



Contents lists available at ScienceDirect

Food Quality and Preference

journal homepage: www.elsevier.com/locate/foodqual

International consumer insights into the desires and barriers of diners in choosing healthy restaurant meals

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ARTICLE INFO

Article history:

Received 20 October 2014

Received in revised form 24 February 2015

Accepted 24 February 2015

Available online 3 March 2015

Keywords:

Food service
Nutritious meals
Public health
Behavior change
Restaurant meals

ABSTRACT

Overweight and obesity are global public-health problems and unhealthy restaurant meals have been identified as one contributing factor. Given the increase in restaurant meals and the number of chefs and restaurants throughout the world, small changes in restaurant meals can have a large public health impact. However, to ensure that chefs and operators are able to provide changes that diners will accept and find appealing, an understanding of diners' desire for healthier menu items and the barriers faced in choosing healthier meals is required. As such we conducted an international consumer study to identify these barriers and needs. A cohort of restaurant diners was recruited from ten countries: United Kingdom, United States of America, Germany, Poland, Turkey, Russia, Brazil, South Africa, Indonesia and China ($n = 5000$, aged 18–65 years, 50% females). Participants completed a comprehensive web-based questionnaire on aspects related to healthy eating at restaurants. Globally only 18% of the sampled diners were strongly satisfied with current healthy options on restaurant menus. Among the diners there was a preference to have "slightly healthier" options. The top 3 small changes that these diners wanted to see included on restaurant menus to make them healthier included: steamed, baked or grilled instead of fried, fresh ingredients used, and served with plenty of vegetables. Taste, price and satiation were seen as key barriers to current healthy options. Diners had clear preferences for when they wanted to see healthy items on the menu in terms of time of day, time of the week and occasions. Country, age and gender had a large influence on preferences, while personal factors such as diet type, family status and food reactions had minimal influence. In the current study, diners were largely unsatisfied with current healthy options and clear barriers and triggers for healthier meals were identified. Nutritionists, dietitian, chefs and managers working for restaurants and other out of home food services can leverage these insights to provide healthier and appealing meals.

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1. Introduction

Since 1980 rates of obesity have doubled globally, in 2008 more than 1.4 billion adults aged 20 and over were overweight and 500 million of these were obese (World Health Organisation, 2014). Overweight and obesity are a central public health issue as they are known to increase the risk of morbidity and mortality from diabetes, cardiovascular disease, musculoskeletal disease and some cancers (American Heart Association, 2013). These diseases impact quality of life and contribute to burgeoning health care costs. For example, in the USA the national cost of overweight and obesity combined has been estimated at \$148.9 billion (Gilden Tsai,

Williamson, & Glick, 2011). Overweight and obesity are largely preventable through lifestyle modifications, including calorie reduction.

Food eaten in restaurants has a significant impact on caloric intake and therefore weight gain. One study showed that each additional meal or snack eaten away from home adds an average of 134 calories that day, compared with the same meals or snacks prepared at home (Todd, Mancino, & Lin, 2010). Holding all else constant, one additional meal eaten away from home each week could result in about two extra pounds per year. The effect of food prepared away from home on daily caloric intake is even more pronounced in obese individuals. An away-from-home meal adds an average of 239 calories to daily caloric intake for obese individuals (Body Mass Index (BMI) greater than or equal to 30 kg/m²) versus 88 additional calories for those with a BMI less than 25 kg/m²

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(McCroory et al., 1999). It is therefore not surprising that an increased frequency of eating away from home has been associated with long-term weight gain (McCroory et al., 1999).

In the foodservice industry there are 17.5 million outlets around the world with more than 500 billion transactions daily (Data Monitor, 2013). With tens of millions of chefs and cooks in the world preparing meals and each one cooking hundreds of thousands of meals in their lifetime, it is clear that the food service industry, and associated partners, have an opportunity to impact on the global obesity epidemic.

