



Investigating the effect  
packaging has on sensory  
perception using the Bayesian  
design approach to choice-based experiments.



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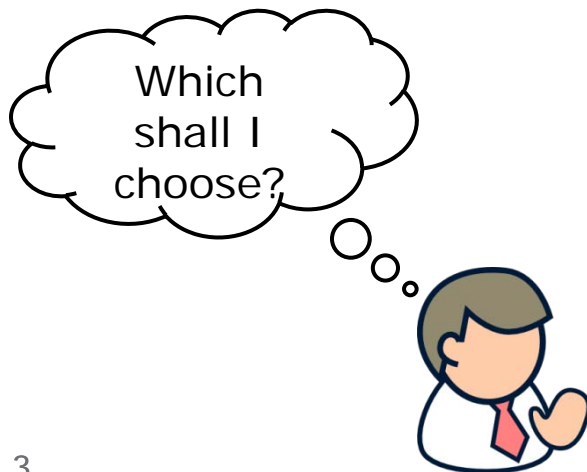
## Background

- In everyday situations consumers do not blind taste; instead their preferences are liable to be shaped by pre-existing information they have about the product.
- **Goal:** to **accurately** and **efficiently** model consumer product preference including any interaction between the intrinsic product attributes (e.g. its colour and taste) and the extrinsic product variables (e.g. shape of packaging, health claim).



## Choice-based methods: Realistic consumer task

- Choice-based experiments provide a realistic set-up by which to study consumer preferences and the trade-offs they make.
- Investigate the influence packaging attributes (referring to “naturalness”) have on the consumer liking of strawberry yogurt.



# Experimental set-up: attributes & levels

## Attributes & levels

### 1. Colour of yoghurt:



light pink



dark pink

### 2. Sugar information:

- No added sugar
- Without artificial sweeteners
- Only fruit sugars

### 3. Naturalness claim:

- pure and natural



- pure and natural +



### 4. Images:



artificial  
drawing



natural  
photograph

## Experimental set-up: limitations

- Inclusion of a intrinsic product attribute places limits on the design of a choice-based experiment.
- Use of actual product samples limits number of choice profiles that can be presented to participants due to sensory fatigue and to stay within the limits of participant acceptance.

## Experimental set-up: solutions

### **Use descriptive information**

- Using descriptive information as a substitute for physical taste allows more variables to be examined.
- Questions exist as to the validity of this approach.

### **Increase the number of participants**

- For example, Enneking, Neumann and Henneberg (2007), required over 600 participants in order to establish interaction effects between taste (sweetness), brand, labelling and price information using a standard balance design.
- Unfortunately, this number of participants is generally not feasible.

## Experimental set-up: solution

### Bayesian designs

- Traditional designs assumes that people have no preference for any of the attribute levels.



- This assumption does not reflect reality and it results in an inefficient design.
- Bayesian designs do not make this assumption – they are generated using prior preference information and incorporate uncertainty.
- They are more efficient and have been shown to outperform utility-neutral designs (Kessels et al, 2008).

# Experimental set-up: create choice sets

- While Bayesian designs are efficient they are computationally intensive.
- Inclusion of tasting actual product samples into a choice-based designs is a more practical option.
- For this experiment set:
  - 36 yogurts profiles
  - a choice set consists of 3 profiles
  - several survey versions
  - fully randomized



# Experimental set-up: presentation scheme

## Test 1: Prototype + sample



## Test 2: Photo + sample



## Test 3: Photo + description



Het is een frisse magere yoghurt met aardbeien smaak en fruit stukjes. Een zoete smaak, iets snoepjes, maar ook iets zuur. Het uiterlijk van de yoghurt is dieproze en romig.

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## Test 4: Attributes + description



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- puur en natuurlijk
- geen suiker toegevoegd

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- puur en natuurlijk
- zonder kunstmatige zoetstoffen

