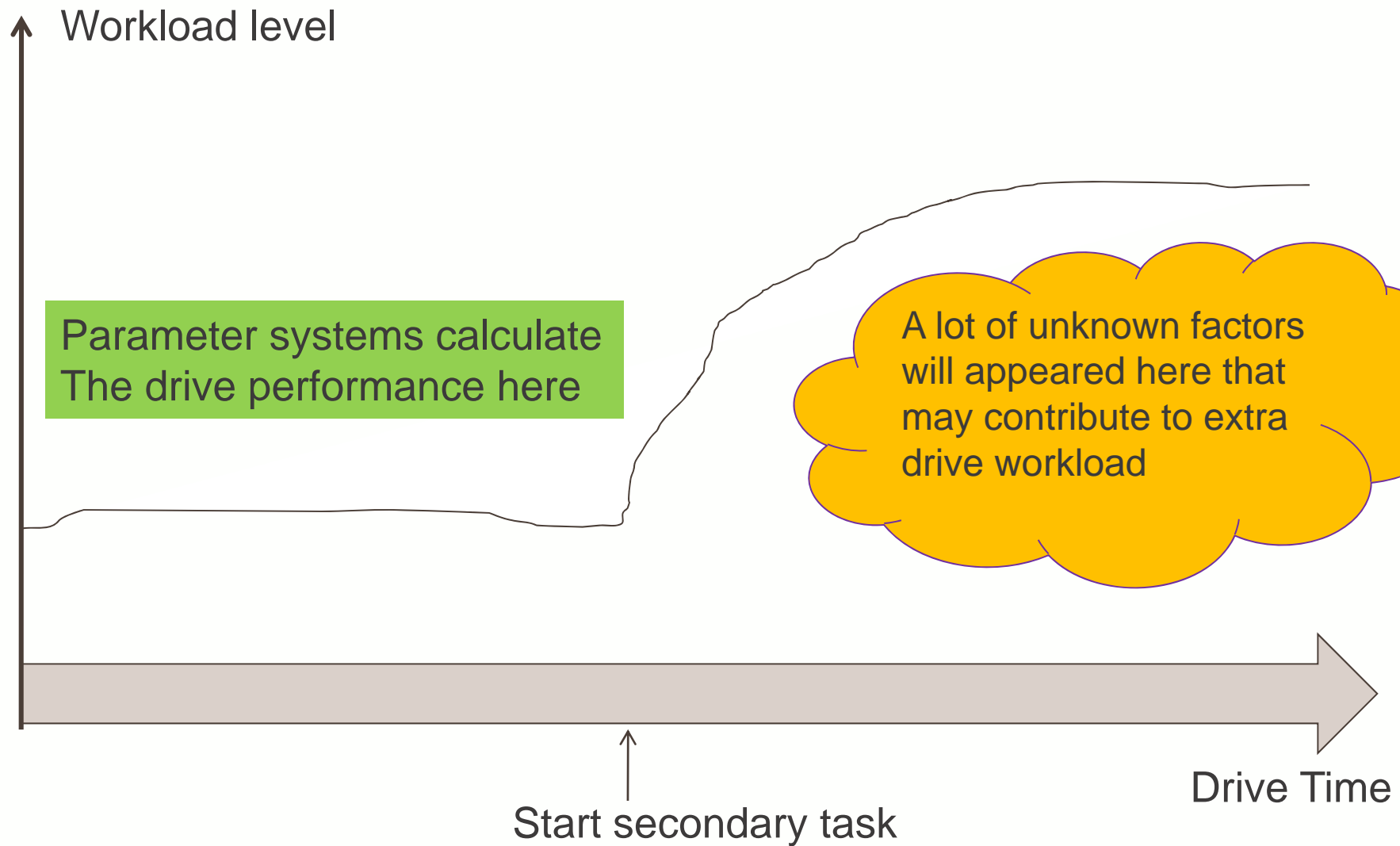
Limitations of parameter systems

- They are 'backward looking' as they enable/disable functions based on what has just been happening rather than what is about to happen.



