

Consumer understanding of food portion sizes

Summary report



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A report into adults' knowledge, attitudes and reported behaviour around food portion sizes on the island of Ireland

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1 Introduction

In 2010, **safefood** commissioned this study to investigate consumer understanding of food portion sizes (PS) on the island of Ireland (IOI), with a view to providing clear and practical advice about PS for consumers.

Recent dietary surveys on the IOI have confirmed that large portions are associated with overeating in both adults and children (1, 2). International research, mainly conducted in the United States (US), has demonstrated that when adults and children are served larger portions, they consume more calories (3, 4). If overtime the energy (calories) consumed through food and drink is consistently greater than the energy expended through physical activity, the result is weight gain. Not only is the calorie content of the food important but so too is its nutritional quality.

Currently on the IOI, there is little information on consumer understanding and behaviour around food PS. With two out of every three adults on the IOI currently overweight or obese (5, 6), this must be addressed in order to support the development of future public health initiatives and so that PS forms an integral part of an overall strategy to reduce levels of obesity on the IOI.

2 Aims and Objectives

The overall aim of the project was to investigate consumer understanding of food portion sizes on the IOI in order to provide clear and practical advice to consumers.

This project comprised **four main tasks**:

1. To review the literature and other relevant sources of information to determine patterns and trends in food PS on the IOI
2. To review national and international serving size (SS) guidance
3. To investigate adults' understanding and behaviour in relation to PS, specifically:
 - (i) Their knowledge and attitudes
 - (ii) How such behaviours are influenced when exposed to foods perceived as "healthier"
4. To develop and evaluate a range of consumer strategies for estimating food PS

There are two similar terms used in this report: portion sizes (PS) and serving sizes (SS). They mean two different things: PS refers to the amount you eat while SS is the amount of that food you are recommended to eat. Throughout this report, we are going to use PS for simplicity unless otherwise stated.

3 Methods

Consumer understanding of PS was considered using a number of methodologies focussed on four areas:

- Trends in food PS
- Reviewing national and international SS guidance
- Consumers' understanding and behaviour in relation to PS
- Tools for estimating food PS

3.1 Trends in food portion size (Task 1)

Trends were investigated in four different ways using existing databases (Table 1) and recipe books (Appendix 1).

3.1.1 Recorded food intake

Changes over time (approximately 10 years) in reported PS of 13 staple foods were investigated in the periods 1997–1999 (North South Ireland Food Consumption Survey (NSIFCS)) and 2009–2010 (National Adult Nutrition Survey (NANS)) (Table 1). These foods represent the ones that contribute most to energy intake on the IOI.

3.1.2 Unpackaged foods – bakery/deli/takeaway

Trends in the PS of unpackaged food products (specifically in-store bakery products sold in supermarkets; products sold in independent bakeries or delis; and takeaway foods consumed in the home) in the periods 1997–1999 and 2009–2010 were examined.

3.1.3 Recipes

Trends in recipe SS from a sample of 21 books published between 1959 and 2010 were studied (Appendix 1). The mean difference in years between the older and recently published recipes was 27.5 years (range 11–46 years).

3.1.4 Serving size versus portion size

The PS intake reported by NANS in the Republic of Ireland (ROI) was compared to the manufacturers' recommended SS using the Irish National Food Ingredient Database (INFID) to establish if consumers followed the recommended SS guidelines on labels.

Table 1: Data sources used to investigate trends in portion sizes

Database	Description	Year	Reference
North South Ireland Food Consumption Survey (NSIFCS)	Survey carried out by the Irish Universities Nutrition Alliance (IUNA) Collected data on food & beverage consumption, nutrient intakes, body measurements, physical activity and behaviours/attitudes in 1,379 18–64 year olds in ROI and NI*	1997–1999	10
National Adult Nutrition Survey (NANS)	Survey Carried out by IUNA Collected data on food & beverage consumption, nutrient intakes, body measurements, blood pressure, physical activity and food choice in 1,500 18–90 year old adults in ROI. No data for NI	2009–2010	11
Irish National Food Ingredient Database (INFID)	A database of all food ingredients used in ROI. Has been extended to include packaging material usage	Late 1990s onwards	12

*While NI data was available from the NSIFCS, there were no follow-up data available for NI within NANS and so only trends in food PS in the Republic of Ireland (ROI) are discussed here.

3.2 Review of national and international serving size guidance (Task 2)

There were two elements to this task:

3.2.1 SS guidance schemes were identified using internet searches (Appendix 2). Schemes were rated (out of five) according to the following criteria:

- Format, e.g. colourful, interactive, appealing (1 mark)
- Use of descriptors, e.g. cup, spoon (1 mark)
- Foods included –all food groups (0.5 marks); composite foods (0.5 marks)
- Guidance on frequency of consumption of food portions (0.5 marks) and accounting for differences in individual needs (0.5 marks)
- Practical and concise (1 mark)

Schemes were classed as poor (score 0–1.5), average (score 2–3.5) or excellent (score 4–5).

3.2.2 A literature search on the effectiveness of different SS advice and schemes in practice was conducted (Appendix 3). These were evaluated based on consumer understanding, impact, acceptability and usability of the method, and potential barriers to their use.

3.3 Consumers' understanding and behaviours in relation to portion size (Task 3)

3.3.1 Knowledge, attitudes and behaviours

3.3.1.1 Qualitative – focus groups

Adults (aged 19–64 years) (Appendix 4) were recruited from community centres, churches and universities in IOI to attend one of 10 focus group sessions. A total of 66 people (4–6 participants per group) took part between April and June 2011. A discussion guide was developed and informed by task 2. It covered:

- Consumer understanding of food PS
- Consumer awareness and use of PS strategies
- Food purchasing
- Selection of PS prior to consumption
- PS decisions during consumption
- The eating environment

Dietary guidelines (UK: the eatwell plate or ROI: the Food Pyramid) were used to focus the discussion on food PS.

3.3.1.2 Quantitative– survey

A survey was completed by 1,012 adults (IOI) aged ≥ 18 years between July and September 2012. A nationwide social marketing research agency was contracted to collect the data. Participants (Appendix 5) were recruited using the electoral register and were interviewed in their own home on a face-to-face basis.

