



a TASTE of  
— APRIL 21ST 2022 —  
CHANGE

# Chemosensory research in times of COVID-19

Ilja Croijmans

#SENSORY22

# WINE EXPERTISE SHAPES OLFACTORY LANGUAGE AND *Ilja Croijmans* COGNITION



Radboud Universiteit



Global Consortium for  
Chemosensory Research

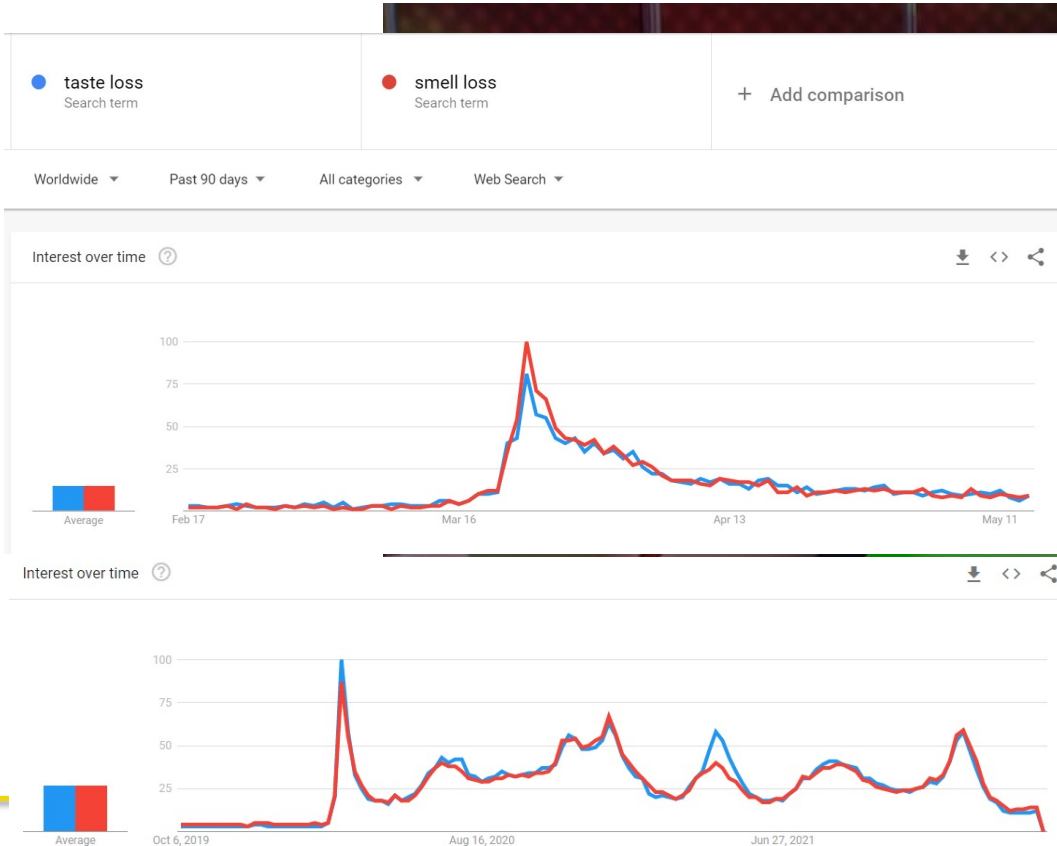


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## Background

- PhD in psychology, language & wine expertise
- NOSE network affiliation
- Smell research at the Utrecht University Smell Lab
- March 2020: COVID-19

# Februari 2020



**Dr. Maria Veldhuizen** 🇳🇱  
@margaveldhuizen

Do I know anyone in @PsySciAcc or other large consortium that would be interested in advising us regarding starting a global consortium for chemosensory questionnaire and/or at home assessment for #Covid\_19 anosmia?