Small changes can make a large difference at the population level (e.g., reducing obesity) and over time many small changes in dishes could also make a difference at the individual level (e.g., helping individuals to meet daily nutritional recommendations). Given the large number of chefs and operators in the world, making small changes in their top dishes could really add up to make a big difference toward energy intake and the overweight and obesity epidemic. Moreover, behavioral economists suggest that “nudging” people to make small changes is the key to treating obesity as these changes are achievable and sustainable as well as promoting self-interest (such as choosing healthier foods) without taking away freedom of choice (Heshmat, 2011; Thaler & Sunstein, 2013). Additionally, enabling environments play an important role in overeating, therefore helping to provide a supportive environment to help individuals make it easier to make healthy choices without relying on individual “will power” could be a realistic public health approach applied to the food service industry (Wansink, Just, & Payne, 2009).

The need for changes to current restaurant options to improve the level of healthiness is clear for diners. However, to ensure that chefs and operators are able to provide changes that diners will accept and find appealing, an understanding of diner’s desire for healthier menu items and the barriers faced in choosing healthier meals is required. To explore this, we conducted an international online cohort study in 10 countries to understand current levels of satisfaction with healthy options, evaluate what diners wanted to see from healthy meals (extent of change toward healthiness, what items should be included to make menu’s healthy and when they want healthier meals) and to evaluate the potential barriers of three important facets of restaurant meals: price, taste and satiation.

2. Materials and methods

2.1. Design and procedure

The study consisted of an online cohort conducted in the following 10 countries: United Kingdom, United States of America, Germany, Poland, Turkey, Russia, Brazil, South Africa, Indonesia and China. These countries were selected to provide a cross-section of different cultures, economies and cuisines. Data was collected during October to November 2011 using an online questionnaire, received via an email link, which took approximately 30-min to complete. This was completed using the participants own computer in their own environment. The questionnaire had to be completed in one sitting and prompting was provided on incomplete answers to reduce the occurrence of missing data. Participants were recruited through an international online panel provider (BrainJuicer), who was registered with the Data Protection Act. Informed consent was provided by all participants and they received a minor reimbursement for their time.

2.2. Participants

A recruitment target was set for each country of a sample size of 500 adults aged 18–64 years with an equal representation of males

and females (total sample, $n = 5000$). The online participant panels were stratified based on gender to enable cross-country comparability. To ensure the relevant audience for the questionnaire, the following inclusion criteria were applied: must eat a meal out of home at least once a week (e.g., at a restaurant) and must not be employed in the hospitality or marketing industry.

2.3. Questionnaire

A self report questionnaire was developed in consultation with experts in food services, nutrition and consumer science. Questions were developed, based on common themes seen in consumer and food science research, to elicit information to understand diner’s reactions to meals eaten away from home, their desires when dining out, and perceived barriers faced in choosing healthier meals. The term “healthy” was not defined to respondents in the study as we wanted to learn without the complications of definitions what current diner’s wanted and what their barriers were. One standard framework questionnaire was designed, which was then adapted to each country for local foods, serving sizes and culture by local chefs and nutritionists. When a language other than English was used, this was then translated into the local language by a professional service.

2.3.1. Socio-demographics and personal characteristics

Participants were asked about several personal factors which may relate to eating at a restaurant. Participants reported whether they had children living at home, whether they had food allergies or intolerances and their main dietary preference: meat eater/vegetarian/vegan/pescatorian (only eats fish as a source of protein). Finally, to understand the restaurant eating behavior of diners, the participants were asked how often they chose healthy menu items at restaurants and how often they ate at restaurants. First, participants reported how often they chose a healthy option from a restaurant menu on a 4-point scale (not at all often/not very often/quite often/very often). Then participants reported how often they ate at restaurants for breakfast, lunch and dinner: every day/6 times a week/5 times a week/4 times a week/3 times a week/2 times a week/once a week/once every 2 weeks/once a month/less often and never. These were converted per meal occasion into times per week to create a continuous variable (e.g., once a month = .25 times per week etc.). These three meal occasions were then summed to create total meals eaten in restaurants per week.

