Car Design and Road Crossing Behaviour

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European Human Behaviour and Evolution Association, Helsinki, 29th March - 1st April 2015

Research Questions

- Does car design have a bearing on the behaviour of pedestrians?
- Is the minimum accepted distance when crossing the street bigger for cars with dominant appearance than for cars with friendly appearance?
- Is the speed of dominant cars overestimated compared to friendly cars?

Introduction

- Sensitivity for facial features even in non-human and inanimate objects, such as cars[1]
- Both car fronts and human faces lead to comparable N170 amplitudes in EEG[2, 3, 4] and similar activation of the fusiform face area[5]
- Car fronts elicit attributions of emotions, personality traits and attitudes[1]

Method

- Virtual reality (VR) environment with a road and a zebra crossing with centre island
- Head-mounted display
- 4 cars with "high power" design, 4 cars with "low power" design, chosen from Windhager et al. (2008)[1]
- Vehicles passing by individually

Block 1: Crossing time

- Cars passed by with a speed of 50 km/h without stopping
- Participant's task: Cross the road at the latest moment (starting position: Pavement or centre island)

Block 2: Speed estimations

- Cars passed by with a speed of 45, 50, or 55 km/h respectively
- Participant's task: Estimate the speed of the car (position: Pavement or centre island)

Participants

- 60 subjects (30 female), mean age 23.1 years

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Special thanks: Alvin Chesham for his help with programming the virtual reality

This research was funded by SNF Project No. PP00P1_139072

Conclusion

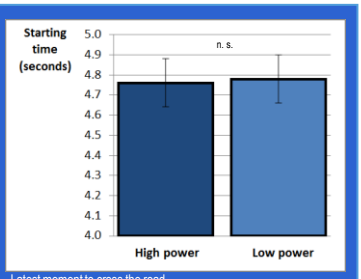
- Car size, not car design seems to influence road crossing behaviour

Results

Block 1: Crossing time

Repeated measures ANOVA (high/low power of car design)

- Car design: No effect for starting time, arrival time, and crossing duration (all p's > .16)



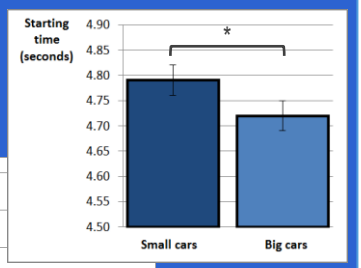
Latest moment to cross the road

Block 2: Speed estimations

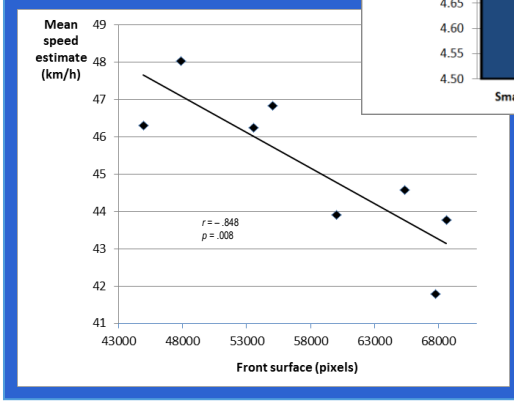
2 (car design) x 3 (actual speed) repeated measures ANOVA

- Car design: Significant effect ($F(1,59) = 13.529$, $p = .001$), low power cars are perceived to be faster ($M = 45.7$ km/h, $SD = 13.84$) than high power cars ($M = 44.7$ km/h, $SD = 13.75$)
- Actual speed: Significant effect ($F(2.58) = 155.657$, $p < .001$), speed estimations differed significantly between 45, 50, and 55 km/h actual speed (all p's < .001)

Size (front surface)
Crossing Block: Starting time significantly earlier for big cars compared to small cars ($F(1,59) = 4.285$, $p = .04$)



Latest moment to cross the road



Size (front surface)
Speed estimation Block: The bigger the front surface, the lower the speed estimate

Discussion

- Car design seems not to have an influence on road crossing behaviour in VR
- Decision to cross on average at a distance of 48 metres, image too small?
- Results can be explained by size-speed bias[6], according to which large objects seem to be moving more slowly than small objects

References

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