[Tweet vertalen](#)



**Dr. Maria Veldhuizen** 🇳🇱 @margaveldhuizen · 19 mrt. 2020

So some portion of #COVID19 patients have taste/smell complaints during and after their illness. Are there any @ home taste/smell tests that use common household items? Not for diagnostic purposes, but to track function over time during epidemics? #citsci

[Deze collectie weergeven](#)

# The first study



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19035  
respondents  
4039 respondents  
diagnosed with  
COVID-19  
23 languages



These questions relate to your sense of smell (for example, sniffing flowers or soap, or smelling garbage) but not the flavor of food in your mouth.

13. Rate your ability to smell BEFORE your recent respiratory illness or diagnosis

No sense of smell Excellent sense of smell



(Place a mark on the scale above)

Question Type: Line Scale

14. Rate your ability to smell DURING your recent respiratory illness or diagnosis

No sense of smell Excellent sense of smell



(Place a mark on the scale above)

Question Type: Line Scale

Number of members

☐ No members ☐ 1-5 ☐ >5

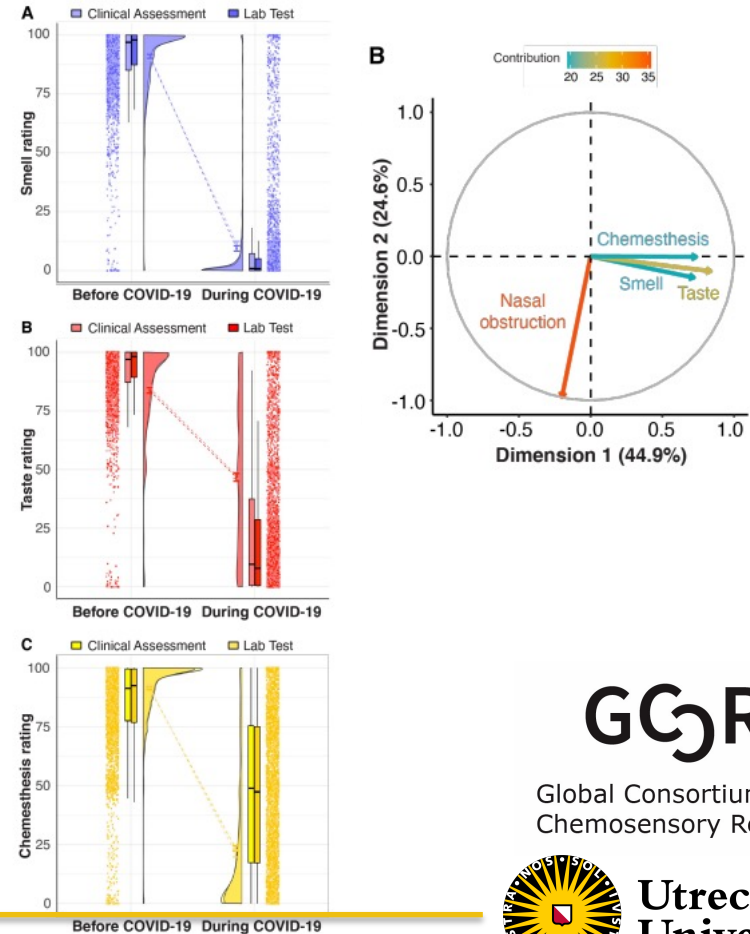


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# The first study

- Ran April 2020, Published September 2020
- Contributed to the wide acceptance of chemosensory disturbances as a distinguishing feature of COVID
- In addition to smell, taste and chemesthesis changes are also related to COVID-19
- *More than smell – covid is associated with severe loss of smell, taste & chemesthesis*



