



Cyclists and traffic sounds

The results of an internet survey

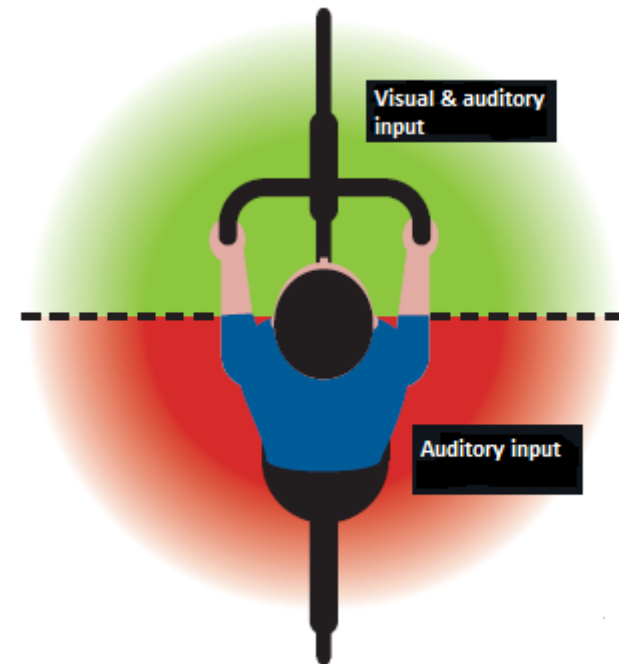
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Cyclists and auditory information

- What is the role of auditory information in cycling?
 - used for detection and localisation of other road users
 - for areas outside one's visual field of view



Implications

- Portable electronic devices:
 - 39% of cyclists listen to music and 55% engage in a phone call (at least occasionally) ¹
- Quiet (electric) cars
 - target: 1 million in 2025 in the Netherlands ²



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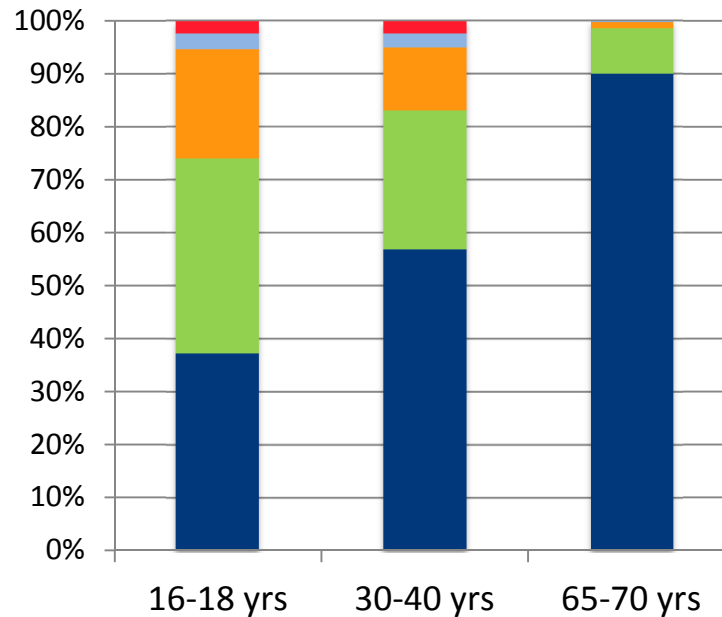
¹ Goldenbeld et al. (2012) ² IEA (2012)

