

**EFFECTS OF APPETITE STATUS AND PERCEIVED SATIATION ON
PORTION SIZE ESTIMATION IN MEN**

A thesis submitted by

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in partial fulfilment of the requirements for the degree of

Master of Science

University of Chester

October 2009

ACKNOWLEDGEMENTS

This research was funded by a grant from the Faculty of Applied and Health Sciences, University of Chester, to Dr. Eva Almiron-Roig.

I would like to thank Dr *Eva Almiron-Roig* for her invaluable academic support and enthusiasm throughout this study. I would also like to thank *Juan Manuel Bravo Garcia, Sue Dunn and Helen Green* for their technical support; Dr *Basma Ellahi* for her constant encouragement and assistance; *Alison Morgan* for her administrative support; *Colin Sinclair* for his advice with statistical analyses; and all the participants who took part in my study, without whom this project would not have been possible.

Finally, I would like to thank my parents, *John and Christine*, my brother, *Jon* and my partner, *Craig*, for their encouragement, assistance and everlasting support.

ABSTRACT

Background. People are generally unable to accurately estimate appropriate portion sizes of foods and drinks. Underestimation of food portion sizes, particularly in energy dense foods, can lead to energy over consumption.

Aims. This study investigates the effects of appetite status and perceived satiation (PS) on estimation of food/drink portion sizes and accuracy of estimation based on portion size guidance schemes. In addition, the study also explores how accuracy of portion size estimates may fluctuate with food/beverage energy density.

Design and procedures. Twenty-seven male volunteers estimated portion sizes of eight foods/drinks with high, medium, low and very low energy densities in a within-subjects crossover design with four conditions: (F) fullness; (H) hunger; (FPS) fullness with PS cue; (HPS) hunger with PS cue. The independent variables were fullness, hunger, PS cue and energy density. The dependant variable was perceived portion size measured using questionnaires.

Results. Estimated portion size for all foods/drinks was significantly smaller when subjects were hungry compared with when they were full ($p < 0.01$). Accuracy of estimation decreased under hungry conditions for all foods/drinks with respect to health professional standards (DOM UK and ADA). This was also true with reference to government standards (FSA and FDA), except for the banana. Irrespective of appetite status, portion size estimates for all foods and drinks were significantly smaller than actual portion sizes based on all four standards ($p < 0.001$), except for the banana. Portion estimates for the banana were significantly larger

($p < 0.05$), significantly smaller ($p < 0.001$) or exact ($p > 0.05$), depending on the standard used for comparison.

The PS cue had no significant effect on estimation of food/drink portion sizes or accuracy of estimation according to any of the four standards.

Percentage error of portion size estimates increased with increasing energy density ($r = 0.36$, $n = 32$, $p < 0.05$), although the relationship failed to reach significance in the absence of drinks ($r = 0.40$, $n = 24$, $p = 0.05$).

Conclusion. Portion size estimates were greater and more accurate when subjects were full compared with when they were hungry. However, irrespective of appetite status, portion size estimates were significantly smaller than actual amounts displayed, based on standards from portion size guidance schemes. PS had no effect on estimation of portion size or accuracy of estimation. Foods of high energy densities and caloric drinks are estimated less accurately than foods of lower energy densities.

In order to resolve discrepancies between consumers' perceptions of portion sizes and recommendations from governments/health professionals, creation of a portion size guidance scheme with consistent information on appropriate portion sizes is essential.

I hereby declare that work contained herewith is original and is entirely my own work. It has not been previously submitted in support of a Degree, qualification or other course.

Signature

Date

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
cm	Centimetres
dp	Decimal place
ED	Energy dense
ES	Expected satiety ¹
F	Fullness
FPS	Fullness with perceived satiation cue
g	Grams
h	Hours
H	Hunger
HED	High energy dense or high energy density (> 4.0 kcal/g or ml)
HPS	Hunger with perceived satiation cue
kcal	Kilocalories
kg/m²	Kilograms per metre squared
kJ	Kilojoules
KS	Kolmogorov-Smirnov
LED	Low energy dense or low energy density (0.6 - 1.4 kcal/g or ml)
MED	Medium energy dense or medium energy density (1.5 – 3.9 kcal/g or ml)
ml	Millilitres

¹ The perceived ability of a food to stave off hunger until the next meal (Brunstrom and Shakeshaft, 2009).

mm	Millimetres
PS	Perceived satiation ²
SD	Standard deviation
VLED	Very-low energy dense or very-low energy density (< 0.6 kcal/g or ml)
y	Years

² A measure of how full a person expects to feel on finishing a food/drink.