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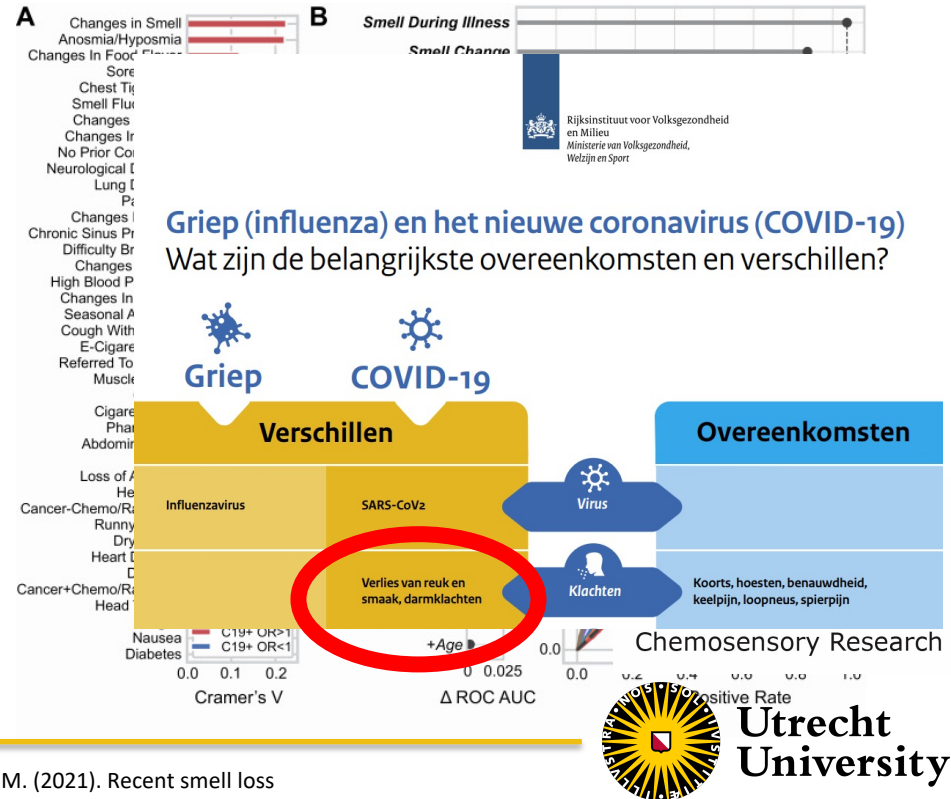
Global Consortium for  
Chemosensory Research



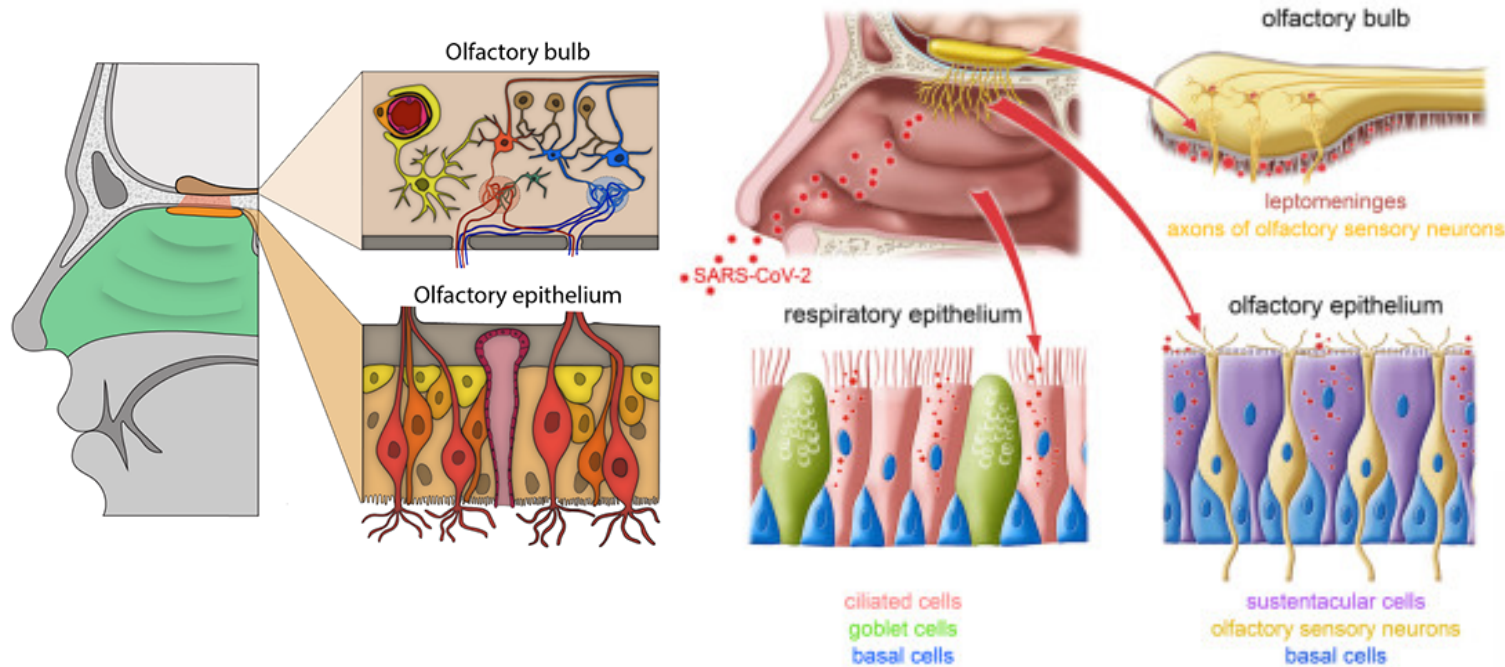
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# The second study