Aims & methods

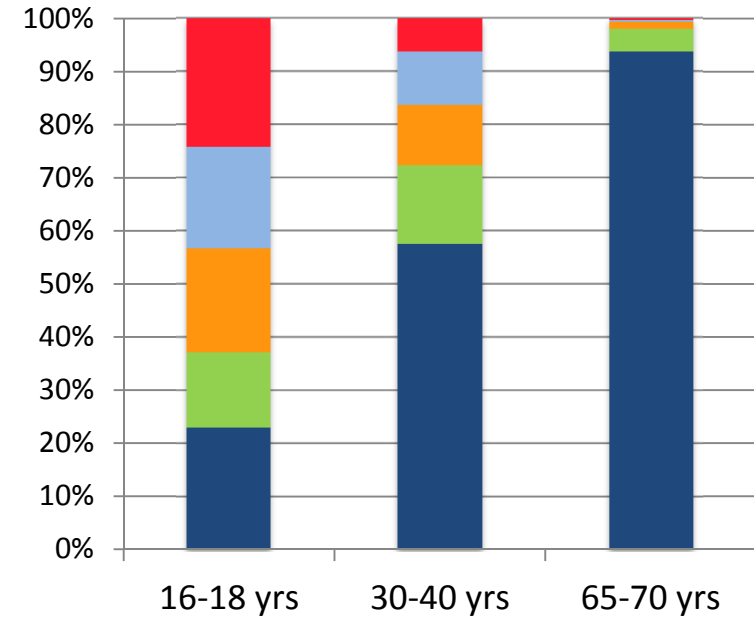
- Impact of listening to music and talking on the phone while cycling:
 - when controlled for other risk cycling behaviour, exposure, cycling in demanding situations, cyclist characteristics (sensation seeking, risk perception)
- Cyclists' experiences with quiet (electric) cars
- Internet survey (N=2250)
- 3 age groups: 16-18; 30-40; 65-70 yrs
 - use of devices
 - vulnerability
 - hearing problems

Results: frequency music & phone

Frequency making a phone call



Frequency listening to music



- on all trips
- on some trips
- never
- on most trips
- seldom

Results: impact music & phone

- About 90% of respondents think cyclists should hear all or most sounds
- While listening to music: 66-81%
- When talking on the phone: 66-75%

Results: impact music & phone

- Incidents
42-48% report one or more incidents (startled/ got surprised by other road users) in the past month
- Crashes
6% report one or more crashes

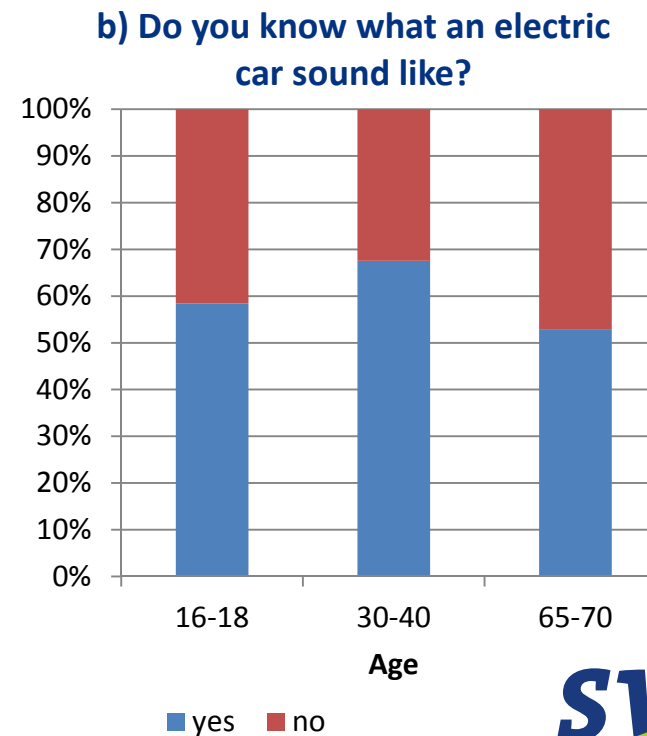
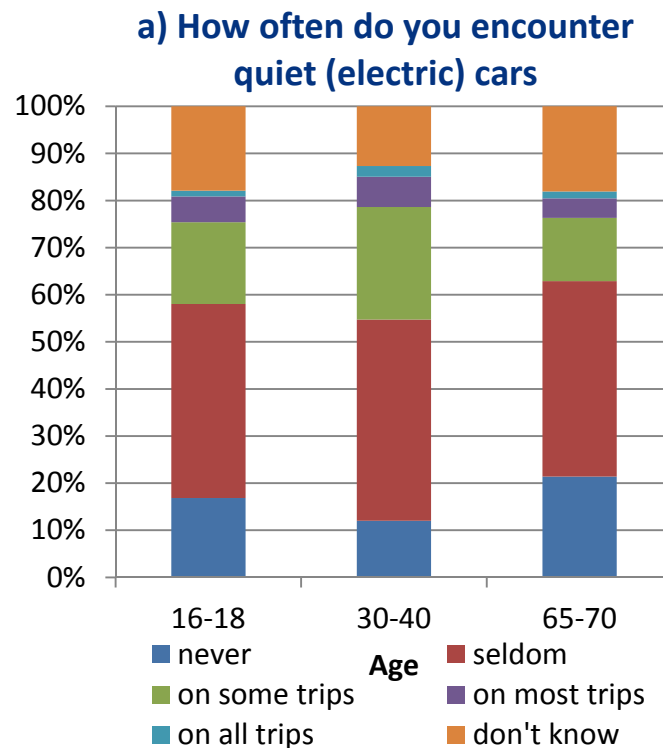
SEM: only data of teenage cyclists showed sufficient fit

