CAN PORTION SIZE DECISIONS SUPPORT REDUCTION OF FOOD WASTE

Liisa Lähteenmäki

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MAPP CENTRE – RESEARCH ON VALUE CREATION IN THE FOOD SECTOR
DEPARTMENT OF MANAGEMENT
AARHUS UNIVERSITY

LIISA LÄHTEENMÄKI
PROFESSOR

BACKGROUND

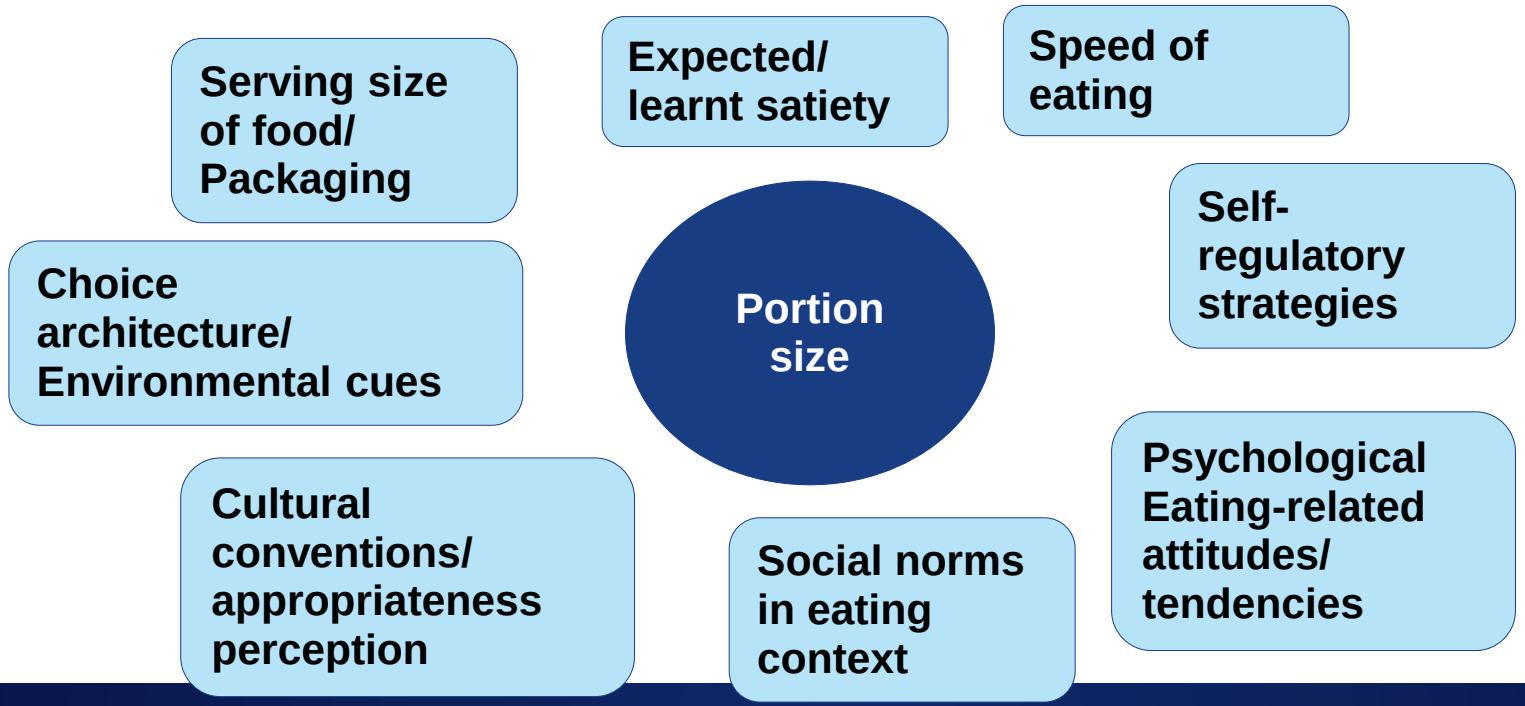
- Portion size decisions have been studied widely during the last fifteen years
- Increasing obesity and overweight rates have been partly attributed to increased portion sizes
- Increased portion sizes produce a risk of food being left on plates and wasted
- If we can reduce portion sizes/ have more appropriate portion sizes, this is likely to have a positive impact on food waste
- What determines individuals' portion size decisions and how the decisions can be influenced?

PORTION SIZE

- As volume
- **As weight (grammes)**
- **As energy (kJ or kcal)**
- Energy density (energy per weight)

- **Meals**
- Eating occasions between meals (mellemmåltid)
- Snacking as a side activity

WHICH FACTORS INFLUENCE OUR PORTION SIZE DECISIONS?



SERVING (PORTION) SIZE EFFECT

- Larger serving size produces larger portion sizes that are eaten
- Unit size: serving food in smaller units decreases portion sizes, but does not impact food waste
- Smaller plates reduce portion sizes: less consumed, less needs to be served
- Energy-dense food increases intake (portion size in calories)

- In addition to overeating, excessive serving sizes can promote food waste

TWO ARGUMENTS

- People are not very good in assessing energy density or how much they are going to eat or even have eaten; higher sensitivity to under-eating than over eating
  → we need help to avoid overeating or producing food waste

- People are in principle capable of differentiating energy density, assess the amount of food required to reach satiety
  → we can predict and produce the appropriate portion size which can reduce food waste

LOW ABILITY TO ESTIMATE HOW MUCH A PORTION CONTAINS FOOD AND ENERGY?