- Respondents with confirmed (n = 4039) and without (n = 546) COVID-19 were included
- Both groups reported a number of symptoms, including smell loss, but COVID patients reported it much more
- Smell loss was proven to be a distinctive symptom of covid, more distinctive than fever, sore throat, chest tightness and other symptoms



# The underlying mechanism



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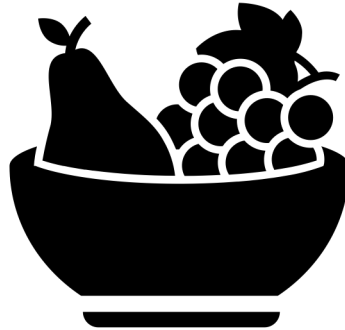


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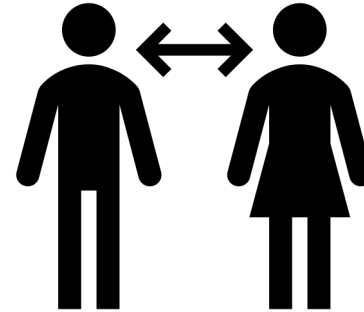
# Losing your sense of smell or taste



Warning/avoidance



Intake behavior



Social communication

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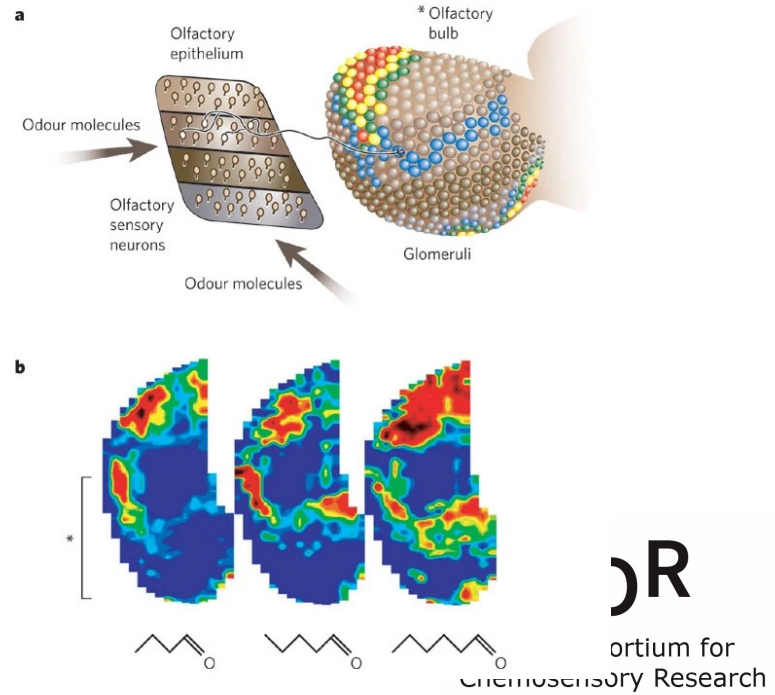
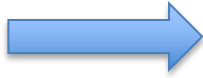
