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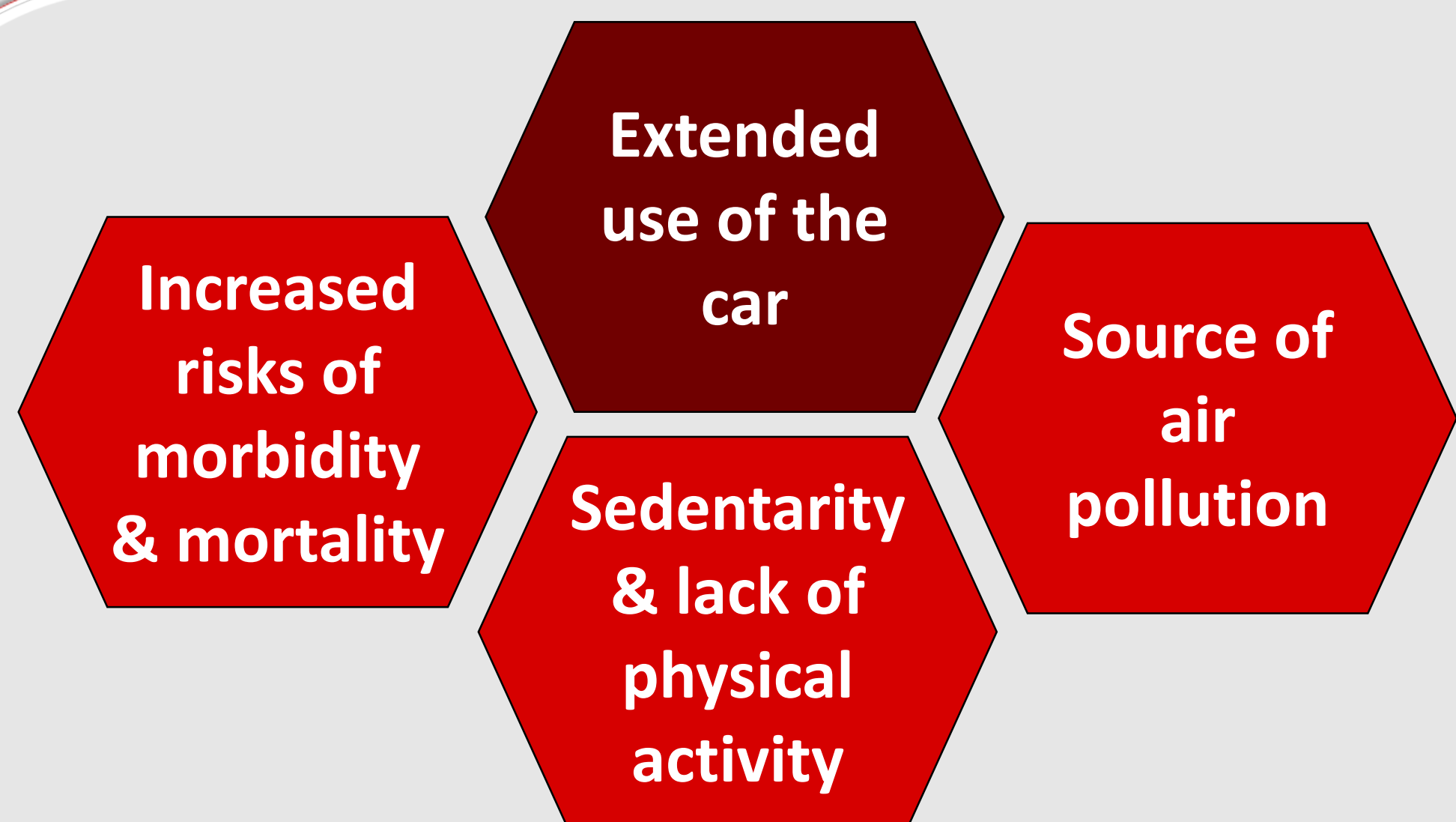


# Is the impact of transport modes on health an individual determinant of transport mode choice?

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## Introduction



- Modal choice generates individual and public health issues.
- Modal shift to active and less polluting modes is a valid strategy to reduce:
  - **Individual** health risk related to (a lack of) **physical activity** (Tainio et al., 2016).
  - **Public** health risk related to **air pollution** (Bouscasse et al., 2022).

