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Translation of customers needs into sensory product characteristics – application of a systematic model to integrate marketing and R&D



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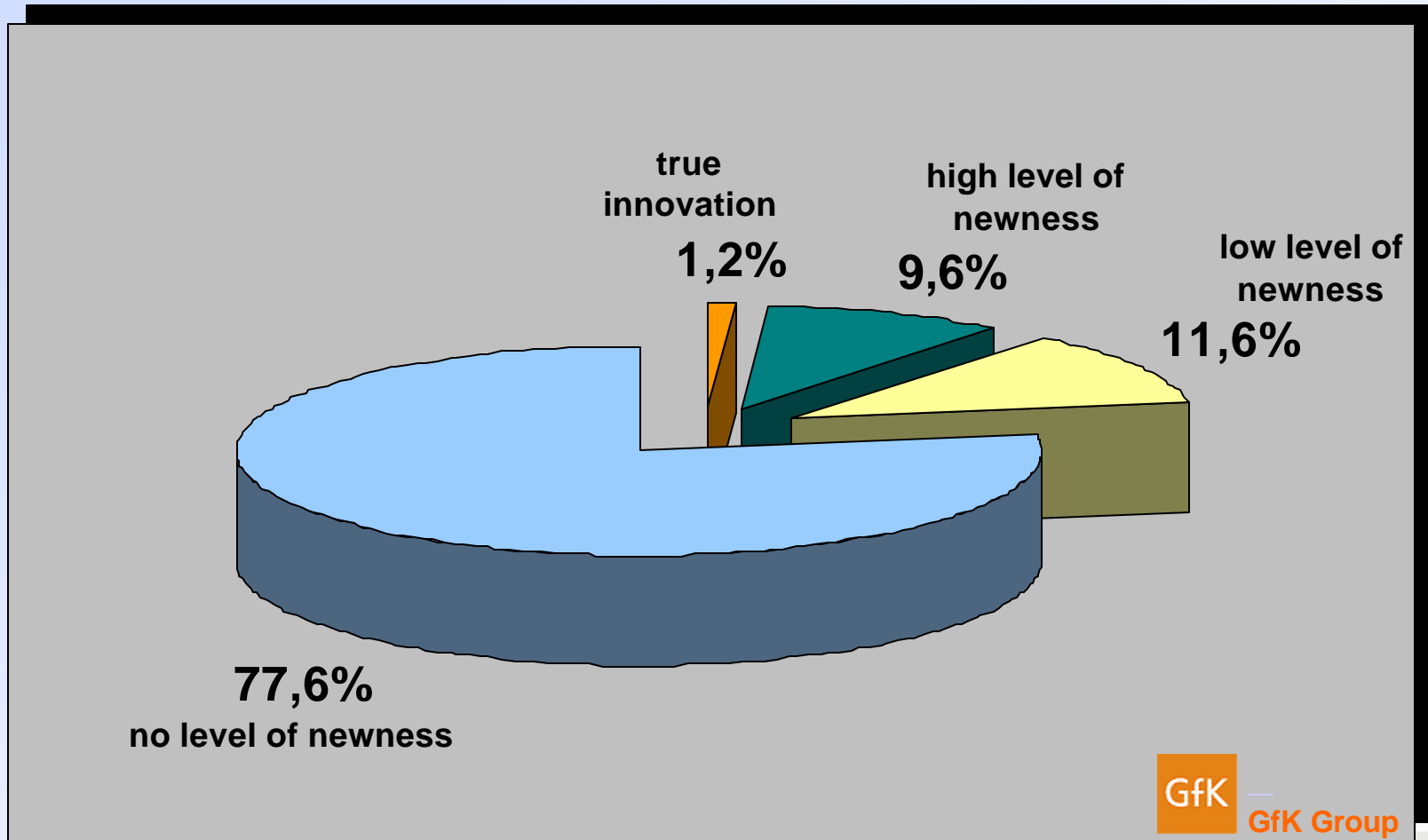
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Actual problems on the market for foods and stimulants

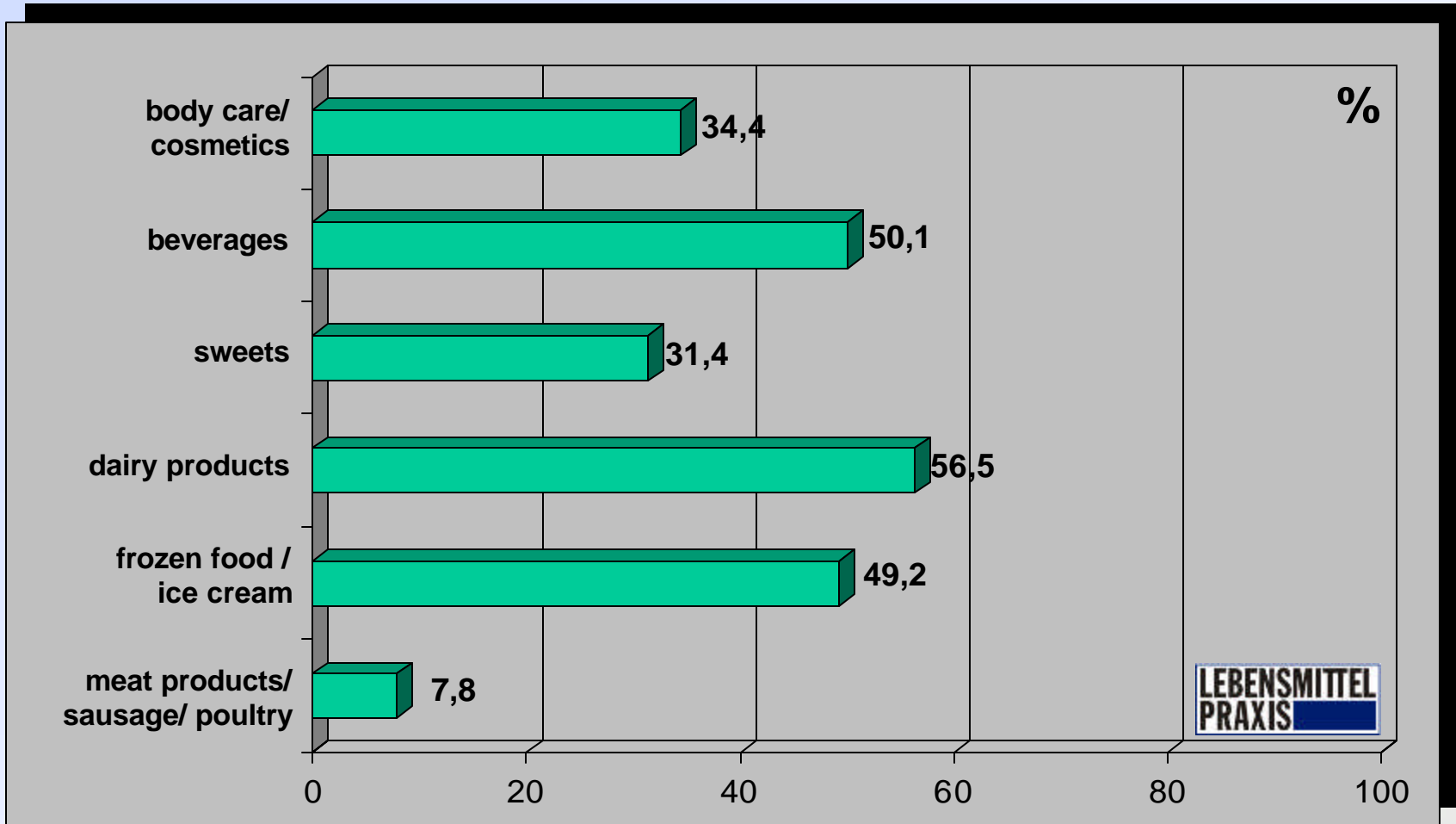
- Competitive products of the relevant target market are mature in the technological, sensory and conceptual way.
® *Limited possibilities for a sensory or Marketing-induced differentiation.*
- Life-cycles of many products are becoming shorter.
® *Decreasing time span for the amortization of the investment.*
- Increasing number of innovations and a fast imitation of successful innovations.
® *Innovation risk is dramatically increasing.*
- Hard prognosis of future needs of relevant target groups because of short-lived, not predictable trend developments and fundamental changes in the consumer behavior.
® *Requirements for the information supply in the innovation process are growing.*
- Consumers suffer dramatically from the information overload of the advertising and promotion activities at the point of sale.
® *Expenses for Marketing in the phase of a product launch are permanently growing.*