They only take into account the driving performance of the vehicle in question and not the wider driving situation, such as road conditions, traffic density and weather.





Managing the driver's workload

- Workloads are contributed by:
 - Road the traffic conditions
 - Secondary task performance
 - Roadside presentations
 - Different in-car presentations
- How to control driver's secondary task performance

A lot of studies on

- Workloads are contributed by:
 - Road and traffic conditions
 - Secondary task performance
 - Roadside presentations
 - Different in-car presentations

Secondary task performance levels

Level one: The complexity of the driving situation requires that the driver focus all of their attention on it. Therefore, all secondary tasks should be prohibited.

Level two: The driving situation may be quite demanding, but the driver will still have some spare capacity. Therefore, limited simple secondary tasks could be performed while driving.

Level three: The driving situation is relatively undemanding, so the driver has the capacity to cope with more secondary tasks. The system will allow access to a wider range of functionality.

Technical Report UMTRI-2006-6 May, 2007

Task Acceptability and Workload of Driving City Streets, Rural Roads, and Expressways: Ratings from Video Clips

By
Jason Schweitzer and Paul A. Green

How to control the secondary task performance

There are three levels of control:

- Total control by the system
- System partly control and partly provide advices
- System provide advices

Interview study

How does the driver like the vehicle control of their secondary task performance?

- *Total block*
- *According to drive situation*
- *Provide advice and up to driver to decide*

40 participants from China, 20 from Sweden

Method

The participants were asked about 17 tasks with different telematics devices that they would perform while driving.

The tasks were grouped into easy, medium and difficult tasks.

Participants were asked which control system they would prefer to have if they would have to perform the tasks on different road (high way, country road, and city traffic) and traffic conditions (High or low traffic hours) while driving. (totally 12 conditions)

For each subjects, within 204 (17x12) situations, they voted which control they prefer.

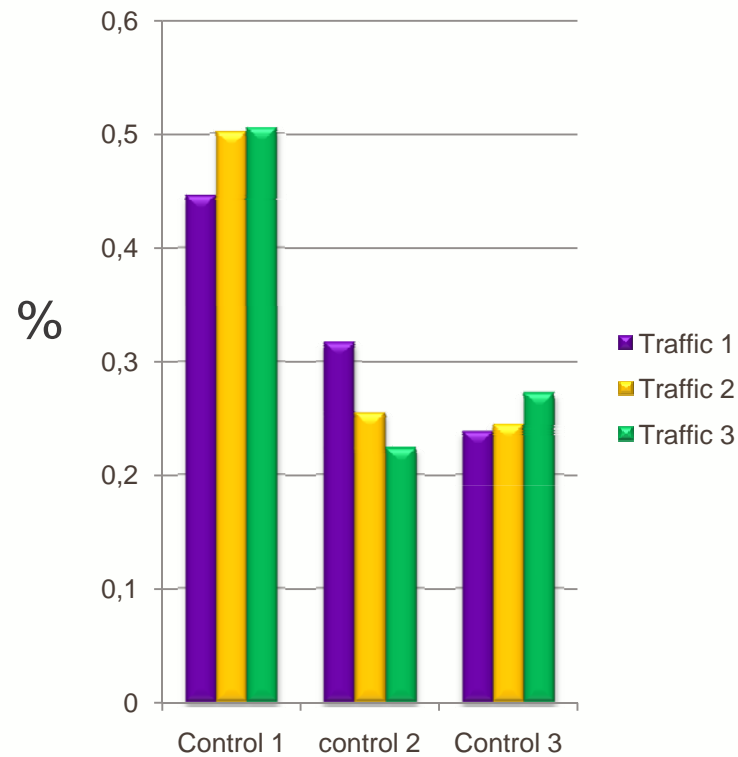
Data Analysis

- Task level 1:
 - Listen to radio only; Looking for traffic information; Weather forecast ; Special scheduler; look at other information; Listen to music but do not do anything
- Task level 2:
 - Remind the importment date and time; Voice recording; Change TV channel; Change channels of radio; Modulate the radio
- Task level 3:
 - Dial number (searching numbers the installed in phone book); Receive a call; SMS – send and receive; Check personal routine schedule; Looking for special music in a long list; Watch in-car TV

