



FINDING A BETTER WAY

# Bicycles and mobile IT

Impacts on attention and behaviour

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# General research question

- How does mobile IT affect cyclists' strategies and behaviour?
- With mobile IT we mean anything you can do with a modern phone.
- This presentation focuses on visual adaptation strategies and speed adjustments, with special attention to self-paced and system-paced tasks
- Heads-up: Cyclists' use of Mobile IT in Sweden, Annika Nilsson, last talk in this session. Will provide numbers and facts about phone usage and strategies while cycling based on interviews and observations.

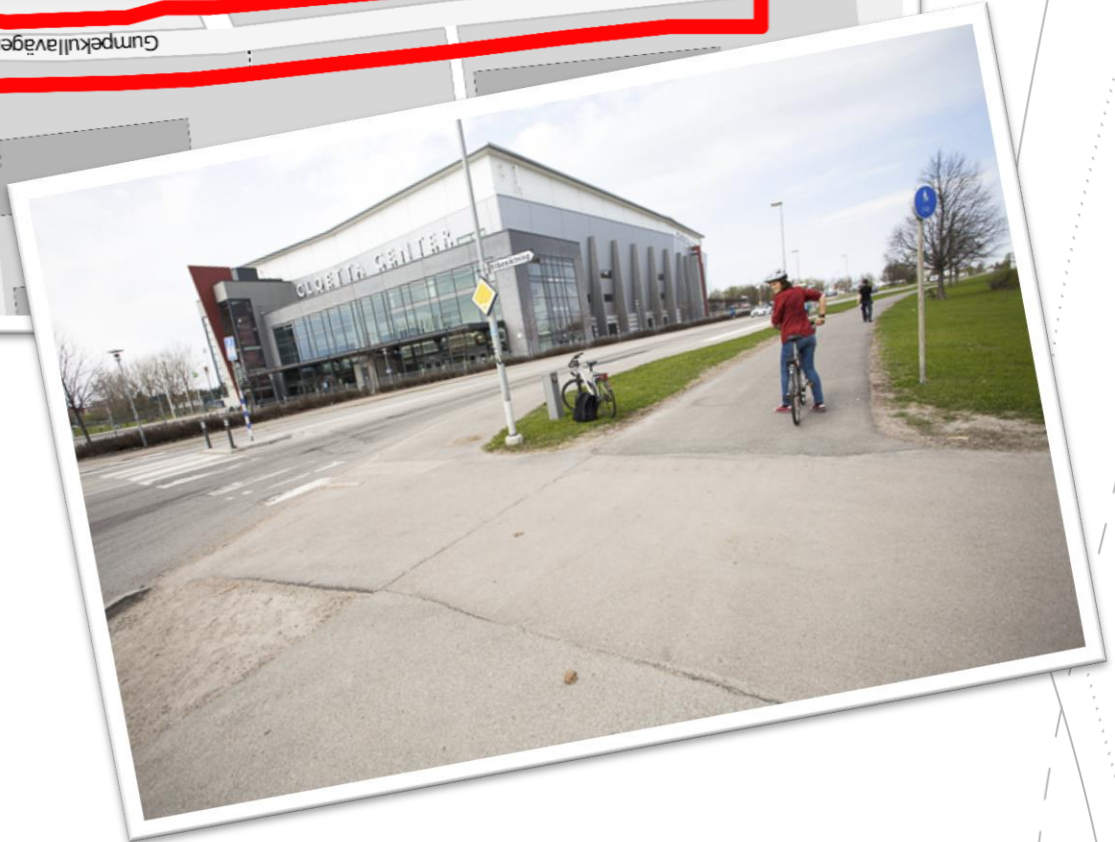
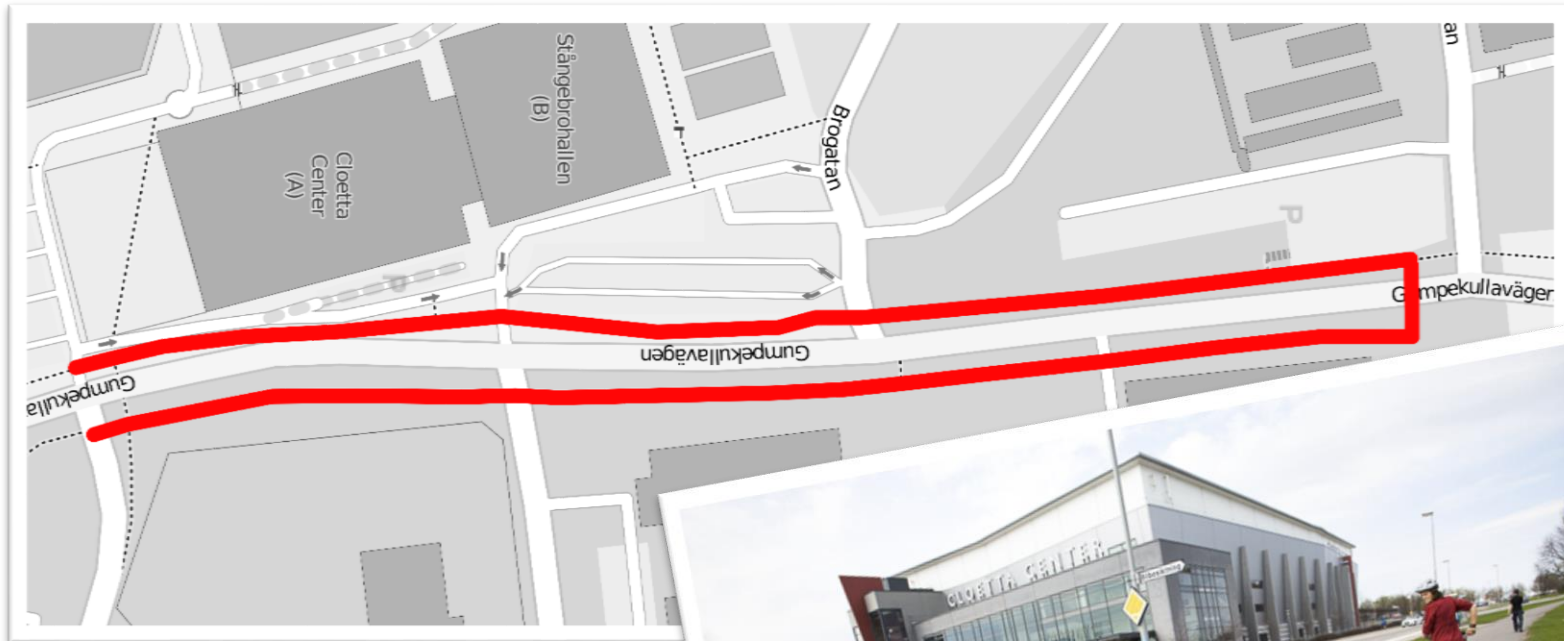