2.3.2. Current satisfaction with healthier restaurant meals

To determine the current level of satisfaction that diner’s experience with currently offered healthy options, participants were asked to what extent they agreed with the following healthy options: “I am happy with the healthy options available when eating out”. Participants could answer on a 5-point scale (strongly disagree/slightly disagree/neutral/slightly agree/strongly agree).

2.3.3. The needs of diners in choosing healthier restaurant meals

We asked the participants how much change they wanted, what they wanted changed, and when they wanted it. Participants were asked to rate their level of interest in seeing small healthy changes in out-of-home meals by reporting the extent to which they agreed with the following statement: “I would prefer to have slightly healthier food options when eating out.” Participants could answer on a 5-point scale (strongly disagree/slightly disagree/neutral/slightly agree/strongly agree).

To establish which food options diners wanted to see in restaurants in order to make current restaurant menu’s healthier, participants were shown a list of 20 items (presentation randomized to prevent bias) and asked to select as many as applied. The items consisted of:

Preparation techniques:

- Steamed, baked or grilled instead of fried.
- Prepared with healthy oils/fats.
- Locally grown.
- Produced ingredients.

Adding healthy ingredients:

- Plenty of vegetables.
- Fish dishes.
- Lean meat.
- Grilled vegetables.

Removing 'unhealthy' ingredients:

- Low in fat.
- Without additives.
- Lower in calories.
- Low in sugar.
- Gluten free.
- No cream based sauces.
- Not seasoned with salt.

Serving style:

- Right-sized portions.
- Smaller or half sized portions.

Offering alternative options:

- Healthier side dishes.
- Whole grain options.
- Vegetarian dishes.

To establish when diners are most interested in seeing healthy items on the menu, they were asked to rate on a 4-point scale (not at all often/not very often/quite often/very often) how likely they were to choose a healthy item on the following occasions:

Time of day:

- Breakfast.
- Lunch.
- Dinner.

Time of the week:

- Monday.
- Tuesday.
- Wednesday.
- Thursday.
- Friday.
- Saturday.
- Sunday.

Events/purposes:

- When I am not feeling 100% healthy.
- When life is hectic.
- When someone else with me chooses a healthy option.
- When out on a business meeting.
- When I am trying to manage my weight.
- Depending on the weather.
- In preparation for a big event (e.g., wedding or holiday).

2.3.4. The barriers diners face in choosing healthy restaurant meals

Price, taste and expected satiation are important in getting diners to select a dish from a menu; as such it is important to understand how diners currently rate healthy options in terms of these three facets. We asked diners to tell us how much they agreed with the following three statements: "Healthy options tend to be more expensive", "Healthy options on the menu usually don't sound very tasty" and "Often the healthy option is not very filling."

Participants could rate each statement on a 5-point scale (strongly disagree/slightly disagree/neutral/slightly agree/strongly agree).

2.4. Analyses

The majority of results are presented as descriptive statistics, using percentages or means and standard deviations where relevant. To test for differences based on socio-demographic or personal characteristics Chi-square analyses were used for categorical outcomes and Analysis of Variances (ANOVAs) were used for continuous outcomes. Due to the large number of countries included, it was decided for clarity of reporting to present all tables and figures globally, as well as for individual countries. All analyses were conducted using SPSS version 18.0 and significant differences were evaluated at a level of $p < .05$.

3. Results

Characteristics of the participants are displayed in Table 1, for the total sample and per country. More than half of the participants globally had children under the age of 18 at home (58.4%), ranging from 41.0% in the USA to 74% in China. Notably, almost one fifth of the population self-reported experiencing a food allergy or intolerance; this was lowest in the UK and highest in Indonesia where one quarter of participants reported an issue with food. Ninety percent of the global population were meat eaters, China and Indonesia had the highest proportion of non-meat eaters, with 13% and 15% of the populations respectively only eating fish as a main protein source.

