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# Factors influencing acceptance of novel food technologies

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**Consumer Behavior** 

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# **A Historical Timeline** Food technologies



Siegrist & Hartmann, 2020

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#### Food technology aspects

- Voluntary exposure
- Perceived naturalness
- Perceived dread
- Perceived control

#### **People's characteristics**

- Disgust sensitivity
- Food technology neophobia
- Cultural values

# Heuristics Affect heuristic Natural-is-better heuristic Trust heuristic Acceptance

**Fig. 2 | Factors influencing the perception of food technologies.** How a food technology is perceived by consumers depends both on the perceived aspects of a food technology and on the individual characteristics of the consumers. Furthermore, both of these factors influence the heuristics that consumers rely on when evaluating the benefits, risks and acceptance of food technologies.

#### Siegrist & Hartmann, 2020

## **Food Technology Aspects**

# Perception of various gene technology applications



Connor & Siegrist, 2009

#### **People's Characteristics**

#### Knowledge, Trust, Personality

- Lay people may have misconceptions about novel technologies that are barriers for acceptance
- Lay people often have to rely on experts
  - Trust is a key factor
- Personality related factors influence acceptance
  - Food neophobia
  - Disgust sensitivity
  - Health concerns

#### **Knowledge of European consumers**

#### (N = 5.631)



Incorrect response

? Don't know

The chemical structure of the synthetically produced salt (NaCl) is exactly the same as that of salt found naturally in the sea.

Being exposed to a toxic synthetic chemical substance is always dangerous, no matter what the level of exposure is\*

\* Incorrect statement (reverse-coded)



Bearth, Saleh & Siegrist, 2019

# **Chemophobia: views of European consumers**

(N = 5,631)



Bearth, Saleh & Siegrist, 2019

#### Natural-is-better heuristic

- In the food domain various heuristics help us to make quick decisions
- Natural-is better heuristic is important for evaluating healthiness, taste and sustainability of foods



# Impact of Symbolic Information: Sensory Experience

- Participants were invited to a sensory experiment
- Evaluate a "mousse au chocolat"
- Three groups
  - No information
  - Natural Vanilla
  - Artificial Vanillin



# **Food Irradiation**

- Irradiated food has to be labeled in Switzerland
  - "Mit ionisierenden Strahlen behandelt"
  - "bestrahlt"
- Benefits associated with food irradiation are not tangible for consumers; they must be communicated
- This may be difficult due to the associations evoked by the term irradiation



# **Food Irradiation**

- Radiation is strongly associated with nuclear power that tends to evoke negative associations and images
- These negative attitudes may shape attitudes toward food irradiation, helping to explain why a number of consumers perceive food irradiation as a risky technology
- Several studies suggest, that knowledge positively influences acceptance

# **Consumer Perception of Food Irradiation**



Consumers' affect evoked by nuclear power and quality perception of the irradiated food were large and significantly correlated (r>.52, p < .001)





Bearth & Siegrist, 2019

# **Biases Related to the Evaluation of Naturalness**

- Process is more important compared with outcome
- Dose insensitivity
- E-numbers refer to synthetic ingredients

# **The Importance of the Process**

#### Water, removing natural minerals (.1%)

1. Consider water A that comes out of a natural spring. This water contains .1% minerals.

2. Imagine that water A goes to a processing plant, and the minerals are removed, so it is now pure water.

3. Imagine that after the minerals are removed in the processing plant, the same minerals are put back in, so that the water has .1% minerals, like water A, that came out of the spring.



Naturalness, N=77



## **The Importance of the Process**

#### Water, adding natural minerals (.1%)

4. Consider water B that comes out of a natural spring. This water contains no minerals.

5. Imagine that water B goes to a processing plant, and that .1% minerals, extracted from other spring water, are added.

6. Imagine that after the minerals are added in the processing plant, the same minerals are then removed, so that the water has no minerals, like water B, that came out of the spring

Naturalness, N=75

Rozin, 2006

# **Dose Insensitivity**



Evans et al., 2013

# Food Additives: The Symbolic Power of E-Numbers

As how artificial or natural do you evaluate the following food additives? (0=artificial, 100=natural)

	With E- Number (M, SD) (N=121)	No E-Number (M, SD) (N=123)	t-value
(E 100) Curcumin, natural food color (orange-yellow)	65.10 (32.26)	75.89 (26.42)	2.86**
(E 220) Sulfur dioxide, blocks browning reactions in dry fruits	39.55 (33.29)	46.72 (33.93)	1.66*
(E 620) Glutamic acid, flavor enhancer	30.62 (29.11)	37.89 (33.58)	1.81*

\*\* p < .01; \* p < .05, one-tailed

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# Conclusions

- People are rather conservative when it comes to food
- Aspects of a food technology influence acceptance
- Large individual differences
- Naturalness evokes positive evaluations of foods
  - Tastier, healthier, more sustainable
- Biases related to the evaluation of naturalness
  - Process is more relevant than outcome
  - Dose insensitivity