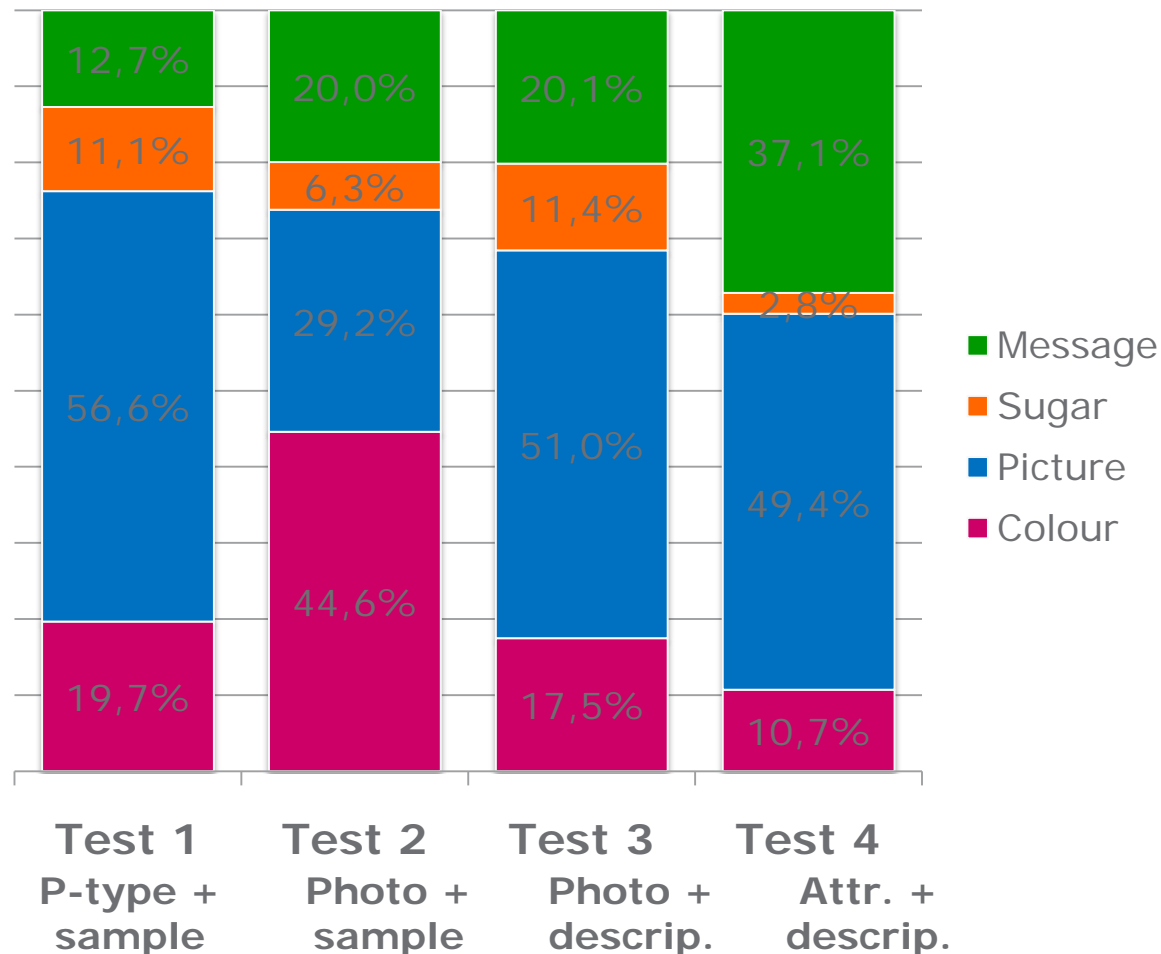
Een magere aardbei yoghurt met een romig uiterlijk. De kleur is licht roze met fruit stukjes. De yoghurt heeft een frisse, licht zure, maar zoete smaak met iets snoepjes aroma.

