

# Car Design and Road Crossing Behaviour

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## 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<sup>(1)</sup>
- Both car fronts and human faces lead to comparable N170 amplitudes in EEG<sup>(2, 3, 4)</sup> and similar activation of the fusiform face area<sup>(5)</sup>
- Car fronts elicit attributions of emotions, personality traits and attitudes<sup>(1)</sup>

## 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)<sup>(1)</sup>
- 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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## Conclusion

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

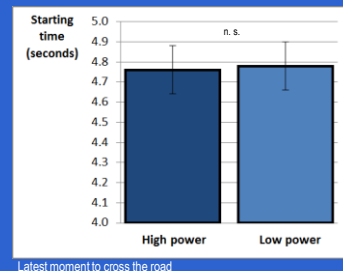
## Results

### 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)



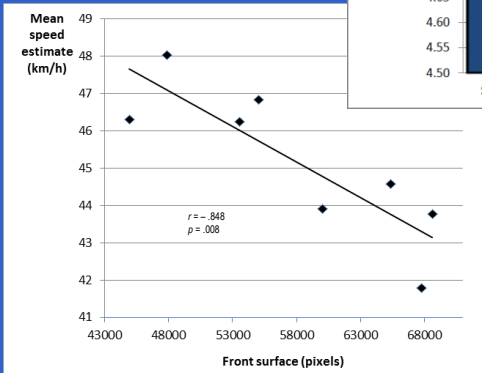
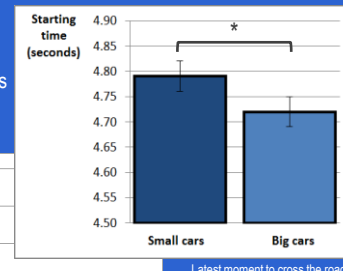
### Block 2: Speed estimations

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 ( $F(2,58) = 156.657, p < .001$ ), 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 ( $F(1,59) = 4.285, p = .04$ )



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<sup>(6)</sup>, according to which large objects seem to be moving more slowly than small objects

## References

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