g y m **s e n**
PROJECT

Sensory Gymnastics for the Elderly

Tools used for impact validation

Four pilot studies were carried out by the indicated partners. More details of the pilots can be consulted in the corresponding section. In order to validate each intervention and to get information regarding different aspects of the participating populations, all partners have used different questionnaires and tools.

- **TNA** (Training Need Analysis): a specific questionnaire created by the partners for collecting demographic information, health status data, food preferences, eating habits, perception of sensory characteristics of food and related meal experience. TNA allowed to gain some knowledge on the needs and possibilities before starting to design and perform the pilot activities. This test was used by all partners. The test form is shown in Annex 1.

- **MNA**® (Mini Nutritional Assessment): a validated nutrition screening and assessment tool that can identify geriatric patients aged of 65 and above who are malnourished or at risk of malnutrition. The questionnaire is passed at the beginning and at the end of the intervention period (first and last days). Since olfactory and tasting capabilities are strongly related to eating behaviour and thereby conditioning the nutritional status of the subject, this questionnaire allowed to get some scientific information on the effects of the pilot training in nutritional aspects. This test was used by all partners. The test form is shown in Annex 2.

- **OCT** (Olfactory Capability Test): This type of test allows one to evaluate the effect on sensory capabilities of participants in the training program. The test is focussed in the identification of different odours and in the distinction of different intensities for the same odour. Two versions of the OCT were designed and used, one for groups 1 (intellectually active elders-UMH) and 2 (intellectually inactive elders-ERA), and one for groups 3 (institutionalized elders-ANS) and 4 (Alzheimer patients-AAADRD). Descriptions of the tests as well as the test forms are shown

in Annexes 3a (ERA and UMH: no sensory problems) and 3b (ANS and AAADRD: with sensory problems).

- **Blandford Questionnaire**: Aversive Feeding Behaviours Inventory Scale. This validated scale allows to evaluate eating behaviour in dementia patients. This has to be accompanied by an "informed consent". This test identifies different disorders that use to appear in this group of patients such as resistance to eat, global cognitive deficit, selective behaviours towards food intake and different levels of dysphagia (difficulty to swallow). The scale was only passed to the Alzheimer group. The form of the scale is indicated in Annex 4.

- **Informed consent**: This ethically necessary in order to do interventions with Alzheimer patients. The questionnaire has to be filled out by the corresponding relative in charge of the patient. Participation is free and revocation of the consent can be perfomed in any moment of the intervention with no explanations. The informed consent form is shown in Annex 5.

- **Diary**: In order to collect and record properly the information during the activities, a diary has been designed in an Excell sheet in order to be used by all partners. The goal of this tool was to collect day-by-day information regarding comments, observations and general aspects of each intervention. The diary was followed by all partners. The suggested form for the diary is shown in Annex 6.

- **Feedback questionnaire:** The questionnaire tries to give feedback about possible weaknesses, improvements and modifications based on the experiences gained in each one of the intervention groups. UMH uses to pass a "satisfaction" questionnaire at the end of the different activities performed at the university. This questionnaire was used as template to design the "feedback questionnaire". The questionnaire was passed at the end of intervention by all partners and was anonymous. The questionnaire was answered by participants as well as caregivers. The suggested form for the questionnaire is shown in Annex 7a for participants and 7b for caregivers/trainers/professors.

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Annexes

Annex 1

Training Need Analysis (TNA)

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- ⟳ Group 1: Intellectual active elders
- ⟳ Group 2: Intellectual inactive elders
- ⟳ Group 3: Institutionalized elders
- ⟳ Group 4: Alzheimer's disease

1. Socio-demographics

1. Gender (Please, mark with a cross in the option that fits you)

- ⟳ Male
- ⟳ Female

2. Age (Please, indicate your age): _____

3. Size of household (Please, mark with a cross in the option that fits you)

- ⟳ 1 person, I live alone
- ⟳ 2 people
- ⟳ 3 people
- ⟳ 4 people
- ⟳ +4 people
- ⟳ N.A (this option for those elderly people belonging to Group 3 (Institutionalized) and Group 4 (Alzheimer)

4. Level of education (Please, mark with a cross in the option that fits you)

- ⟳ Without studies
- ⟳ Primary
- ⟳ Secondary
- ⟳ Graduate

5. Former occupation (Please, indicate your former occupation): _____

1. Do you have any of the following diseases? (You should mark all the diseases you have)

- ⟳ Obesity
- ⟳ Overweight
- ⟳ Type 2 diabetes
- ⟳ Hypertension

- ⟳ Cardiovascular disease
- ⟳ Metabolic syndrome
- ⟳ Other (indicate): _____

2. Do you have any of the following disorders digestive tract? (You should mark all the disorders you have)

- ⟳ Salivary deficiency
- ⟳ Dysphagia
- ⟳ Reflux
- ⟳ Ulcer
- ⟳ Gastritis
- ⟳ Sickness

- ⟳ Constipation
- ⟳ Frequent diarrhea
- ⟳ Abdominal pain
- ⟳ Flatulence
- ⟳ Other (indicate): _____

3. Do you have any of the following neurological/mood state disorders? (You should mark all the disorders you have)

- ⟳ Depression
- ⟳ Alzheimer
- ⟳ Loss of appetite

- ⟳ Altered taste and smell (dysgeusia)
- ⟳ Lack of interest in food
- ⟳ Other (indicate): _____

4. Do you have any of the following risk factors? (You should mark all the risk factors you have)

- ⟳ Sedentary
- ⟳ Smoking

- ⟳ Alcoholism
- ⟳ Polypharmacy

5. Do you usually take drugs as a treatment for some disease?

- ⟳ Yes
- ⟳ No

6. Regarding your mobility, please, mark the option that best fits you:

- ⟳ I do not need any help for my mobility
- ⟳ I need some help for my mobility (stick, medical walker, etc)
- ⟳ I am totally dependent (caregiver, relative, etc)