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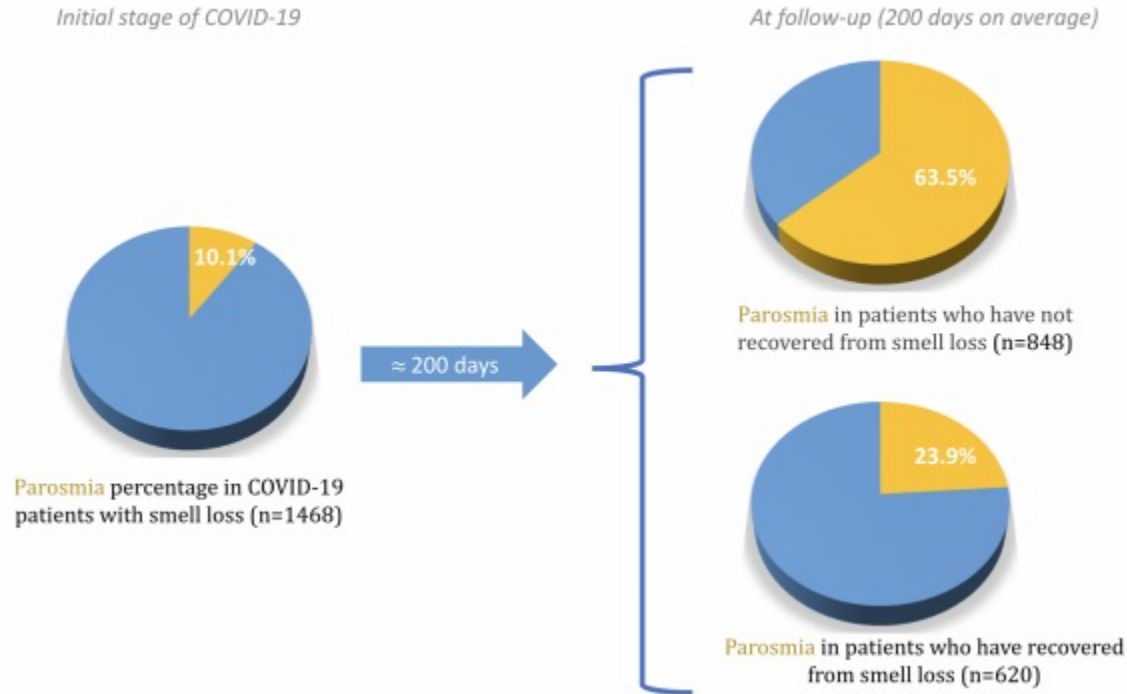
# The third study

Parosmia





# The third study



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# COVID-19 and business

1. Covid changed how we consume: we buy more online, including food



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# COVID-19 and business: Sensory marketing

- On the internet, everyone is anosmic
- Imagery = the ability to mentally re-experience a perceptual experience
- An expert description can inform consumers on what flavor to expect (potentially through imagery)
- But there is a lot of variation in descriptions

What language works best to inform consumers?



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Finca Filadelfia, San Agustín, Huila,  
Colombia

Tasting notes: Dark chocolate, red berries and panela.

