

# Does Unpacking the Carbon Footprint Affect Travel Choices?

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## Introduction & Research Questions

What is the percentage of *mobility-related* CO<sub>2</sub> emissions? Such estimates are not only imprecise, but also dependent on how such “categorical events” are *described*. For example, support theory (Tversky & Koehler, 1994) assumes that the estimate for a categorical event (e.g., mobility-related CO<sub>2</sub> emissions) is higher when it is „unpacked” (implicit subadditivity), that is, when its possible subcategories are also described (e.g., CO<sub>2</sub> emissions from flights, trains, and other forms of mobility). Moreover, the estimate for an unpacked event is higher if it is not evaluated as a whole, but if each subcategory is evaluated separately and then added up (explicit subadditivity).

These two assumptions are tested in two studies with respect to mobility-related CO<sub>2</sub> emission percentage estimates while manipulating other variables (e.g., travel distance). In addition, it is tested whether these estimates can also influence behavior (switching from flight to train).

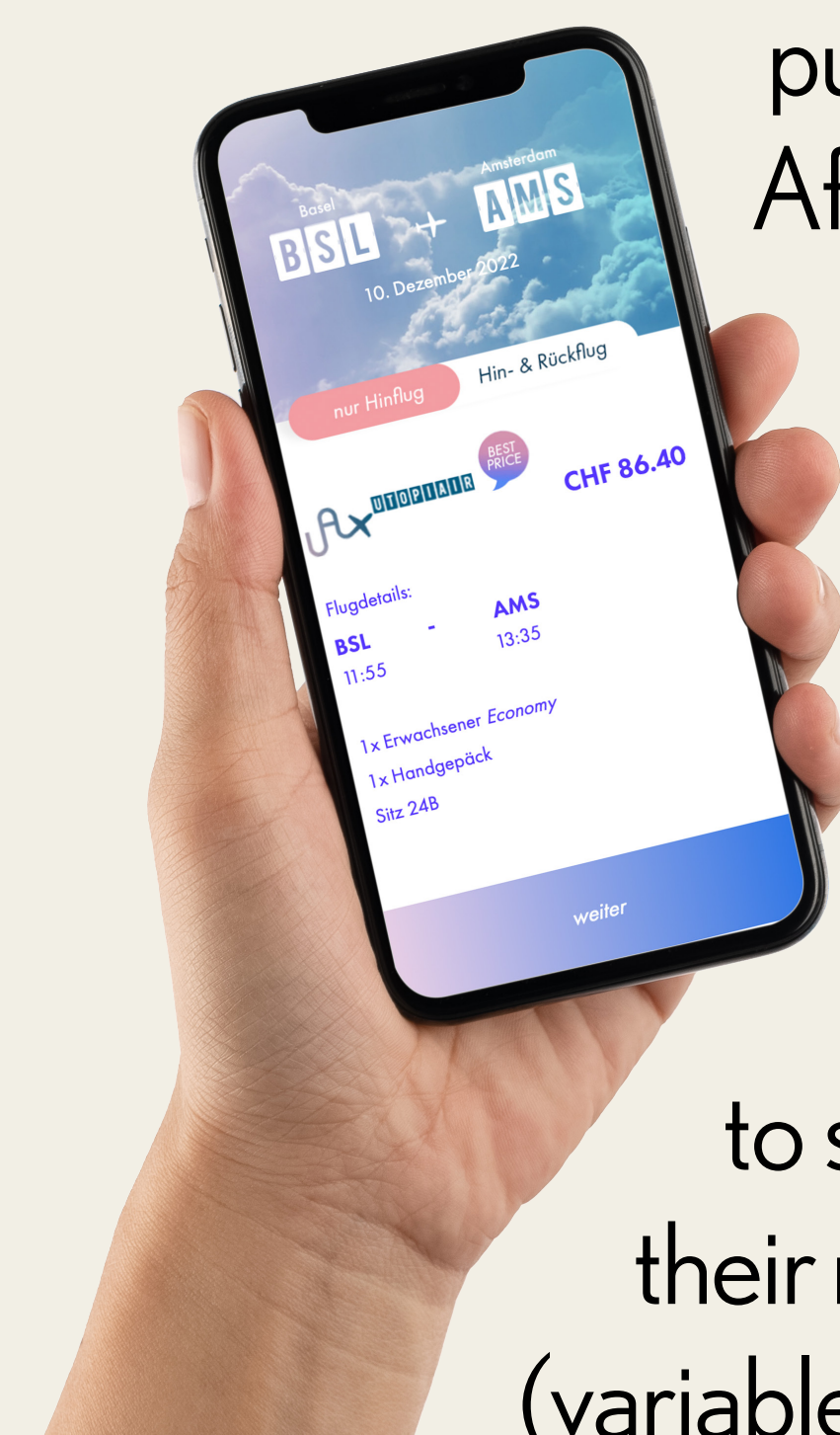
## Method

### Observers (O's):

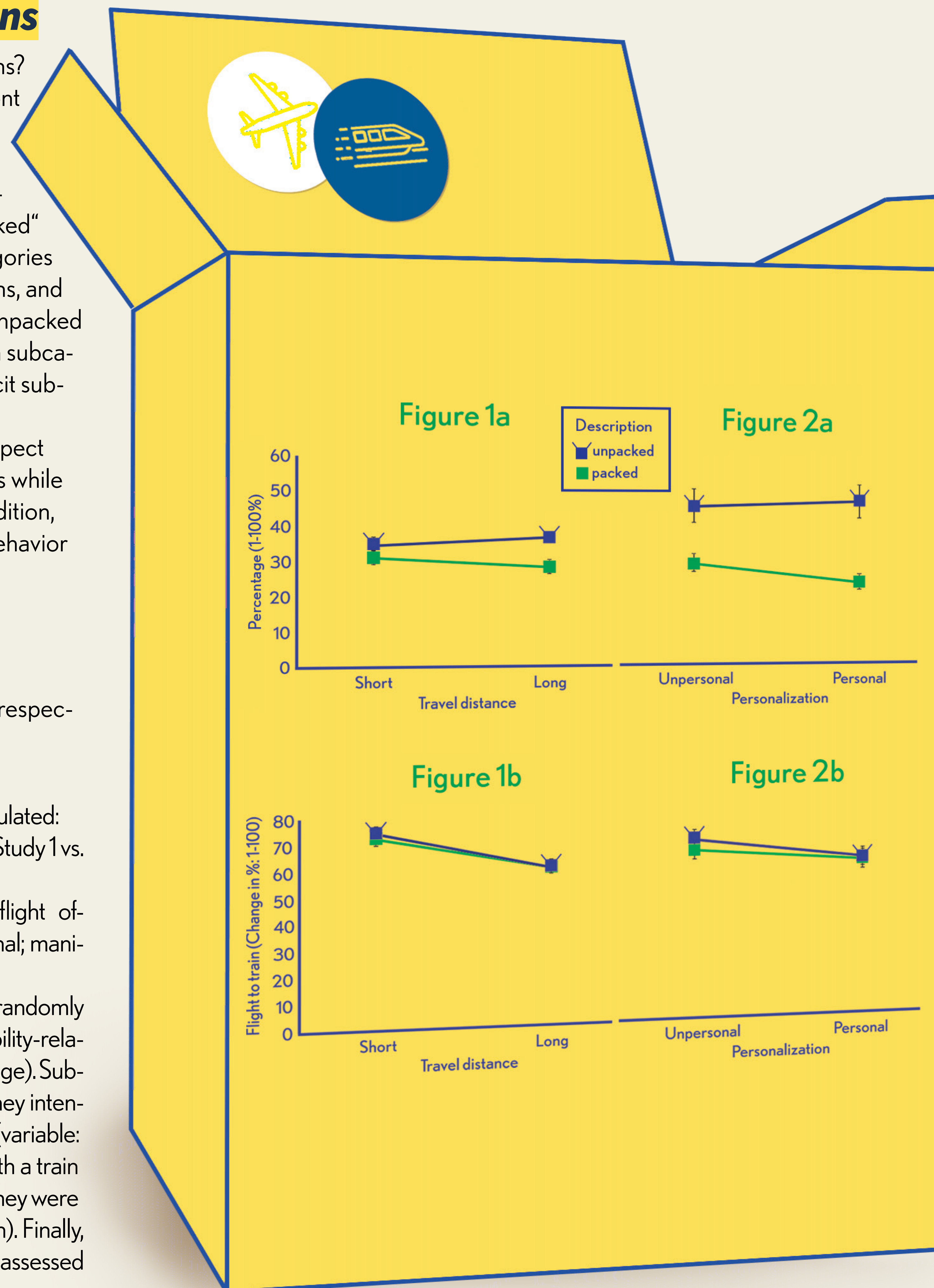
We tested 462 O's ( $M_{age} = 24.0, SD_{age} = 4.0$ ) in Study 1, respectively 231 O's ( $M_{age} = 25.5, SD_{age} = 4.2$ ) in Study 2.

### Procedure & Design:

- O's were offered a flight, with the following variables manipulated:
- description: packed vs. unpacked (implicit subadditivity in Study 1 vs. explicit subadditivity in Study 2).
  - travel distance in Study 1 (short vs. long; manipulated in the flight offer) and personalization in Study 2 (unpersonal vs. personal; manipulated in the description), respectively.



After O's had seen the flight they were randomly assigned to, they had to estimate mobility-related CO<sub>2</sub> emissions (variable: percentage). Subsequently they were asked whether they intended to change their CO<sub>2</sub> emissions (variable: intention) before being presented with a train offer and asked to indicate how likely they were to switch to the train (variable: flight to train). Finally, their mobility behavior in the last 5 years was assessed (variable: personal CO<sub>2</sub> footprint).



