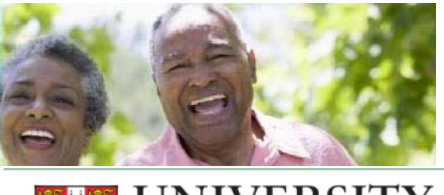
Portion, package or tableware size for changing selection and consumption of food, alcohol and tobacco: Cochrane systematic review

Gareth Hollands, Ian Shemilt, Theresa Marteau, Susan Jebb, Hannah Lewis, Yinghui Wei, Julian Higgins, David Ogilvie




UNIVERSITY OF CAMBRIDGE

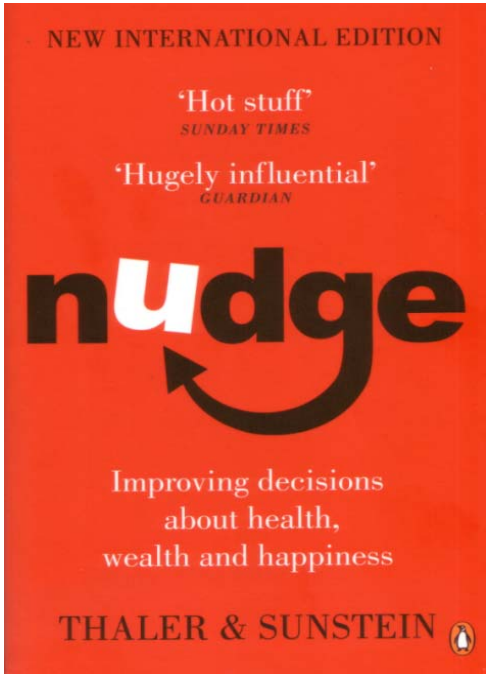
DH Department of Health

BHRU Behaviour and Health Research Unit

Choice architecture

- Idea of ‘nudging’ people — changing the environments within which they make choices (choice architecture) — to change behaviour has gained traction in research and policy circles

- Empirical evidence is limited, but has significant potential to change behaviour at population level



Some examples

- Changing layouts of environments

- Equipment design

- Packaging design

- Changing product size and shape

Choice architecture scoping review

PROVISIONAL TYPOLOGY OF CHOICE ARCHITECTURE INTERVENTIONS IN MICRO-ENVIRONMENTS		MAPPING OF AVAILABLE EVIDENCE BY INTERVENTION TYPE AND TARGET BEHAVIOUR			
Intervention class	**Intervention type**	**Number of study reports (combining primary research and reviews)**			
		Diet 309/440=70.2%	**Physical activity** 84/440=19.1%	**Alcohol** 32/440=7.3%	**Tobacco** 15/440=3.4%
Primarily alter **properties** of objects or stimuli	**AMBIENCE** - alter aesthetic or atmospheric aspects of the surrounding environment	33	10	14	
	FUNCTIONAL DESIGN - design or adapt equipment or function of the environment	27	11	5	
	LABELLING – apply labelling or endorsement information to product or at point-of-choice	78		7	10
	PRESENTATION - alter sensory qualities or visual design of the product	21			2
	SIZING - change size or quantity of the product	66			1
Primarily alter **placement** of objects or stimuli	**AVAILABILITY** - add behavioural options within a given micro-environment	28	6		
	PROXIMITY – make behavioural options easier (or harder) to engage with, requiring reduced (or increased) effort	21	1		
Alter both **properties and placement** of objects or stimuli	**PRIMING** - place incidental cues in the environment to influence a non-conscious behavioural response	9	1	5	1
	PROMPTING – use non-personalised information to promote or raise awareness of a behaviour	26	55	1	1

Objectives

i. To estimate the effects of exposure to different portion, package or tableware sizes on selection or consumption of food, alcohol or tobacco products

ii. To estimate the extent to which these effects may be modified by characteristics of the study, the intervention and the participants

Methods: Eligibility criteria

- **Participants**: Adults and children

- **Interventions and Comparisons**:
  At least two sizes of:
  - a portion of a food, alcohol or tobacco

  - its package

  - an individual unit

  - an item of tableware used to consume it

Methods: Eligibility criteria

- **Outcomes**: Measures of selection or consumption of the manipulated product, or the meal(s) of which the manipulated product is a part

- **Study designs**: Randomised controlled trials, between- or within-subjects (i.e. parallel group or crossover)

Methods: Searches

- Searches of 11 electronic databases plus citation searching, trials registers and key websites

- Dual screening of **51,288** unique title and abstract records then **182** full-text reports. **72** studies met eligibility criteria and were included in analysis (*with a further 11 identified in updated searches but awaiting full integration)*

- Study data extracted and risk of potential bias systematically assessed

Results: Characteristics of included studies (N=72)

- Product:
  - Food = 69
  - Tobacco = 3
  - Alcohol = 0
- Type of manipulation:
  - Portion size = 35 (i.e. amount presented (volume, weight))
- Settings:
  - Laboratory = 50
  - Field = 22 (primarily restaurants, school and worksite cafeterias)
- Populations
  - Low SES = 2

Results: Meta-analysis of effect of interventions

Intervention	Outcome	Comparisons	Effect
Larger size vs smaller size	**Consumption**	**92 from 61 studies *(6711 participants)***	**Small to moderate increase SMD: 0.37 (95% CI: 0.29 to 0.45) – Moderate quality evidence**
Larger size vs smaller size	**Selection**	**13 from 10 studies *(1164 participants)***	**Small to moderate increase SMD: 0.42 (95% CI: 0.24 to 0.59) – Moderate quality evidence**