Results: impact music & phone

- After having controlled for other potentially relevant factors listening to music and talking on the phone while cycling was **not related to incidents** reported by teenage cyclists

Results: quiet electric cars

- 19-33% encounter quiet (electric) cars at least on some trips
- 53-68% know how an electric car sounds like



Conclusions

- Listening to music is popular among teenage cyclists
- When listening to music or talking on the phone cyclists can hear less sound than what they consider safe
- Listening to music and talking on the phone while cycling is not related to incidents reported by teenage cyclists
 - compensatory behaviour of cyclists (reported by about 67%)?
 - compensatory behaviour of other road users?

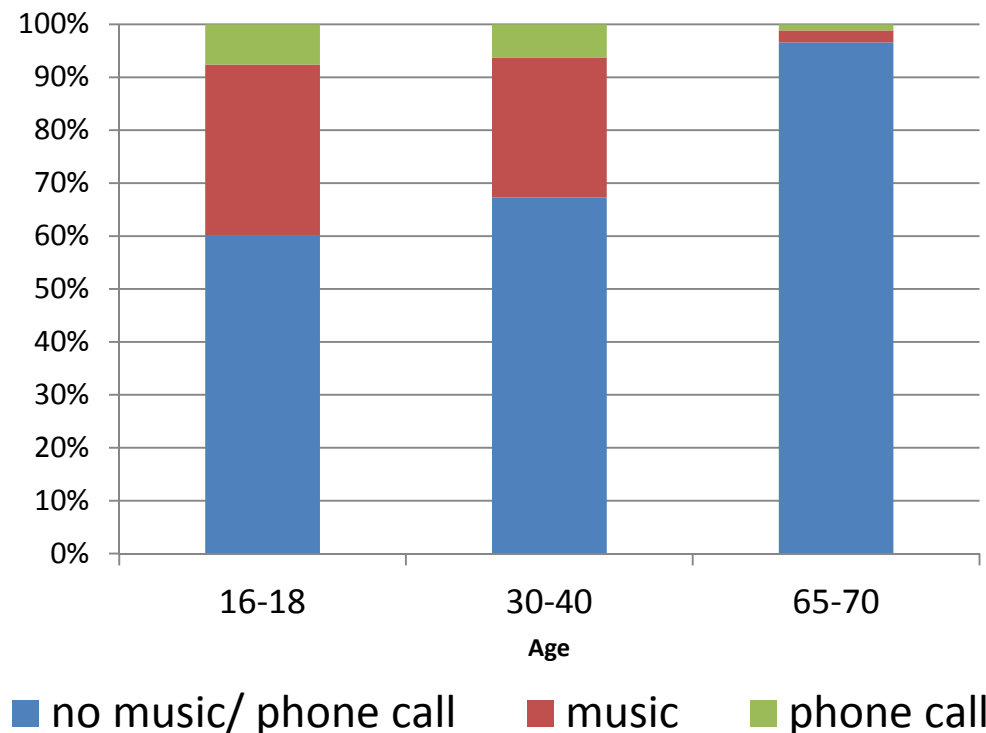
Conclusions

- Majority never or seldom encounter quiet (electric) cars when cycling. Many counties aim to increase the number of EV profoundly in the near future.
- Will cyclists sufficiently compensate for the limited auditory input of electric cars?