7. Please, indicate your approximated weight (kg):

8. Please, indicate your approximated height (cm):

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3. Food habits and preferences

1. Which one of the following flavours is your favourite? (You should mark one of the options)

- ⭗ Salty
- ⭗ Sweet
- ⭗ Sour

- ⭗ Bitter
- ⭗ None

2. Which one of the following foods within the **Farinaceous** category is your favourite? (You should mark one of the options of each column)

Farinaceous		
⭗ White bread		⭗ Beans
⭗ Wholemeal bread	⭗ French Fries / Fried Chips	⭗ Lentil beans
⭗ Pasta	⭗ Steamed Potatoes	⭗ Chickpeas
⭗ Rice	⭗ Baked Potatoes	⭗ Peas
⭗ Whole grains	⭗ None	⭗ Soy
⭗ None	⭗ Others (indicate):	⭗ None
⭗ Others (indicate):	_____	⭗ Others (indicate):
_____		_____

3. Which one of the following foods within the **Vegetables& Fruits** category is your favourite? (You should mark one of the options of each column)

Vegetables	Fruits
⭗ Steamed Vegetables	⭗ Fresh
⭗ Salads	⭗ Syrup
⭗ Grilled Vegetables	⭗ Dried
⭗ None	⭗ None
⭗ Others (indicate):	⭗ Others (indicate):
_____	_____

4. Which one of the following foods within the **Dairy** category is your favourite? (You should mark one of the options of each column)

Dairy		
Milk	Yogurt	Cheese
⭗ Whole	⭗ Natural	
⭗ Semi	⭗ Sweetened	⭗ Fresh
⭗ Skimmed	⭗ Flavored	⭗ Semi-cured
⭗ Lactose-free	⭗ Low-fat	⭗ Cured
⭗ None	⭗ None	⭗ None

1. Which one of the following foods within the **Protein foods I** category is your favourite? (You should mark one of the options of each column)

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Protein foods I			
Beef	*Pork*	*Poultry*	*Fish*
○ Grilled ○ Baked ○ Fried ○ Cooked with sauce ○ None	○ Grilled ○ Baked ○ Fried ○ Cooked with sauce ○ None	○ Grilled ○ Baked ○ Fried ○ Cooked with sauce ○ None	○ Grilled ○ Baked ○ Fried ○ Cooked with sauce ○ None
○ Others (indicate): _____			
○ Grilled	○ Baked	○ Fried	○ Cooked with sauce

6. Which one of the following foods within the **Protein foods II** category is your favourite? (You should mark one of the options of each column)

Protein foods II		
Cured	*Cold Cuts*	*Cooked*
○ Cured Ham ○ Fish ○ None	○ Sausages (Bologna, Pastrami, etc) ○ Smoked Ham ○ None	○ Meatloaf ○ Frankfurts ○ Sausages (Pork, Beef) ○ None

7. Which one of the following foods within the **Sauces and Condiments** category is your favourite? (You should mark one of the options)

Sauces and Condiments			
○ Olive oil ○ Vinegar ○ None	○ Salt ○ Fat sauces ○ None	○ Ketchup ○ Spices ○ None	○ Others (indicate): _____

8. Which one of the following foods within the **Beverages** category is your favourite? (You should mark one of the options of each column)

Beverages			
Non-alcoholic		*Alcoholic*	
○ Sodas ○ Juices ○ None	○ Water ○ Others (indicate): _____	○ Wine ○ Beer ○ None	○ Distilled ○ Others (indicate): _____

9. Which one of the following foods within the **Others** category is your favourite? (You should mark one of the options)

Others			
○ Pastry	○ Candies	○ Puff pastries	○ Salty snacks
○ Others (indicate): _____			
○ None			

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10. Please, indicate how you agree or disagree with the following sentences related to nutrition:

	I totally agree	I partly agree	I neither agree nor disagree	I partly disagree	I totally disagree
I consider my eating habits to be healthy					
I use to eat a varied diet					
I think it's difficult to eat a varied diet					
I use to listen to advice given by experts on healthy eating					
I avoid foods that are rich in calories (meat, legumes, whole milk, fish vs. Vegetables and fruits)					
I like olive oil, whole milk, butter, sauces, etc.					
Low-fat foods taste equally as good as foods with higher fat content					
I like to eat fruit every day					
I usually have some snacks between my main meals					
I would like to learn more about how my eating habits might affect my health					

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I would choose to eat more of low-calorie foods if they were tastier (vegetables, fruits, salads, etc.)					
I would choose to eat more of low-fat foods if they were tastier					

4. Perception of the sensory characteristics of food and development of a sensory task

1. Regarding the impairment of capabilities for the perception of the sensory characteristics of food, please, check all that apply:

- ○ I have difficulties for tasting the meals and foodstuff
- ○ I have difficulties for smelling the meals and foodstuff
- ○ I have difficulties for perceiving the textures of the meals and foodstuff
- ○ I have difficulties for the correct vision of the meals and foodstuff
- ○ I have difficulties for the correct hearing of the meals while I am eating

2. Which sensory characteristic of food is more difficult to perceive for you? (Please, mark with a cross in the option that fits you)

- ○ Taste/Flavour
- ○ Odour
- ○ Visual characteristics: colour, size, texture, shape, consistency and opacity
- ○ Sound: i.e. sizzling, crunching, popping, bubbling, etc.
- ○ Food texture: hardness, wetness, oiliness, moistness, etc.