PERU

Estrella Divina

Strawberry, Cream, Milk Chocolate, Pineapple

NOTES:  
BLACK TEA  
-  
HIBISCUS  
-  
RASPBERRY  
-  
ORANGE

PRODUCER  
NANO CHALLA COOPERATIVE  
REGION  
GERA JIMMA  
VARIETY  
ETHIOPIAN LANDRACE

BURUNDI RYARUNYINYA

Natural, cherry, strawberry, rosehip

Mahembe

Rwanda

Fruity. Fresh. Syrupy.

These beans from the Mahembe washing station are intense. The flavours are complex, with bursts of sweet berries, bright citrus, pomegranate, and herbal notes.

JOLIE-PITT & PERRIN

Méditerranée Rosé Studio by Miraval 2018

\$14

Salty, sea breeze notes flank the delicate white raspberry, melon and tangerine peel flavors in this delicate rosé. Offers a spicy, crisp finish. Cinsault, Grenache, Rolle and Tibouren. Drink now. 20,000 cases imported. —*Gillian Sciaretta*

Winemaker Notes

From its deep, inviting color to its enticing layers of boysenberry, blackberry, plum and star anise, this wine showcases what we love about great Sonoma County Cabernet Sauvignon. On the palate, the lush fruit flavors are framed by rich tannins and hints of dark chocolate and barrel spice.

Blend: 85% Cabernet Sauvignon, 10% Merlot, 3% Zinfandel, 1% Petit Verdot, 1% Petite Sirah

Product description

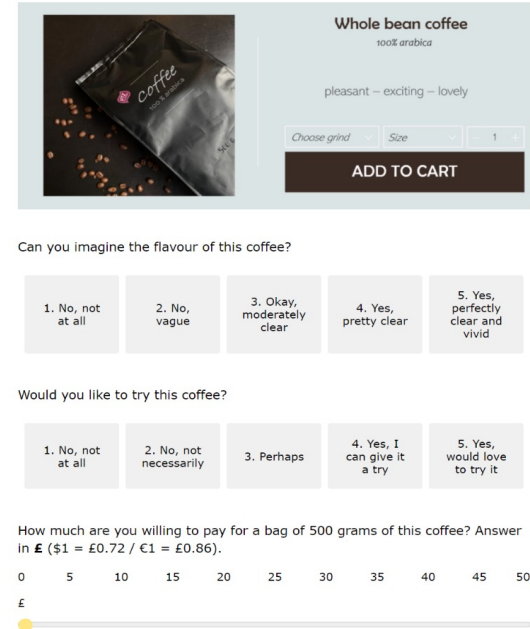
Straw-colored wine with brilliant reflections. The aroma is fruity, reminiscent of pear and citrus with a slightly floral bouquet. The wine is fresh and crisp with apparent apple and peach flavors. This gentle-sparkling wine epitomizes the traditional wine maker's Prosecco, fermented in the Charmat method to maintain the fresh fruity quality of the Prosecco grape.

From the award-winning Ara winery this is a benchmark example of Marlborough Sauvignon Blanc. Expect vibrant notes of white peach, lemon and thyme alongside a fresh acidity, and crisp finish.



# Informing consumers about coffee

- Coffee consumers rated different coffee descriptions in two online experiments on evoked imagery, desire, and willingness to pay.
- What kind of descriptions do consumers prefer?
  - Abstract, concrete or evaluative words?
  - Words or sentences?



The image shows a screenshot of a coffee product page and a survey interface. The product page features a bag of 'Whole bean coffee 100% arabica' with a 'Choose grind' dropdown menu, a 'Size' dropdown menu, and an 'ADD TO CART' button. Below the product page, there are two survey questions. The first question is 'Can you imagine the flavour of this coffee?' with five response options: '1. No, not at all', '2. No, vague', '3. Okay, moderately clear', '4. Yes, pretty clear', and '5. Yes, perfectly clear and vivid'. The second question is 'Would you like to try this coffee?' with five response options: '1. No, not at all', '2. No, not necessarily', '3. Perhaps', '4. Yes, I can give it a try', and '5. Yes, would love to try it'. Below the survey questions, there is a question about willingness to pay: 'How much are you willing to pay for a bag of 500 grams of this coffee? Answer in £ (\$1 = £0.72 / €1 = £0.86)'. A horizontal slider is provided for the answer, ranging from 0 to 50, with a yellow dot indicating the selected value.