➔ **Innovation pressure along the value chain is increasing!**

Level of newness of innovative foods and stimulants



Proportion of promising new products Evaluation by German retailers



Core questions of the innovation management:

How can actual or latent needs of consumers with new or modified products optimally satisfied?

➔ Transformation of benefit expectations and important usage situations of relevant target groups in suitable sensory product characteristics.

Example: Product differentiation



Orange juice



Orange juice
with pulp



Orange juice
with Calcium

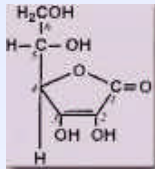
- In which way have the benefits and the usage context be adjusted?
- How have the sensory characteristics be modified?

The “transformation problem” in the innovation process



All perceivable (e.g. odor, taste) and “hidden” (e.g. vitamins) attributes which are available for the design of new products.

All product attributes which are perceived by the consumers and which are for him/ her related with a concrete benefit.



- ✓ *Optimal digestion*
- ✓ *Mild juice*
- ✓ *Essential vitamins*
- ✓ *Every days thirst quencher*

Psycho-physical transformation exemplary for “Orange juice”

**Objective product attributes
 (“characteristics”)**



**Subjectively perceived
 product attributes
 (“benefits”)**

**intrinsic
 attributes**

- High quality fruits
- Extra much pulp
- Viscous

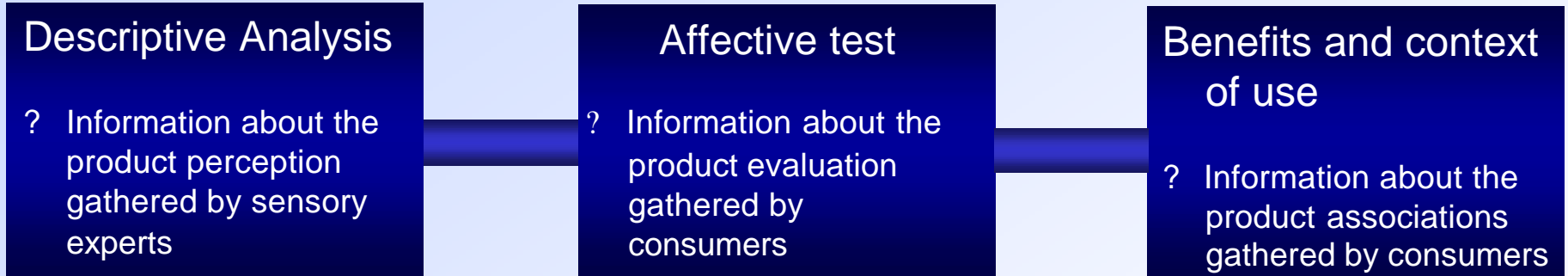
**extrinsic
 attributes**

- Ripe pulps on the label
- Claim “contains extra much pulp”



