

## Evaluations of new food technologies – looking beyond the rational actor model

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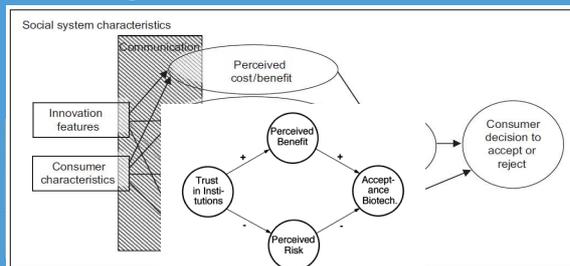
## Question

- What do you think is the first thought of consumers encountering this food?



## Consumer response models

- Conceptual models have been developed that tried to explain consumer response to new technologies.

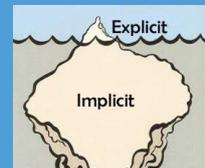


## Beyond rational processing

- Rational actor model is appealing: straightforward and predictable.
- BUT:** systematic processing covers only a limited part of attitude formation;
  - This also applies to risk perception (Slovic, 2002, 2004; Loewenstein, 2001).

- Distinction between:

- conscious, deliberative, explicit processes
- Dual processes:** unconscious, intuitive, and implicit processes.



## Aim of presentation

- More specifically, this study:

- Proposes key priorities to guide future research towards application of dual process models in consumer research on new food technologies;
- Based on an empirical case study, discusses specific challenges of using implicit measures with regard to consumer responses.



## Dual process models

- Dual processes:** distinction between human decision processes that are unconscious, implicit and intuitive (**System 1**), and those that are conscious, explicit and deliberative (**System 2**) (Kahneman and Frederick, 2002).



- Many studies on dual-process models have evolved over the past decades;
- Popularity of dual process models led to some applications within domain of new food technologies (Frewer, 1999; Siegrist et al., 2007).



## Dual process models

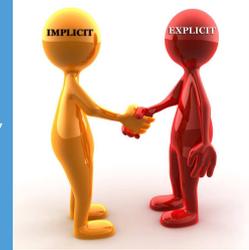
- Different disciplines developed multiple theoretical accounts and associated empirical measures (i.e., ELM, HSM, MODE, etc).
- Multiple concepts and terminologies of System 1 processes exist (Glöckner and Witteman, 2010).
- System 2 appears to be a more coherent and consistent concept than System 1 (Evans, 2008).
- Mixed success of testing dual processes in applied domains.

**Research Priority 1:** What aspects of dual processes are relevant in the context of new food technologies?



## Implicit versus explicit attitudes (1)

- One of the distinctions that is often made is between **implicit** and **explicit** attitude formation.
- Several studies showed that behaviour is better predicted by a combination of explicit and implicit attitudes than by explicit attitudes alone (Nosek, Banaji, and Greenwald, 2002; Perugini, 2005).



## Implicit versus explicit attitudes (2)

- 2 kinds of mental processes underlying implicit and explicit attitudes (Gawronski and Bodenhausen, 2006):

- **Implicit attitudes:** affective reactions resulting from associations that are activated automatically when one encounters an attitude object.



- **Explicit attitudes:** evaluative judgments that stem from propositional reasoning and is concerned with the validation of evaluations and beliefs.



## Implicit versus explicit attitudes (3)

- If an attitude object is unfamiliar (i.e., new technologies), associative reactions are insufficient and more elaborate processing is needed.
- However, since in many such cases factual information is also missing making elaborate and conscious processing difficult, the subsequent processing may remain implicit.

**Research Priority 2:** When are implicit (versus explicit) attitudes more important predictors of behavioural responses to new technologies?



## Implicit versus explicit attitudes (4)

- Implicit attitudes found to be more stable and less flexible than explicit attitudes (Hermans et al., 2003; Spence and Townsend, 2006).
- It is unlikely that implicit attitudes are more consistent than explicit attitudes for new food technologies:
  - No strong stereotypes and not extensively conditioned.
  - Elements of information may lead to consistent explicit attitudes even in unclear situations.

**Research Priority 3:** How stable are implicitly formed attitudes as compared to explicitly formed attitudes?



## Implicit risk and benefit perceptions

- The study of **risk perceptions** and **benefit perceptions** is a common approach to understand how evaluations of new technologies are formed (e.g., Siegrist, 2000; Frewer et al., 2003).
- When explicit and implicit processes lead to different outcomes, asymmetric effects can occur in risk and benefit perceptions.
  - Previous studies show that implicit measures may give important insight into risk perceptions (e.g., Siegrist et al., 2006; Dohle et al., 2010).



## Implicit risk and benefit perceptions

- Risk is affectively laden construct; benefit perceptions are likely to be more rational construct.
  - Risk as feelings model (Loewenstein et al., 2001).
  - For food, the affective origin of risk is reinforced because it is ingested (Ronteltap et al., 2007).
- Implicit measures are better able to capture responses to affectively laden constructs (Nevid, 2010).