The survey contained 22 portion control-related statements (framed in a positive manner) divided into sections (Table 2). These statements were identified from the previous qualitative research and relevant literature. Participants were asked to indicate their response according to a four-point response scale (1=never, 2=sometimes, 3=often, 4=very often) the extent to which they used each strategy to control the amount of food they ate at one time (i.e. during a meal or snack).

Additional questions (12, 13) were included to measure demographic information, participants' general interest in health and their use of restrained eating practices.

Table 2: strategies for controlling food portion size

Purchasing strategies	Avoid buying tempting foods Buy single individual portions of food so you are not tempted to eat a whole bag/box Buy food already packaged into portion-controlled sizes Order small food portions when eating out Avoid eating certain foods that you tend to overeat Share food
Storage strategies	Divide and store food in smaller portions Keep leftovers out of reach Cook less food
Satiety strategies	Deliberately take small helpings Eat slowly Wait a while before deciding to go back for seconds Fill up with vegetables/fruit Fill up with water Eat until satisfied (not full) Use small plates/bowls and cutlery
Guidance strategies	Rely on someone else serving you Measure foods using visual aids, such as a deck of cards or fist Measure food in grams, ounces or cups Use suggested SS from food packets Use suggested SS from weight-loss plans Count calories

3.3.2 Intervention to see how adults' attitudes and behaviours are influenced when exposed to foods perceived as "healthier"

In order to establish whether foods perceived as "healthier" have the potential to increase food intake, three pairs of foods ("healthier" vs. standard) with approximately the same energy density (kJ/100g) were selected (Table 3).

Table 3: Energy density and fat content of perceived 'healthier' vs standard foods

Energy/fat content (/100g)	"Healthier"	Standard
	Semi-skimmed milk	Sprite
Kj	192	185
Kcal	46	44
Fat, g	1.6	0.0
	Special K (Original)	Frosties
Kj	1586	1594
Kcal	374	374
Fat, g	1.5	0.6
	Country Kitchen reduced-fat coleslaw	Country Kitchen luxury coleslaw
Kj	926	926
Kcal	225	224
Fat, g	22.2	21.9

Participants (total, n 186) aged 19–60 years with a BMI $\geq 20\text{kg/m}^2$ served an appropriate PS of each food for themselves, and its calorie content was estimated. Participants also rated their anticipated consumer guilt (ACG) about eating the food on a scale of 1 (= not at all guilty) to 5 (= very guilty). Results were compared between "healthier" and standard food pairings.

3.4 Tools for estimating food portion sizes (Task 4)

This task is described in Figure 1.

Figure 1: Tools for estimating food portions

	'PORTION DISTORTION' QUIZ	LEAFLET	MEASURING AIDS
DESCRIPTION	<p>An online interactive quiz adapted from a US quiz (14). For a typical day's meals/snacks, participants were shown the energy content of an average PS and were asked to estimate the energy content of the larger PS (from three options) (Appendix 6)</p>	<p>Adapted from a US leaflet (14), it contained tips for consumers to control their PS in a range of settings. Two versions were produced—both contained the same information but differed in terms of design, format & presentation (Appendix 7).</p>	<p>A list of 16 visual aids, such as measuring jug/scales, reference objects, household measures and pack labels/markings, were chosen.</p>
HOW TESTED	<p>Online: Participants were asked a range of questions on their perception of PS and on their portion-control behaviours. They were then asked to complete the Food Portion Distortion Quiz and to provide feedback on it.</p>	<p>One-to-one, semi-structured, 30-minute interviews were conducted, where participants were separately shown the two leaflets and then asked to provide feedback on its content and usefulness, and the situations in which they would use it.</p>	<p>Six semi-structured focus interviews were conducted to explore views on a range of measuring aids. After this, participants were asked to serve recommended the SS of each food presented, using the aid they considered most appropriate. They rated their chosen aid in terms of ease of use (1=not very easy to 5=very easy) and likelihood of future use (1=not very likely to 5=very likely).</p>
PARTICIPANTS	<p>1,032 adults (18–64 years), living on the IOI took part in the study via a computer link which was distributed via email and social networking sites. The quiz was completed anonymously.</p>	<p>The leaflet was tested with 40 adults (19–64 years) in NI. They were recruited via local advertisements, email and word-of-mouth by Queen's University Belfast (QUB) and the University of Ulster (UU) (from both the university and the local population). A signed informed consent form was obtained from each participant.</p>	<p>32 adults (18–64 years) on the IOI were recruited to focus groups and 120 adults were recruited to the testing session. Participants were recruited via local advertisements, email and word-of-mouth by QUB, UCD and UU. A signed informed consent form was obtained from each participant.</p>

3.5 Data analysis

Those tasks which included focus groups discussions and semi-structured interviews were digitally recorded with the participants' consent (Tasks 3 and 4). These were then professionally transcribed word for word, and major themes were identified with the help of the computer programme NVivo 9 (QSR International Pty Ltd, Southport, UK), using a technique called inductive thematic analysis (10).

Quantitative data (Tasks 1–4) were expressed as proportions (%), mean, median, standard deviation (SD), interquartile range (IQR) or percentiles, where appropriate. All analysis was conducted using SPSS for Windows (IBM Corp, Armonk, NY, USA).

4 Main findings

4.1 Trends in food portion sizes (Task 1)

4.1.1 Recorded food intake

No clear overall trend was found in reported PS of food over a 10-year period (Table 4).

4.1.2 Unpackaged foods

4.1.2.1 Baked goods

This category showed an upward trend in PS. **There has been a threefold increase in the mean PS of croissants, scones, éclairs and jam doughnuts, while the mean PS of Danish pastries and muffins is four times greater now compared to the late 1990s.** The only food to show a decrease in PS was plain scones. The mean PS for a variety of unpacked baked goods is presented in Table 5.

4.1.2.2 Takeaway products

The greatest increases in PS have occurred in doner kebabs, battered sausages and spring rolls (177 per cent, 92 per cent and 101 per cent respectively). Overtime, the mean PS of chips, and of vegetable and cheeseburgers, has remained relatively steady. The mean PS for a variety of takeaway products is presented in Table 6.

4.1.3 Recipes

Overall there was a small, non-significant increase in the recommended SS and calories (energy) per serving of main meals, side dishes and dessert recipes over time. The reason the trends were non-significant is probably due to a large variation in SS.