Interestingly, 66% of the population self-reported that they "very often" or "quite often" chose healthy meals. This was higher in the (South-East) Asian regions, and lower in the European regions. On average globally, these participants ate at restaurants seven times per week; which was expected as this sample was selected to ensure it focused on people that ate at restaurants. China had the highest rate of restaurant eaters, recording on average 11 restaurant meals per week and the UK recorded the lowest. Globally, lunch was the most popular meal eaten at restaurants, where on average this was 3.3 times per week.

3.1. Current satisfaction with healthier restaurant meals

The level of satisfaction of diners, both globally and for individual countries, is shown in Fig. 1. Globally, only 18% of diners were completely satisfied with the current healthy options on restaurant menus, with 43% noting room for improvement. Chi-square analyses of independence showed that there were significant differences between the countries in terms of level of satisfaction ($\chi^2 = 414.9$, $p < .001$). Level of satisfaction was notably highest in China and Indonesia, where 46% and 32% of diners were completely satisfied with current healthy options. In the USA and Germany this fell to only 10% of diners. Men were significantly more satisfied than women with current healthy options ($\chi^2 = 4.16$, $p < .05$) while age had no influence on level of satisfaction ($p > .05$).

3.2. The needs of diners in choosing healthier restaurant meals

The reaction of the diners regarding whether they would prefer to have slightly healthier food options when eating out is presented in Fig. 2, the outcome is treated as continuous to provide a mean rating. Both globally, and across all countries, participants were on average above neutral in terms of their interest in the idea of small, healthier changes to current restaurant menus. The global average was just below "slightly agree." The difference between countries was significant ($F(1,9) = 22.9$, $p < .001$). China and Brazil had the

Table 1
Background characteristics of participants ($n = 5000$; 500 per country).

	Global (%)	USA (%)	UK (%)	Poland (%)	Brazil (%)	China (%)	S. Africa (%)	Germany (%)	Russia (%)	Turkey (%)	Indonesia (%)
<i>Gender</i>											
Females	50.0	50.4	50.2	50.8	50.0	50.0	50.0	49.6	50.0	49.2	50.0
<i>Age groups</i>											
18–24 years	14.8	5.6	6.4	20.6	27.8	11.2	14.2	11.0	15.6	13.6	22.0
24–34 years	36.6	17.4	28.8	49.6	37.4	53.6	28.8	30.4	44.0	43.2	32.6
35–44 years	24.1	15.8	23.8	17.4	21.4	27.6	25.4	26.6	24.0	33.8	25.6
45–54 years	16.0	26.2	25.0	9.2	10.2	6.6	22.2	22.8	13.8	8.0	16.2
55–64 years	8.5	35.0	16.0	3.2	3.2	1.0	9.4	9.2	2.6	1.4	3.6
<i>Family situation</i>											
Children at home	58.4	41.0	47.8	62.4	56.2	74.0	58.4	45.6	70.2	63.8	64.8
<i>Food reactions</i>											
Allergy/intolerance	17.1	14.0	7.8	15.6	19.4	22.6	24.4	12.0	16.6	13.8	25.2
<i>Main dietary type</i>											
Vegetarian	2.7	2.4	4.0	1.0	3.4	3.2	1.4	4.2	1.6	.6	5.0
Vegan	2.0	1.2	1.2	.2	6.2	3.0	1.0	1.4	1.6	1.8	2.0
Pescatorian ^a	5.7	2.0	2.4	3.4	4.8	13.4	4.4	3.8	4.0	4.2	14.4
Meat eater	89.7	94.4	92.4	95.4	85.6	80.4	93.2	90.6	92.8	93.4	78.6
<i>Frequency of choosing healthy</i>											
Very or quite often ^b	65.6	54.6	58.8	50.4	74.2	87.6	68.6	59.6	52.6	68.0	81.8
	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD
<i>Restaurant meals per week^c</i>											
Breakfast	2.1 ± 2.3	1.4 ± 2.0	1.4 ± 2.0	2.2 ± 2.3	2.4 ± 2.6	4.3 ± 2.3	1.7 ± 2.2	1.7 ± 2.0	1.7 ± 2.2	2.0 ± 2.2	2.1 ± 2.3
Lunch	3.3 ± 2.2	2.3 ± 2.0	2.6 ± 2.0	2.3 ± 1.8	3.7 ± 2.4	4.2 ± 2.0	2.6 ± 2.1	2.8 ± 2.1	4.2 ± 2.0	3.5 ± 2.3	4.3 ± 2.2
Dinner	1.7 ± 1.7	2.0 ± 1.8	1.4 ± 1.7	1.3 ± 1.4	1.9 ± 1.8	2.5 ± 1.9	1.7 ± 1.8	1.3 ± 1.5	1.4 ± 1.5	1.5 ± 1.4	2.3 ± 2.1
Total meals	7.1 ± 4.8	5.7 ± 4.6	5.4 ± 4.6	5.9 ± 4.0	8.0 ± 5.0	11.0 ± 4.6	5.9 ± 4.6	5.9 ± 4.3	7.3 ± 4.1	7.0 ± 4.3	8.6 ± 4.8