3. Which one of the tastes do you think have more difficulties for perceiving? (Please, mark with a cross in the option that fits you)

- ○ Salty
- ○ Sweet

- ○ Sour
- ○ Bitter

4. Which odours and tastes are familiar to you? Which do you remember?

- ○ Vanilla
- ○ Cloves
- ○ Apple
- ○ Eucalyptus
- ○ Cinnamon
- ○ Fuel oil
- ○ Pine
- ○ Garlic
- ○ Cut grass

- ○ Anise
- ○ Orange
- ○ Fish
- ○ Rose
- ○ Thyme
- ○ Lemon
- ○ Mint
- ○ Lavender
- ○ Others (indicate): _____

5. Do you think you could include in your routine some training exercise with olfactory and gustatory stimulus to maintain your sensory capacities?

- ○ Yes
- ○ No

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6. How many times do you think you could follow a task?

- ○ More than twice a day
- ○ Twice a day
- ○ Once a day
- ○ Once every two days

- ○ More than once a week
- ○ Once a week
- ○ Less often

7. How long would you be willing to involve in a new activity?

- ○ One week
- ○ Two weeks
- ○ One month

- ○ Two months
- ○ Three months
- ○ More than three months

8. Please, indicate how you agree or disagree with the following sentences related to sensory experience:

	I totally agree	I partly agree	I neither agree nor disagree	I partly disagree	I totally disagree
The taste of food is very important to me					
The food I eat today is as tasty as the food I used to eat before					
The food I eat today tastes differently from what it used to taste before					
For me the taste of a food is more important than its healthiness					
I use to eat more when foods are tasty					
I eat as much as I need irrespective of the taste of the food					
I usually eat too much when foods taste good					
I want my food to be tastier					
I usually add salt to the foods I eat to make them tastier					
I usually add spices to the foods I eat to make them tastier					
I like sweet foods					
Today many sweet foods aren't as sweet as they used to be before					
If foods were tastier I would eat more					
I often leave some food on my plate because it doesn't taste good					
I like traditional food					
I like to try foods that are new to me					
It's more difficult for me to perceive the aromas of various foods today than when I was younger					
I find it easy to recognise and identify odours and flavours					
I find it easy to detect when a meal is salty					
I find it easy to detect when a meal is sweet					
I find it easy to detect when a meal is sour					
I find it easy to detect when a meal is bitter					
I do not enjoy while I am eating					
I enjoy when participating in new activities					
I would like to learn more about how various senses, e.g. the sense of taste, function					
I believe that my ability to perceive tastes can be improved by taste training					
I'm interested in taking part in a training course for improvement of my ability to perceive the taste characteristics of foods					
I'm interested in performing various training tasks, regularly and on my own, that would improve my ability to perceive the taste characteristics of food					

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5. Meal experience

9. Please, indicate how you agree or disagree with the following sentences related to meal experience:

	I totally agree	I partly agree	I neither agree nor disagree	I partly disagree	I totally disagree
I usually cook myself the food I eat					
It's someone else who cooks the food I eat					
I usually eat at regular times every day					
I usually eat on my own					
I usually eat together with one or more other persons					
I enjoy eating					
I think eating is a quite boring task					
I enjoy eating with my family					
I enjoy eating with friends					
I enjoy eating on my own					
I eat my main meal at lunch time					
I eat my main meal in the evening					
I use to have some cheeses with my main meal					
I like to finish my main meal with a sweet dessert					
I usually drink water with my meal					
I usually drink beer with my meal					
I usually drink wine with my main meal					
I like coffee					
I like tea					
I use to have a fruit at least once every day					
I have difficulties with chewing meat and various hard foods					
I suffer from dry mouth which makes it difficult to chew and swallow many foods					
I like my food to be prepared in a way that makes it easy to chew and swallow					
I need some help when eating					
I need some help when drinking					

Annex 2

Mini Nutritional Assessment (MNA®)
G Y M S E N
Sensory Gymnastics for the Elderly: Program for the Maintenance of Sensory Capacities in the Elderly

⏱ Group 1: Intellectual active   ⏱ Group 2: Intellectual inactive
⏱ Group 3: Institutionalized   ⏱ Group 4: Alzheimer

MINI NUTRITIONAL ASSESSMENT ®

Last name:		First name:		
Sex:	Age:	Weight (kg):	Height (cm):	Date:

Complete the screen by match the appropriate numbers.

Screening
A. Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties? 0 = severe decrease in food intake 1 = moderate decrease in food intake 2 = no decrease in food intake
B. Weight loss during the last 3 months 0 = weight loss greater than 3kg (6.6lbs) 1 = does not know 2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs) 3 = no weight loss
C. Mobility 0 = bed or chair bound 1 = able to get out of bed/chair but does not go out 2 = goes out
D. Has suffered psychological stress or acute disease in the past 3 months? 0 = yes   2 = no
E. Neuropsychological problems 0 = severe dementia or depression 1 = mild dementia 2 = no psychological problems
F. Body Mass Index (BMI) = weight in kg/(height in m)2 0 = BMI less than 19 1 = BMI 19 to less than 21 2 = BMI 21 to less than 23 3 = BMI 23 or greater
TOTAL SCORE _____ **points**

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G Y M S E N

Sensory Gymnastics for the Elderly: Program for the Maintenance of Sensory Capacities in the Elderly

Last name:	First name:

Assessment
G. Lives independently (not in nursing home or hospital)   0 = no   1 = yes
H. Takes more than 3 prescription drugs per day   0 = yes   1 = no
I. Pressure sores or skin ulcers   0 = yes   1 = no