Choice architecture/ Environmental cues

- Stacked or spread on the plate: using area covered as a cue (Szocs & Lefebvre, 2017)
- Portion divided into smaller units: clear points to estimate how much has been eaten (e.g. Rolls et al. 2014; Blake et al.,2015)
- Less from squeeze tubes that from traditional container: requires more effort (Huyghe E, Geuens M, Vermeir, 2017)

- Learning to use tools, e.g. visual indicators (handful, a cup, deck of cards) or weighing foods (e.g. Spence et al, 2015)
- Calculating calories

Self-regulatory strategies

GOOD ABILITY TO ASSESS ENERGY CONTENT AND ENERGY DENSITY

- People are relatively good in matching the energy content of familiar foods (Brunstrom et al. 2008)

- Differentiating energy content in foods that have low energy density is good (up to 1.5 kcal per g), but not with foods that have higher energy density (Brunstrom et al. 2018)

WE CAN ESTIMATE THE AMOUNT REQUIRED WITH FAMILIAR FOODS (IN PRINCIPLE) – GOOD FOR

1. Decision on what comes to the plate
   - based on what is expected to lead to satiety
   - cultural conventions

2. How much is eaten?
   - the norm is to empty the plate

→ Portion size decision support low plate food waste

Expected/ learnt satiety

Cultural conventions/ appropriateness perception

WHY NOT IN PRACTICE?

- We do not always decide serving sizes: the more is served, the more we think is appropriate to take
- Cultural conventions and norms override the individually learnt satiety cues (need to have enough food, emptying the plate
- We follow external cues on what is expected portion size: large plates make us eat more - however, one study showed that when using large plates more vegetables were consumed
- In social situations we may use portion size decisions to express our identity, e.g. gender identity
- Many people restrain their eating in order to lose or maintain their weight or respond to their negative feelings by eating

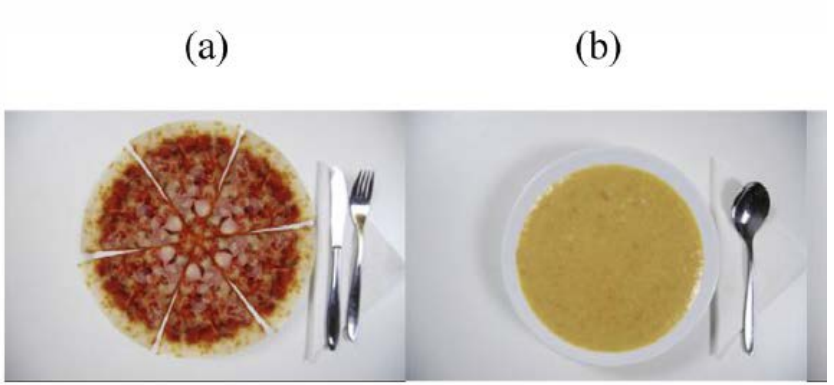
WHAT HAS AN IMPACT ON PORTION SIZE DECISIONS: FOOD OR PERSON?

LIISA LÄHTEENMÄKI
PROFESSOR

EXAMPLE FROM OUR PIZZA & SOUP STUDY

- On-line experiment where respondents could change the size of portion by arrows

- The decisions were predicted by situational hunger/thirst, gender and age, psychological eating attitudes, and food-related perceptions



Spence et al., 2016

Independent variables	Pizza portion size (kcal)		Vegetable soup portion size (kcal)	
	IoI (n = 946)	DK (n = 988)	IoI (n = 953)	DK (n = 984)
Step 1: Physiological				
Hunger[b]	**0.13*****	−0.01	**0.09***	0.06
Thirst[b]	**−0.10****	−0.03	**−0.09***	−0.04
Step 2: Sociodemographic				
Sex[c]	**−0.28*****	**−0.22*****	**−0.29*****	**−0.12*****
Age	**−0.07***	**−0.21*****	0.01	**−0.07***
Body mass index[d]	−0.02	**0.07***	−0.01	**0.11****
Step 3: Psychological				
Cognitive restraint[e]	−0.06	**−0.11****	**−0.08***	**−0.14*****
Uncontrolled eating[e]	**0.11****	**0.13*****	**0.17*****	**0.14*****
Emotional eating[e]	**0.15*****	−0.02	**0.09***	−0.05
General Health Interest[f]	−0.05	0.04	0.04	**0.08***
Step 4: Food-related				
Expected fillingness[b]	**0.06***	0.04	−0.05	−0.06
Expected healthfulness[b]	−0.01	−0.05	**0.12*****	**0.10****
Liking[b]	**0.28*****	**0.25*****	**0.27*****	**0.29*****
Food familiarity[b]	0.15***	0.05	0.01	0.06
Final model (R^2_{adj})	0.43	0.29	0.21	0.16
Model F	**56.17*****	**31.27*****	**20.99*****	**14.96*****
df	13,932	13,974	13,939	13,970

Spence et al., 2016

SUMMARY

- Large portion sizes contribute to higher energy intake and probably also food waste
- Portion size decisions are a result of physiological, psychological, social and environmental factors
- On supply side the energy density can be a crucial factor: we have learnt satiety cues in foods that are not high in energy density
- Most of our knowledge comes from experimental studies using short-term manipulation
- Often portion sizes are studied in relation to energy-dense foods (M&M, chocolate, biscuits, pizza, crisps etc)
- We need better understanding of how portion-size decisions are made in routine-like everyday situations, and whether the portion size decisions are linked to food waste

THANK YOU FOR YOUR ATTENTION

LIISA LÄHTEENMÄKI
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