# Procedures

- Participant arrived, bicycle was equipped, participant was equipped (22 participants in total, age 16-25)
- Participant cycled through five conditions (1 km each)
- The participant's own bike and own telephone were used
- Measures: Eye tracking, GPS, cameras



# Test route

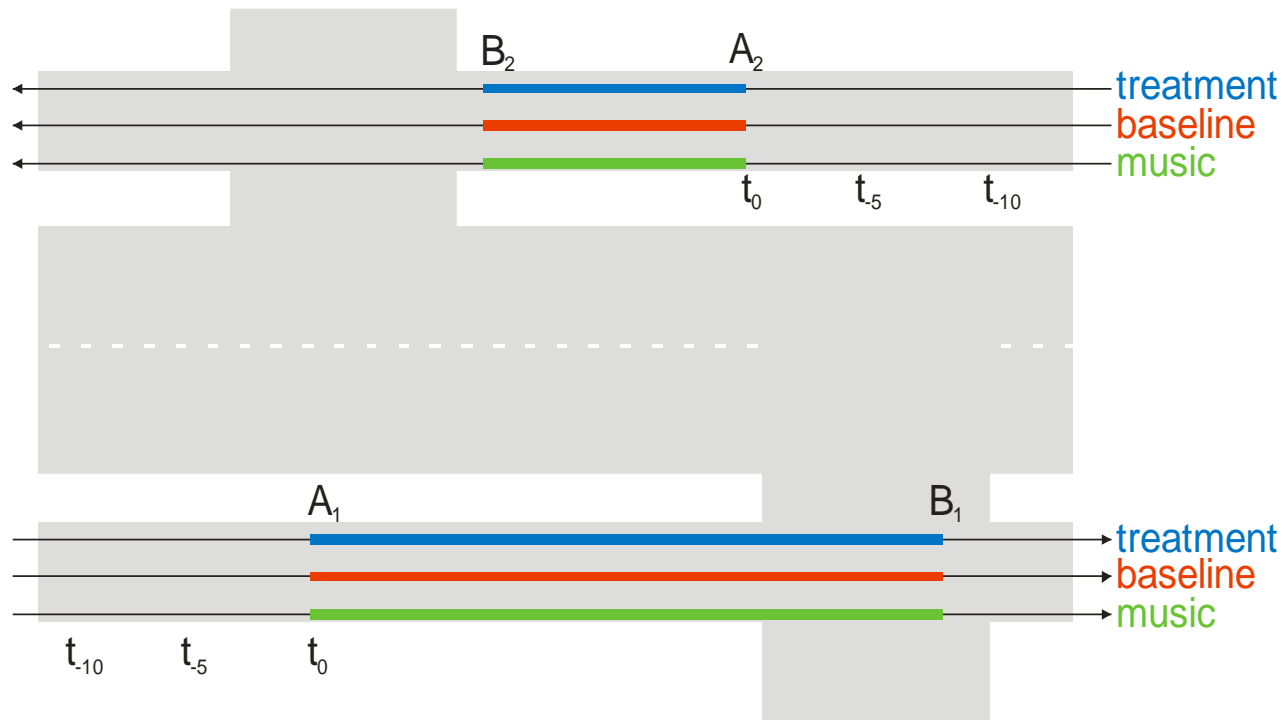


# Conditions

condition		description	phone task and pace
baseline		The route was cycled without any interaction with the mobile phone.	
music		The cyclist listened to music.	
Treatment	conversation	(1) The cyclist was called up just before an intersection. Upon answering he or she was asked to call back after having passed the turning point.	call system-paced
		(1) The cyclist called back.	call self-paced
		(1) The cyclist was called again just before an intersection.	call system-paced
	text	(1) The cyclist received an sms with a simple question just before an intersection.	sms system-paced
		(1) The cyclist answered the question by replying to the sms. A one-word answer was enough, but this was not explicitly stated in the instructions.	sms self-paced
		(1) The cyclist received another sms just before an intersection.	sms system-paced
	internet	(1) The cyclist was asked to check the first headline in one of the main Swedish newspapers ( <a href="http://www.dn.se">www.dn.se</a> ) after having passed the first intersection, and to	www self-paced
		(1) call the experimenter and name the headline.	call self-paced
		(1) During the same phone call the cyclist was asked to check the current temperature in Oslo on a known weather site ( <a href="http://www.yr.no">www.yr.no</a> ).	www self-paced
		(1) The answer should then be texted to the experimenter.	sms self-paced

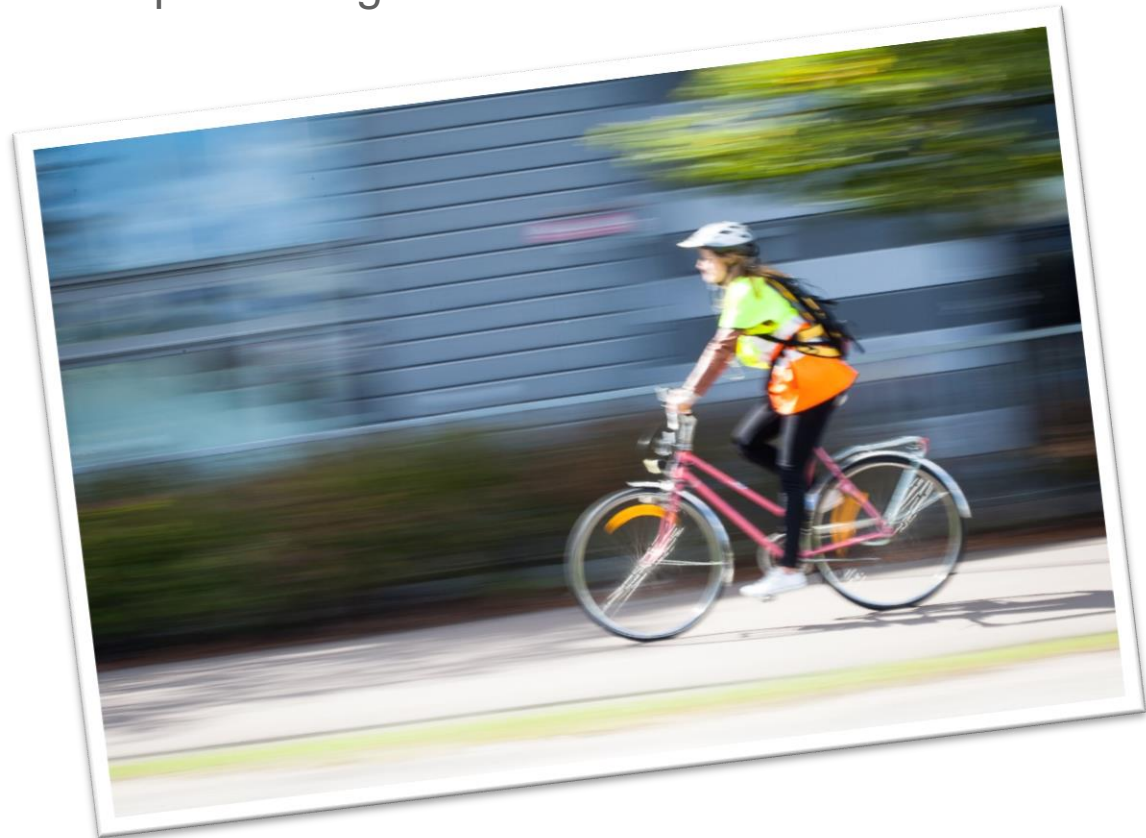
# Analyses and comparisons

- As the cyclists could choose how, when and where they performed the phone tasks, individual matched baseline segments were extracted as comparison.
- All presented comparisons between conditions are based on these matched segments in order to avoid possible confounding with location.