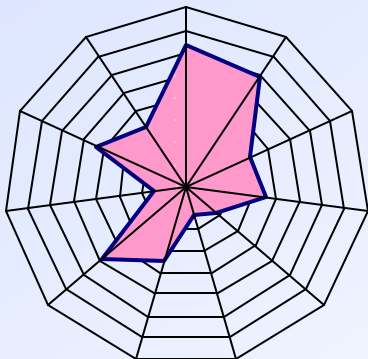
Healthy indulgence

Gathering of product perception and product evaluation

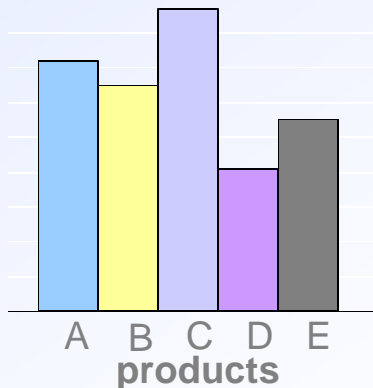


Functional relationship

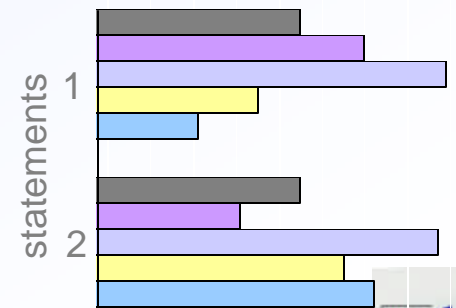
Descriptive product profiles



Consumers' acceptance data

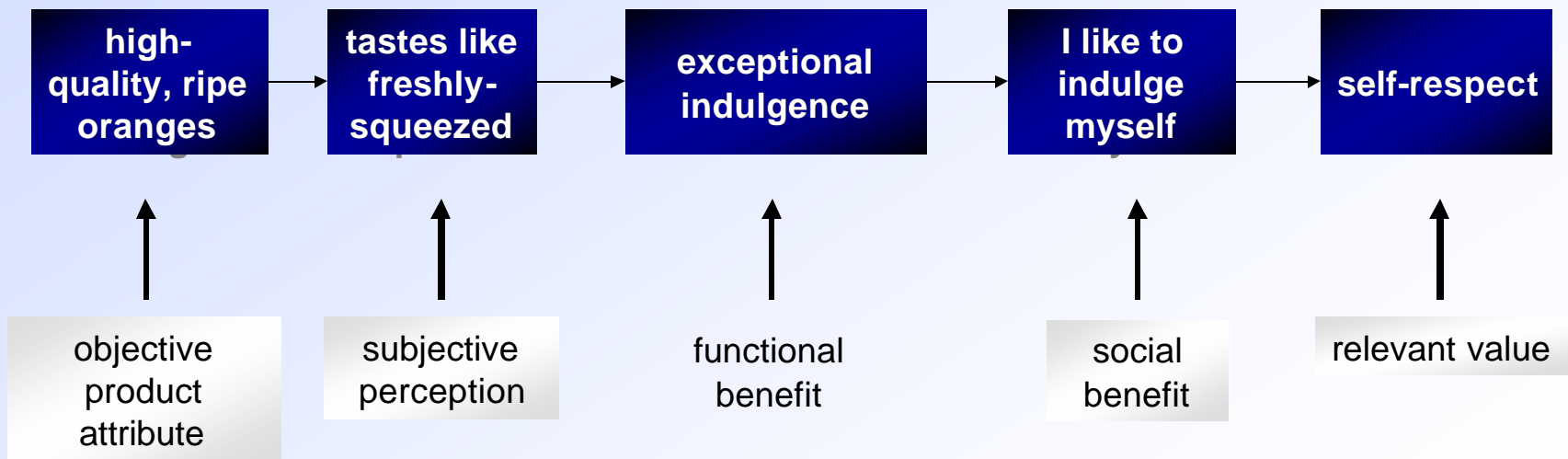


Benefits and usage

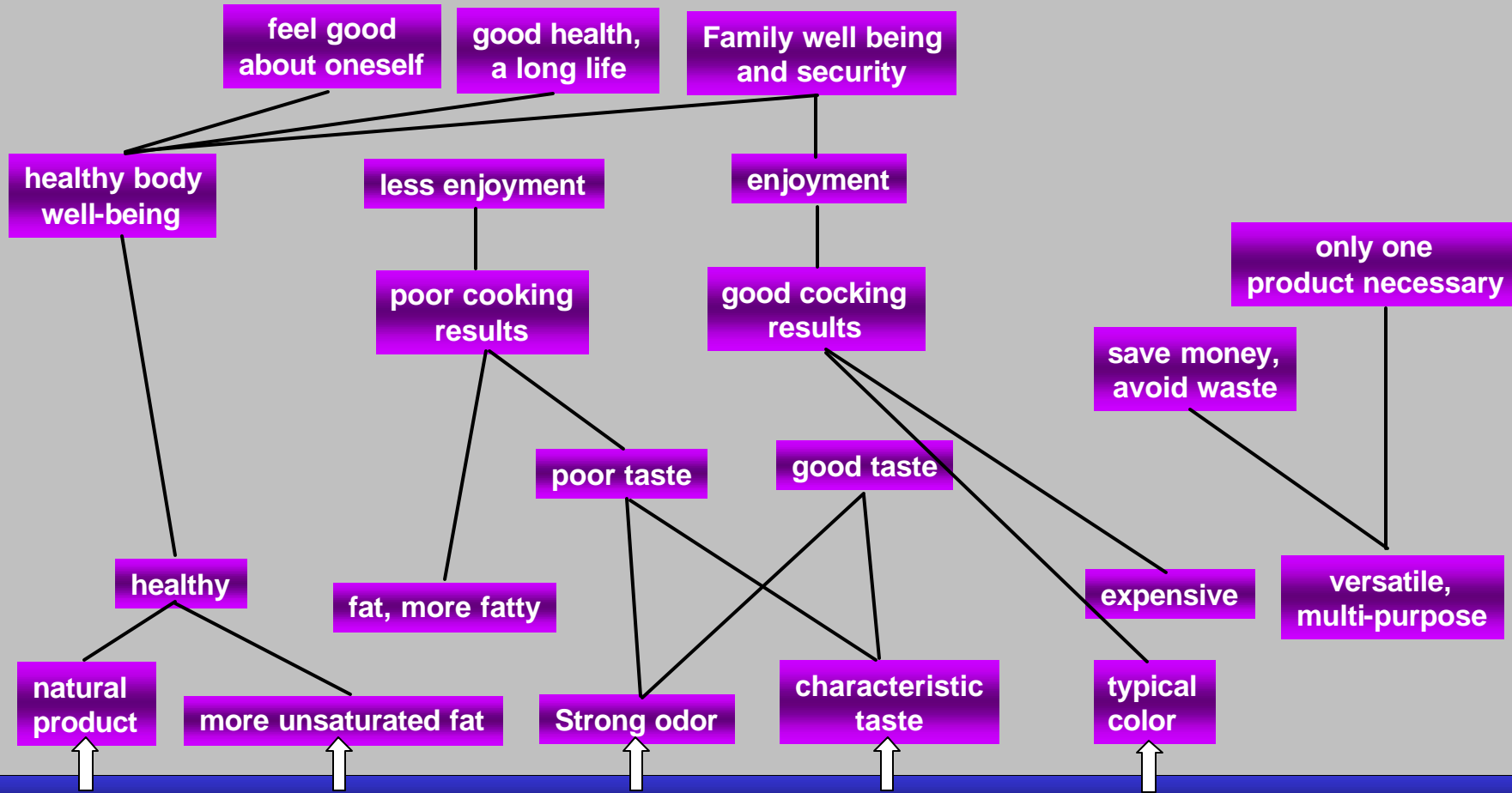


Psycho-physical transformation with the help of a “means-end-approach”

Individual “means-end” - chain for an orange juice



Hierarchical Value Map for virgin olive oil (Nielsen et al. 1998)



Sensory attributes – source: expert or consumer panel

Empirical example 1: (Hersleth et al. 2005)

Relationship between consumers' perception of breads and the appropriateness of use

- Seven different types of Norwegian breads. Products differed in recipe, size and shape.
- Samples were served unbranded and unpacked.
- 30 Consumer elicited constructs (related either to sensory attributes or to appropriateness of use) by using repertory grid method.
- The consumers rated the product intensity on the constructs using a 9 point hedonic scale.