4.1.4 Serving size versus portion size

The actual PS consumed were compared to the recommended SS on food packaging. This revealed that in 19 per cent of eating occasions, consumers complied with the recommended SS, in 55 per cent,

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they exceeded the recommendation, and in 26 per cent, they consumed less than the recommended SS.

The reported median PS of individually packaged food products tended to comply with suggested on-pack SS, indicating consumers are likely to experience the most difficulty in consuming the appropriate amount when self-selecting from multi-portion units.

Table 4: Summary of changes in portion sizes of staple foods in Ireland

Trend	Food
Significantly increased	White sliced breads (60g to 72g)
	Brown/wholemeal breads (70g to 72g)
	All meat cooked (84g to 100g)
	Poultry roasted (72g to 100g)
	Milk (46g to 48g)
Significantly decreased	Potatoes (240g to 181g)
	Chips/wedges (200g to 150g)
	Ham sliced (35g to 34g)
No significant change	Processed potato products
	Bacon/ham
	Cheese
	Yoghurt
	Butter/spreads

Table 5: Mean portion sizes and trends in unpacked bakery goods from 1997/1999 to 2010/2011

Bakery good	Mean (grams)		% change
	1997/1999	2010/2011	
Soft brown rolls	68	76	+12%
Croissants	44	139	+216%
Danish pastries	47	250	+436%
Scones, fruit	82	260	+218%
Jam doughnuts	29	108	+271%
Éclairs	40	128	+219%
Muffins	50	247	+394%
Scones, plain	68	56	-18%

Table 6: Mean portion sizes and trends in takeaway products from 1997/1999 to 2010/2011

Dishes	Mean (grams)		% change
	1997/1999	2010/2011	
Doner kebabs	143	397	+177%
Spring rolls	77	155	+101%
Battered sausages	66	127	+92%
Battered burgers	135	169	+25%
Chicken nuggets	81	101	+24%
Hamburgers	122	140	+15%
Cheeseburgers	148	149	+1%
Chips	377	371	-2%
Vegetable burgers	237	228	-3%
Fish burgers	197	187	-5%
Fried rice	352	330	-6%
Chicken curry	534	448	-16%

4.2 Review of national and international serving size guidance (Task 2)

4.2.1 Identifying serving size guidance schemes

The available data suggested that consumers have difficulty understanding the terms PS and SS, as they tend to be used interchangeably.

A total of 87 national and international schemes were identified and evaluated with respect to consumer understanding, impact, acceptability, usability and potential barriers. While government schemes most consistently followed the pyramid format (37%; n 18), the majority of other recommendations (from non-government organisations, healthcare professionals and industry) used food photographs, information sheets and other visual aids to demonstrate appropriate SS.

4.2.2 Assessing the effectiveness of serving-size guidance schemes

Consumer understanding, acceptability and application are necessary for SS guidance schemes to work. Consumers generally have a poor understanding of SS guidance, in particular in relation to:

- **Terminology:** there was confusion between the terms PS and SS and terms such as ‘daily allowance’ and ‘restriction’.
- **Units of measurement:** various units are used; statements such as ‘consume more’ and ‘small/medium/large’ are too ambiguous and subjective; there is difficulty with metric vs. imperial scales. Amounts expressed in household measures/units together with food examples make more sense to consumers than specific weights (e.g. one cup of oatmeal = one serving of grains).
- **Consumer perceptions vs. recommendations:** the idea of what is an appropriate PS varies by age, sex and ethnicity, and recommended SS often does not reflect consumers’ normal eating patterns.

A limited number of studies have been carried out in this area and have found that awareness of SS guidance does not necessarily result in it being followed. Consumers are more likely to use it when they are aware that change is good for their health. They tend to be interested and recognise that SS guidance is helpful, but its relevance is often questioned. Acceptability is dependent on the eating occasion and the type of food as well as sex, socio-economic status, level of interest, perceived time commitment and credibility of the source.

4.3 Consumers' understanding and behaviours in relation to PS (Task 3)

4.3.1 Knowledge, attitudes and behaviours regarding food portion sizes

This task used both qualitative and quantitative research, and produced the following findings: (a) PS barriers from a consumer viewpoint, as identified in focus groups (Table 7), and (b) PS control strategies used by participants, as identified in a survey (Table 8).

4.3.1.1 Portion size barriers (qualitative research)

Descriptive data from focus group participants highlighted seven significant barriers to healthy PS control (Table 7).

Table 7: Barriers to healthy portion size control

Lack of clarity and irrelevance of suggested SS guidance	<p>“...you’re permeated with this stuff...you’re so bogged down with it, it’s actually information overload and it just gets to the point where it’s not effective anymore.”</p> <p>“You don’t know if it’s for a small, petite lady or is it for us lads who play rugby? That can be wrong so how do you judge by that?”</p>
Guilt-free serving	<p>“I don’t think portion sizes really matter for the likes of chicken and potatoes and all, but it does for chocolate or a cake... For healthy food, you’ll just eat away and away at it cos you know it’s fine...like if I’m making scrambled egg, I’ll just throw 5-6 eggs into it.”</p>
Lack of self-control over food cues	<p>“Like today I went and got five boxes of Rice Krispies because it was on offer, I’ll eat more.”</p>
Distracted eating	<p>Eating has become “something you’re doing automatically” and so meal-to-meal compensation would occur in this context.</p> <p>In addition, when socialising with friends, “...no-one’s thinking about portion sizes. It’s kind of your spoiling yourself you know.”</p>
Social pressures	<p>“If you’re at somebody’s house and even if it’s a terrible feed like, you’re not going to leave it all, you’re going to eat a certain amount so they don’t get offended...”</p> <p>Males viewed eating as a “test of manhood”, while females reported increasing their habitual PS in the company of male diners to avoid appearing “mean about food” and not wanting to give the impression they are “constantly counting calories”.</p>
Emotional eating rewards	<p>“Well if I’m bored, or if I’m having a really bad day, I’m like, right, give me the chips and dip –I’m eating the whole bag!”</p>
Quantification habits ingrained from childhood	<p>“I think that PS is set by your upbringing, because my husband doesn’t eat so much because he was never given large portions but I would eat more because we were obviously given bigger portions when we were young.”</p> <p>“If there was a big plate of something in front of me, I would definitely eat it all because I have that thing like I can’t waste this.”</p>

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4.3.1.2 Portion control behaviours (quantitative research)

Based on the quantitative survey results, PS control strategies used by participants were broadly classified into three types (Table 8):

Table 8: Strategies used to control portion sizes

Satiety strategies	Fill up with vegetables/fruit
	Fill up with water
	Eat slowly
	Wait a while before deciding to go back for seconds
	Eat until satisfied (not full)
Guidance strategies	Use suggested serving sizes from weight-loss plans
	Measure foods in grams, ounces or cups
	Measure foods using visual aids, such as a deck of cards or a fist
	Count calories
	Use suggested SS from food packets
Purchasing strategies	Buy single individual portions of food so you're not tempted by the whole bag or box
	Buy food already packaged into portion controlled sizes
	Order small food portions when eating out

Satiety-related portion control strategies were most frequently used, whilst strategies related to measuring or estimating appropriate food PS were least commonly used.