# Analysis of speed

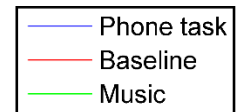
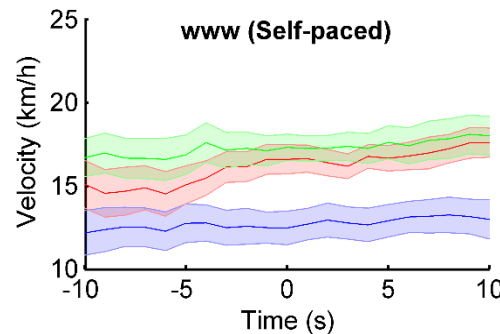
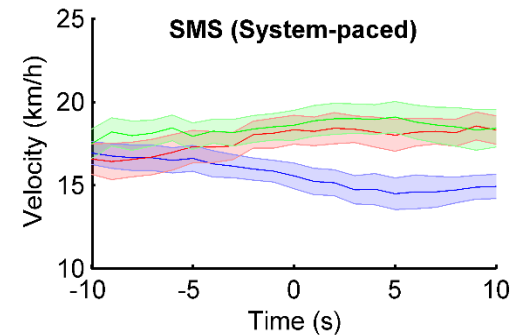
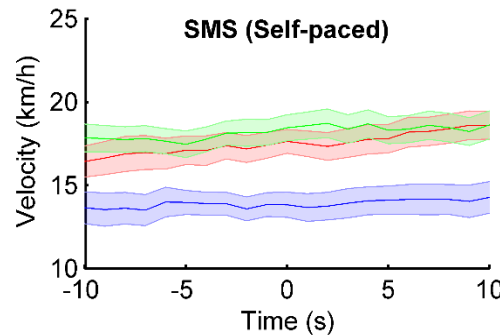
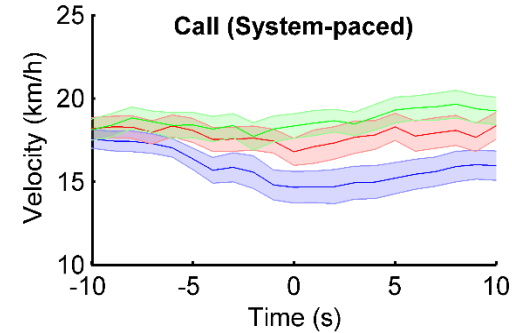
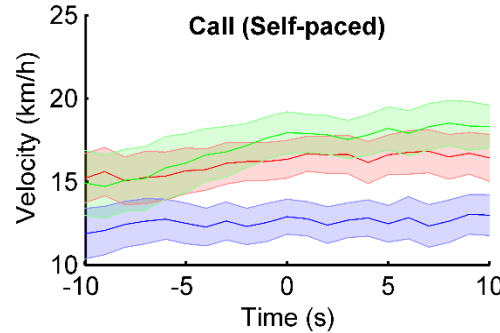
- In how many cases did the cyclist stop while performing the task?
- Is the mean speed while performing tasks different?
- Is the speed profile while performing tasks different?