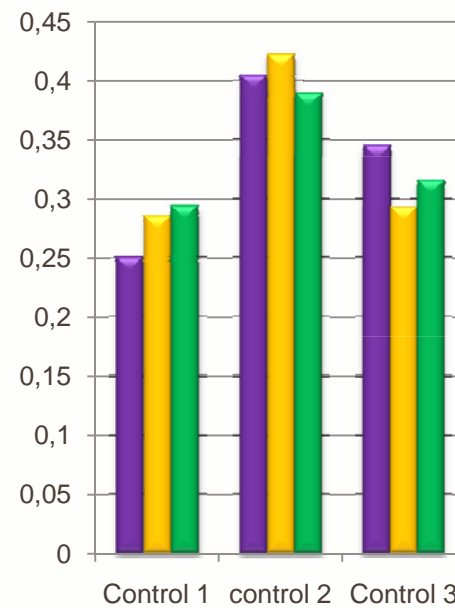
Data analysis

- Traffic levels 1:
 - Hight way with normal traffic;
 - Country road with easy traffic in big road;
- Traffic level 2:
 - Country road with busy traffic in big roads (no pedestrians);
 - City traffic without busy traffic in big roads
 - Hight way with busy traffic, or road construction work area
- Traffic level 3:
 - City traffic with busy traffic in big roads (no pedestrians)
 - City traffic with busy traffic on smaller roads (many other road users)
 - City traffic without busy traffic on smaller roads (there are some other road users)
 - Country road with busy traffic on smaller roads (many other road users)
 - Country road without busy traffic smaller roads (there are some other road users)
 - Pass through small villages