Whole bean coffee  
100% arabica

pleasant – exciting – lovely

Choose grind Size 1

ADD TO CART

Can you imagine the flavour of this coffee?

1. No, not at all 2. No, vague 3. Okay, moderately clear 4. Yes, pretty clear 5. Yes, perfectly clear and vivid

Would you like to try this coffee?

1. No, not at all 2. No, not necessarily 3. Perhaps 4. Yes, I can give it a try 5. Yes, would love to try it

How much are you willing to pay for a bag of 500 grams of this coffee? Answer in £ (\$1 = £0.72 / €1 = £0.86).

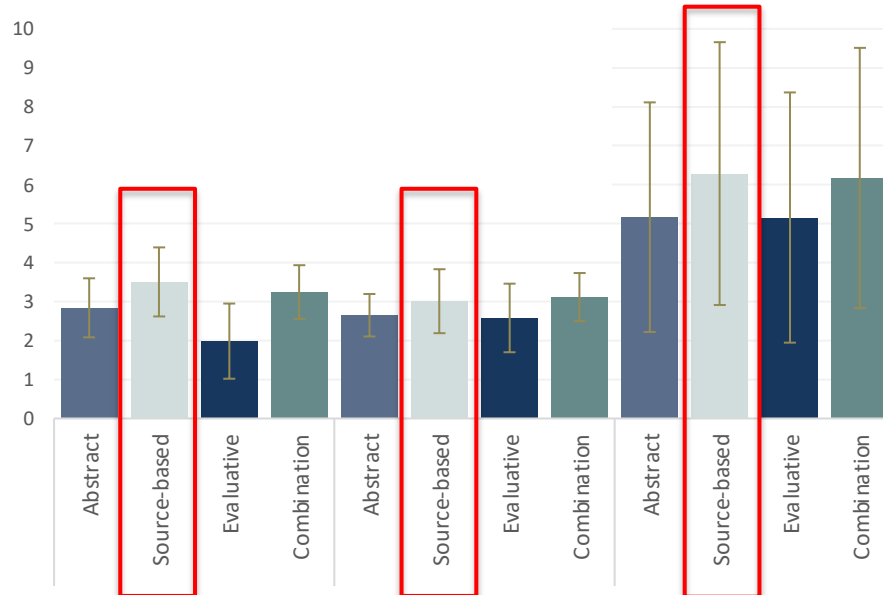
0 5 10 15 20 25 30 35 40 45 50

£





# The words



Imagery vividness:  $F(1.76, 68.74) = 45.79, p < .001, \eta^2 = .54$

Desire to taste:  $F(1.83, 71.21) = 8.63, p < .001, \eta^2 = .18$

Willingness to pay:  $F(1.8, 70.21) = 11.22, p < .001, \eta^2 = .22$

Abstract: sweet – acidic - mild

Source based: honey – chocolate - pear

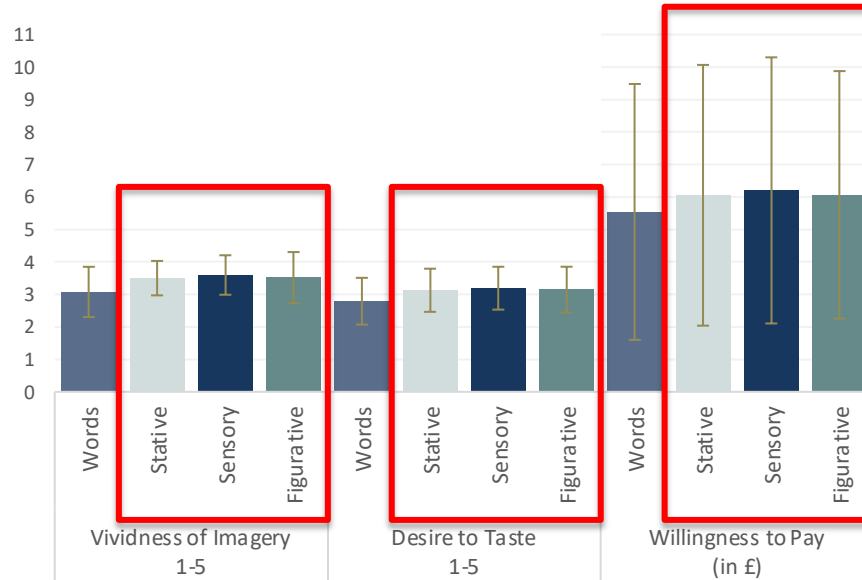
Evaluative: exciting – distinct - appealing

Combination: honey – sweet - exciting



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# The narrative



**Words:** honey, chocolate, acidic, mild, exciting, distinct

**Stative:** Mild coffee with distinct hints of honey and chocolate. This exciting taste is slightly acidic.

**Sensory:** The smell of honey and taste of chocolate are accompanied by an acidic mouthfeel. This mild coffee is distinct and exciting.

**Figurative:** Although this coffee is mild, it has a very exciting touch. Hints of honey take you to the enchanting taste of chocolate, sprinkled with a dash of acidity. This distinct coffee is a true walk in wonderland.

Imagery vividness:  $F(2.1, 136.5) = 16.50, p < .001, \eta^2 = .20$

Desire to taste:  $F(2.62, 170.36) = 13.36, p < .001, \eta^2 = .17$

Willingness to pay:  $F(2.56, 166.16) = 7.30, p < .001, \eta^2 = .10$