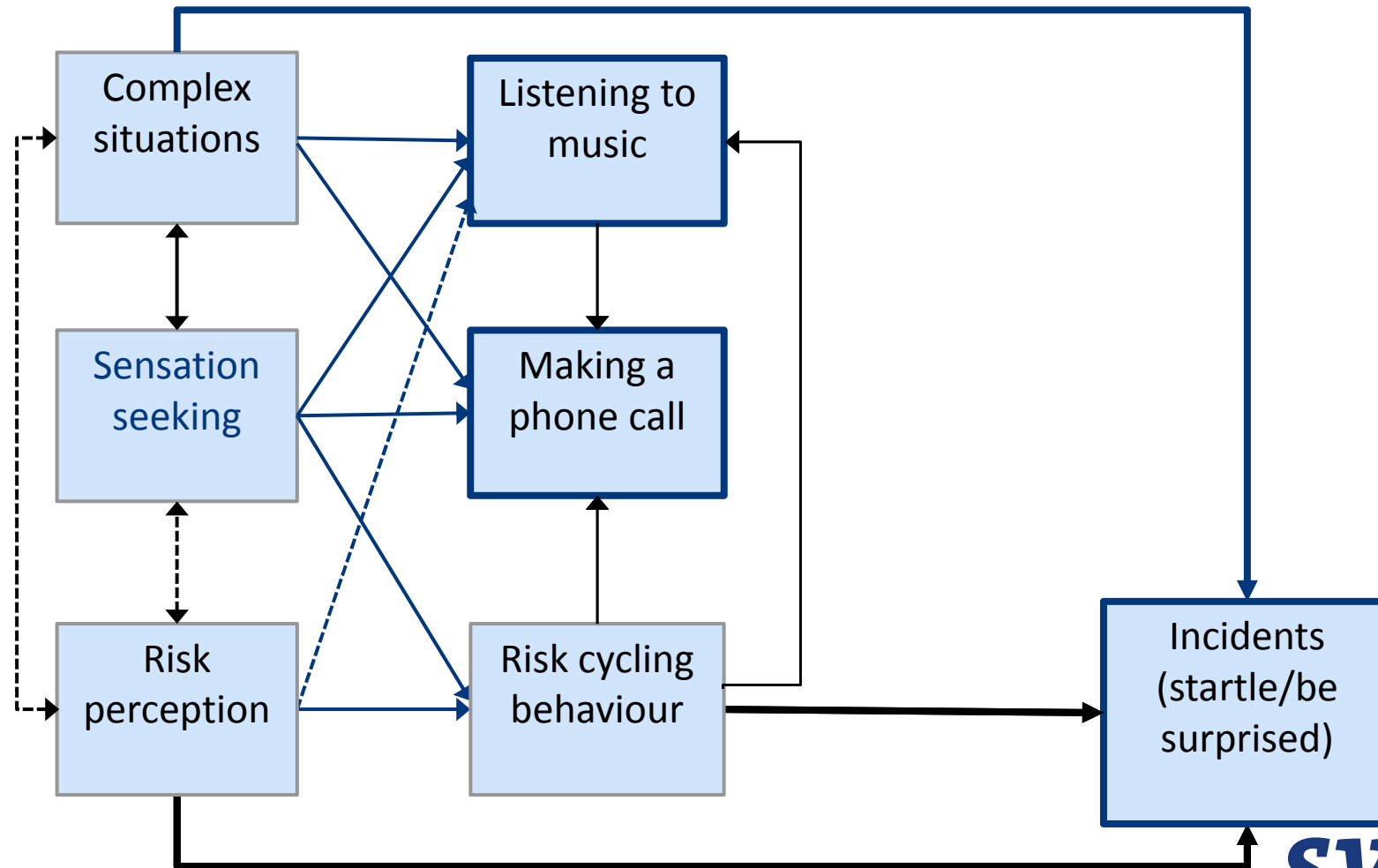
Results: reason of the incidents

Were you listening to music or having a phone conversation?