Products and attributes elicited from the consumers

Products

- White rolls
- Foccacia
- Whole grain bread
- French bread
- Dark rye bread
- Ciabatta
- Whole-grain-rolls

Cognitive and affective attributes

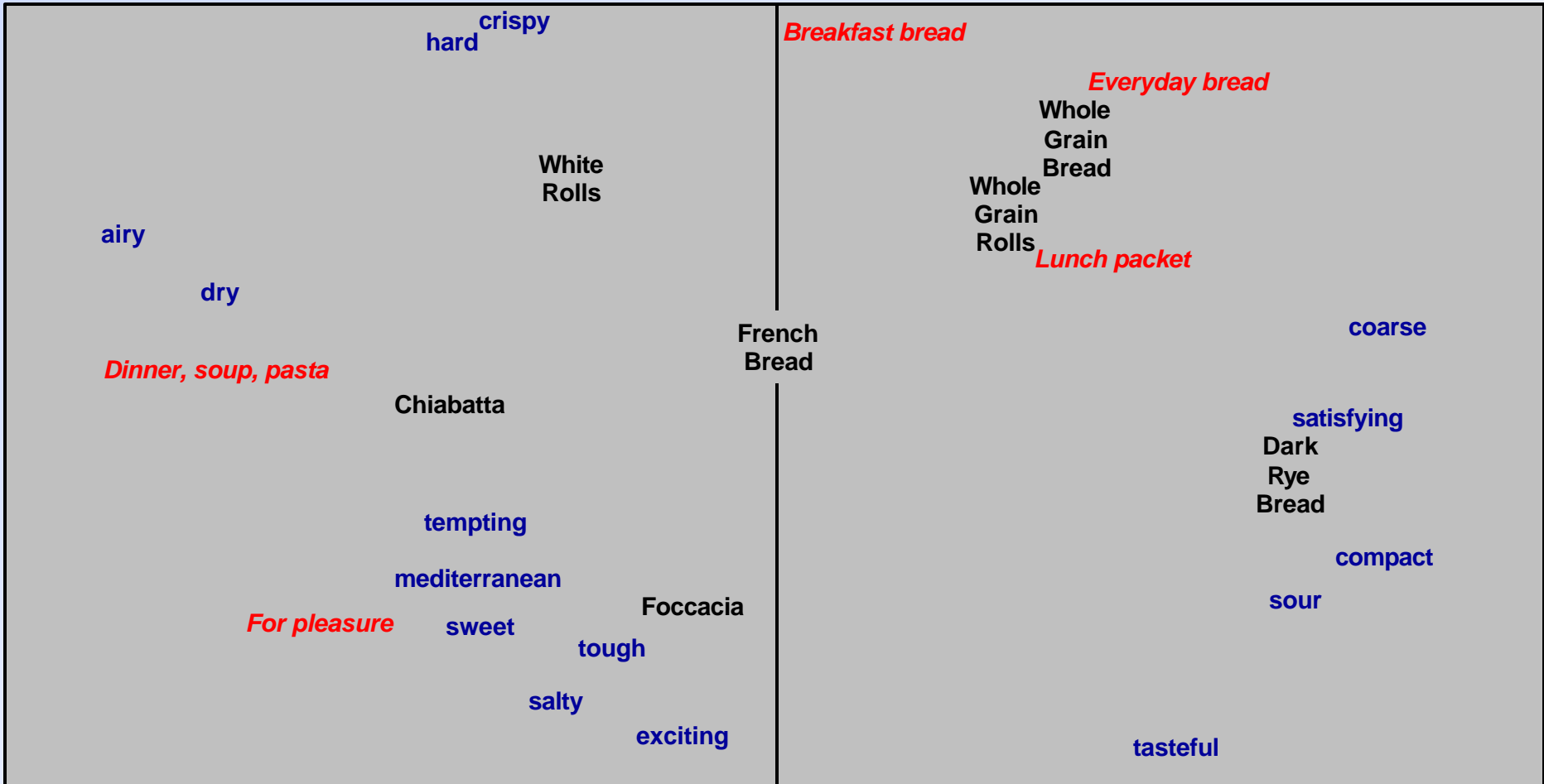
- Sweet
- Crispy, crispy crust
- Coarse, coarse crust
- Spongy, airy
- Sour
- Satisfying
- Hard, hard crust
- Tasteful
- Tough
- Tempting
- Dry
- Exciting
- Salty
- Compact
- Mediterranean

Appropriateness

- Dinner, soup, pasta
- Everyday bread
- Lunch packet/
packet of sandwich
- For pleasure
- Breakfast bread

PLS regression

- sensory attributes (X) and constructs for appropriateness (Y) -



(X-expl. = 44%; 41% / Y-expl.= 30%; 25%)

Empirical example 2: (Appelbaum et al. 2006)

Relationship between consumers' perception of hard cheese and the appropriateness of use

- In total, 10 different hard cheeses were tested. The samples varied in the fat content – 4 cheeses contained a normal fat level and 6 samples were fat-reduced.
- By application of “Natural Grouping” and “Laddering”, several benefits and usage situations were generated.
- A trained panel evaluated the 10 samples on 39 sensory attributes
- 100 consumers evaluated the 10 samples in a sensory blinded test (2 sessions) using a 9 point hedonic scale.
- Directly after the evaluation of each sample, the consumers indicated how good this cheese is suitable for the several consumption situations.