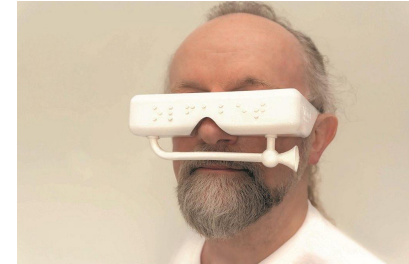
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# COVID-19 and business: Sensory marketing

1. Covid changed how we consume:  
we buy more online, including food



2. How to deal with covid related  
anosmia, parosmia, phantosmia  
and anosmia in general?



Product development, disabilities &  
inclusivity

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# Outlook

- Therapies

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# Treatments: Collaborative efforts

## Medication



UMC Utrecht



ZonMw



WAGENINGEN  
UNIVERSITY & RESEARCH

[reuksmakstoornis.nl](https://reuksmakstoornis.nl)

## Smell training



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# Outlook

- Treatments
- New variants (omicron)
- Strengths of global collaborative science:
  - Patients' advocacy
  - Accessibility
  - New collaborations, new methods, new experiences

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# Thank you for your attention!

Many thanks to many people, and in particular:

Organization of Sensory for Business 2022!

Bente Klein-Hazenbroek

Monique Smeets & the Utrecht Smell Lab

& The GCCR! <https://gcchemosensr.org/surveys/nl/>

Do you have any questions or suggestions? Reach out:

[mail@iljacroijmans.nl](mailto:mail@iljacroijmans.nl)



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**Thank you for your attention**

**#SENSORY22**

# Flavor Imagery

Imagery = the ability to mentally re-experience a perceptual experience

*Imagine frying onions in a pan.*

- 1. Imagine the sound of the onions, how vivid is the sound?*
- 2. Imagine the smell of the onions, how vivid is the smell?*

Imagery is related to simulation, but is voluntary and effortful  
And often initiated via language

-> can language be used to change imagery, and consumer behavior?