- **Effect for food consumption:**

Translation into more familiar terms

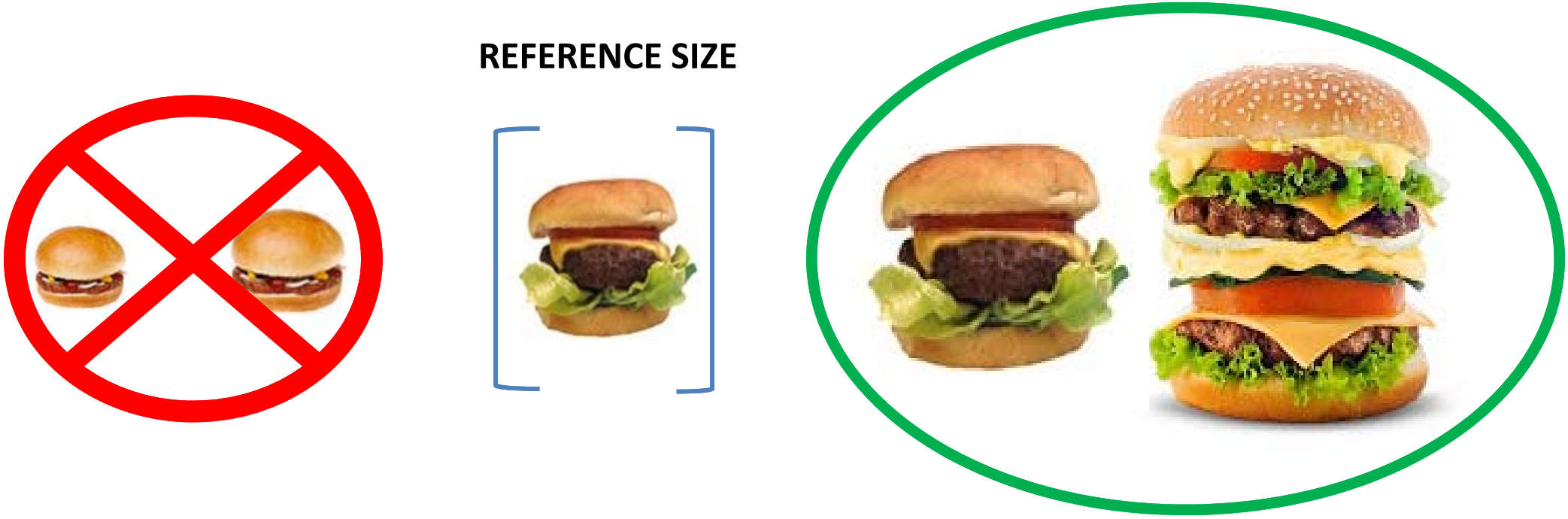
- Available data on consumption levels among representative samples of UK and US adults (NDNS; NHANES) so can re-express effect sizes in these terms

- **IF** sustained reductions in exposure to large sizes could be achieved across the whole diet, this could reduce average daily energy consumed from food by up to 16% among UK adults (equivalent of 279 kcals per day) or up to 29% among US adults (527 kcals per day)

- Re-expressions extrapolate beyond included data so guide interpretation only

Limitations of evidence base

- Lack of evidence to establish whether effects sustained over long term
- Typically large absolute sizes: both sizes ≥ 100% reference portion size in 81% of comparisons with available data
- Typically large changes in relative size: at minimum larger of compared sizes 120% of smaller (majority either 120-160% or ≈ 200%)



Summary

- Most conclusive evidence to date that people consume more food or non-alcoholic drinks when offered larger portions, packages or tableware

- Did not find evidence that size of effect varied substantively between men and women, BMI or tendency to control eating behaviour. If replicated :
  - people susceptible to environmental influences independent of individual characteristics often portrayed as main drivers of consumption
  - confirm potential for effective interventions targeting size among broad range of population

Implications for research

- With exception of directly controlling sizes of the foods people consume, assessment of effectiveness of intervention strategies was beyond scope
- Need to strengthen evidence base around effectiveness of interventions to reduce, or mitigate effects of, exposure to larger sizes

- More primary research on effects of sizing needed:
  - Alcoholic and non-alcoholic drinks, and tobacco;
  - Complex 'real-world' settings (e.g. homes or shops)
  - Sustained effects (prolonged or repeated exposures over longer time)
  - Lower SES populations
  - Smaller incremental changes at smaller end of portion size continuum

Implications for policy 1

- Not enough evidence to inform alcohol or tobacco policy
- Suggests policy actions to reduce, or mitigate effects of, exposure to larger sized portions, packages and tableware have potential to contribute to meaningful reductions in food consumption
- Would support actions to reduce size, availability and appeal of larger sizes but with exception of directly controlling sizes of foods, effectiveness of such strategies not yet established

Implications for policy 2

- Potential actions targeting physical environment (in public and commercial sectors) e.g.:
  - Making default serving sizes or tableware smaller;
  - Reducing availability of larger sizes

- Targeting the economic environment e.g.:
  - Restricting pricing practices whereby larger sizes cost less in relative terms than smaller sizes and so offer more value for money;
  - Restricting promotions on larger-sized packages

- Actions might be introduced through voluntary agreements or regulatory and legislative frameworks

THANK YOU

Full review available in Cochrane Library:
http://dx.doi.org/10.1002/14651858.CD011045.pub2

Follow-up policy implications article, in press at BMJ

Email: gareth.hollands@medschl.cam.ac.uk