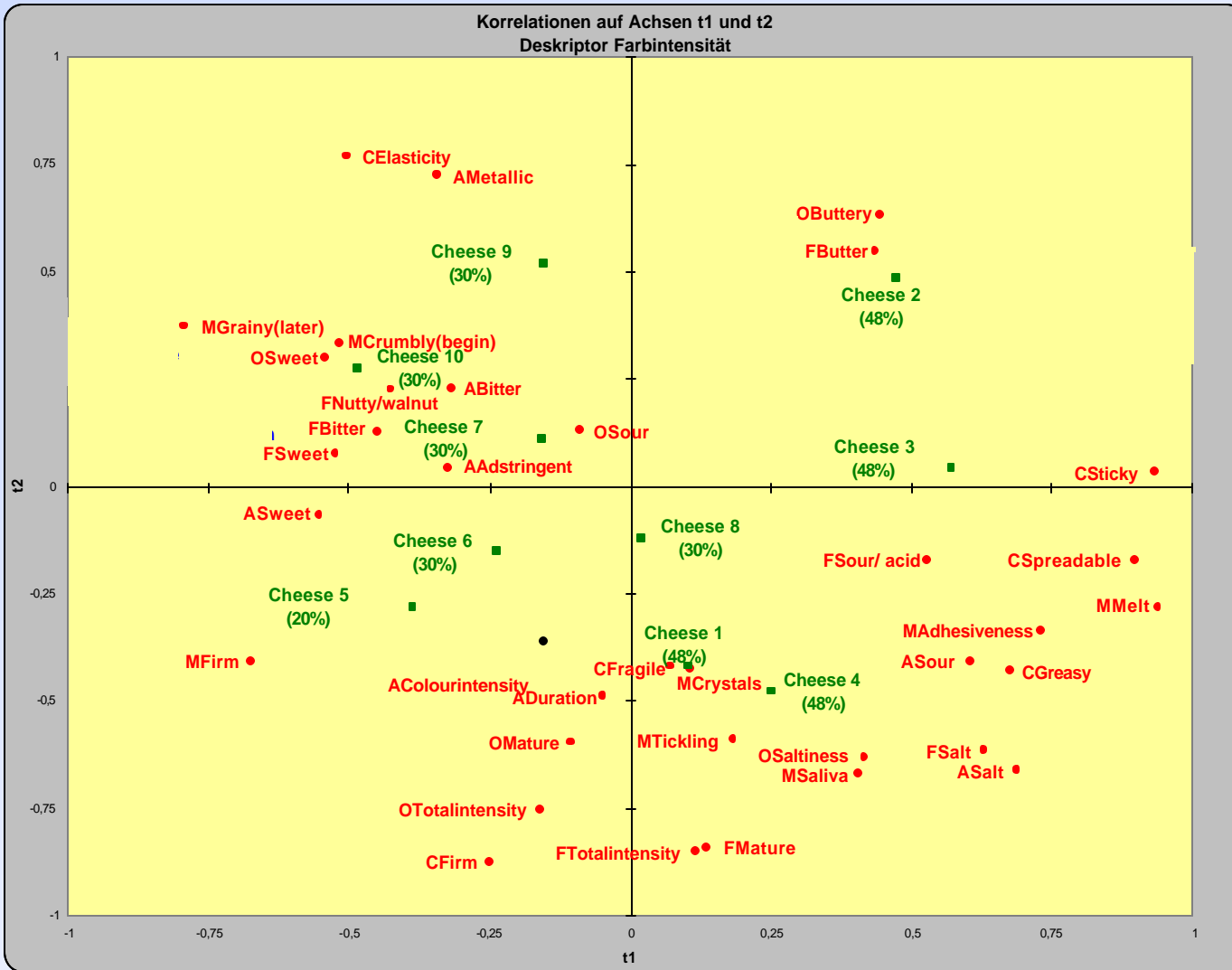


Appropriateness of use attributes for cheese

especially suitable ...

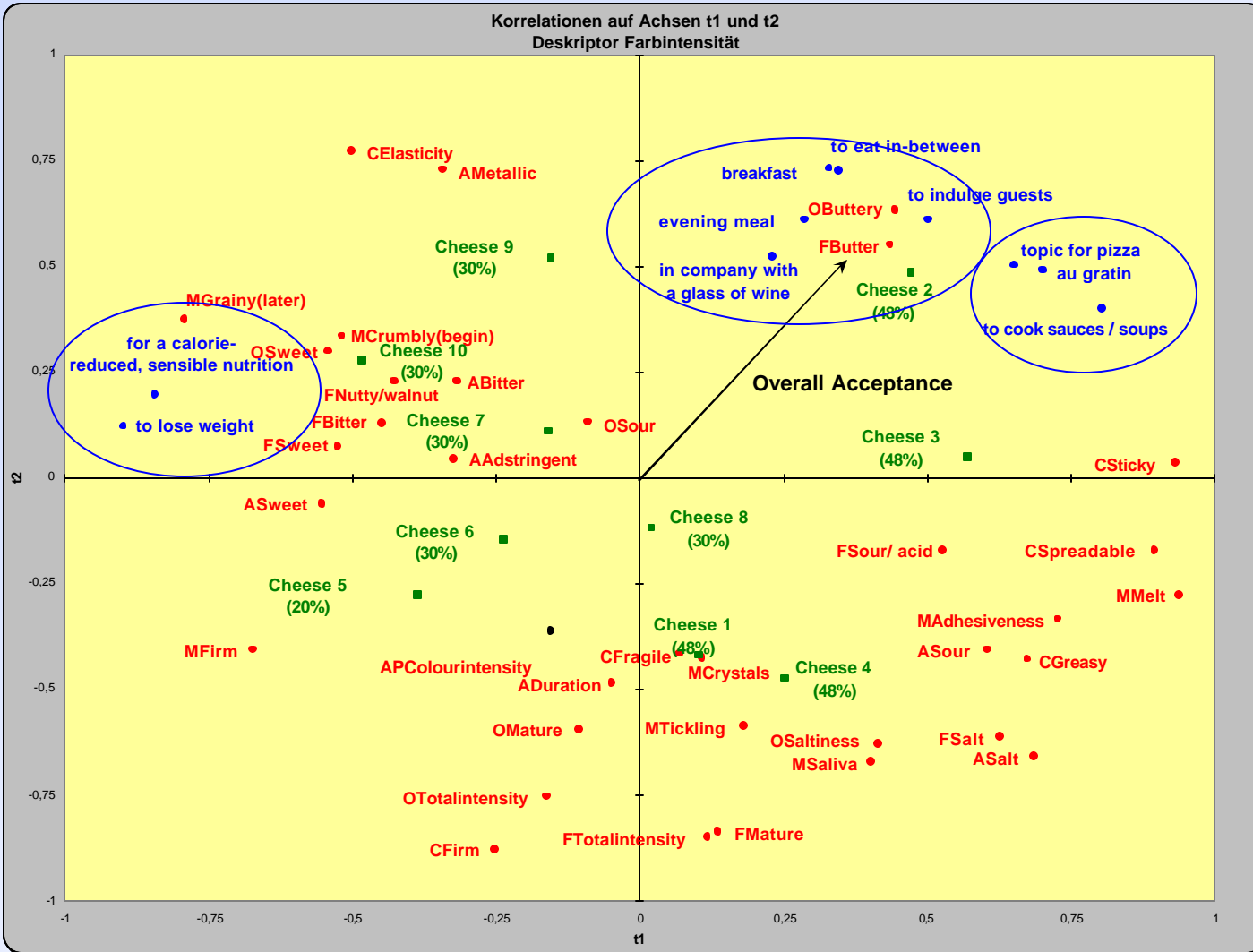
- au gratin
- as topic for a pizza
- to cook sauces / soups
- as topic for the evening meal (on dark bread/ rye bread)
- as topic on the breakfast bread
- to lose weight
- to indulge guests (e.g. on cheese platters, cheese morsels)
- for a calorie-reduced, sensible nutrition
- to eat in-between
- in company with a glass of wine