J. How many full meals does the patient eat daily?
     0 = 1 meal
     1 = 2 meals
     2 = 3 meals

K. Selected consumption markers for protein intake
     • At least one serving of dairy products (milk, cheese, yoghurt) per day
     Yes_____   No_____
     • Two or more servings of legumes or eggs per week
     Yes_____   No_____
     • Meat, fish or poultry every day
     Yes_____   No_____
          0.0 = if 0 or 1 "Yes"
          0.5 = if 2 "Yes"
          1.0 = if 3 "Yes"

L. Consumes two or more servings of fruit or vegetables per day?   0 = no   1 = yes

M. How much fluid (water, juice, coffee, tea, milk...) is consumed per day?
     0.0 = less than 3 cups
     0.5 = 3 to 5 cups
     1.0 = more than 5 cups

N. Mode of feeding
     0 = unable to eat without assistance
     1 = self-fed with some difficulty
     2 = self-fed without any problem

O. Self view of nutritional status
     0 = views self as being malnourished
     1 = is uncertain of nutritional state
     2 = views self as having no nutritional problem

P. In comparison with other people of the same age, how does the patient consider his / her health status?
     0.0 = not as good
     0.5 = does not know
     1.0 = as good
     2.0 = bette

Q. Mid-arm circumference (MAC) in cm
     0.0 = MAC less than 21
     0.5 = MAC 21 to 22
     1.0 = MAC greater than 22

R. Calf circumference (CC) in cm
     0 = CC less than 31
     1 = CC 31 or greater

SCREENING SCORE: _____ points **ASSESSMENT:**   _____ points **TOTAL ASSESSMENT:**   _____ points

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(For the interviewer)

G Y M S E N

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⏱ Group 1: Intellectual active   ⏱ Group 2: Intellectual inactive

⏱ Group 3: Institutionalized   ⏱ Group 4: Alzheimer

MINI NUTRITIONAL ASSESSMENT ®

Last name:			First name:	
Sex:	Age:	Weight (kg):	Height (cm):	Date:

Complete the screen by match the appropriate numbers. Add the numbers for the screen (A-F). If score is 11 or less, continue with the assessment (G-R).

Screening
A. Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?   0 = severe decrease in food intake   1 = moderate decrease in food intake   2 = no decrease in food intake
B. Weight loss during the last 3 months   0 = weight loss greater than 3kg (6.6lbs)   1 = does not know   2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs)   3 = no weight loss
C. Mobility   0 = bed or chair bound   1 = able to get out of bed/chair but does not go out   2 = goes out
D. Has suffered psychological stress or acute disease in the past 3 months?   0 = yes   2 = no
E. Neuropsychological problems   0 = severe dementia or depression   1 = mild dementia   2 = no psychological problems
F. Body Mass Index (BMI) = weight in kg/(height in m)2   0 = BMI less than 19   1 = BMI 19 to less than 21   2 = BMI 21 to less than 23   3 = BMI 23 or greater

Screening score (subtotal max. 14 points)
      12-14 points: Normal nutritional status
      8-11 points: At risk of malnutrition
      0-7 points: Malnourished
 If score is 11 or less, continue with questions G-R

Assessment
G. Lives independently (not in nursing home or hospital)   0 = no   1 = yes
H. Takes more than 3 prescription drugs per day   0 = yes   1 = no
I. Pressure sores or skin ulcers   0 = yes   1 = no
J. How many full meals does the patient eat daily?   0 = 1 meal   1 = 2 meals   2 = 3 meals
K. Selected consumption markers for protein intake   • At least one serving of dairy products per day   Yes____ No____   • Two or more servings of legumes or eggs/week

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Yes____   No_____
• Meat, fish or poultry every day
Yes____   No_____
0.0 = if 0 or 1 "Yes"
0.5 = if 2 "Yes"
1.0 = if 3 "Yes"

L. Consumes two or more servings of fruit or vegetables per day?
    0 = no   1 = yes

M. How much fluid (water, juice, coffee, tea, milk...) is consumed per day?
    0.0 = less than 3 cups
    0.5 = 3 to 5 cups
    1.0 = more than 5 cups

N. Mode of feeding
    0 = unable to eat without assistance
    1 = self-fed with some difficulty
    2 = self-fed without any problem

O. Self view of nutritional status
    0 = views self as being malnourished
    1 = is uncertain of nutritional state
    2 = views self as having no nutritional problem

P. In comparison with other people of the same age, how does the patient consider his / her health status?
    0.0 = not as good
    0.5 = does not know
    1.0 = as good
    2.0 = bette

Q. Mid-arm circumference (MAC) in cm
    0.0 = MAC less than 21
    0.5 = MAC 21 to 22
    1.0 = MAC greater than 22

R. Calf circumference (CC) in cm
    0 = CC less than 31
    1 = CC 31 or greater

Screening   _____ **points (max. 14 points)**
Assessment   _____ **points (max. 16 points)**
Total Assessment   _____ **points (max. 30 points)**

Malnutrition Indicator Score

24 to 30 points   Normal nutritional status
17 to 23.5 points   At risk of malnutrition
Less than 17 points   Malnourished

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Annex 3a

<u>**OCT: Olfactory Capapbility Test – Groups 1 (UMH) and 2 (ERA): populations with no sensory problems**</u>

A short description

The test consists of sixteen pair comparisons bottles with odorous samples: four odours, each one at three different concentrations.

The weak odours might be very difficult to detect but the the strong ones are assumed to be fairly easy to detect for persons with normal olfactory capability.

The samples should be at room temperature when the test is carried out. (The samples' temperature has an great influence on how strong they will smell, thereby also on how easy it will be to recognize the odours)

- It's advicable to use the same set of samples for 5 people.