There was a feeling by many participants that PS control was only relevant for 'dieters' and that it didn't apply to 'treats'. Females and participants with a higher interest in health and those who had made at least one weight-loss attempt in the past year used significantly more portion control strategies (guidance, satiety and purchasing) than did men, participants with a lower interest in health and those who had made no weight-loss attempts in the past year. Portion control strategy use did not vary as a function of age group, ROI/NI or social class.

4.3.2 How adults' attitudes and behaviours are influenced when exposed to foods perceived as "healthier"

The PS of all six foods estimated by participants (n 186) was generally larger than the recommended SS, while the calorie content of the six foods was underestimated. With regard to the food pairings (Special K vs. Frosties; semi-skimmed milk vs. sprite; luxury vs. reduced fat coleslaw), participants perceived the "healthier" foods (Special K; semi-skimmed milk; reduced fat coleslaw) to be inherently lower in calories than their standard alternatives.

A higher level of ACG was also associated with the standard foods, despite the food pairs containing approximately equal calories. Consistent with consumers' viewpoints (Table 7), this led participants to serve out a larger PS of the "healthier" coleslaw than that of the standard version, because it was associated with 'guiltless eating'. Although this was only observed for one of the food pairs (coleslaws) in this present study, it is noteworthy that it was only for this food pair that a direct comparison between product descriptions was plausible (i.e. reduced fat vs luxury of the same branded product), and this example clearly demonstrates how people can overestimate the healthiness of a product based on nutrition labelling claims.

4.4 Strategies to help consumers with food portion sizes (Task 4)

All of the strategies developed for monitoring PS (online quiz, leaflet and measuring aids) were well received by the majority of participants. Although they were each treated individually and were not directly compared, a summary table (Table 10) has been compiled at the end of this section to demonstrate the key strengths and weaknesses of each.

4.4.1 Quiz

This online interactive tool significantly raised awareness of PS distortion in 64 per cent of participants, although more than a third of the total group indicated that they were not likely to change their PS after using the tool. Between 30 per cent and 60 per cent of participants, however, were likely to use the information and ideas from the quiz, particularly when preparing food in the home (n 596; 58%) and when eating at work (n 524; 51%).

Accuracy in completing the quiz

- Only two per cent of respondents correctly estimated the energy content of the larger PS at all five eating occasions (Appendix 6).
- The majority (64%) correctly estimated the calorie contents of the larger PS at two or three eating occasions.

Portion-size opinions

Participants indicated they ‘always’ find it difficult to manage their PS on special occasions, but also when tired, busy, ‘hung-over’ or hungry, when travelling, when cooking, after exercise and when eating at a friend’s house.

The majority of respondents also felt that compared to 10 years ago, PS was bigger in fast food outlets, restaurants and supermarkets. However, PS was perceived to be unchanged in the home and in vending machines.

4.4.2 Leaflet

Efficacy of the leaflet

Participants rated the content of the leaflet (Appendix 7) highly in terms of its advice for managing food PS (mean rating >8 out of 10 on a scale of 0 '*very poor*' to 10 '*very good*'). The viewpoint was that much of the information and tips were "common sense". However, participants agreed that the leaflet was a good "reminder", acting as a motivator to encourage "self-discipline" and promote "good intentions" in terms of PS control.

Perceived use of the leaflet

After reading the leaflet, the majority felt the advice would particularly help them manage their PS better in certain situations: while eating in, eating out, when they had a lack of time and when watching TV. However, they generally felt that it could be difficult to implement in a family household and would not be as useful on special occasions, when eating at a friend's house, in stressful situations or when snacking.

Information on when participants found it most difficult to manage their PS (Table 9) was also collected.

Table 9: Participants' opinions on situations where it is difficult to manage food portion sizes (n40)

Settings	Sometimes (%)	Always (%)	Never (%)
Eating in	45	7.5	47.5
Eating out of the home	57.5	10	32.5
Eating at work	20	0	80
Eating with friends	62.5	2.5	35
Stressful situations	35	10	55
Lack of time	40	2.5	57.5
Special occasions	40	37.5	22.5
Eating late/after a night out	35	7.5	57.5
Eating while watching TV	50	2.5	47.5
Preparing a meal	20	5	75

4.4.3 Portion size measuring aids

Overall, participants showed a strong preference for household measures (e.g. 200ml disposable cups, bowls, glasses, measuring spoons) compared to other forms of measuring aid as they were deemed easy to use, acceptable for future usage and relatively precise. Measuring jugs and scales were not popular. Even though the majority of participants (79%) rated the measuring scales/jug as either easy or very easy to use (rating 4/5 out of 5, respectively), a large proportion (43%) were not likely to use them again (rating them 1–2 out of 5).