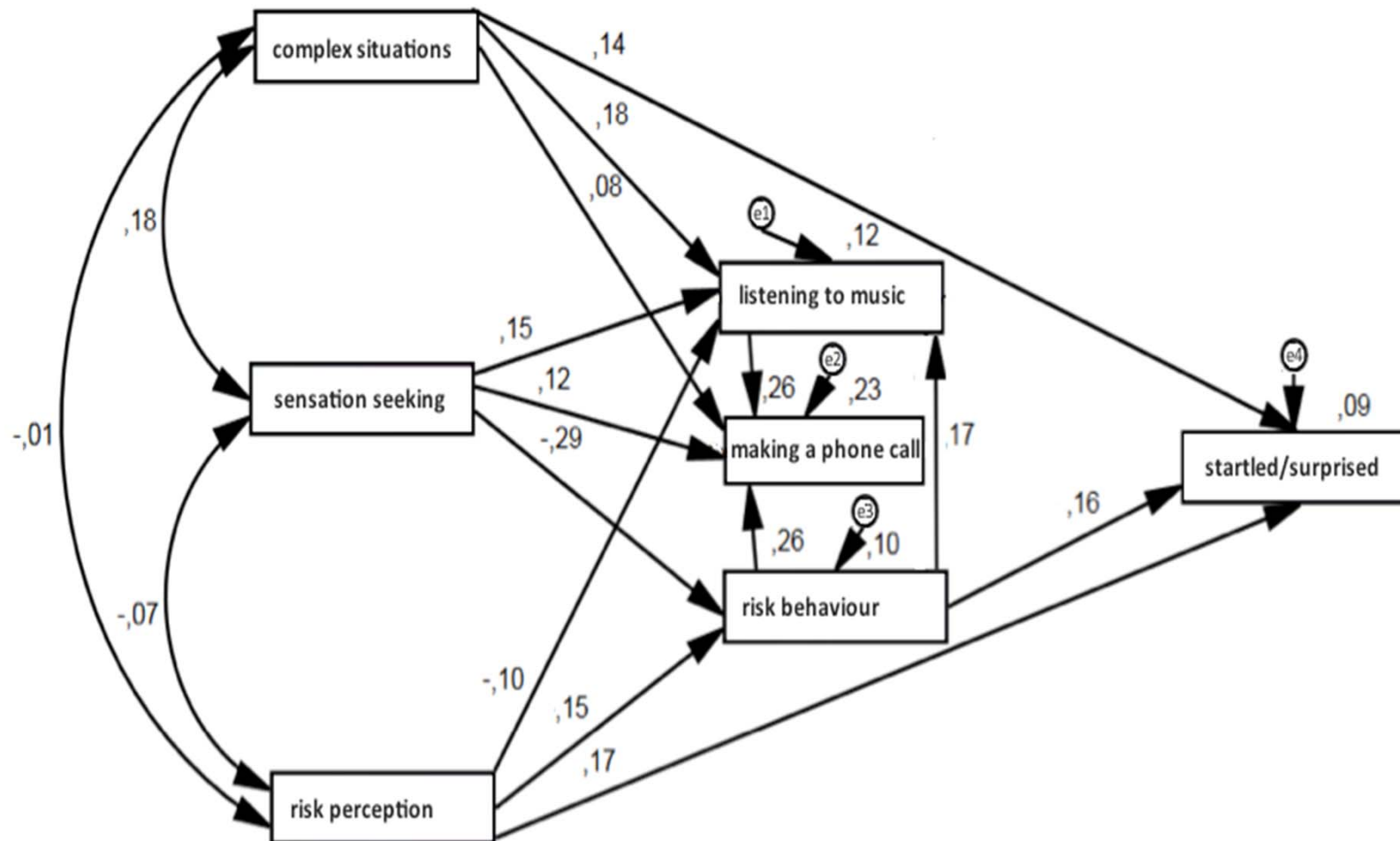


- listening to music more often reported than talking on the phone

Results: Impact music & phone (teenage cyclists)



Results: impact music & phone

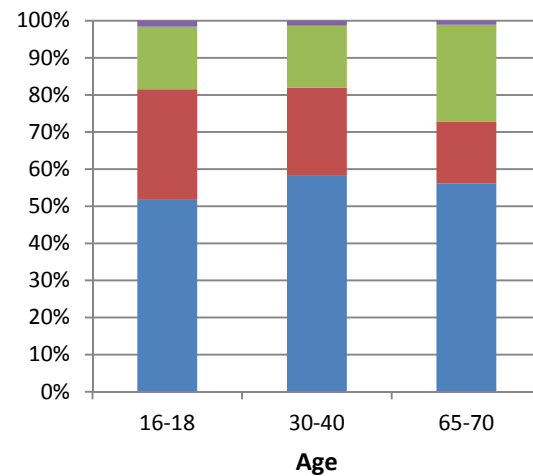


Cycling safety

- Road safety of cyclists shows a less favourable development than that of car occupants:
 - number of fatalities among cyclists has not decreased since 2004 in the Netherlands³
 - number of seriously injured cyclists is showing an increasing trend over the period 2000–2009 (in the Netherlands, the UK and Germany)⁴