PLS-Regression using panel data as X-variables



- AP – Appearance
- O – Odour
- C – Textur
- M – Mouthfeel
- F – Flavour
- A – Aftertaste

PLS-Regression using appropriateness of use data as Y-variables

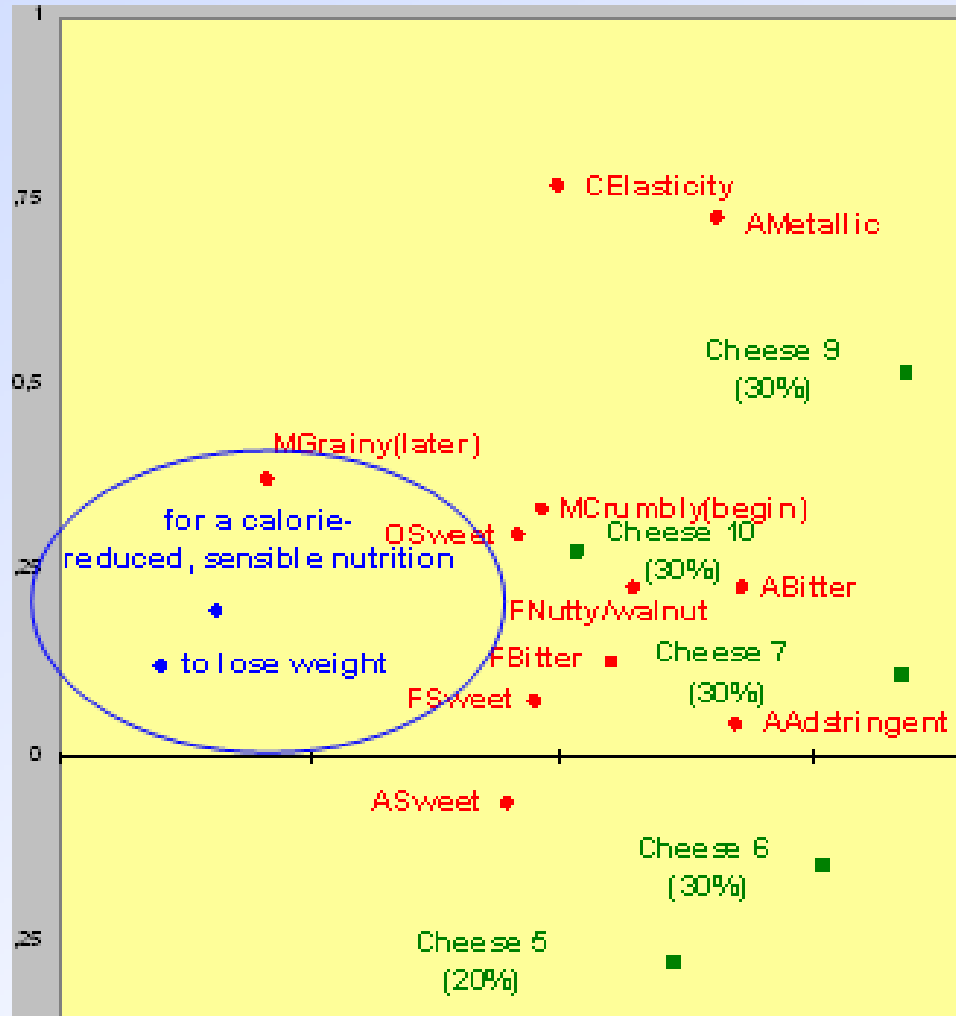


- AP – Appearance
- O – Odour
- C – Textur
- M – Mouthfeel
- F – Flavour
- A – Aftertaste

