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Food comfortability: a new concept to understand elderlies' expectations in terms of sensory characteristics

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Eurosense - September 2016 - Dijon





Context

Ageing is often accompanied by oral impairments:

- **Tooth loss (Müller et al., 2007)**
- **Decreased muscle strength (Fontijn-Tekamp et al., 2004)**
- **Hyposalivation (Vandenberghe-Descamps et al., 2016)**
- **Impaired swallowing (Ekberg & FeinbergEkberg, 1991; Schindler & Kelly, 2002)**
- **Changes in orosensory perception (Song et al., 2016)**
- **Etc.**



Context

Those oral impairments have a qualitative and quantitative impact on elderlies' intake of food

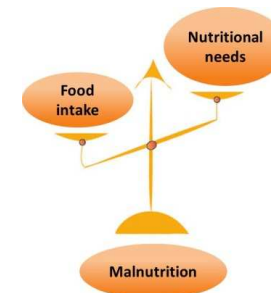
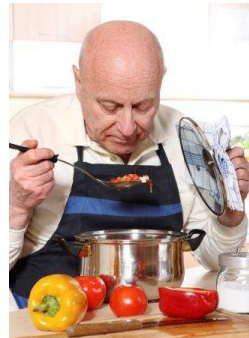
Sheiham et al., 2001



Samnieng, 2014



Solemdal et al., 2012



Context

The food offer for elderlies is reduced to mixed products, not always pleasant with regard to flavor or texture (Luckow & Delahunty, 2004; Song et al., 2016; Doets et al., 2016).

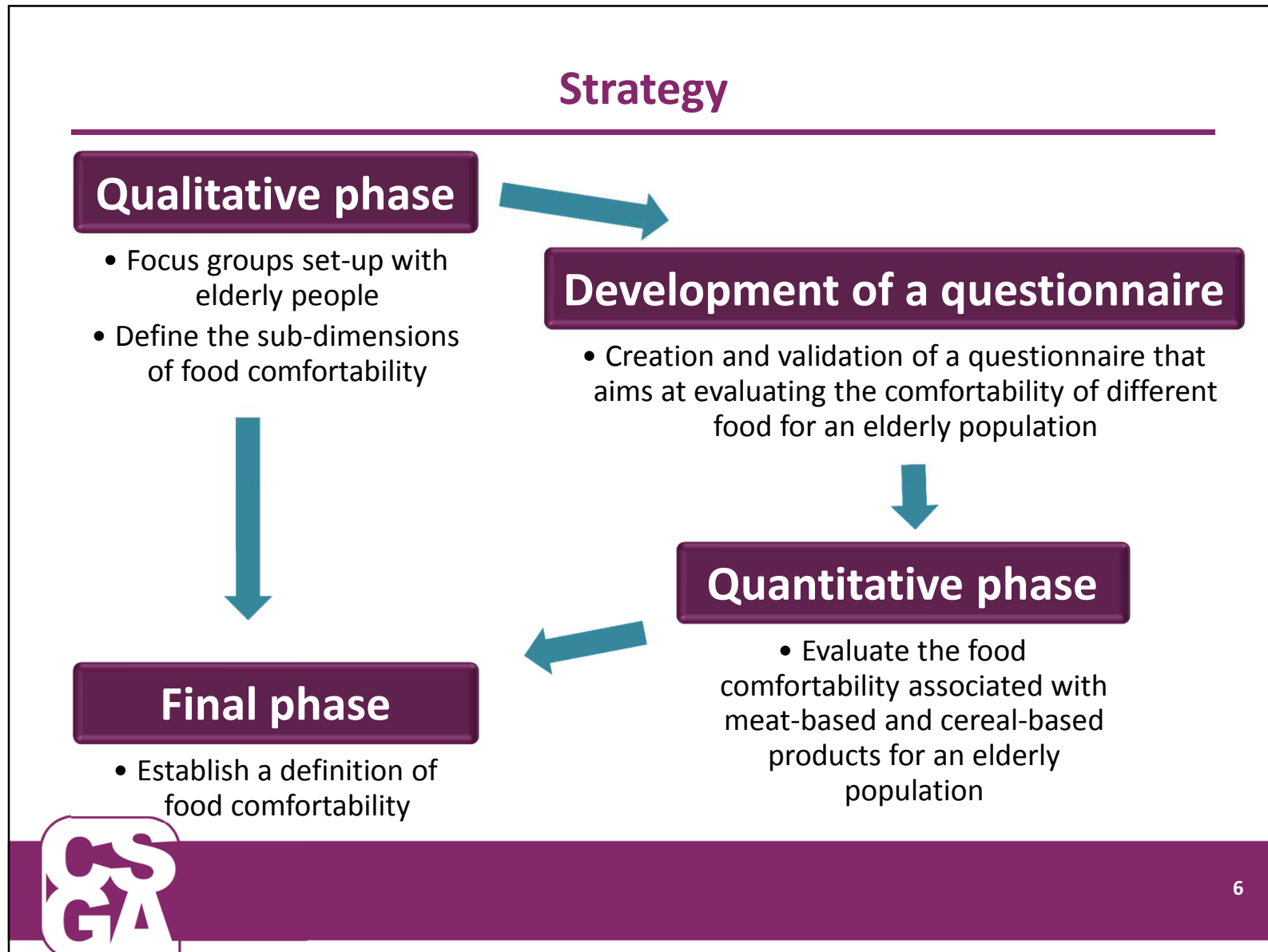


It is necessary to improve those products in a sensory manner and therefore work on the concept of food comfortability