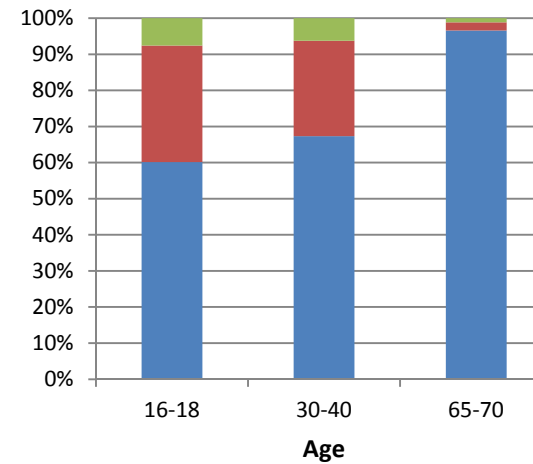
³ Reurings et al. (2012) ⁴ Pastor (2012)

a) Have you been startled or surprised in the past month



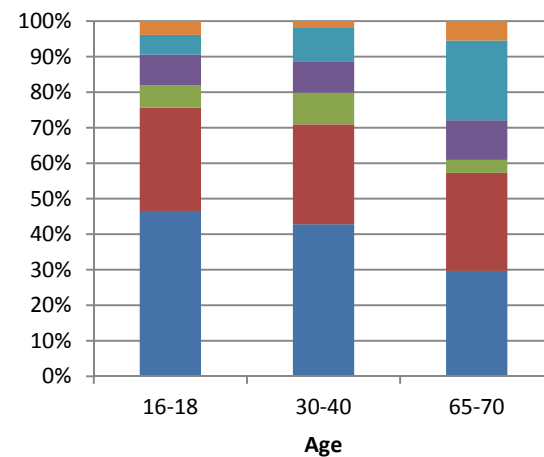
■ no ■ once ■ more than once ■ often

b) Were you listening to music or having a phone conversation?