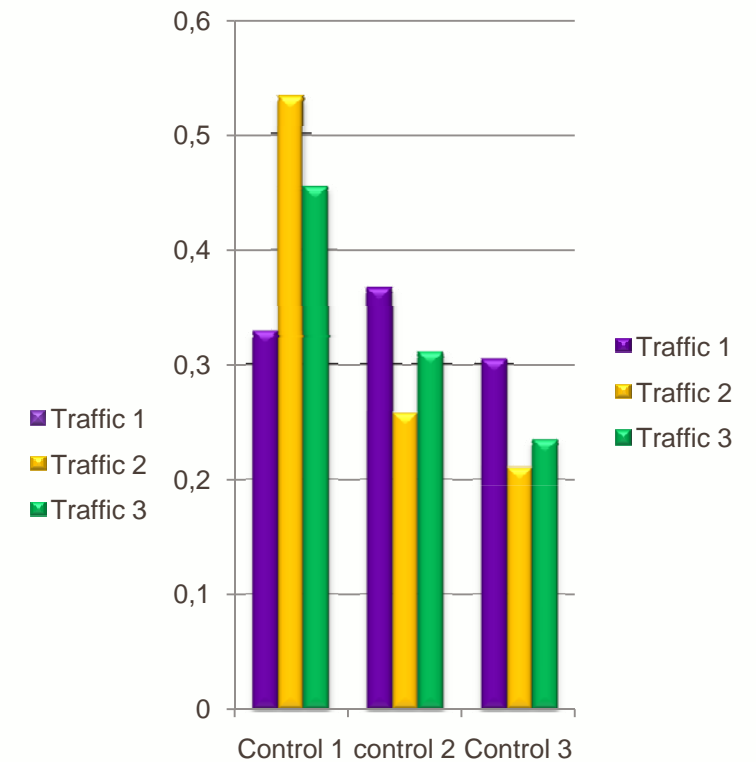
Swedish data



Task 1

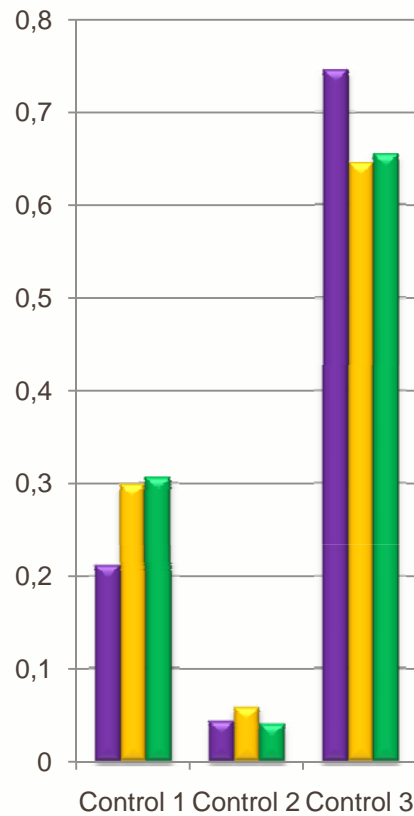


Task 2

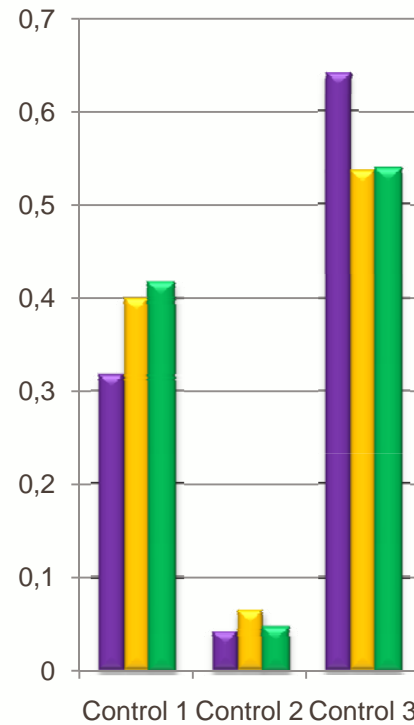


Task 3

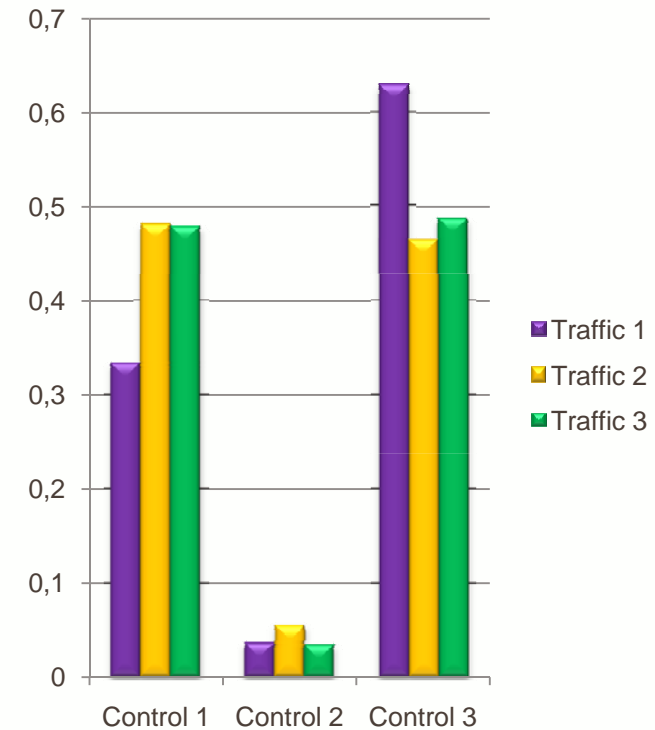
Chinese data



Task 1

