Reducing food portion sizes to benefit public health: are visual perceptions of normality important?

Ashleigh Haynes 1
Charlotte Hardman 1
Alexis Makin 1
Jason Halford 1
Susan Jebb 2
Eric Robinson 1

1 Department of Psychological Sciences, University of Liverpool
2 Nuffield Department of Primary Care Health Sciences, University of Oxford
Increasing portion sizes: part of an obesogenic environment

- Portion sizes available for consumption are on the increase (Marteau et al., 2015, BMJ)
- Availability of larger portion sizes implicated in rising obesity rates
The portion size effect

- Larger portion sizes promote greater energy intake
- Demonstrated for a range of foods, and robust to individual differences (Hollands et al., 2015, Cochrane)
- Portion size effect on energy intake beyond single eating occasion less clearly understood

→ Reducing portion sizes could benefit public health
   (but how small is too small?)
Substantial difference in energy intake, proportional to magnitude of portion size difference (despite being considered equally as ‘normal’) (Robinson et al., 2015, *Appetite*)
Portion size

- ‘Not normal’ (too small)
- ‘Normal’
- ‘Normal’

\[ \text{Negligible difference in energy intake due to compensatory eating} \]
Norm range model

- Lower norm range boundary
  - Portion sizes not categorised as normal
  - All of portion is eaten & additional compensatory eating occurs

- Norm range
  - Portion sizes categorised as being normal
  - Most of the meal is eaten

- Upper norm range boundary
  - Portion sizes not categorised as normal
  - Significant amount of meal uneaten

0g portion

1000g portion
Aims

1. Estimate the range of portion sizes that are considered normal for several foods.
2. Test whether perceived ‘normality’ of a food portion influences intended consumption.
Stimulus set

5 foods

(range of meal types, piloted for liking, familiarity and consumption frequency)

X

27 portion sizes

(40 – 300% of manufacturers’ recommended portion size at 10% increments)*

* Cake and ice-cream photographed at up to 400% of manufacturers’ recommended portion, resulting in 37 portion sizes
Normal

Not normal
Only a very small part (it is too big)

The whole lot (it is just the right amount)

The whole lot and much more (it is too small)
Only a very small part (it is too big)

The whole lot (it is just the right amount)

The whole lot and much more (it is too small)
Participants and procedure

- Within-subjects: 60 adults, aged 21 – 73 ($M = 40.33$, $SD = 14.90$)
  - Stratified gender X weight band (BMI: 22.5 – 27.5, 27.5 - 32.5)

Portion size computer-based tasks (counterbalanced order):
- Normality judgments
- Intended consumption

Self-report:
- Liking, familiarity, consumption frequency of food types
- Dietary restraint, emotional and external eating (DEBQ)
- Trait self-control
- Plate-clearing tendency
- Currently dieting (y/n)

Height and weight measurement
Portion size norm ranges (% of recommended)

- **Porridge**: 100% - 150%
- **Pasta**: 70% - 120%
- **Curry**: 80% - 160%
- **Crisps**: 130% - 190%
- **Cake**: 90% - 170%

100% of recommended portion

**Norm range**

**Outside norm range**
Intended consumption

“The whole lot and much more (it is too small)”

“The whole lot (it is just the right amount)”

“Only a very small part (it is too big)”

*Main effect norm position on intended consumption: F(1.31, 77.25) = 1137.40, p < .001, partial η² = .95.
Intended consumption

“The whole lot and much more (it is too small)”

“The whole lot (it is just the right amount)”

“Only a very small part (it is too big)”

* 

Below norm: \( t(59) = 19.87, p < .001, d = 5.17 \); within norm: \( t(59) = -1.53, p = .13, d = 0.40 \); above norm: \( t(59) = -24.99, d = 6.51 \).
Conclusions

• Reduction of portions to sizes considered abnormally small is likely to result in compensatory eating

• Considerations of portion size normality useful to guide effective reductions to benefit public health
Acknowledgements

Ashleigh Haynes \(^1\), Charlotte Hardman \(^1\), Alexis Makin \(^1\), Jason Halford \(^1\), Susan Jebb \(^2\) & Eric Robinson \(^1\)

\(^1\) Department of Psychological Sciences, University of Liverpool
\(^2\) Nuffield Department of Primary Care Health Sciences, University of Oxford

We are grateful to Chloe Thompson for assistance with data collection.

This project was funded by a MRC New Investigator Research Grant provided to Eric Robinson.