# Speed

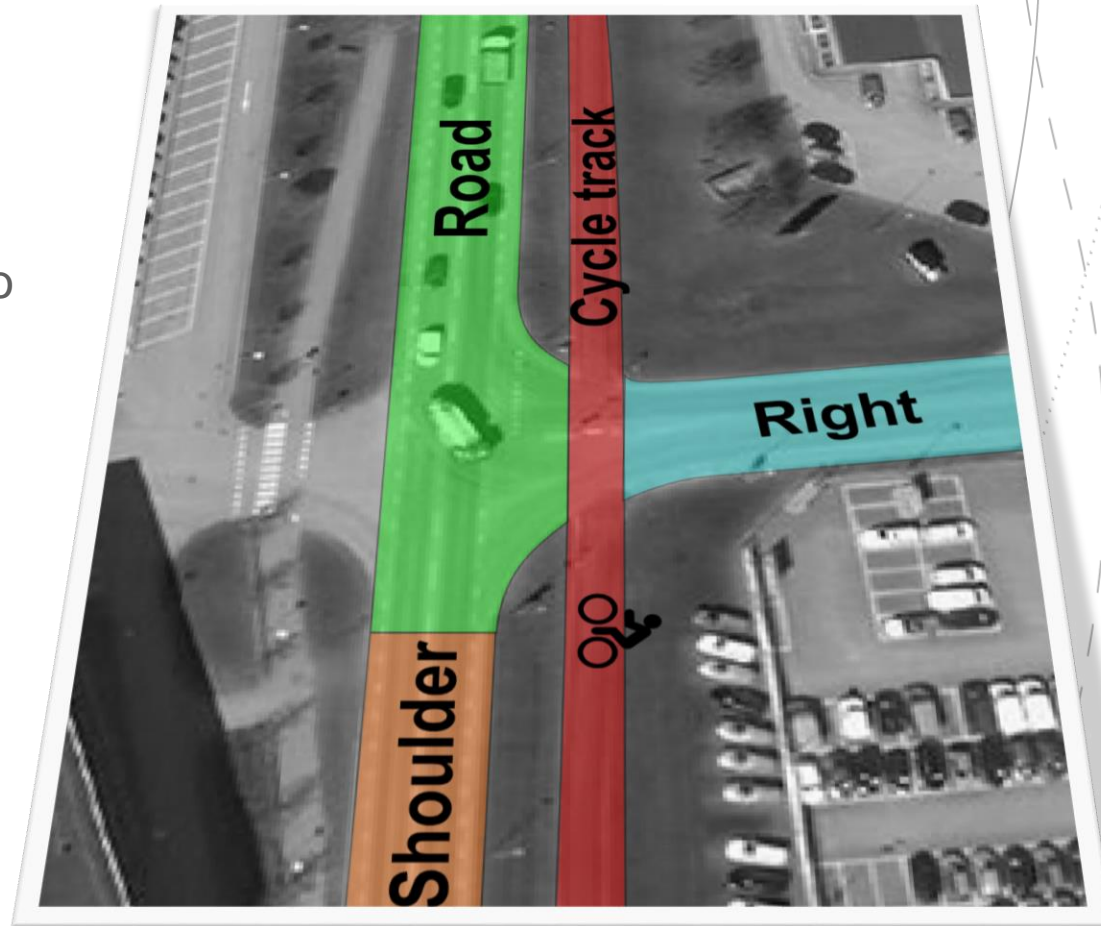
- Number of cases where the cyclist kept on cycling:
  - System-paced: 80 %
  - Self-paced: 70 %
- Mean speeds:
  - Baseline ( $17.6 \pm 3.5$  km/h)
  - Music ( $18.2 \pm 3.7$  km/h)
  - Phone ( $13.0 \pm 5.0$  km/h)
- The mean speed is not different between system-paced and self-paced tasks, but...
- ...taking the time course into account, there is a difference between system-paced and self-paced tasks.
- There is no difference between phone conditions (call/sms/www).