Objectives:

- Understand what a pleasant food is for elderly people in terms of food comfortability
- Develop and define the concept of food comfortability





Strategy – qualitative phase

3 focus groups organized, each composed of 6 elderly people

- **Brainstorming: what comes to your mind when I say “oral comfort”?**
- **“What is the most uncomfortable food for you, and for what reason?”**
- **Food tasting**

Among the foods in front of you, choose one comfortable food and one uncomfortable food.

Why did you select those foods?



Strategy – qualitative phase

Analysis of verbatim

- Categorization and counting of the words

categories	Nb of words with repetition (%)	Nb of words without repetition (%)
texture	36,50	35,25
Bolus formation	29,78	16,55
Flavour	18,54	15,11
Culinary aspects	4,63	7,91
Sensations	2,67	7,91
Volume	2,09	2,16
Visual	1,97	4,32
Pain	1,27	5,04
To eat	1,27	2,88
Smell	0,93	0,72
Environment	0,23	1,44
Mouth	0,12	0,72
TOTAL	100%	100%



Strategy – development of a questionnaire

General question

This food is...

Very uncomfortable	Uncomfortable	Moderately comfortable	Comfortable	Very comfortable
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bolus formation

To cut this food with your incisor is...

Impossible	Very difficult	Difficult	Moderately easy	Easy	Very easy
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Same scale for cutting with premolars, masticating, humidification with saliva and swallowing



Strategy – development of a questionnaire

Mouth pain

Does eating the food bring a burning or spicy sensation?

Extremely

A lot

Little

Not at all

Same scale for muscular pain, articular pain, dental pain and gum pain

Texture and flavour

Is this food sticky?

Extremely

A lot

Little

Not at all

Same scale for stringy, greasy, dry, doughy, melting, firm, hard, intense in taste, salty, sugary, acidic and bitter



Strategy – quantitative phase



Subjects

n = 39
21 women / 18 men
Mean age = 72.64 ± 6.2
(min: 65 y/o max: 87 y/o)

Products

Beef cheek	Ground chicken balls
Plain beef	Chicken aiguillette
Ground beef	Reconstituted chicken



Subjects

n = 42
21 women / 21 men
Mean age = 73.57 ± 6.04
(min: 65 y/o max: 87 y/o)

Products

Crispbread	Milk roll
Financier	Protein enriched milk roll
Madeleine	Sponge cake




Data analysis

Are the products perceived differently in terms of oral comfort?

- Anova and means multiple comparisons (Student Newman Keuls)

What are the characteristics of each product in terms of oral comfort?

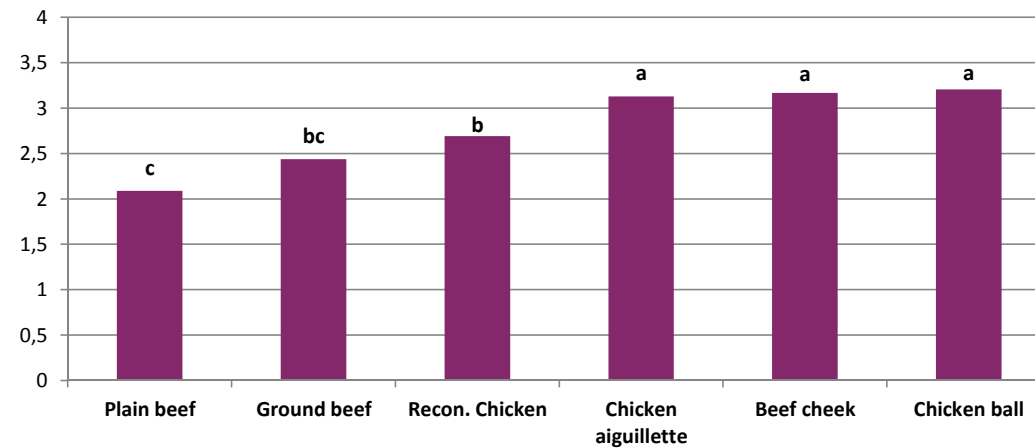
- Flash table (Schlich, 1998) 



Results on meat-based products



How comfortable is the food ?