“So definitely the visual, yeah, rather than the grams and ounces, because that just goes over people’s heads sometimes and it is a torture to take the scales out to weigh, unless you’re in that frame of mind of weighing; most of the time we don’t bother”



Table 10: Key strengths and weaknesses of the tools as identified by consumers

	QUIZ	LEAFLET	MEASURING AIDS
STRENGTHS	<p>Liked the photos and the immediate feedback on their answers</p> <p>Was “helpful”, “fun”, “informative”, “realistic”, “interesting” and “easy to use”</p> <p>Useful for aiding weight loss; students; those unaware of calories</p>	<p>Liked: ‘eating in’ section; idea of calories on menus; ordering a half portion</p> <p>Increased awareness of on-pack SS and how it compares to their usual PS</p> <p>More inclined to read food labels and nutritional information now</p>	<p>85% most likely to use visual aids when preparing food at home, particularly for dinner, compared to any other eating occasion (e.g. breakfast)</p>
WEAKNESSES	<p>No vegan/vegetarian options</p> <p>Did not address a balanced diet</p> <p>Did not teach them anything new</p>	<p>Tip to fill up on “extra vegetables and salad” was unrealistic</p> <p>Would restaurants be amenable to half portions?</p> <p>Buying pre-portioned food not realistic as it is too expensive</p> <p>Related to meals more than snacks</p>	<p>Inconvenient to use overall, not widely available, not practical for certain foods.</p> <p>May not be suitable for left-handed people (e.g. portion pots) or visually impaired (e.g. when using food labels), and others may require more detailed instructions (e.g. level/heaped spoon).</p> <p>Not relevant when eating out (93%) and on special occasions (72%)</p>

5 Discussion

This research highlighted that thinking about PS when choosing food is not the norm for most adults in IOI. Prior to this research, limited information on our consumers' knowledge of and attitudes to food PS information was available. While many adults have been exposed to PS guidance, its relevance and usefulness were questioned. "*We don't really think about it or understand it*". Adults in this study attributed their lack of PS control to habits ingrained from childhood, social pressures and emotions.

It became clear from this research that many people felt that 'healthy foods' were exempt from PS control. This was evident during Task 3 when participants underestimated the energy content of the foods they viewed as "healthier", and served themselves a larger PS of these foods. There appears to be a 'halo' effect, where certain foods are perceived to be "healthier" and people believe that they can eat more of such foods. Other recent research has also confirmed this finding (14,15).

Existing PS guidance was seen as unrealistically small, and participants reported that they usually judged their PS by habit/eye, the size of the plate or bowl or the size of the piece of food, e.g. chicken breast, but the majority felt that PS information was important. They would like to learn more but felt that the information should not be too specific or 'regimented'. Participants indicated they find it difficult to manage their PS at special occasions, when travelling, cooking or eating at a friend's house and when trying to avoid food wastage. A common theme running through the research was the feeling that PS control was only relevant for 'dieters' and that it did not apply to 'treats'.

The research also provided insights into the portion control strategies consumers commonly use. The most common ones were satiety-related strategies, such as eating until satisfied rather than full, filling up with vegetables/fruit, eating slowly and filling up with water. Women and those who had more than one weight-loss attempt in the past year tended to use strategies more than men or those who had made no weight-loss attempt in the last year.

Participants felt that compared to 10 years ago, PS were now larger in fast food outlets, restaurants and supermarkets. Although there were no consistent trends in PS from 1997–2010, other international data have shown clearer increases in PS overtime (17). However, due to the lack of data available before 1997, this piece of research looked at a relatively short time period compared to many international studies. On the other hand, the PS of bakery and takeaway foods has increased over time, some by as much as 400 per cent.

safefood has funded research into takeaway foods (18, 19). The ‘takeaway series’ provides a snap shot of the PS and nutritional content of various takeaway foods, such as pizza, Chinese and Indian, as well as on-the-go foods like sandwiches and wraps. Currently on the IOI, there is a drive by the departments of health, north and south, to support the catering industry in displaying calories on menus to help consumers choose appropriate PS, and this research supports this move.

While there was no direct comparison between the tools for measuring PS, the visual measuring aids appeared more popular than the online quiz or leaflet for helping consumers to judge the appropriate amounts of food to eat. More than 85 per cent of the participants who took part were likely to use visual aids, particularly at the stage of food preparation, with portion pots, cups, household measures and indicators on food packaging being preferred, as opposed to measuring scales or jugs. Given that most food eaten by adults on the IOI is prepared at home, this is a good start. It was however felt that this was impractical for use in other settings, for example, when eating out or at a friend’s house. Participants felt that they wouldn’t change their PS after using the quiz, while many felt that the leaflet was “common sense” but was a useful “reminder”.

Participants felt that where PS control information and guidance were given, it should limit the focus on weight control and instead focus on other health benefits. It should also focus on situations where consumers have the most control over their eating situation, e.g. in the home, and that it should be realistic and age, gender and lifestyle specific where possible. Similar challenges and results to those found in this piece of research have been found internationally.

6 Conclusions

The findings from this project give a greater insight into the barriers faced by consumers in relation to appropriate food PS control, and also provide opportunities to empower consumers in this complex area of eating behaviour. There was inconsistent evidence found with regard to PS trends in Ireland, but certain high energy-dense foods, such as bakery and takeaway items, have shown clear upward trends over the last 10 years.

Consumers do not habitually consider PS. Several barriers to PS control were identified: a lack of self-control, social pressures, habits ingrained since childhood and emotional eating rewards. In addition, there is evidence to show that consumers may underestimate the energy content of foods with apparently “healthy” labels, e.g. reduced fat, and as a consequence exceed recommended PS. It is apparent that consumers need to be supported and given clearer information on appropriate PS selection behaviours for foods bearing nutrition claims, such as ‘reduced fat’. For those who used portion control strategies, satiety-related controls, such as filling up on water, filling up with vegetables, eating slowly and eating until satisfied (but not full) were the most popular. Women and those who previously attempted weight loss were most open to trying different PS control strategies.

Future initiatives in this area should emphasise the overall quality of the diet, focussing on health benefits rather than weight loss and being aware of differences between gender and lifestyle.

7 Recommendations

- Health professionals and those aiming to increase awareness of PS should focus on the home eating context initially as this is where most food is eaten and prepared, and where adults are more likely to implement change.
- Household measuring aids, e.g. cups and spoons, should be promoted to consumers as effective aids for the estimation of appropriate PS.
- PS control strategies should be used to empower consumers to overcome identified barriers to PS control.
- Strategies should be tested and targeted at specific consumer groups to achieve maximum acceptance and relevance.
- Information to consumers on PS should be:
 - Provided from independent sources
 - Consistent across the board (i.e. on food labels, in advertising and through health messages)
 - Communicated innovatively and through modern technology (e.g. smartphone apps)
 - Realistic
 - Initiated when they are at school.