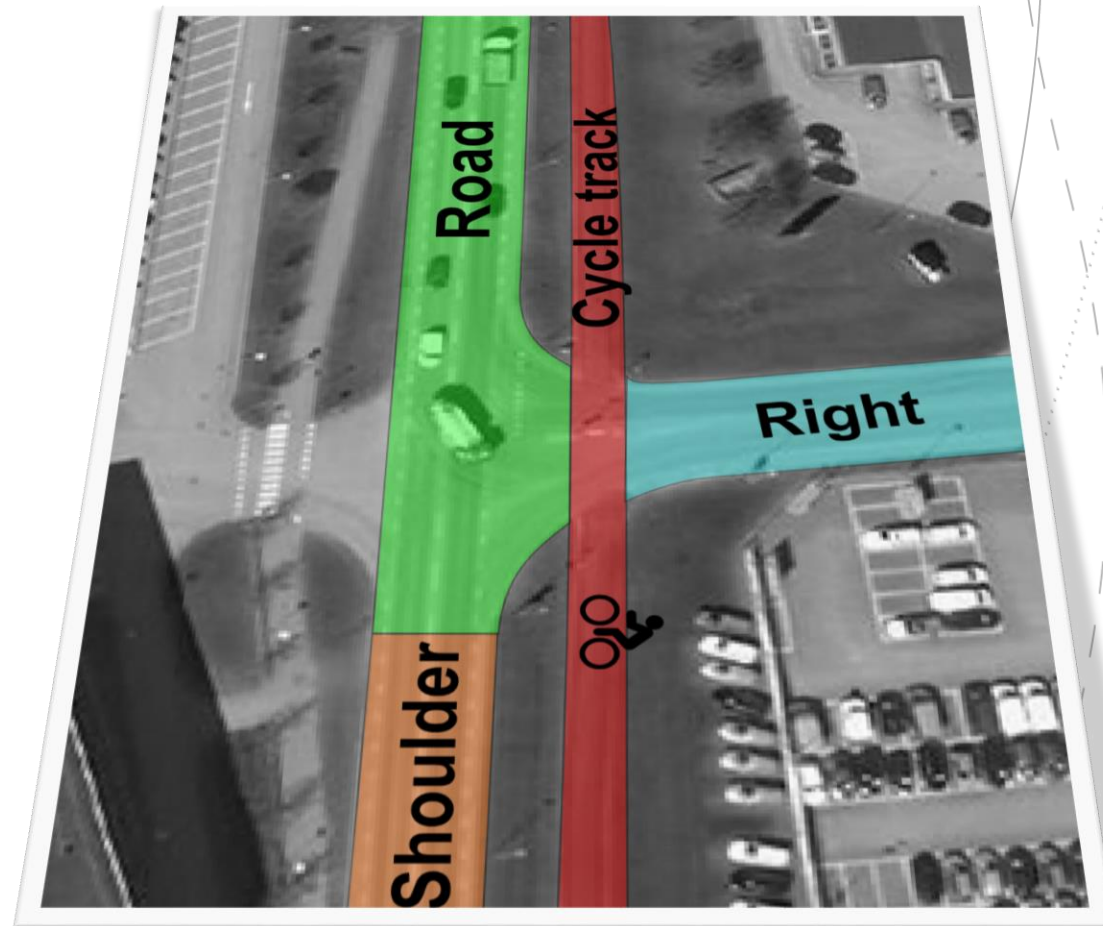
# Analysis of visual behaviour

- Where are cyclists looking?
- Which glance targets are forgotten (or left out) when the cyclist looks at the phone?
- What characterises a glance to the phone?



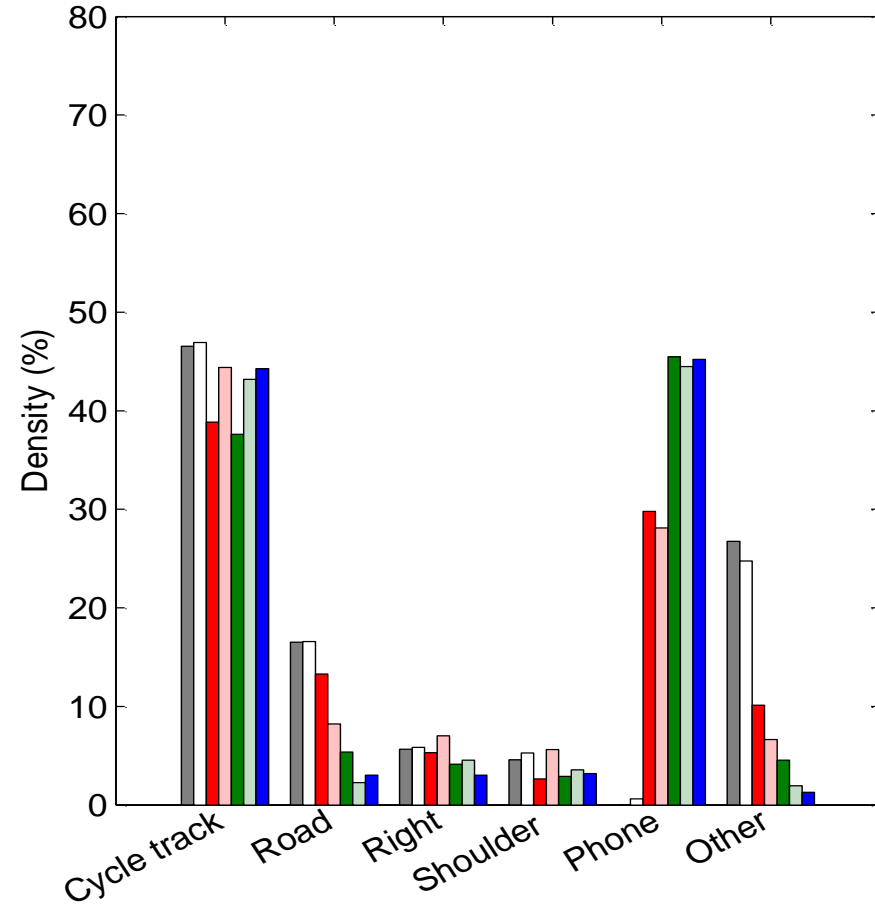
# Glance coding

Target	Description
Cycle track	Glances to the forward view of the cycle track
Road	Glances to the road ahead to the left of the cycle track
Right	Glances to the right into an intersecting road
Shoulder	Glances over the shoulder to the road behind the cyclist
Phone	Glances towards the smartphone
Other	Glances to other targets such as trees, birds, advertising signs etc.