The products are perceived as significantly different

The aiguillette, the beef cheek and the chicken ball are the most comfortable products

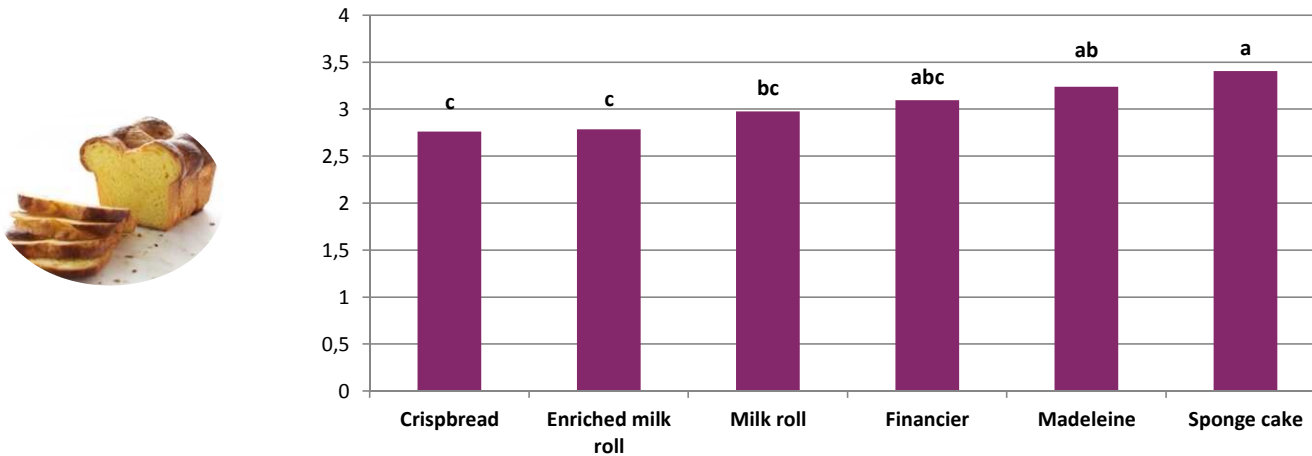
The plain beef is the most uncomfortable product



	F-Prod	P(F)	Chicken balls	Chicken aiguillette	Beef cheek	Recon. Chicken	Ground beef	Plain beef
General question								
comfort	14.46	***	+	+	+		-	-
Difficulty to form food bolus								
incisor	42.01	***	-	-	-	-	+	+
molar	35.26	***	-	-	-	-	+	+
masticate	37.45	***	-	-	-	-	+	+
humidify	8.45	***	-	-	-		+	+
swallow	20.34	***	-	-	-		+	+
time	24.09	***	-		-		+	+
Pain encountered while eating								
muscle	5.89	***		-				+
articular	10.54	***	-		-			+
dental	4.06	**						+
gum	2.28	*						+
Texture (intensity)								
sticky	2.18					+		-
stringy	28.14	***	-	-	+	-	-	+
greasy	12.12	***	+	-	+		+	-
dry	13.51	***		+	-	+	+	-
doughy	12.94	***	+		-	+	+	-
melting	24.31	***			+	-	-	-
firm	29.54	***	-		-			+
hard	25.11	***	-	-	-	-	+	+
Flavour (intensity)								
Taste intense	8.77	***			+	-	-	+
salty	5.69	***	+	+		+	-	

Results on cereal-based products

How comfortable is the food ?




The products are perceived as significantly different

The sponge cake is the most comfortable food

The crispbread and the enriched milk roll are the most uncomfortable foods



	F-Prod	P(F)	Madeleine	Sponge cake	Financier	Milk roll	Crispbread	Protein enr. milk roll
General question								
comfort	5.95	***	+	+			-	-
Difficulty to form food bolus								
incisor	10.85	***	-	-			+	+
molar	13.49	***	-	-	-		+	+
masticate	11.26	***	-	-			+	+
humidify	9.02	***	-		-		+	+
swallow	8.65	***		-	-		+	+
time	13.85	***	-	-	-		+	+
Pain encountered while eating								
burn	2.01				+			+
dental	3.99	**					+	
gum	6.16	***					+	
Texture (intensity)								
sticky	7.15	***	+				-	
stringy	2.83	*				+		+
greasy	26.64	***	+	-	+		-	
dry	49.89	***	-		-	-	+	+
doughy	25.90	***	+	-	+	+	-	+
melting	17.30	***	+	+	+		-	-
firm	33.61	***	-	-		-	+	+
hard	52.46	***	-	-	-	-	+	
Flavour (intensity)								
Taste intense	15.38	***	+		+		-	
salty	15.77	***	-	-	-		+	+
sugary	34.80	***	+	+	+		-	
acidic	2.89	*					-	+
bitter	3.23	**					-	+

Food comfortability: the definition

For elderly people, food comfortability depends on easiness to form bolus when eating and on texture softness

Mouth pain caused while eating the food decreases food comfortability

Food comfortability also decreases when the texture is dry, doughy and not melting

To a lesser extent, a balanced flavour contributes to food comfortability



Perspectives

To evaluate whether food comfortability is perceived differently according to elderlies' oral health

To understand better the elderlies' expectations in terms of food offer

To develop functional foods that are nutritionally effective but also well-balanced on orosensory characteristics using the definition of food comfortability





Thank you for your attention