X-expl. = 37%; 27%
Y-expl. = 35%; 25%

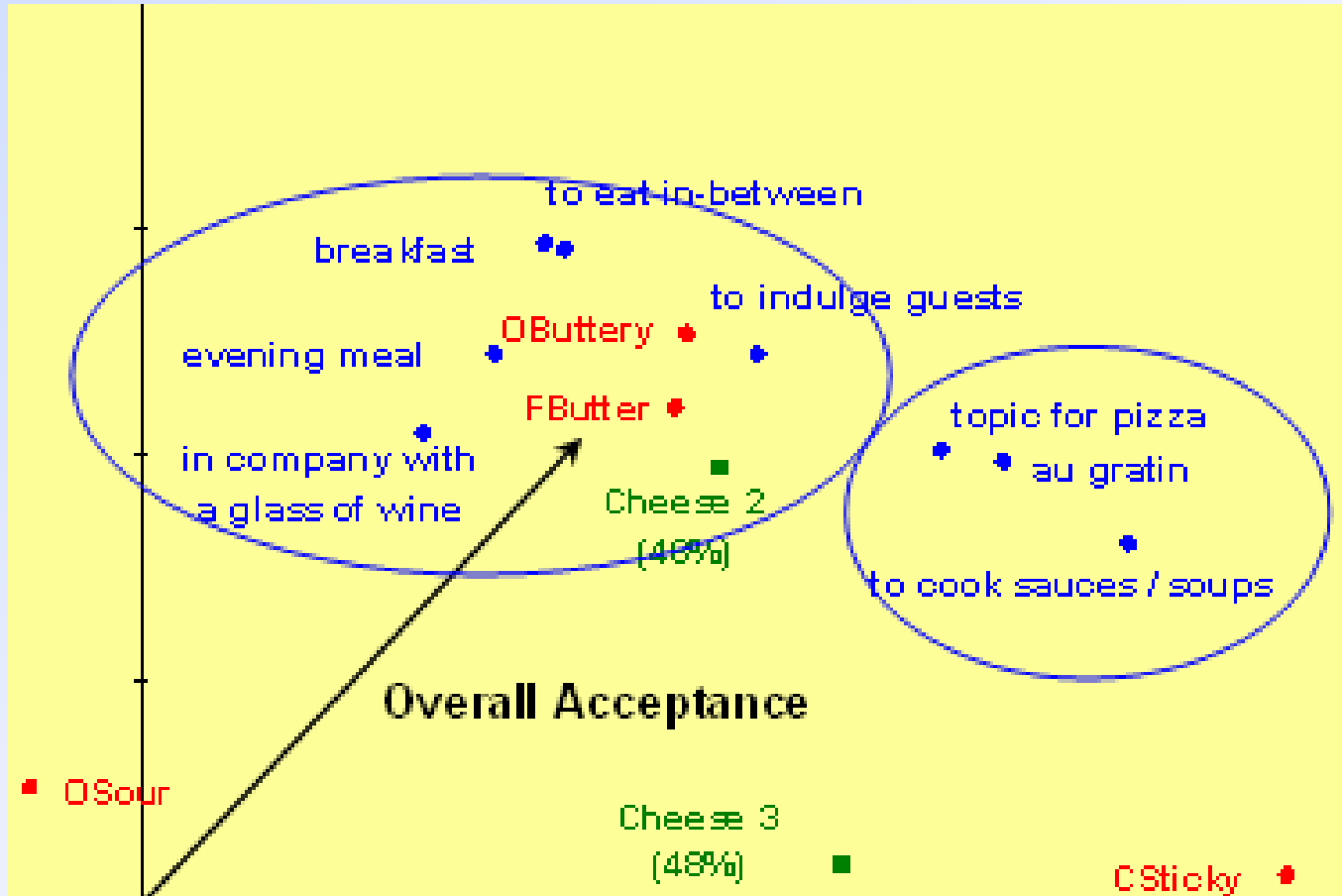


Cluster 1 – Sensible / light nutrition



Cluster 2 – eating occasions

Cluster 3 – cooking with cheese



Empirical example 3: (Glassl/Scharf 2006)

Relationship between consumers' perception of cordials and the appropriateness of use

- In total, 8 cordials (existing market products) were tested.
- In a Focus Group with actual users, typical usage situations for cordial were derived.
- The sensory product profiles were generated with Flash Profiling.
- 100 consumers evaluated the 8 cordials in a sensory blinded test (2 sessions) using a 9 point hedonic scale.
- Directly after the evaluation of each sample, the consumers indicated how good this cordial fits to the several consumption situations.

Appropriateness of use attributes (source: consumers) and sensory attributes (source: experts) for cordials

Appropriateness of use

- For special occasions
- To mix
- For celebrations / parties
- After lunch / dinner
- As appetizer
- Together with friends
- To drink in-between