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Appendix 1– Publications used to investigate serving size in chosen recipes for trend analysis (Task 1)

Meal	Recent (n 13)		Traditional (n 9)		
	Publication title	Date	Publication title	Date	Years Difference
Main Dishes					
Irish Breakfast	The Irish Kitchen	2006	Irish Traditional Cooking	1995	11
Beef Stroganoff	Comfort Food	2003	The Best of Today’s Cooking	1985	18
Chilli Con Carne	Comfort Food	2003	The Best of Today’s Cooking	1985	18
Lasagne	Gordon Ramsey Kitchen Heaven	2004	The Best of Today’s Cooking	1985	19
Shepherd’s Pie	Comfort Food	2003	The Book of Meat Cookery	1968	35
Spaghetti Bolognese	Best of Italy	2002	Exciting Cooking	1959	43
Irish Stew	The Irish Kitchen	2006	Exciting Cooking	1959	47
Sweet & Sour Pork	Best of China	2002	The Best of Today’s Cooking	1985	17
Chicken Casserole	Cookery in Colour	1990	The Book of Meat Cookery	1968	22
Chicken Curry	Comfort Food	2003	The Belfast Cookery Book	1967	36

Seafood Chowder	Real Food, Real People	2007	Cookery in Colour	1990	17
Seafood Pie	Best of Ireland	2002	The Belfast Cookery Book	1967	35
Macaroni Cheese	Comfort Food	2003	The Belfast Cookery Book	1967	36
Side Dishes					
Tomato Sauce	Jamie Oliver Naked Chef	1999	The Best of Today's Cooking	1985	14
Wholemeal Bread	Cookery in Colour	1990	Make Your Own Bread, Cakes and Pastry	1976	14
Potato Salad	Cookery in Colour	1990	Cookery Book from 1972	1972	18
Tomato Soup	Cookery in Colour	1990	The Belfast Cookery Book	1967	23
Colcannon	Best of Ireland	2002	The Belfast Cookery Book	1967	35
Coleslaw	Good Housekeeping	2010	Cookery Book from 1972	1972	38
Desserts					
Bread and Butter Pudding	The Dairy Book of Home Cookery	1995	Talking About Puddings	1968	27
Gingerbread	Easy Baking	2008	Make Your Own Bread, Cakes and Pastry	1976	32
Apple Pie	Easy Baking	2008	Make Your Own Bread, Cakes and Pastry	1976	32
Christmas Cake	Gorgeous Cakes	2005	Exciting Cooking	1959	46

Appendix 2 –Literature review (Task 2)

(i) Identification of international recommendations

SS guidance schemes were identified using internet searches for national food guides, government, non-governmental organisation and health care professional recommendations, and peer-reviewed journals.

(ii) Literature search for evaluation of schemes

A literature search for relevant peer-reviewed journal articles (Jan 1970–Feb 2012) was conducted using the online electronic database, ‘Web of Knowledge: Web of Science with Conference Proceedings’ and manual searches of reference lists in papers identified.

Papers were included or excluded based on their abstract or, where necessary, their full text.

A final 108 papers were identified.

Appendix 3: Details of studies included in the review to assess the effectiveness of serving size guidance schemes (Task 2).

References	Details of PS guidance	Subject characteristics	Country	Impact
Bolland <i>et al.</i> (1988)	10 min group training – household measures & food models	n=42 (F) College students	US	Positive
Yuhns <i>et al.</i> (1989)	10 min group training – food models	n=145 (M&F) Students	US	Positive
Weber <i>et al.</i> (1997)	1 hour SS training for solid, liquid & amorphous foods	n =66 (9F) Adults	US	Positive
Brown & Oler (2000)	2D and 3D aids ,e.g. 1 cup of milk	n=380 (M&F) Students	US	Positive
Venter <i>et al.</i> (2000)	Photographs of SS of commonly eaten foods	n=169 (M&F) Adults	South Africa	Positive
Byrd-Bredbenner & Schwartz (2004)	2D and 3D aids, e.g. golf balls	n = 113	US	Positive
Ayala (2006)	Computer & group training	n= 76 (9F) Adults	US	Positive
Martin <i>et al.</i> (2007)	Energy calculation training system	n=44 (M&F) Adults	US	Positive
Colapinto & Malaviarachchi (2009)	Interactive fruit & vegetable SS display in grocery store	n=201 (81%F) Adults	US	Positive
Ollberding <i>et al.</i> (2010)	SS labelling	n=4454 (M&F) Adults	US	Positive
Tavelli <i>et al.</i> (1998)	Food pyramid guide	n=346 nutrition students	US	Negative
Riley <i>et al.</i> (2007)	Computer tutorial	n=7 Adults	US	Negative
Ashfield-Watt <i>et al.</i> (2004)	Fruit &vegetable 5-a-day household measures & food photographs	n=269 (M&F) Adults	UK	None
Ueland <i>et al.</i> (2009)	Lunch labelled as 0.5/1/1.5 servings	n=33 (M&F) Adults	Norway	None
Vermeer <i>et al.</i> (2009)	Proportional pricing cafeteria & fast-food	n=291 (M&F) Adults	US	None
Kothe & Mullan (2011)	Fruit & vegetables SS – online questionnaire	n=106 (79%F) Adults	Australia	None
Vermeer <i>et al.</i> (2011)	Soft drinks labelled 0.8 to 3 servings	n=89 Adults	Netherlands	None

Appendix 4: Focus group demographics (qualitative research: Task 3)

Group	Location	Gender	Age range (years)	<i>n</i>
1	ROI	Female	20-29	8
2	ROI	Female	30-40	9
3	ROI	Male	29-39	8
4	NI	Male	29-59	6
5	NI	Male	20-25	7
6	NI	Female	21-59	4
7	NI	Male	19-24	8
8	NI	Female	39-45	4
9	NI	Female	22-63	5
10	NI	Female	35-64	7

48 per cent of participants were in social class ABC1 and 52 per cent were in social class C2DE

Appendix 5: Demographics of participants who participated in survey (Task 3)

Demographic characteristics	<i>n</i>
Country	
Republic of Ireland	704
Northern Ireland	308
Gender	
Female	528
Male	484
Age group	
18-29	274
30-49	382
50+	356
Social class	
ABC1	489
C2DE	523
Highest education level	
Basic school	268
A-level	327
Professional training	197
University level	220
Body mass index	
$\leq 24.9 \text{ kg/m}^2$	527
$\geq 25 \text{ kg/m}^2$	453
Weight loss attempts in past year	
None	632
\geq one	380
General health interest	
Low	527
High	485

Appendix 6: Example of the one-meal occasion in the online quiz (Task 4)

Consumer Understanding of Food Portion Sizes

Breakfast

Corn flakes with semi-skimmed milk and sugar, served with a banana and a glass of orange juice

***9. How many calories do you think is in the larger portion?**

- 412 calories
- 550 calories
- 641 calories

Average portion



363 calories

average bowl cereal
with semi-skimmed milk
level teaspoon sugar
small glass pure orange juice
medium banana

Large portion



?? calories

large bowl cereal
with semi-skimmed milk
heaped teaspoon sugar
tall glass pure orange juice
medium banana

Appendix 7: Example of two versions of the leaflet (Task 4)

Leaflet one

Food shopping

Portion control begins at the supermarket! Get into the habit of checking food labels.