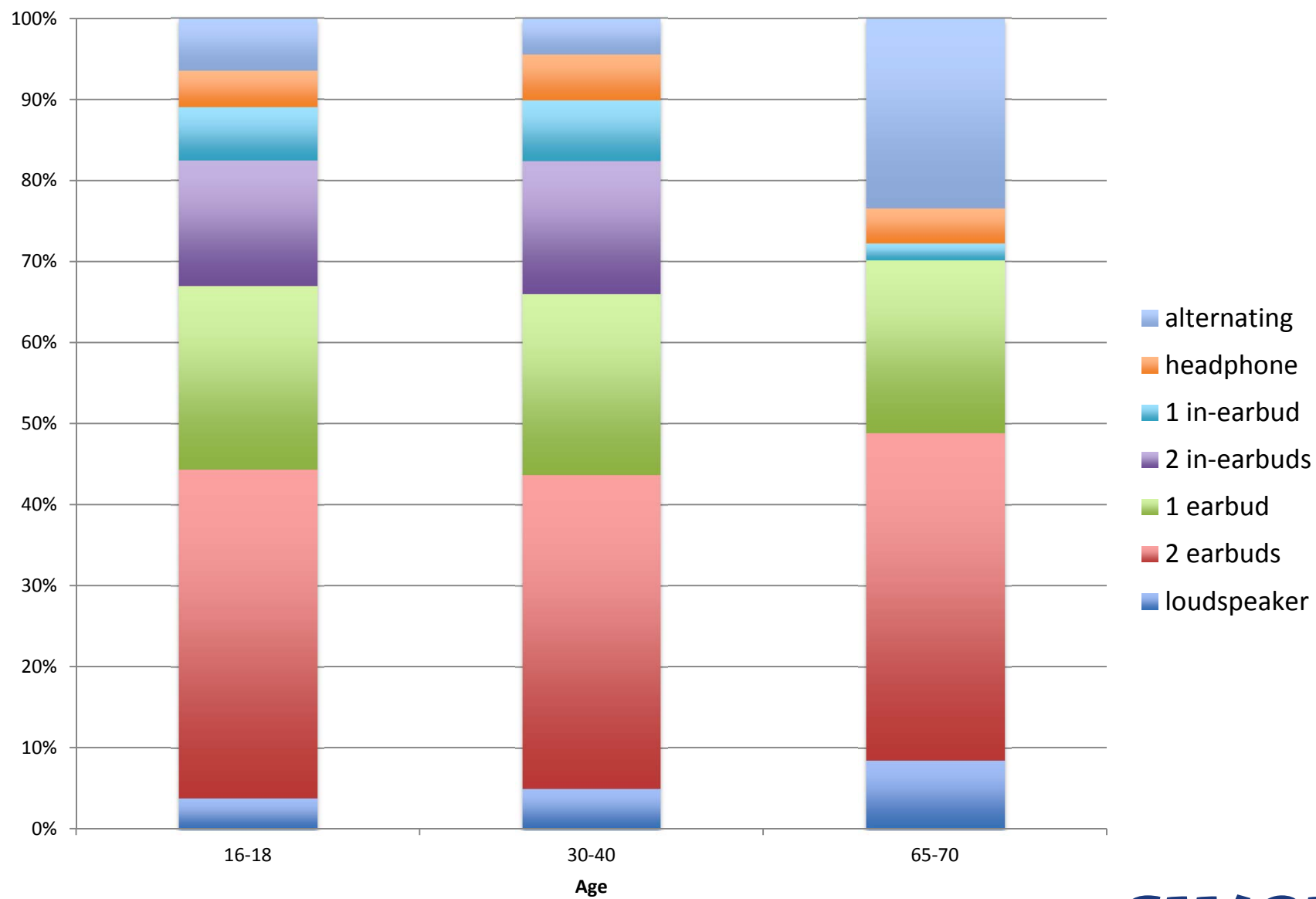


■ no music/ phone call ■ music ■ phone call

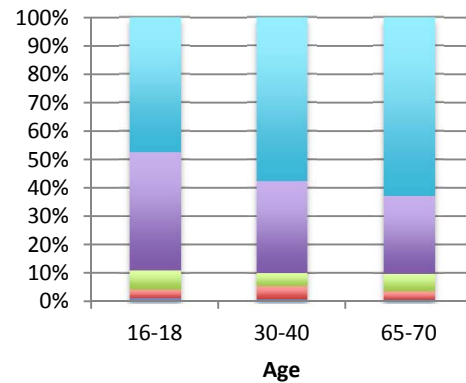
c) Type of road user involved



■ car driver ■ cyclist
 ■ pedestrian ■ motorcyclist
 ■ (light) moped rider ■ other

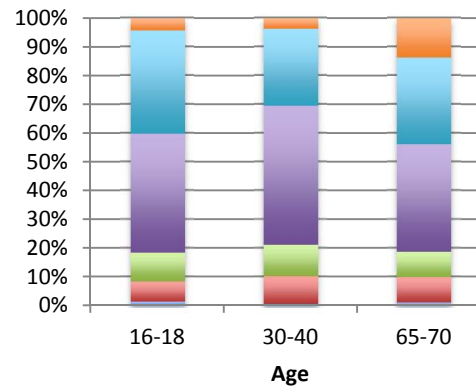


a) How much should a cyclist hear to be able to cycle safely



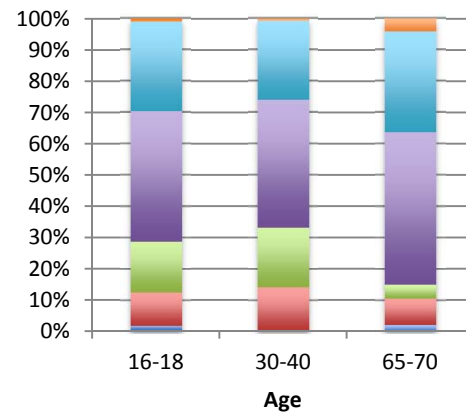
nothing at all
only loud/sharp sounds
all sounds
not much
most sounds

b) How much can you hear while talking on the phone



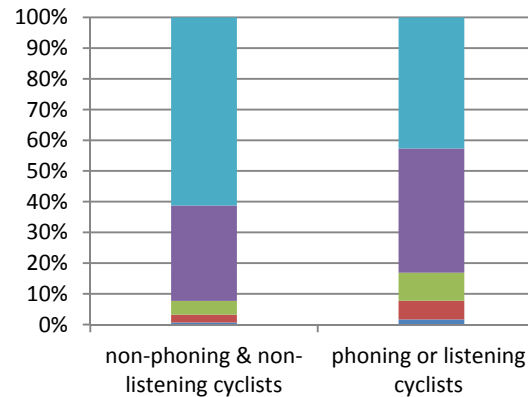
nothing at all
only loud/sharp sounds
all sounds
not much
most sounds
don't know