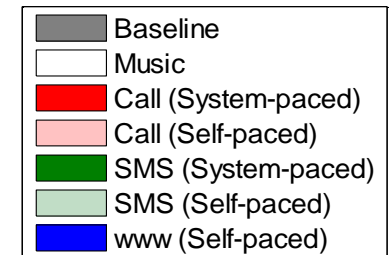
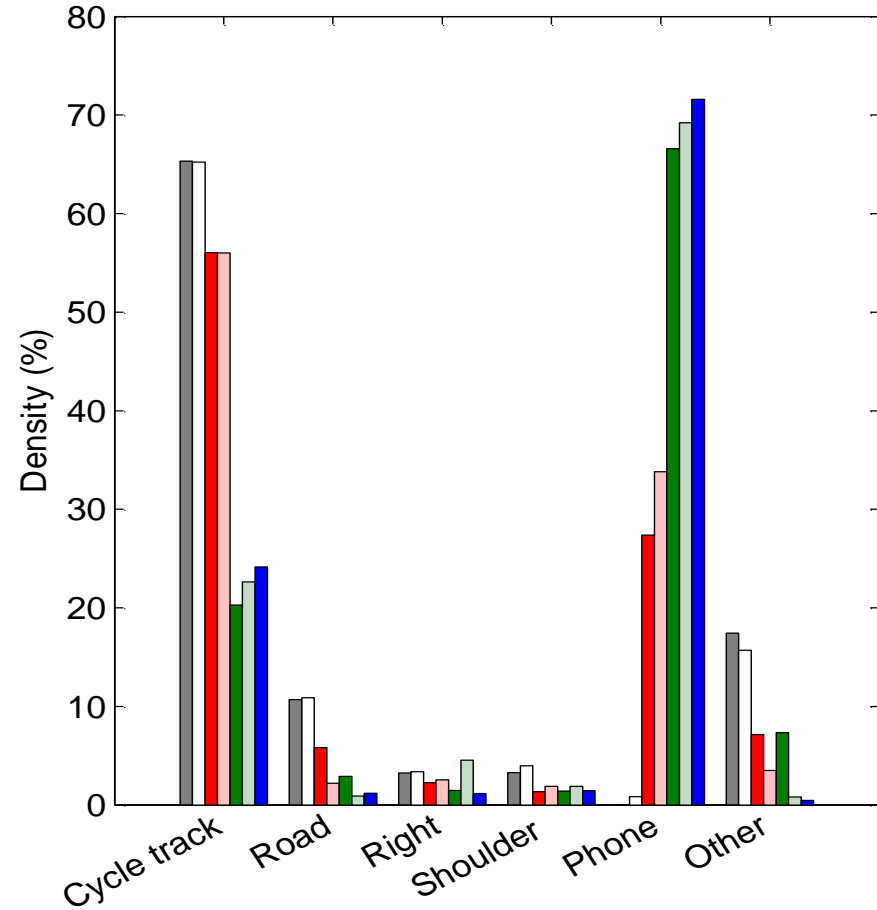