S 2 - HALF PIZZA PROVIDES			
SUGAR	FAT	SAT FAT	SA
9.0g	18.3g	9.2g	2.0
10%	26%	46%	33%

Smart shopping

- Plan your meals for the week and make a shopping list so you only buy what's needed.
- Avoid buying foods which you tend to overeat.
- Buy pre-portioned food e.g. single-serve rice.
- Don't go food shopping when you're hungry!

Be careful with foods that seem "healthier" due to claims or advertising techniques – just because something is low or reduced fat doesn't mean you have a licence to eat as much as you want! They still contain calories so it's important to consider portion sizes for these foods. Of course, there are other nutrients that influence the healthiness of foods e.g. vitamins, minerals and fibre, but calories are the important factor in controlling your weight.

"Special K" may seem like a better choice than "Frosties" but they actually contain roughly the same calories, so don't forget to look at the on-pack serving sizes for these perceived "healthier" foods too!

Special K	Frosties
114 calories per 30g serving	113 calories per 30g serving
	



Be wise with portion size!

safe food has some handy tips

be safe be healthy be well

A healthy approach

We hear a lot about *portion size* and *serving size* but there's a difference!



NUTRITION INFORMATION			
per 100g	30g serving with 125ml of semi-skimmed milk		
1626kJ	383 kcal	739 kJ	174 kcal
	6 g		6 g
TE	87 g		32 g
ers	10 g		9 g
	77 g		23 g

A **portion** is the amount of food or drink you consume at one time - whether in your own kitchen, in a restaurant or from a package.

A **serving** is the amount of food that is recommended e.g. by a manufacturer on a food label. A serving size is a guide to what is an appropriate amount to eat, and lets you know how many calories and nutrients are in a particular serving size.

Smart savings

By sticking to on-pack serving sizes you have better control over the amount you eat, you get the most out of your money!

50g cereal bowl	30g cereal bowl
36p per serving	21p per serving
	



Swap and Save!

If a family of four swapped the typical 50g bowl of cereal for a 30g bowl on-pack serving size, they'd save around £206 in a year. Good for your waistline and your pocket!

Snacks and drinks

The calories from snacks and drinks all add up! These tips to will help you choose healthier options.



Treat yourself to healthy options

Snacks such as low-fat yogurts, plain popcorn, fruit and vegetables are good choices.

For high calorie snacks, have the on-pack serving size. For example, one scoop of ice-creams per the recommended serving.

Multi-pack and treat size options are good ideas but don't be tempted to have more than one and enjoy it!

Drinks count too!

Avoid large or super-sized sugar-sweetened drinks, or at least make it a small one. Even better, swap them for water, a calorie free alternative. Add some flavour with a slice of lemon or lime. You could save 140 calories by swapping a can of cola for water.

Have a smaller glass

Remember that alcohol also contributes to your calorie intake. If you enjoy an occasional drink try having a small glass of wine rather than a large one, and be especially careful of your measures when drinking in the home.



Be careful

Skipping meals or leaving long gaps between meals may lead you to eat larger amounts the next time you eat. Try to eat at regular intervals.

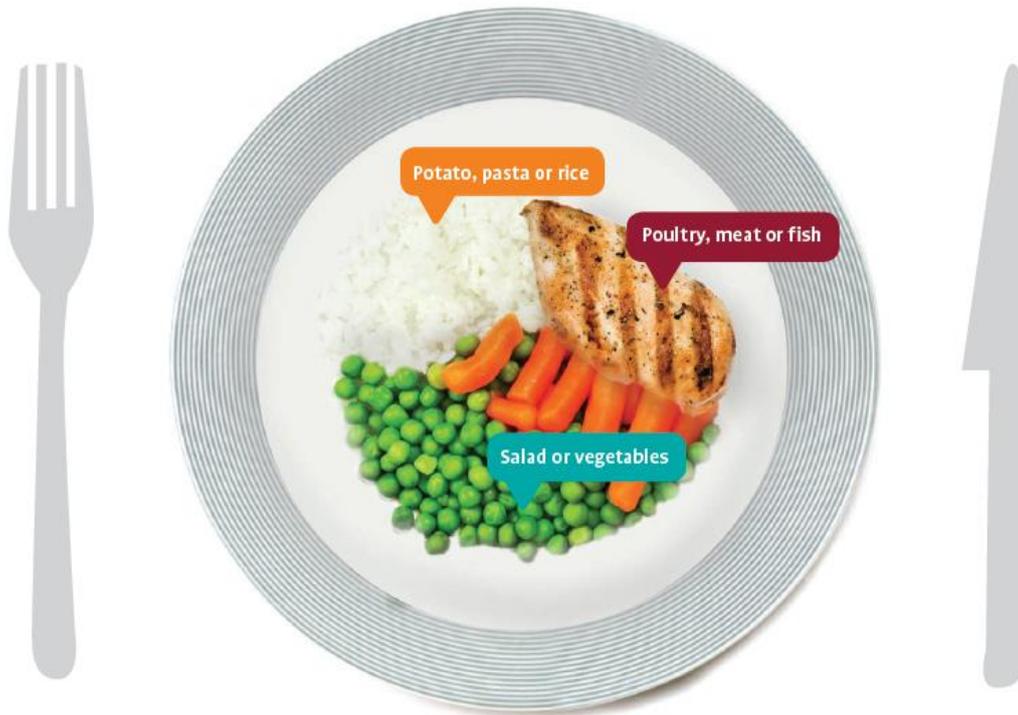
Getting the balance right

A balanced diet involves more than just choosing a variety of healthy foods, you also need to think about how much and how often you eat.