- In the first activity, the test leader provide with the first pair of samples for the identification task. Participants are asked about the ingredient in which samples are different. Participants are provided with the images about the four possible odours. The test leader indicates the choice made by the participant in the form.

- In the second activity, a pairwise comparison test is performed. Participants receive a new pair of samples and they have to indicate which one of the two is more intense in an indicated odour. The test leader indicates the choice made by the participant in the form.

- The samples should always be presented in the order from pair 1 (first) to pair 8 (last).

Olfactory capability test – Groups 1 and 2

Subject:_____

Date:_____ Place:_____

Test leader:_____

Pair	Odour identity				Odour intensity	
	Garlic	**Lemon**	**Vanilla**	**Paprika**	**Pair**	**Sample**
1					**1**	
2					**2**	
3					**3**	
4					**4**	
5					**5**	
6					**6**	
7					**7**	
8					**8**	

No. correct identification:				
Total no. correct identification:				

Comments:_____

_____

_____

Test leader's signature:_____

Description of samples for the OCT:

Codification	Odour identity	Odour Intensity
ToJu-0	1	2
ToJu-GaM	3	4
ToJu-GaH	5	6
ToJu-0	7	8
ToJu-PaM	9	10
ToJu-PaH	11	12
ApJu-0	13	14
ApJu-VaM	15	16
ApJu-VaH	17	18
ApJu-0	19	20
ApJu-LeM	21	22
ApJu-LeH	23	24

0: Low intensity odour, **ApJu:** Apple juice, **H:** High intensity, **M:** Medium intensity, **ToJu:** Tomato juice

Pairs for the odour Identity task:

Pair	Stimulus	Odour identity			
1	Vanilla (Va)	13 and 15	0-M	13	15
2	Paprika (Pa)	11 and 7	0-H	11	7
3	Lemon (Le)	23 and 19	0-H	23	19
4	Garlic (Ga)	1 and 3	0-M	1	3
5	Lemon	19 and 21	0-M	19	21
6	Paprika	7 and 9	0-M	7	9
7	Vanilla	17 and 13	0-H	17	13
8	Garlic	5 and 1	0-H	5	1

Pairs for the odour Intensity task:

Pair	Stimulus	Odour intensity			
1	Vanilla	14 and 16	0-M	14	16
6	Paprika	10 and 12	M-H	10	12
3	Lemon	22 and 20	0-M	22	20
4	Garlic	2 and 4	0-M	2	4
5	Lemon	22 and 24	M-H	22	24
2	Paprika	10 and 8	0-M	10	8
7	Vanilla	18 and 16	M-H	18	16
8	Garlic	6 and 4	M-H	6	4

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Participants have to complete firstly the ODOUR IDENTITY task (8 pairs), then have a break and then the ODOUR INTENSITY (OIntensity) task (8 pairs): total of 16 comparisons.

For arranging the OCT: it is needed to involve at least two people, one in charge of the OCT and other doing something else during the time the OCT lasts: i.e. complete the rest of questionnaires MNA, TNA parts 1-2 and the Excel.

Test leader: each test leader has a complete set of samples, both for the Odour identity and intensity (16 pairs in total). An orientation about the OCT test duration could be approximately:

- Odour identity: 10 min/participant

- Odour intensity: 10 min/participant

ODOUR IDENTITY TASK: Test leader has to firstly give the participant all the pairs for the Odour identity task, one by one. To do so, test leader has to provide the samples to the participant in the order foreseen in the table: i.e. for pair 1, sample 13 has to be situated at participant's left hand and sample 15 at participant's right hand.

Give participant some seconds to rest between samples.

Once the participant ends the OIntensity task, have a break. Participant continues doing something else (the rest of questionnaires) and a new participant starts with the OIntensity task.

ODOUR IDENTITY TASK: Once all participants end the OIntensity task, the test leader starts with the ODOUR INTENSITY task. The procedure is the same as in the previous task: test leader has to provide the samples to the participant in the order foreseen in the table: i.e. for pair 1, sample 14 has to be situated at participant's left hand and sample 16 at participant's right hand.

Give participant some seconds to rest between samples.

Test leader's instruction to the subject (maybe in a somewhat less formal language):

1. **You have two samples in front of you. The samples are the same except for one ingredient. Please, indicate which ingredient is it by the olfaction of the sample.**

   You will get four alternatives and **<u>you have to choose one</u>** of them.

   To the test leader: *Remember that this is a **<u>forced choice test</u>**, so you **<u>must to tick a box</u>** on the test form.*

| **Garlic** | **Lemon** | **Vanilla** | **Paprika** |

The idea is using both pictures and words is that it should make it as easy as possible for the subject to remember the odour

The idea with using a forced choice procedure is that the subject might be guided by unconscious memories

2. Which one of the two following samples has a higher intensity in garlic odour?

3. Which one of the two following samples has a higher intensity in lemon odour?

4. Which one of the two following samples has a higher intensity in vanilla odour?

5. Which one of the two following samples has a higher intensity in paprika odour?

To the test leader: *Remember that this is a <u>forced choice test so you must indicate the number of sample in the box</u> on the test form*

Which food does the odour of this sample remind you of?

Garlic

Lemon

Vanilla

Paprika

Which one of the two following samples has a higher intensity in garlic odour?

Which one of the two following samples has a higher intensity in lemon odour?

Which one of the two following samples has a higher intensity in vanilla odour?

Which one of the two following samples has a higher intensity in paprika odour?