# Where are cyclists looking?

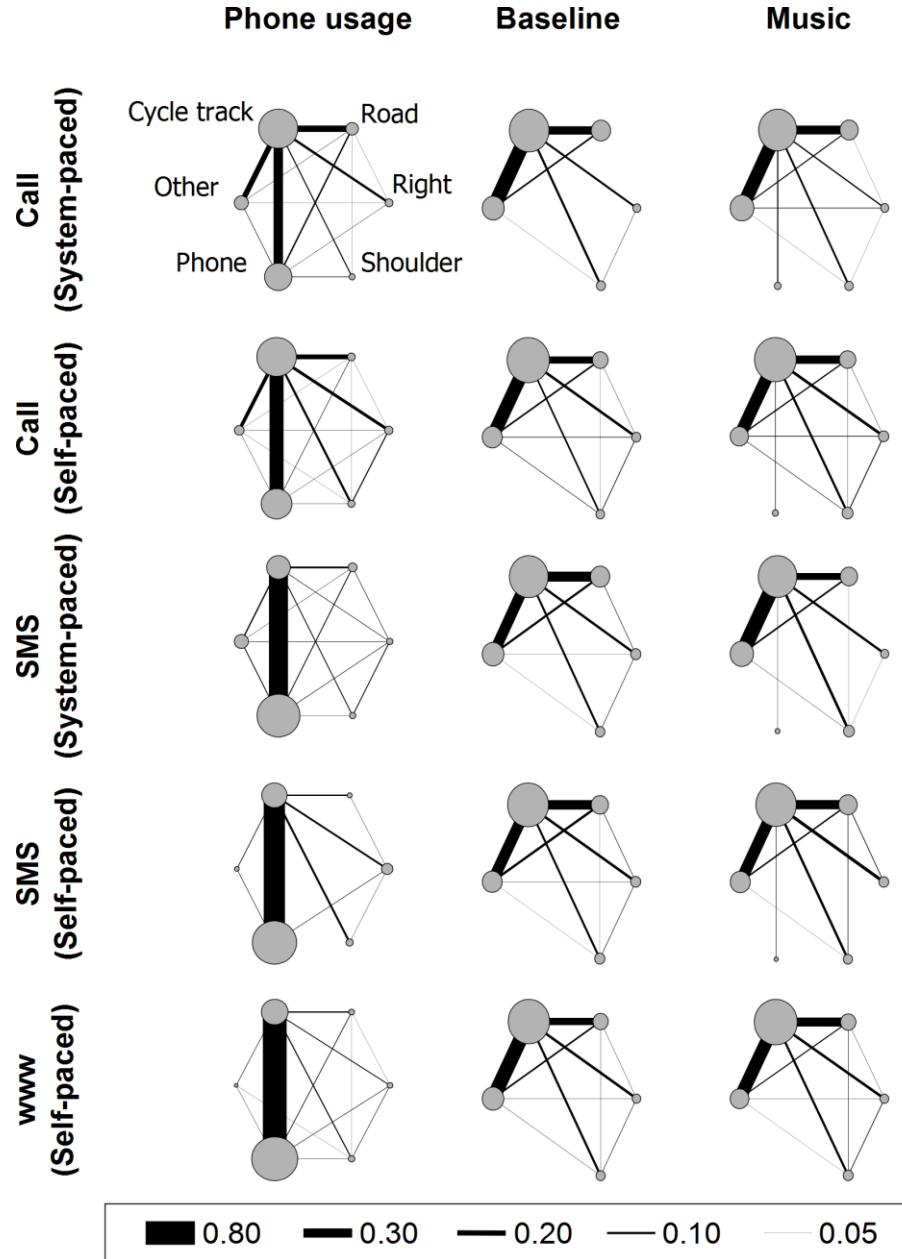
Number of glances



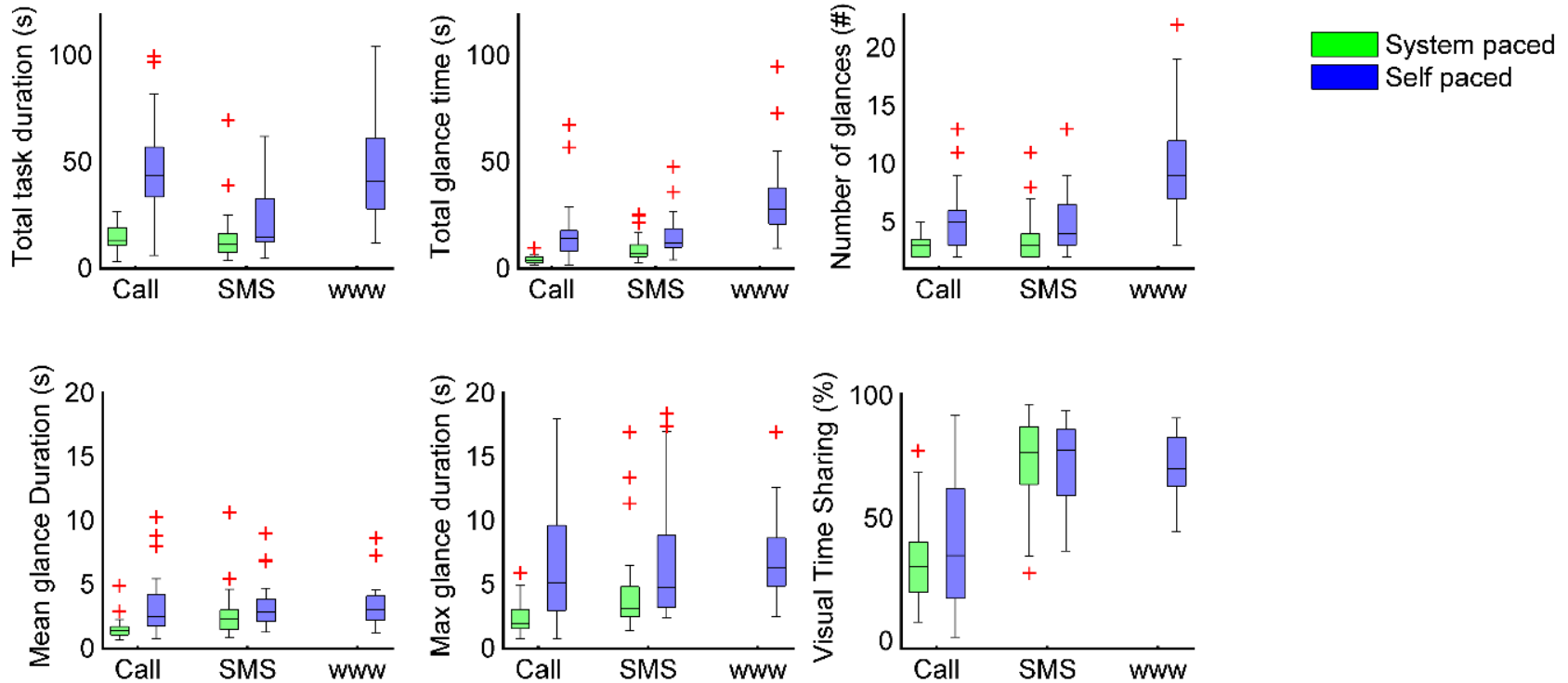
Total glance duration



# Which glance targets are left out?



# What characterises a glance to the phone?



# Conclusions

- Cyclists either stop or use adaption strategies when looking at the phone.
- Cyclists strategically choose locations where to interact with the phone.
- There is a clear distinction between behaviour in self-paced and in system-paced tasks. This should be investigated also for car drivers.
- Further research is necessary to investigate whether the observed compensatory behaviour is enough.



# Thank you!

**If you are interested in the topic we'll be happy to provide more information. Just drop us an email!**

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