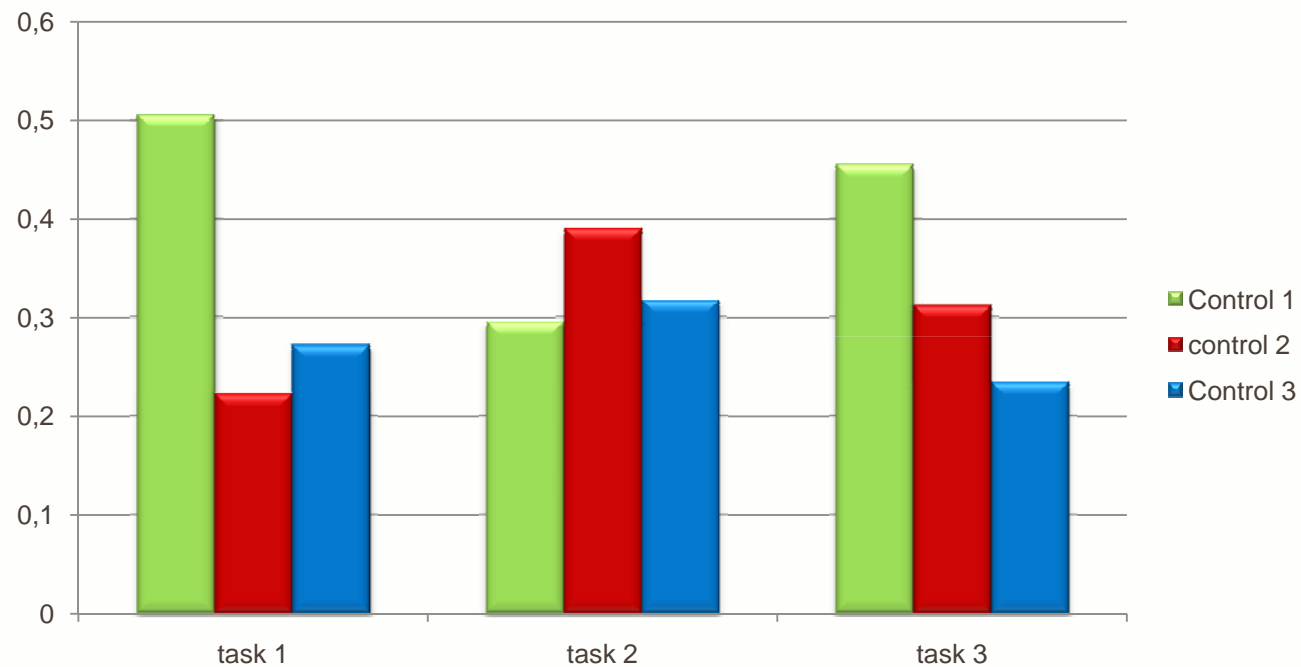


Task 2

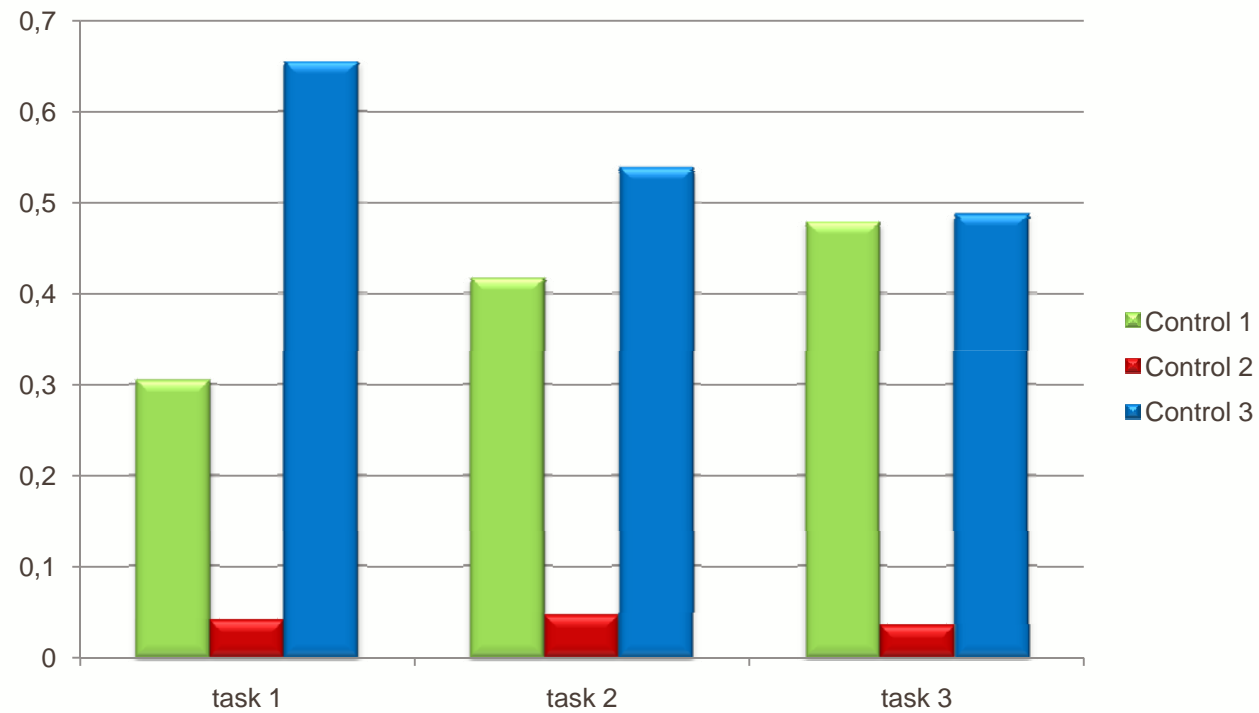


Task 3

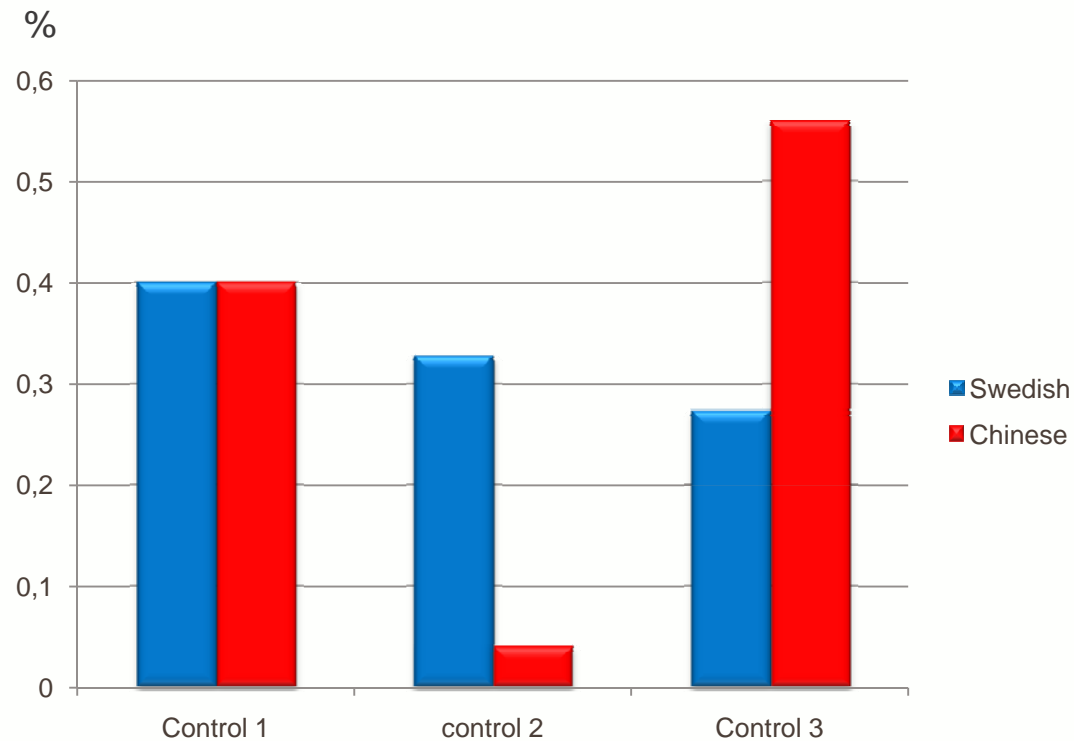
Swedish data under traffic level 3 condition



Chinese data under traffic level 3 condition



Results



Control 1: Total block
Control 2: According to drive situation
Control 3: Provide advice and up to driver to decide

Total comparison (3923 Swedish answers and 7959 Chinese answers)

Summary

Detail statistic data analysis needs to be carried out