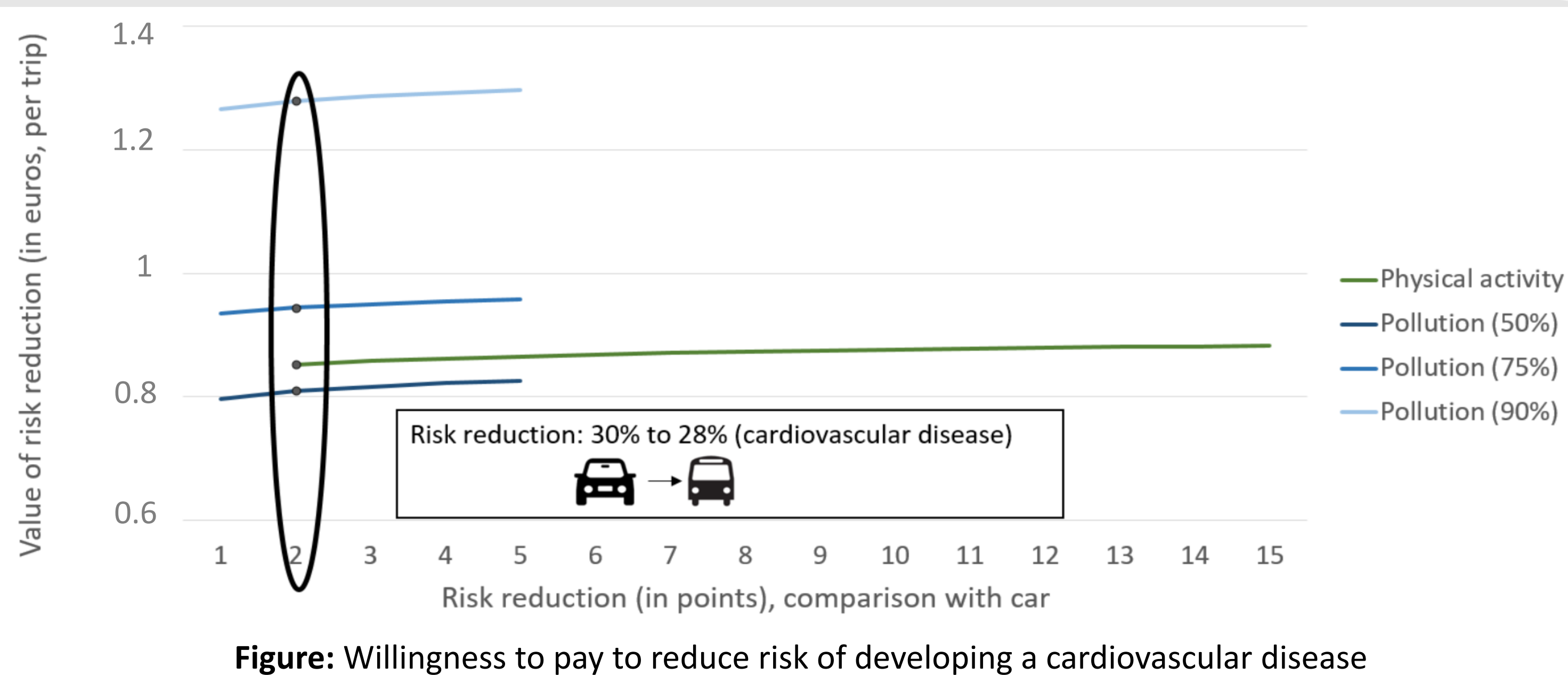
## Objectives

- Assess the way introducing these two health dimensions in the individual choice process could influence modal shift intentions
- Account for the perception of health risks in the study of mobility behavior



## Results

- **Individual risk reduction:** More significant effect in encouraging modal shift compared to public risk when there is a relatively small share of the population (50%) already using alternatives.
- **Public risk reduction:** Has a larger impact on the mobility preferences than the individual risk reduction with larger shares of the population (75% or 90%) .
- **Both types of information:** the risk reduction is generally under-estimated by the participants.