You may be surprised to find that the portion sizes you are used to eating could be equal to 2 or 3 on-pack recommended servings!

Sometimes portion sizes and serving sizes match, but sometimes they don't. For example, your large bowl of cereal in the morning may be equal to one and a half of the recommended 30g serving sizes.

Try to get into the habit of checking food labels, particularly if the food is unfamiliar to you, to see how many servings it contains. Being aware of on-pack serving sizes can help you judge how much you are eating.



Eating in



At home, it's a good idea to occasionally measure out on-pack serving sizes of food as it may help you see what one serving size looks like compared to what you normally eat.

You don't need to measure out everything you eat for the rest of your life, but if you do it the odd time it may help to remind you how your portion sizes compare with on-pack servings.

- Don't "Chop & Pop" i.e. nibble while preparing and cooking food.
- Avoid the temptation of second helpings by serving food on individual plates instead of putting a serving dish on the table.
- Use smaller plates, bowls and glasses – it may help you eat and drink less
- Try to avoid eating while watching TV as it's easy to overeat when you are distracted.
- Have you ever eaten straight from a large packet e.g. a share bag of crisps? It's hard to keep track of how much you're eating so just serve a single portion in a bowl.
- "Out of sight, out of mind" - store tempting foods like cakes, biscuits and chocolate at the back and move the healthier foods to the front.
- Freeze or chill leftovers straightaway so you're not tempted to go back for more.
- Cook food in large batches and freeze in single portions or just enough for the family.
- If you're still hungry, fill up on extra vegetables and salad.

Eating out



It has been shown that the more often someone eats out, the fatter they tend to be! When eating out we are often served bigger portions than we need.

The amount of food you eat affects your weight and health. You don't have to clean your plate - eat slowly and stop eating when you have had enough! Choosing nutritious foods in sensible portion sizes may help you reach and maintain a healthy weight.

- Calories can be displayed on menus, get into the habit of checking for them.
- If you choose a higher calorie option such as pizza or chips, order the small size.
- Remember to ask if there's a healthy option available.
- Order a half portion, have a starter as your main meal or split a dessert with a friend.
- Larger sizes of chips, drinks or getting "combo" meals can seem like better value for money but you end up with a lot more food and calories than you need.
- Ask for a "doggy bag" and take half of your meal home – this is becoming more and more common in restaurants so don't be afraid to ask.

Leaflet two

Change



One by one, small changes can add years to your life, and take inches off your waistline.

Shopping

- Don't buy the foods you tend to overeat

At home

- Instead of eating straight from a large packet, serve a single portion into a bowl to keep track of what you're eating
- Serve food on individual plates to avoid second helpings
- Store foods like cakes, biscuits and chocolate out of sight, moving healthy foods to the front
- Freeze or chill leftovers straight away so you're not tempted to go back for more
- Don't "Chop & Pop", avoid nibbling while preparing and cooking food
- Avoid eating while watching TV as it's easy to overeat when you are distracted
- If you enjoy a high calorie snack, have the on-pack serving size (e.g. one scoop of icecream)
- Alcohol also contributes to your calorie intake. If you enjoy an occasional drink have a small glass of wine rather than a large one, and be careful of your measures at home.
- With high calorie snacks, have the on-pack serving size (for example, one scoop of Ice-cream)

Eating out

- Ask for a "doggy bag" and take half of your meal home



Be careful
Skipping meals or long gaps between meals can lead you to eat larger amounts the next time you eat.

www.safefood.ie
HELPLINE
NI 0800 085 1683
ROI 1850 40 4567



Size Matters!

Food portions and healthy eating made easy



be safe be healthy be well

A Balanced Diet

This simple guide helps you find out about portion sizes and serving sizes and gives you tips for everyday life.

A healthy approach

A balanced diet involves more than eating a variety of healthy foods. How much and how often you eat are just as important as what you eat. Choosing and eating foods in sensible portion sizes helps you reach and maintain a healthy weight.

! Size matters

Portion size and serving size: there's a difference.

- A portion is the amount of food or drink you consume at one time - whether in your own kitchen, in a restaurant or from a package
- A serving is the amount of food that is recommended - for example by a manufacturer on a food label. A serving size is a guide to what is an appropriate amount to eat, and lets you know how many calories and nutrients are in a particular serving size

? Did you know

Portion sizes and serving sizes can match, but sometimes they don't. For example, your large bowl of cereal in the morning may be equal to one and a half of the recommended 30g serving sizes.

Check

Information on food labelling, checking food serving sizes and looking out for healthy options helps keep portions under control.

Shopping

- Foods that seem "healthier" due to claims such as low fat still contain calories, watch out!
- Look at the on-pack serving sizes and nutrition information to compare foods and pick the healthier option

At home

- Measure out on-pack serving sizes of food to see what one serving size looks like compared to what you normally eat
- Find out and stick to on-pack serving sizes, it's healthier and will save you money

Eating out

- Calories can be displayed on menus, get into the habit of checking for them
- Look out for healthy options on the menu

Choose

Now that you know what to look out for, it is much easier to take action when shopping, cooking and dining out.

Shopping

- Make a shopping list so you only buy what's needed
- Buy healthier snacks such as low-fat yogurts, plain popcorn, fruit and vegetables
- Buy multi-packs with treat size options instead but don't be tempted to have more than one
- Buy pre-portioned food, for example single-serve rice

At home

- Cut down or cut-out sugar sweetened drinks - add lemon or lime to water for a low-calorie tasty drink
- Cook food in large batches and freeze in single portions or just enough for the family
- Use smaller plates, bowls and glasses - it may help you eat and drink less!
- If you're hungry after your meal, fill up on extra vegetables and salad

Eating out

- If you pick higher calorie foods such as pizza or chips, order the small size
- Order a half portion, have a starter as your main meal or split a dessert with a friend



Swap and save!

If a family of four swapped the typical 50g bowl of cereal for a 30g bowl on-pack serving size, they'd save around £206 in a year. Good for your waistline and your pocket!



Top tip

The portion sizes you are used to eating could be equal to 2 or 3 on-pack recommended servings. Check food labels to see how many servings it contains to help you judge how much you are eating



Watch out

Larger sizes of chips, drinks or getting "combo" meals can seem like good value but you can end up with a lot more food and calories than you need.

safefood:

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