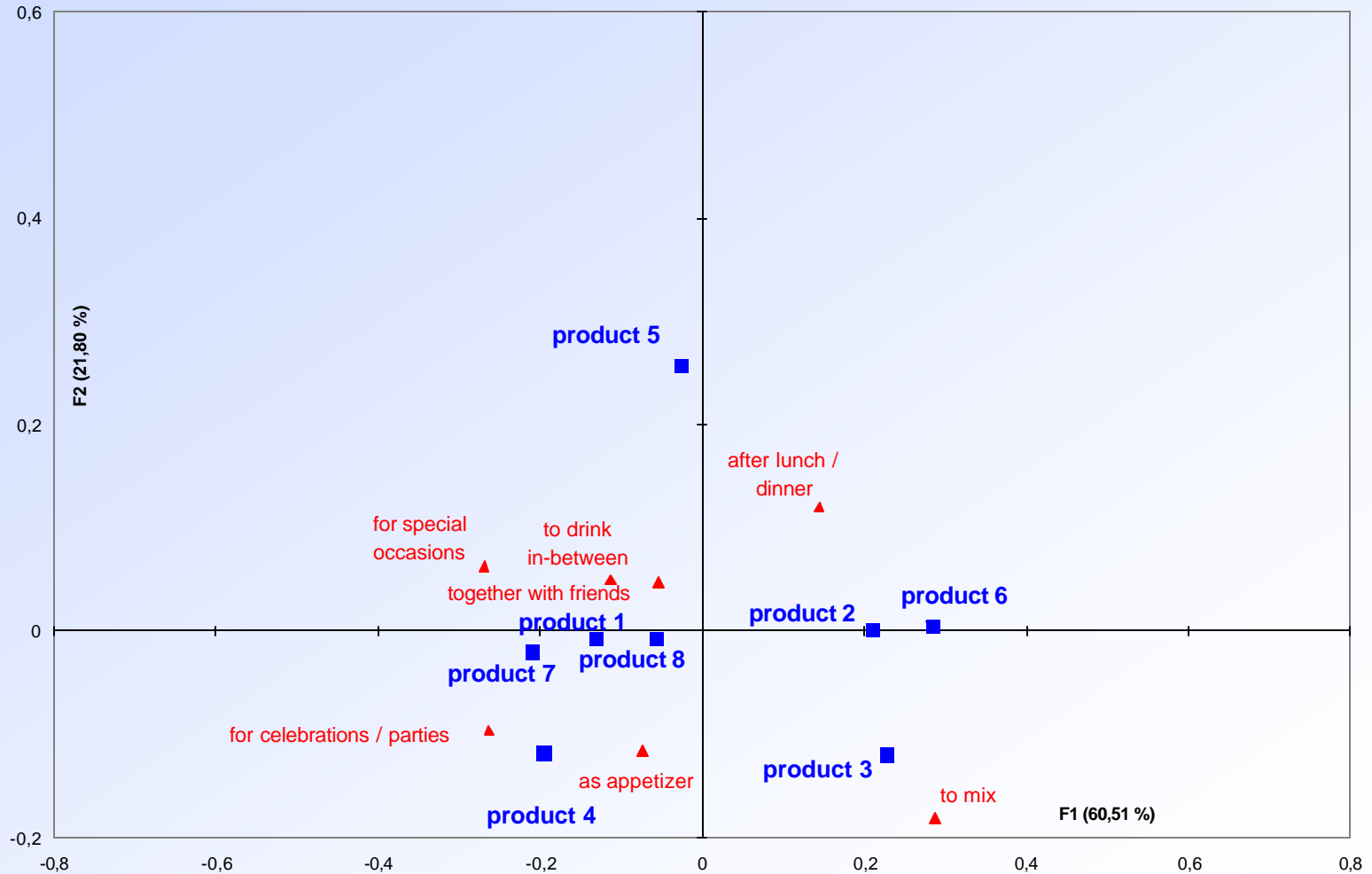
Flavor attributes

- Sweet
- Acerb
- Fruity
- Aromatic
- Artificial
- Citric
- Medical
- Bitter
- Herbal
- Gingerbread
- Mint
- Licorice

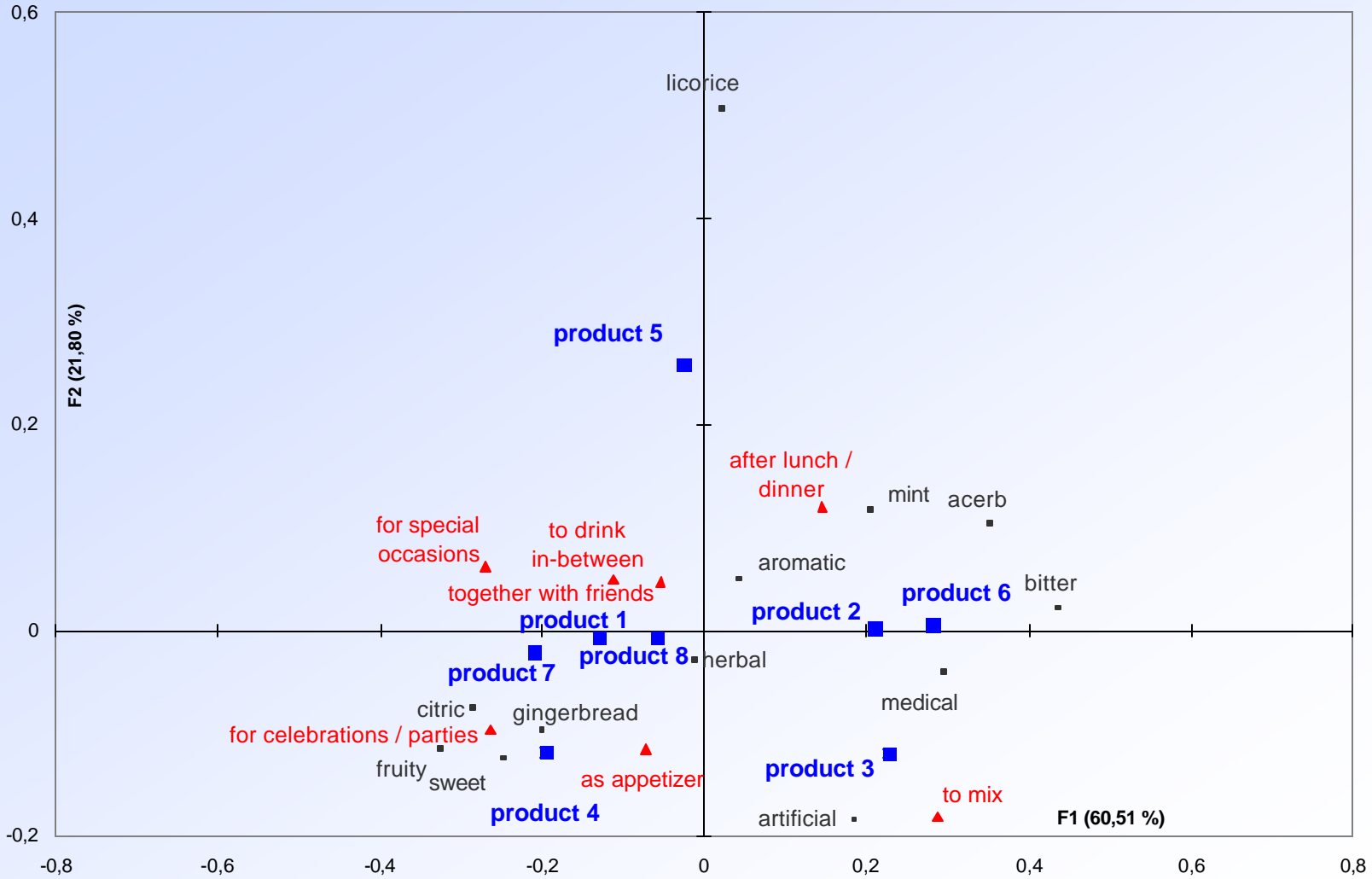
Frequency table – product x appropriateness of use items

N = 100	for special occasions	to mix	for celebrations / parties	after lunch / dinner	as appetizer	together with friends	to drink in-between
Product 1	13	25	34	49	21	44	27
Product 2	8	34	19	57	13	37	10
Product 3	5	38	19	49	16	29	16
Product 4	15	23	38	42	28	38	15
Product 5	13	14	22	68	15	41	20
Product 6	5	31	13	59	19	25	13
Product 7	13	19	39	45	19	39	19
Product 8	12	25	27	49	20	31	25

Correspondence analysis of appropriateness of use data for cordials



Mapping of sensory attributes in the consumers' appropriate of use space



Conclusions and outlook

- Information about the relationship between the sensory characteristics of products on the one hand and the perceived benefits resp. usage situations on the other hand facilitate the successful development of new products.
- As product perceptions of experts and consumers often differ, it is not always possible to identify the sensory attributes which are responsible for the derived benefits and usage situations.
- Further research needs to be conducted in order to identify ideal qualitative methods for the identification of suitable benefits and usage situations as well as for the data collection.

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