Neuronal coding of valence of food-related stimuli: intrinsic taste properties versus individual preference

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To disentangle intrinsic product properties from individual preferences (extrinsic), and to localize neuronal differences (characterization of brain areas and underlying activity) between individuals that determine our liking or disliking for a food...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational invasive

Summary

ID

NL-OMON36130

Source
ToetsingOnline

Brief title
Neuronal coding of valence of food-related stimuli

Condition

- Other condition

Synonym
eating behavior, taste and smell perception

Health condition

sensoriek (smaak- en reukvermogen) en eetgedrag

Research involving
Human

Sponsors and support

Primary sponsor: TI Food and Nutrition
Source(s) of monetary or material Support: Top Institute Food and Nutrition

Intervention

Keyword: fMRI, food, preference, valence

Outcome measures

Primary outcome

Difference in brain response between likers and dislikers for the target food stimulus (fMRI)

Secondary outcome

The secondary outcome measures are:

1. Difference in brain response for the target stimulus and neutral control stimulus

2. Difference in brain response for the target stimulus and the universally liked and disliked stimuli

3. Difference in experienced pleasantness for the target stimulus between likers and dislikers

4. Difference in experienced pleasantness between the target stimulus and the universally liked and disliked stimuli

5. Difference in experienced desirability for the target stimulus between likers and dislikers

6. Difference in experienced desirability between the target stimulus and the universally liked and disliked stimuli

7. Difference in experienced intensity for the target stimulus between

likers and dislikers

8. Difference in experienced intensity between the target stimulus and the

universally liked and disliked stimuli

9. Difference in sensitivity to the basic tastes (sweet, sour, salty, bitter)

between likers and dislikers

10. Correlations between differences in brain responses and differences in

ratings of experienced pleasure, desirability, and intensity

Study description

Background summary

Previous research has indicated several brain regions that code the valence for food-related stimuli (odours, tastes). However, these studies have used *universally* pleasant or unpleasant stimuli, providing limited information on whether this coding is due to the intrinsic product properties, or determined by one*s individual preferences and experience. In this study, we will use a target food stimulus that is liked by half of the study population and disliked by the other half of the study population, to disentangle intrinsic product properties from individual preferences (extrinsic), and to localize neuronal differences between individuals that determine our liking or disliking for a food product. We hypothesize that stimuli with positive valence activate different networks in the brain than negative valence-stimuli, rather than a graded scale of activation within the same network or area. In addition, we hypothesize that brain activity patterns in response to individually liked versus disliked stimuli will differ from activation patterns generated by universally liked and disliked stimuli. Characterization of these brain areas and activation patterns will enable the future development of a model for the assessment of long-term acceptance of food products by measuring changes in valence and acceptance coding after repeated exposure.

Study objective

To disentangle intrinsic product properties from individual preferences (extrinsic), and to localize neuronal differences (characterization of brain areas and underlying activity) between individuals that determine our liking or disliking for a food product.

Study design

The study design is an observational experiment in which a group of likers and a group of dislikers taste a fixed amount of all four test stimuli while their brain responses are being recorded by a 3T MRI scanner: i) the target food-stimulus that is either liked or disliked, ii) a food-stimulus that is universally liked, iii) a food-stimulus that is universally disliked, and iv) a food-stimulus that is perceived as neutral. The order in which participants are exposed to these stimuli is randomized and counterbalanced.

Study burden and risks

The study duration will consist of a training session and the actual experiment (1 session) on separate days. Participants will visit the fMRI facility in Ede (Hospital Gelderse Vallei) one time to undergo the fMRI measurements, consume the food stimuli, and rate the experienced pleasure and desirability for each food stimulus. Before inclusion in the study, participants will have a training session for the fMRI measurement. The study is non-therapeutic to the participants. The risk associated with participation is very low.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Extreme liking or extreme disliking for the target stimulus
- Adult men/women, i.e. aged between 18 and 45 years on the first study day
- Having a BMI within the normal range, i.e. 18.5 - 25.0 kg/m2
- Being healthy (as judged by the participant)
- Being right handed
- Having given written informed consent
- Willing to comply with the study procedures
- Willing to be informed about incidental findings of pathology
- Successful completion of the training session

Exclusion criteria

- Being hypersensitive (allergy and/or intolerance) for the foods under study (see 5.2.1 Test foods).
- Having a taste or smell disorder
- Lacking appetite
- Having a score of >= 2.25 on the restraint scale of the Dutch Eating Behaviour Questionnaire
- Using an energy restricted diet during the last 2 months
- Having weight loss or weight gain of more than 5 kg during the last 2 months
- Having stomach or bowel diseases
- Having diabetes, thyroid disease, or any other endocrine disorder
- Having a history of or current neurological disorder
- Using medication, except for paracetamol and oral contraceptive medication
- Smoking
- Having a history of or current alcohol consumption
- Having a contra-indication to MRI scanning (see section 4.3 of protocol)

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-11-2011
Enrollment:	48
Type:	Actual

Ethics review

Approved WMO Date:	13-09-2011
Application type:	First submission
Review commission:	METC Wageningen Universiteit (Wageningen)
Approved WMO Date:	09-12-2011
Application type:	Amendment
Review commission:	METC Wageningen Universiteit (Wageningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL37232.081.11