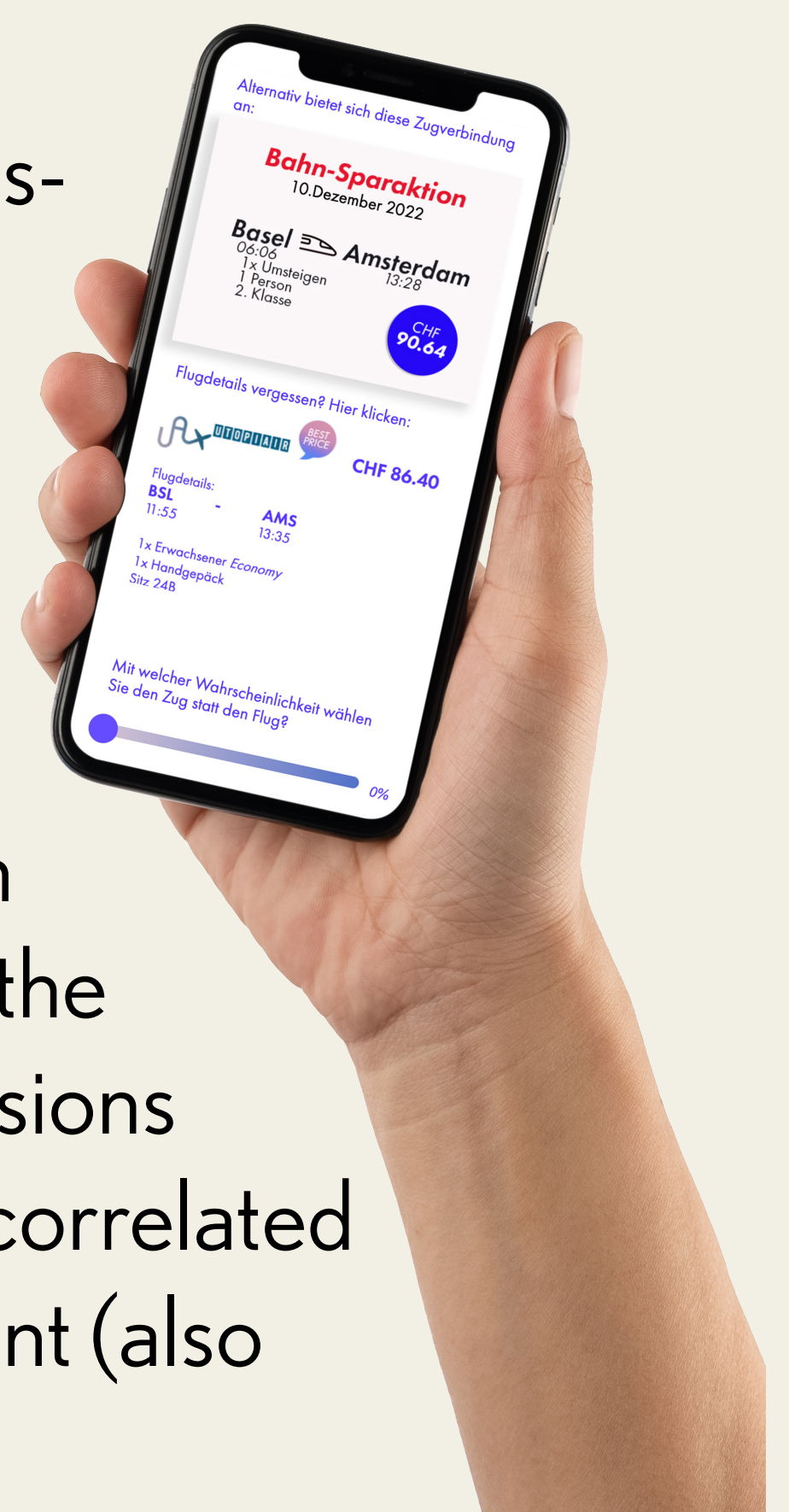
## Results

Regarding CO<sub>2</sub> emission percentage estimates, in both studies we found only a significant main effect of description (implicit subadditivity in Study 1:  $F(1, 458) = 9.99, p < .01$ , and explicit subadditivity in Study 2:  $F(1, 227) = 32.74, p < .001$ , see Figures 1a & 2a).

In terms of behavior change, only Study 1 showed a significant main effect of travel distance,  $F(1, 456) = 22.36, p < .001$ .

That is, the longer the travel distance, the less likely O's were to switch to the train (see Figures 1b & 2b).

However, in both Study 1 and Study 2 we found that intention to switch from flight to train was *positively* correlated with the intention to reduce CO<sub>2</sub> emissions (both  $p < .001$ ) and *negatively* correlated with the personal CO<sub>2</sub> footprint (also both  $p < .001$ ).



## Discussion

Despite the fact that O's estimated the probability of unpacked events to be higher, usually even much higher than the actual values, this did not translate into a behavior change. It is assumed that in terms of the probability estimates, the underlying intent such as „to address the climate crisis CO<sub>2</sub> emissions must be reduced” is to be made clearer so that O's can see why they should switch from flight to train.

## References

Tversky, A., & Koehler, D. J. (1994). Support theory: a nonextensional representation of subjective probability. *Psychological review*, 101(4), 547.