- puur en natuurlijk
- alleen fruit suikers

## Effect of presentation set-up

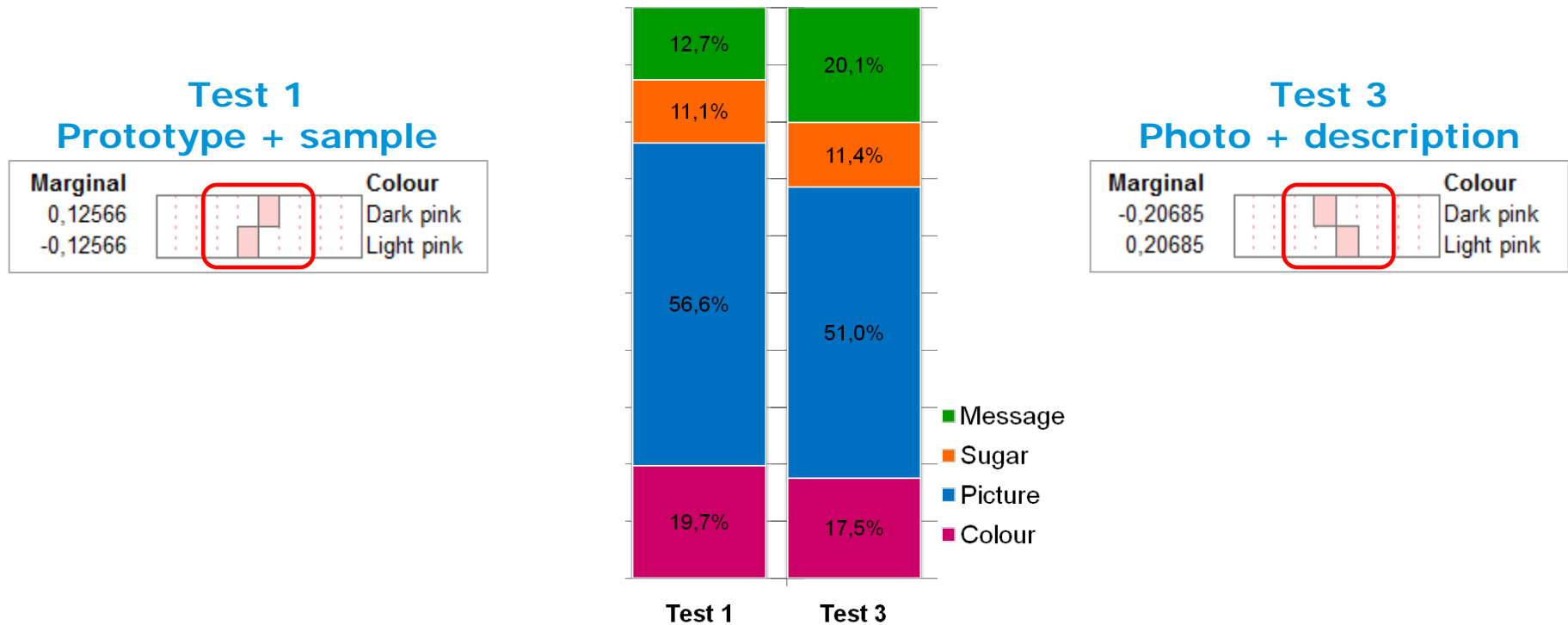
- Test 2 gives completely different results than the other tests.  
→ *paying attention to 2 different locations (screen with pictures and table with tasting samples) is difficult and influences behaviour.*
- Test 1, 3 and 4 give comparable results, but the impact of the attributes differs between the tests.

Impact of attributes on preference



# Effect of presentation set-up

Impact of attributes on preference

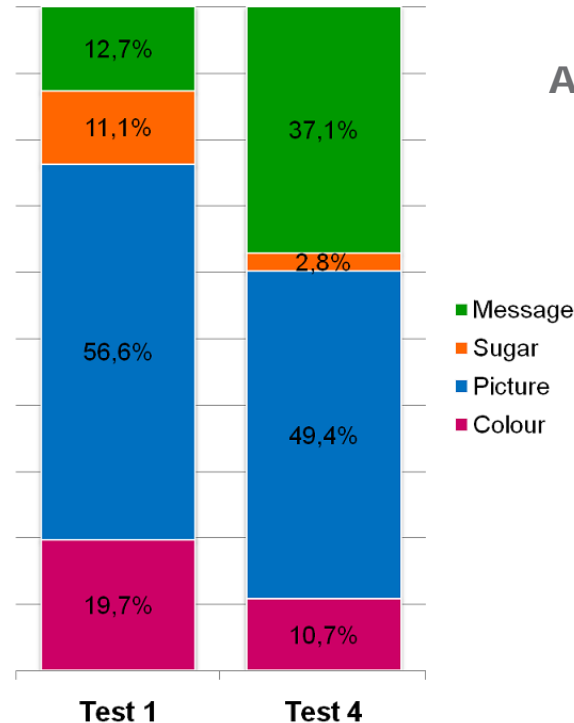


- In test 3 there is a preference for the light pink yogurt, the opposite from test 1.
- It is difficult to [see](#) the colour so decision likely based on description.

# Effect of presentation set-up

## Impact of attributes on preference

**Test 1**  
Prototype + sample



**Test 4**  
Attributes + description



- The impact of message on preference is larger in test 4.
- The oversized logo has a greater influence on consumer choice.

## Summary

- Choice-based experiments provide a realistic set-up by which to study consumer preference.
- Using Bayesian models it is possible to generate an efficient design - making it practical to include intrinsic product attributes into the experiment.
- Attention should always be given to how attributes are presented to the consumer.