Changing neural processing of olfactory and visual food cues by sensory specific satiety

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Appetite and general nutritional disorders
Study type	Interventional

Summary

ID

NL-OMON42333

Source
ToetsingOnline

Brief title
BrainWave

Condition

- Appetite and general nutritional disorders

Synonym
overeating, overweight

Research involving
Human

Sponsors and support

Primary sponsor: Wageningen Universiteit
Source(s) of monetary or material Support: NWO

Intervention

Keyword: electro-encephalography, food cues, sensory specific satiety

Outcome measures

Primary outcome

The difference in event related potentials (obtained with the use of EEG) in response to different food cues (odour/picture; sweet/savoury; high/low energy dense), as well as the difference in ERP before and after sensory specific food intake.

Secondary outcome

Δ Appetite, measured at two time-points (before and after eating a product) on a visual analogue scale, and the correlation between these differences and differences in ERP responses.

Study description

Background summary

In the food abundant environment we live in, proper food intake regulation is crucial for our health. Several studies have found that sensory specific effects can steer towards but also away from intake of specific types of food products (sweet/savoury). Food cues seem to increase appetite for congruent products and decrease appetite for incongruent products. Congruent products are products that have similar characteristics as the product that is signaled by a food cue, incongruent products have dissimilar from the product that is signaled by the cue. For example, after viewing/smelling one has an increased appetite for chocolate itself, but also for products that are similar to chocolate (treacle waffle, cake). Also, one would show decreased appetite for products from a dissimilar category (beef stew, cucumber). Intake of specific food products on the other hand, seem to increase satiety for congruent products and still leave appetite for incongruent products. In this case eating chocolate would decrease the appetite for more chocolate (and treacle waffle and cake), but appetite for products that are not like chocolate (beef stew, cucumber) remains. Changes in food preference might be related to alterations

in central (brain) mechanisms, related to reward sensing. The smell and sight of food can be considered as anticipatory cues for the rewarding effects of food intake. How sensory processing and sensory specific satiety work together is not clear yet. Also, how early neural processing of food cues is affected by intake of products with a specific flavor still needs to be determined.

Study objective

With the current study we aim to assess early brain responses to different food cues (odours and pictures) and we want to determine how these responses are affected by ad libitum intake of product with a specific flavor (sweet/savoury). We expect to find differences between early and late ERP components during sensory processing of food cues. These differences are likely to be dependent on characteristics of the food cues (i.e. high/low energy dense; sweet/savoury). Further, we hypothesize that responses to savoury food cues will dampen after intake of a savoury product whilst responses to sweet food cues remain similar or increase. The opposite effect is expected after intake of a sweet product. Also, with EEG we intend to determine where in the brain these changes approximately take place.

Study design

Intervention study follows a balanced randomized controlled cross-over design. All participants will undergo all interventions.
The order of cue presentations will be randomized between participants.
The order of ad libitum intake of with sweet and savoury products will also be randomized between participants. The number of participants that are assigned the order sweet/savoury will be the same as the number of participants that are assigned the order savoury/sweet.
The order of the interventions will be coupled to the participant number and will be determined before we start with the inclusion of participants. Participant numbers are assigned in the order of inclusion.

Intervention

Each participant will participate in two sessions. In each test session two measurements of brain responses to several olfactory and visual cues will beperformed using electro-encephalography (EEG). Between the two EEG measurements participants will receive an ad libitum quantity of either a sweet or a savoury product. The order of the meals (sweet-savoury / savoury-sweet) is counterbalanced over participants

Study burden and risks

Participation includes two separate test sessions of approximately three hours at the Restaurant of the Future in Wageningen. In these test sessions EEG

measurements will be performed. EEG is a widely used, non-invasive and safe way to measure brain activation. The EEGs are performed/supervised by trained personnel (Jet Zoon, MSc and Dr. Sanne Boesveldt). Because of effects of muscle activity on the EEG signal, participants will be slightly restricted in their movement when the EEG signal is measured. Regular short breaks (± 1 min) will be included in the task about every 7 minutes to give participants opportunity to move freely and rest shortly. During the task, pictures will be presented via a monitor and participants will receive odours from an olfactometer, via small tubes that are places about 1cm into their nostrils. The food products provided to participants in the study consist of ingredients that are commercially available for consumers. These ingredients are safe for consumption. The study is non-therapeutic to the participants. The risk associated with participation is negligible.

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

• Gender: female
• Age: from 18 - 35 years
• Handedness: Right dominant hand
• Language: good Dutch reading and writing skills
• BMI: 18.5 <= BMI <= 25 kg/m2
• Health: good general health (subjective)
• Appetite: healthy appetite
• Olfaction: Normosmic (Sniffin* Sticks ID >= 12)

Exclusion criteria

• Medical background: Having a history of medical or surgical events that may significantly affect the study outcome (affecting tasting, smelling, swallowing), neurological problems (e.g. epilepsy)
• Chronic diseases: Having chronic disorders that can influence the outcome parameters of the study (e.g. thyroid disease, diabetes, kidney disorders)
• Pregnancy: (intention to get) pregnant or breast feeding during the past 6 months
• Medical drug use: use of medication, except for paracetamol and contraceptive medication.
• Mental status: when incompatible with the proper conduct of the study
• Food allergy: allergy or intolerance for the ad libitum products that will be consumed in the study.
• Liking liking < 40 mm on VAS for the ad libitum intake products and for the odours
• Alcohol consumption more than 7 alcoholic drinks per week
• Recreational drug use
• Smoking more than 1 cigarette/cigar/pipe per week
• DEBQ: Dutch Eating Behaviour Questionnaire Restraint score > 2.8
• Weight loss: Reported unexplained weight loss or weight gain of > 5 kg in the two months prior to pre-study screening
• Diet: Reported slimming or medically prescribed diet
• Lack of appetite
• Conviction: Reported vegan, vegetarian or macrobiotic life-style
• Dependent relation: Personnel of Wageningen University, department of Human Nutrition, their partner and their first and second degree relatives
• Other research: Current participation in other research from the Division of Human Nutrition (except for the Eet-Meet-Weet onderzoek)

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	23-11-2015
Enrollment:	20
Type:	Actual

Ethics review

Approved WMO

Date:	23-06-2015
Application type:	First submission
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	NL52713.081.15