NOTES:

Introduction

One of the ideas with the (pilot) training programmes that were developed and tested in the Gymsen project was that the active "sensory gymnastics" should have an effect also on the subjects' sensory capabilities. It's well known that our sensory capabilities decline as we get older. The decline might be more severe in more vulnerable older subjects who suffer from various diseases. It's not only seeing and hearing that is affected. Also the ability to perceive taste and smell is reduced. This is certainly of great imnportance to the perception of the flavours of foods. We usually talk about the taste of foods. From a strict scientific point of view taste (only) refers to what we perceive by our taste receptors located in the mouth and by which we are able to perceive five basic tastes: sweet, salt, sour, bitter and umami. However, most foods have a much more complex "taste" than what is described by the basic tastes. The main reason of this is that also receptors belonging to the sense of smell are stimulated while we are eating and drinking various foods and beverages. The main reason of this is that volatile and odorous compounds are released from the food in the mouth during the chewing and swallowing process. The compounds are transported to the olfactory receptors in the nose by retronasally exhaled air. Our brain integrates the impressions it gets from the senses of taste and smell into an impression that we in ordinary language usually name taste but that from a scientific perspectice usually is named flavour. In fact, the aroma of many foods and beverages make a larger contribution the the foods' and beverages' flavour than their tastes. Therefore, a person's declining olfactory capability might have a serious influnce on the person's abaility to perceive the flavours ("tastes") of various foods and beverages. Since this might result in a declining appetite it might result in serious consequences from a nutrition and health point of view.

It would be a very positive outcome of the Gymsen project if the training programmes that were developed and tested in pilot studies resulted in an improved ability to perceive flavours. One (fairly) easy way to measure if there was such an effect would be to apply some kind of psychophysical test that could objectively measure the olfactory capability. In the training programmes that were developed and pilot tested four types of foods were used: orange, tomato, chocoloate and cheese. Therefore a psychophysical test that made use of the aromas of the four foods was developed.

Short description of the test

 The intention with the test was that it should be easy for the elderly subjects to perform. A detailed description of the test is planned to be presented in a scientific paper.

The test consists of twelve bottles with odorous samples: the aromas of the four foods used in the Gymsen training. Commercial orange, tomato, chocolate and cheese aromas commonly used by food industry were used. The aromas were diluted in Propylene glycol. For each aroma there were samples with three different concentrations. The dilution factor was 10 which means that there was a dilution factor 100 between the least and the most diluted samples. There was not possible in the Gymsen project to spend a lot of time on the design of the samples. The design was therefore based on pilot testing by some colleagues. It's therefore foreseen that it might worthwile to re-design (optimise) the test in the future based on tyjhe experiences gained in Gymsen's pilot studies.

It was expected that the weakest odours might be very difficult to detect and that the strongest ones might be fairly easy to detect for persons with normal olfactory capability.

The test was designed to measure the subjects' abilities both to detect that there were odours and differentiate between different odour intensities and to recognize the identities of the four odours being used.

For detection and intensity judgement the following simple category scale was used:

No odour
Weak odour intensity
Medium odour intensity
Strong odour intensity

Afterwards the intensity categories were transformed into numerical intensity values ranging from 0 (no odour) to 3 (strong odour).

The identification task consisted of making a choice between the following four options:

Orange   Tomato   Chocolate   Cheese

In the afterward statistical treatment of the identification data correct identifiaction was given the value 1 and incorrect identification was given the value 0.

The samples were presented to the subjects in the following order (1 = weakest, 2 = medium and   3 = strongest odour):

Sample 1	Chocolate 2
" 2	Tomato 1
" 3	Cheese 1
" 4	Orange 2
" 5	Cheese 2
" 6	Tomato 2
" 7	Chocolate 1
" 8	Orange 1
" 9	Tomato 3
" 10	Chocolate 3
" 11	Cheese 3
" 12	Orange 3

The picture on the next slide shows a complete set with sniff bottles.

The following general instructions were given:

- The samples should be room tempered when the test is carried out. (The samples' temeprature has a great influence on how strong they will smell, thereby also on how easy it will be to recognize the odours)

- It's advicable to keep the samples in a refrigerator when they are not used for a longer period. It should make them keep longer. Thet has been no possibility in the Gymsen project to test the samples' shelf life but similar samples used by others have have shown to have a long shelf life

- The samples should always be presented in the order from 1 (first) to 12 (last).

Test procedure

Since the test was designed to be used by Gymsen's training groups 3 (institutionalized subjects) and 4 (demented subjecys) it was foreseen that the subjects would need help from a test supervisor.

Thus, the supervisor presented the samples one at a time to the subjects. The subjects were also given two papers, one with the intensity categories they were to use when scoring how strong they considered to odour to be and one with pictures and written names of the foods they were to use in the identification task. The supervisor was using a score sheet for recording the observations. The observations were afterwards transferred to an Excel file for further treatment of the data and statistical analysis.

The score sheet and sheets with information to subjects and test leaders can be seen on the next pages.

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| Gymsen | Olfactory capability test - A |

Subject:_____

Date:_____Place:_____

Test leader:_____

Short instruction to the test leader:

Open a bottle and place it close to the subject's nose and instruct her or him to sniff at it

- First ask how strong the odour is. Make a mark in the appropriate box
- Then ask which one of the four foods the odour reminds of. Make a mark in the appropriate box
  Note: this is a forced choice test. It might be that the subject feels very uncertain but you should
  nevertheless ask her or him to make a guess.

Sample	Odour intensity				Odour identity			
	No odour	Weak odour	Medium odour	Strong odour	Orange	Tomato	Chocolate	Cheese
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

| No. correct identification: | | | | |
| Total no. correct identification: | | | | |

Comments:_____

_____

_____

Test leader's signature:_____

How strong do you consider the odour of this sample to be?

| The sample has no odour | The sample has a weak odour | The sample has a medium odour | The sample has a strong odour |

Which food does the odour of this sample remind you of?