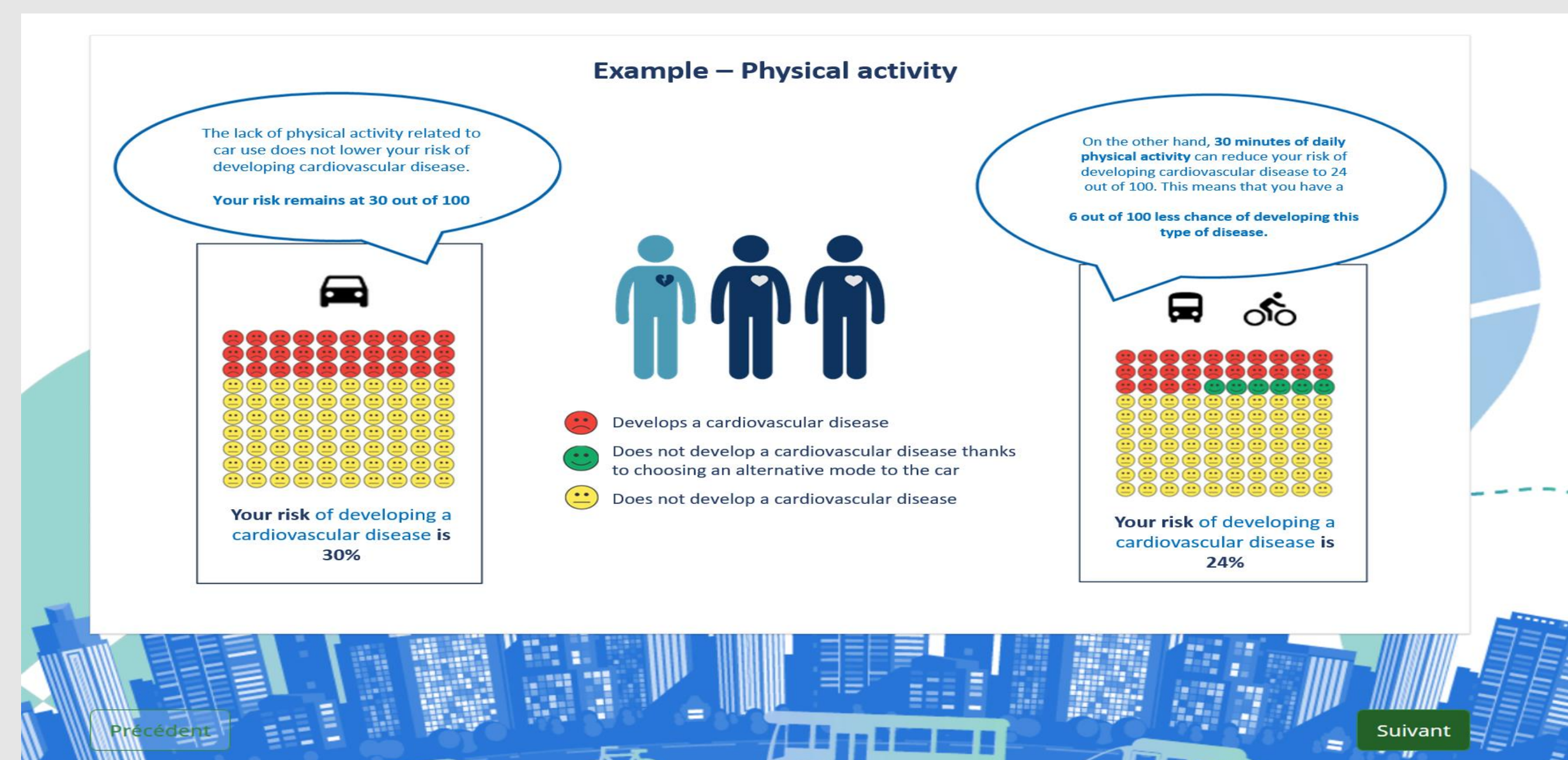
## Method



- **Original data:** Online Discrete Choice Experiment (June to September 2019) . 792 residents of Grenoble Metropolitan Area (France).
- **3 modes** of transport: car, public transport and bicycle.
- **4 Attributes:** Travel time, Cost, Individual (through physical activity) and Public (Through air pollution) health risk with framing (50%, 75%, 90% shares of the population).

Mode of transport			
Travel time	41 min	33 min	43 min
Travel cost	0,5€	2,5€	0€
Physical activity <i>Using this mode daily, your risk of developing a cardiovascular disease is</i>	24%	30%	20%
Air pollution <i>If 75% of the population adopt this mode of transport, the average risk of developing a cardiovascular disease for a person in this agglomeration is</i>	29%	30%	26%
Your choice?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- Illustrating the health risk of developing a cardiovascular disease → Use of smileys (Green = health gain risk).



- Discrete Choice Modelling accounting for the perception of risk reduction probabilities using a power transformation (Bouscasse and de Lapparent, 2020, Yaari, 1987) .

## Conclusion

- Our findings confirm that information on health risks related to air pollution or lack of physical activity both have a significant effect on the preferences of the participants in regards to modal choice.
- Today, in Grenoble, the modal share of people using an alternative mode to the car is rather around 50% or lower, our results indicate that decision makers could play on both the individual and public health impact of modal choices to incent citizens to reduce car usage.

### References:

Bouscasse, H., & de Lapparent, M. (2020). A rank-dependent utility approach to model intra- and inter-individual heterogeneity in risky choice behaviours. *Applied Economics*, 52(31), 3337-3353.  
 Bouscasse, H., Gabet, S., Kerneis, G., Provent, A., Rieux, C., Salem, N. B., ... & Slama, R. (2022). Designing local air pollution policies focusing on mobility and heating to avoid a targeted number of pollution-related deaths: Forward and backward approaches combining air pollution modeling, health impact assessment and cost-benefit analysis. *Environment International*, 159, 107030.  
 Tainio, M., de Nazelle, A. J., Götschi, T., Kahlmeier, S., Rojas-Rueda, D., Nieuwenhuijsen, M. J., de Sá, T. H., Kelly, P., and Woodcock, J. (2016). Can air pollution negate the health benefits of cycling and walking? *Preventive medicine*, 87:233-236.  
 Yaari, M. E. (1987). The dual theory of choice under risk. *Econometrica: Journal of the Econometric Society*, pages 95-115.