c) How much can you hear while listening to music



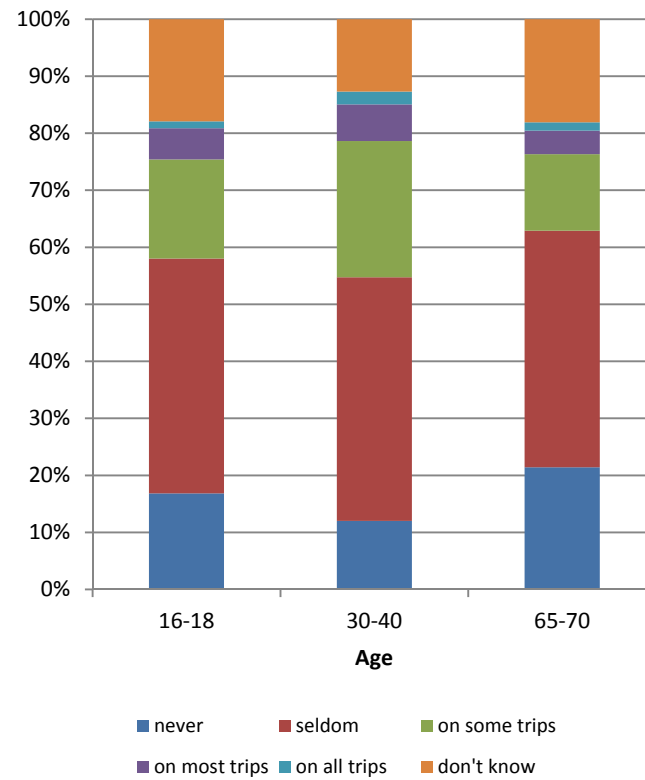
nothing at all
only loud/sharp sounds
all sounds
not much
most sounds
don't know

d) How much sound should a cyclist hear to be able to cycle safely

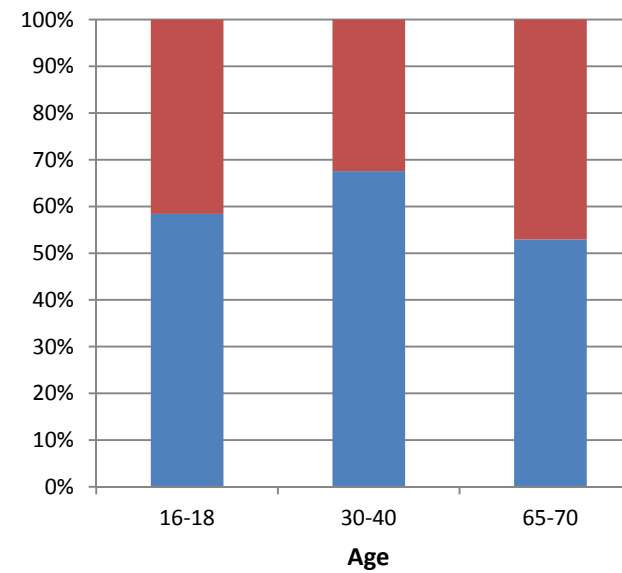


nothing at all
only loud/sharp sounds
all sounds
not much
most sounds

a) How often do you encounter quiet (electric) cars



b) Do you know what an electric car sound like?



Results: impact music & phone

- About 90% of respondents think cyclists should hear all or most sounds
- While listening to music 66-81% of respondents are able to hear all or most sounds (81%: the oldest group – low volume?)
- When talking on the phone about 66-75% can hear all or most sounds (66% the oldest group)

Conclusions

- Some conditions detrimental:
 - high tempo music, high volume music and listening to music using in-earbuds: missed a honking horn more often¹
 - engaging phone conversation²
- More concerns about listening to music than talking on the phone while cycling
 - more popular among cyclists than talking on the phone
 - fewer respondents report that they can hear all or most sounds when listening to music
 - more cyclists were listening to music before or during the incident

¹ De Waard, D., Edlinger, K. & Brookhuis, K. (2011)

² De Waard, D., Schepers, P., Ormel, W. & Brookhuis, K. (2010)