Orange   *Tomato*   *Chocolate*   *Cheese*

gymsen
PROJECT
Sensory Gymnastic for the Elderly

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Test leader's instruction to the subject (maybe in a somewhat less formal language):

1. Without thinking of what odour it is, <u>how strong</u> do you consider the odour of this sample to be?

You will get four alternatives. *To the test leader: remember to tick a box on the test form!!*

| The sample has no odour | The sample has a weak odour | The sample has a medium odour | The sample has a strong odour |

The idea with this part of the test is to get information about the subject's ability to perceive odours at all. Below is a suggested interpretation of the intensity categories that might be used by the test leader, in own words, to help the subject express how strong he or she perceives the odour to be:

| The subject can't perceive any odour at all in the sample | The subject can with (some) difficulty perceive that the sample has an odour. The subject might very well express that it's very hard or even impossible to recognize what odour it is, but there is "something". | The subject can fairly easily perceive that the sample has an odour. It might be difficult to recognize what odour it is, but it's not necessary for the response in this part. It's enough that there is "something" | The subject can easily perceive that the sample has an odour. It might be difficult to recognize what odour it is, but it's not necessary for the response in this part. It's enough that there is "something" that has a strong odour. |

Test leader's instruction to the subject (maybe in a somewhat less formal language):

1. I will now ask you to tell me what kind of food the odour of this sample reminds you of

You will get four alternatives and **you have to choose one** of them.

To the test leader: *Remember that this is a <u>forced choice test</u> so <u>you must tick a box</u> on the test form!!*

Orange   ***Tomato***   ***Chocolate***   ***Cheese***

The idea with using both pictures and words is that it should make it as easy as possible for the subject to remember the odour

The idea with using a forced choice procedure is that the subject might be guided by unconscious memories

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Annex 4

G Y M S E N

Sensory Gymnastics for the Elderly: Program for the Maintenance of Sensory Capacities in the Elderly

⌂ Group 4: Alzheimer   ⌂ Informed consent

AVERSIVE FEEDING BEHAVIOURS INVENTORY

Name:			First name:		
Sex:	Age:	Weight (kg):	Height (cm):		Date:

Stage 1: Resistant behavior (Defensive reflexes)

1. Turns his/her head when faced with a spoon.
2. Covers his/her mouth with his/her hands to avoid eating.
3. Pushes food away or the person who is trying to feed him/her.
4. Scratches, hits or bites the person who is feeding him/her.
5. Throws food away.

Stage 2: General dyspraxia/Agnosia (Global cognitive deficit, confusion, inattention)

6. Eats only thanks to verbal inducement.
7. Uses his/her fingers instead of cutlery.
7. a. Is unable to use cutlery.
8. Mixes and plays with the food, but does not eat it.
9. Talks or vocalizes constantly instead of eating.
10. Ingests inedible objects (diapers, napkins, etc.).
11. Constant drifting at meal time.
11. a. Ignores or cannot recognize food.

Stage 3: Selective behavior (Requires qualitative changes on the diet)

12. If he/she is not given certain food or additives, he/she does not eat.
13. After getting the food he/she asks for, he/she tries it but then rejects it.
14. Does not eat variedly enough.
15. Eats small amounts and then stops eating.
16. Prefers liquid food (over 50% of intake).
17. Only accepts liquids

Stage 4: Oropharyngeal dysphagia (Oral neuromuscular incoordination at intake)

18. Does not open his/her mouth unless physically forced.
19. Pushes his/her lips together thus impeding food intake.
20. Closes his/her mouth and teeth thus impeding food intake.
21. Constantly moves his/her mouth or tongue.
22. Accepts food and then spits it.
23. Accepts food but does not swallow it.
24. Accepts food but it falls because his/her mouth is kept open.

Stage 5: Pharyngoesophageal dysphagia (Food in the air way)

25. Coughs or chokes with food.
26. Loses voice or has a dry voice

THE SCALE'S ASSESSMENT MAKES IT POSSIBLE TO IDENTIFY 5 DEVELOPMENTAL STAGES. **LOWER VALUES ON THE SCALE INDICATE A FAVORABLE EVOLUTION ON THE PATIENTS.**

Stage 1: Aversion to self-feeding, the patient has a resistant behavior towards eating, with defensive reflexes and a systematic rejection of food.

Stage 2: General dyspraxia and/or agnosia secondary to confusion and lack of attention due to the global cognitive deficit.

Stage 3: Selective behavior, it is still possible to feed the patient if qualitative changes on the diet are made.

Stage 4: Oropharyngeal dysphagia; there is oral muscular incoordination in the oral and pharyngeal stages of swallowing. There is a virtually total dependency of the patient towards the caretaker when it comes to eating.

Stage 5: Pharyngoesophageal dysphagia, choking and aspiration risk; it is the final manifestation of eating disorders. At this point, intervention techniques are invalid and different alternatives to oral nourishing – like artificial nutrition – arise.

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Annex 5

INFORMED CONSENT FOR THE PARTICIPATION IN THE SENSORIAL GYMNASTICS WORKSHOP FOR PATIENTS WITH ALZHEIMER´S DISEASE

Mr/Mrs/Ms.. as the family caretaker of patient …………………………………………………………. and AAADRD member, of .... years of age, residing in ....
.... ID nº ....

DECLARES:

That Dr. Enrique Roche, has explained to me:

1.- Identification, description and objectives of the procedure.
The AAADRD (Athens Association of Alzheimer's Disease and Related Disorders) (Greece) in collaboration with the University Miguel Hernandez (UMH) (Spain) will organize a sensorial gymnastics workshop where different smells will be studied as well as exercises associated with sensorial stimulation, olfactory-taste memory and intensity valorization. In these workshops, special attention will be taken to patients which have lost interest in food, present salivary deficiencies or deglutition problems (which are very frequent alterations in Alzheimer´s disease).
The results derived from this workshop can be included in the guides being developed for caretakers and family members in order to improve the quality of life and nutrition of patients with Alzheimer´s disease.
The procedure that is proposed to me does not require the study of demographic or clinical data, nor the revision of clinical histories or follow-up of the progression of the disease.