**Research Priority 4:** *Is the supposed parallel between risk perceptions and implicit and benefit perceptions and explicit a promising entry to explore the role of dual processes?*



## Measuring implicit consumer responses (1)

- Knowledge on implicit processes has been advanced by the development of implicit measures:

**Implicit Association Test**  
*Affect Misattribution*      *Affective Priming Task*  
**Primary Response Task**



## Example: Empirical case study IAT

- **2 Single Category Implicit Association Tests (SC-IATs)** were developed (1 with pictures and 1 with words) related to a new food technology as attitude object.
  - Associations are derived by computing the time that a respondent needs to pair two concepts (Karpinski and Steinman, 2006).
    - *A new technology X with a positively (negatively) laden word Y.*
  - SC-IAT is a specific variant for a single attitude object.
- Sample N=120, representative for Dutch population.



## Empirical case study: Main results

- The SC-IAT with words (vs. pictures) generated stronger effects (but results were in same direction).
- Implicit measure of risk perceptions is significant predictor of both explicit and implicit attitudes.
  - *Addition of implicit predictors significantly increased the explained variance of the attitude model.*
  - *Strikingly, implicit risk appears to have a positive effect on attitudes.*
- Implicit measure of benefit perceptions did not significantly predict explicit and implicit attitudes.



## Empirical case study: Critical reflections

- What effect does the time have that elapses between reading the information on the new technology and performing the IAT?
- To what extent should the explicit and implicit measures correlate with each other?
- Implicit measures of risk and benefit need validation.
  - With the current operationalization we cannot distinguish between the effects of negative (risk) – positive (benefit) and uncertain (risk) – certain (benefit).



## And there are even more issues waiting to be solved...

- Role of context: different associative patterns depending on the particular context in which the object is encountered.
- Focus on new technology itself or product embodying a new technology?
- Differences between decision stages of consumers?
- Other measures to measure System 1 mode (e.g., physiological measures)?



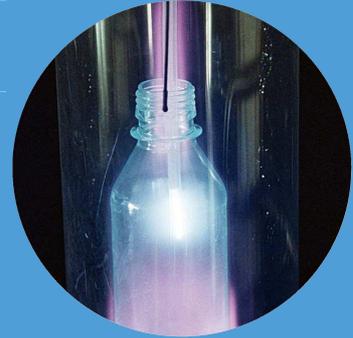
## Conclusions

- General sense of discomfort in the field of consumer response to new food technologies concerning the applicability of current models.
- Scientific accomplishments on dual processes need to be brought together to do justice to complexity of consumer response to new technology.



- We listed the main conceptual and empirical challenges that need to be tackled by the scientific community.
- Researchers to whom it concerns are invited to take up the challenges!

Thank you for  
your attention!



## Back-up slide IAT case study: experimental design and procedure

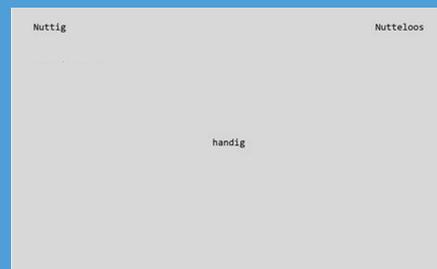
- 2 (target: nutrigenomics word vs picture) x 2 (attribute: utility vs risk perceptions) between-subjects design.
  - Attitudes were measured for all respondents.
- Sample (n=120) was representative for Dutch population on age and gender.
- All tasks were computer-based, speeded categorisation tasks (using Inquisit software);
  - All participants completed the tasks in 15 minutes on average.
- Participants were tested individually in groups of up to 12 at a time.

## Back-up slide IAT case study: measures

- *Implicit measures:*
  - Nutrigenomics as attitude object by 4 pictures and 4 words.
  - Risk: labels *risky* (e.g., danger) - *risk-free* (e.g., certain).
  - Utility: labels *useful* (e.g., functional) - *useless* (e.g., redundant).
  - Attitudes: labels *positive* (e.g., happy) - *negative* (e.g., war).
  - 5 words for all attribute labels.
- *Explicit measures*
  - Risk perceptions (Frewer et al., 1996),
  - Utility perceptions (Frewer et al., 1996), and
  - Attitude (Frewer et al., 2003) (3 items each).

## Back-up slide IAT case study

### Example screen shot with IAT:



### Back-up slide IAT case study

#### Example screen shot with IAT:



### Back-up slide IAT case study: Results

- Block wise regression analyses in which risk perceptions and utility perceptions were included as predictors of attitude.
  - The first step included explicit predictors only;
  - In the second step implicit predictors were added;
- SC-IAT with words (vs pictures) generated stronger effects, but in the same direction.
  - *Only results from conditions with words presented.*



### Back-up slide IAT case study: Results

	Model 1	Model 2	Model 3	Model 4
Dependent variable:	Explicit attitude	Explicit attitude	Implicit attitude	Implicit attitude
<b>Block 1: explicit predictors only</b>				
Explicit risk perceptions	.001		-.112	
Explicit utility perceptions		-.410**		-.307
R <sup>2</sup>	.000	.168	.013	.094
<b>Block 2: both explicit and implicit predictors</b>				
Explicit risk perceptions	-.042		-.156	
Explicit utility perceptions		.402**		-.312
Implicit risk perceptions	-.424**		-.429**	
Implicit utility perceptions		.356*		.216
R <sup>2</sup>	.178 <sup>†</sup>	.295	.195 <sup>†</sup>	.141

\*Significant at p < .10; \*\* Significant at p < .05.  
 † Indicates a significant (p<.05) increase in R<sup>2</sup> relative to block 1.

