Taste and food intake in older adults

Sensory aspects of food intake

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Sensory aspects of food intake

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Conflict of interest

- None
Learning objectives

- Know how sensory perception influences eating behavior
  - Vision, smell, taste, texture
  - Appetite, food choice, food intake, satiety

- Understand that sensory information is not just about pleasure, but can play a functional role for food intake regulation

- Know how this is altered in older adults
Sensory cues: more than just pleasure

Palatability drives food choice and meal size

Sensory characteristics can be considered as a **functional feature** of the foods and beverages we consume and create and thus **play a functional role in food intake control**
- Pre-meal expectations, food choice and portion selection
- Within-meal energy intake and satiation
- Post-meal appetite and further consumption
Visual cues

- Guide pre-meal beliefs, portion selection and intake
  - Food labels
  - Variety, identification
  - Expected liking and fullness
  - Portion size: A ‘clean plate’

Wansink 2005, Obes Res
Olfactory cues

- Stimulate appetite and directs attention towards cued foods (Ramaekers 2014; Gaillet-Torrent 2013, 2014; Zoon 2014, 2016)
Odor exposure triggers specific appetite

Ramaekers 2014, Int J Obes

Hunger, desire to eat

How large is your appetite for a [specific food product]
Olfactory cues – less impact on satiety, intake

- More intense aroma release (retronasal) is linked to bite size and satiety feelings (Harthoorn 2008; de Wijk 2012; Ruijschop 2008, 2010, 2011; Ramaekers 2014)

- No consistent impact on food intake (Fedoroff 1997; Coelho 2009; Larsen 2012; Zoon 2014; Ramaekers 2014; Proserpio 2017)
Nutrient sensing
- Sweet
- Umami
- Bitter
- Salty
- Sour
- Fat? Calcium

Texture

- **Food texture guides satiety expectations** (Hogenkamp 2011; McCrickerd 2012, 2015; Forde 2013; Ferriday 2016; Lett 2016)

- **Eating rate is a feature of the foods we consume (texture), not just the person consuming them**

- **Fast eating promotes energy intake** (Karl 2013; Bolhuis 2014; Forde 2013; Zhu 2013; McCrickerd 2017)
Texture (eating rate, oral exposure duration) is key!

- 2 kilos of grapes
- 1 kilo juiced into grape puree  |  1 kilo divided into 100 gr batches

Courtesy of Guido Camps, Wageningen University
Sensory changes in older adults
Age-related olfactory decline

- Not all elderly lose their sense of smell!
- Is this part of aging, or dependent on health status?

Doty 1984, Science

MacKay-Sim 2004
Smell loss leads to reduced food enjoyment

I go to restaurants less often

It reduces my appreciation of food and drink

I am more careful with what I eat as it may be spoiled

Food tastes different than before

Unpublished data from Smell and Taste Center (Hospital Gelderse Vallei, NL)
Smell loss can, but does not necessarily, lead to altered dietary patterns or malnutrition.

Segmentation might be important!
- Smell/taste loss
- Dependence, health

*Toussaint 2014, Chem Senses*
Age-related taste decline

Cowart 1989, Ann NY Acad Sci
Landis 2009, J Neurol

<table>
<thead>
<tr>
<th>Taste item</th>
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<tr>
<td>Sour</td>
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<td>Sweet</td>
<td>86.8</td>
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<tr>
<td>Salty</td>
<td>67.4</td>
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Boesveldt, 2011 Rhinol
Sensory strategies to maintain food intake

Past
- Flavor enhancement

Present
- Seasoning

Future
- Population segmentation
  - Holistic (multisensory) approach
  - Texture, oral health
Take home message

- Sensory cues: more than just pleasure
  - Vision: satiety expectations, portion size
  - Odors: trigger (specific) appetite
  - Taste: impacts intake and satiety
  - Texture: eating rate, intake and satiety

- Sensory loss in elderly: segmentation is key!
- Sensory loss mainly reduces food enjoyment

- Multisensory (holistic) approach to enhance food intake
Thank you!

Suggestions for further reading

Sensory perception and eating behavior:
Boesveldt 2017, Perception; McCrickerd 2016, Obes Rev

Sensory changes and food intake in elderly:
Kremer 2014, Food Qual Pref; Toussaint 2015, Chem Senses; Sulmont-Rosse 2015, Chem Senses