2.- Expected benefits
I will not receive any economic compensation nor other benefit, however if the research is successful, it may, in the future, help improve the quality of life and nutrition of these patients in collaboration with the supporting associations such as AAADRD.

3.- Reasonable alternatives
The decision to allow the data analysis is completely voluntary, allowing me to deny or even revoke my consent at any moment without reason.

4.- Expected consequences of the fulfillment and non-fulfillment
If I freely and voluntarily allow the evaluation of my information, I will have the right to decide to be or not informed of the results of the research, if it is performed.

5.- Frequent and uncommon risks
The evaluation of the data will never suppose an additional health risk for the patient I care for.

6.- Risks and consequences depending on the personal clinical situation of the patient and his/hers personal and professional circumstances.
None.

7.- Protection of personal information and confidentiality.
The information regarding my personal information and health will be included and handled in a computerized database, complying with the Data Protection Law of Personal Information as well as the sanitary legislation.

The transfer of information in the database to other research centers, as well as my state of health, will be performed through a dissociation procedure where an identification code will be generated that prevents the direct or indirect identification of the patient.

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Furthermore, I have been informed that I have the possibility of using my right of access, rectification, cancellation and opposition to the use of personal information, in the terms provided in the applicable regulations.

If I decide to revoke my current consent, my data will not be used in any research after the date in which I nullify my consent, although the information obtained up until that point will remain as part of the research.

I understand that:

My decision is voluntary, and that I can revoke my consent at any moment, without reason and that this will not affect the medical care of the patient I am in charge of.

I give my consent so that AAADRD and UMH may use my information for the current research, always maintaining anonymity and confidentiality of the patient´s information.

The information and present document has been given to me with sufficient time for consideration and I take my decision freely and responsibly.

I understand the explanations that have been provided in a clear and simple language and the researcher that has attended me allowed to comment on all the aspects and cleared all doubts that I had.

Observations: ....
....

Therefore, I manifest that I am satisfied with the information received and in the current conditions I agree and **CONSENT THE USE OF THE CLINICAL AND DEMOGRAPHIC DATA FOR RESEARCH.**

In .... of .... of 201...

| Patient/ | Witness signature | Researcher signature |
| Family member signature | ID: | |

Signed: .... Signed:.............................. Signed:................................

(Full Name) (Full Name) (Full Name)

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REVOCATION OF CONSENT FOR THE PARTICIPATION IN THE SENSORIAL GYMNASTICS WORKSHOP FOR PATIENTS WITH ALZHEIMER´S DISEASE

Mr./Mrs./Ms.. as the patient (or representative of Mr./Mrs/Ms. ....), of .... years of age, residing in .... ID................................ Revoke my consent given at date.................................... , and as of this date give its conclusion, without requiring any reason and where my medical care will not be affected.

In …………………............. of .... of 201...

Patient/   Witness signature   Doctor signature

Family member signature   ID:

Signed: ....   Signed:.............................   Signed:................................

(Full Name)   (Full Name)   (Full Name)

Annex 6

Items recommended in the diary (format in Excell file)

Partner:

Session number	Date	Duration	Smells used	Other materials	Number of professionals	Number of users (elders)	Description of activities	Notes/comments from participants (elders)	Notes/comments from observer
1									
2									
…									

FEEDBACK QUESTIONNAIRE FOR PARTICIPANTS

G Y M S E N

Sensory Gymnastics for the Elderly: Program for the Maintenance of Sensory Capacities in the Elderly

⟳ Group 1: Intellectual active   ⟳ Group 2: Intellectual inactive
⟳ Group 3: Institutionalized   ⟳ Group 4: Alzheimer

The aim of the questionnaire is to give your assessment of various aspects of the course you have just finished. The purpose of seeking these opinions is to improve the planning of future training programs. So, your participation **is very important**.
When indicate, please rate each of the questions from 1 (very bad) to 5 (excellent).

Name of the activity:
On the professor:
    a) The professor has a full command of the subject taught: 1, 2, 3, 4, 5
    b) The professor gave useful, practical examples to perform the tasks: 1, 2, 3, 4, 5
    c) The professor interacted with the student (helping to write in the questionnaires, helping to read the texts of the documents, answering questions): 1, 2, 3, 4, 5

Running of the course:
    a) The information provided during the course was clear: 1, 2, 3, 4, 5
    b) The duration of the course was optimal: 1, 2, 3, 4, 5
    c) The classroom was adapted to the activities: 1, 2, 3, 4, 5

Contents, materials and methodology
    a) The methodology used was adequate: 1, 2, 3, 4, 5
    b) The contents were appropriate: 1, 2, 3, 4, 5
    c) The materials used were proper: 1, 2, 3, 4, 5
    d) The duration of each activity was optimal: 1, 2, 3, 4, 5

General satisfaction: 1, 2, 3, 4, 5

Suggestions (please, provided additional information)**:**

Annex 7b

FEEDBACK QUESTIONNAIRE FOR CAREGIVERS/TRAINERS/PROFESSORS

Project partner:

Target group:

1) Please list problems and weaknesses that you find out during the pilot experience.

………..

………..

………..

2) Please list possible improvements that you may suggest to enhance the training and its results

………..

………..

………..

3) Please list possible modifications that could be applied to the training

………..

………..

…….