^a A pescatorian eats only fish as the meat source.

^b This represents participants that reported they "very often" or "quite often" chose a healthy meal when eating out at restaurants.

^c This is the average number of meals eaten out per week per individual meal occasion, and summed for 'total meals'.

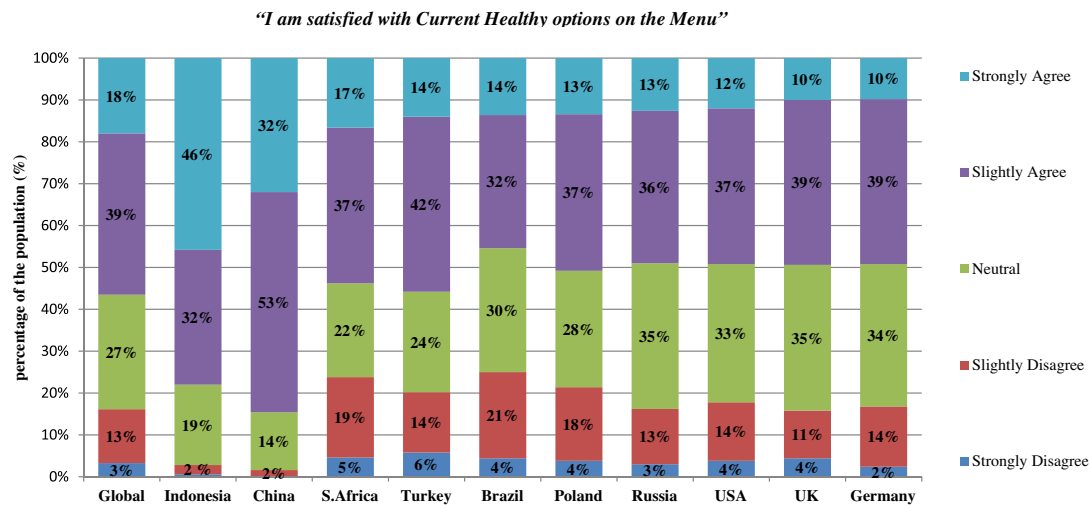


Fig. 1. The level of satisfaction of guests with current healthy options on the menu.

highest interest among all countries. Women were significantly more interested in small changes than men, ($F(1,1) = 31.8$, $p < .001$). There was also a significant influence of age group with diners aged 35–44 being the most interested in small changes ($F(1,4) = 8.2$, $p < .001$). However, all groups were interested in small changes but, these analyses just highlight that some groups were relatively more interested than others.

To make useful changes in current menus it is important to know what diners want included on restaurant menus to make the offerings healthier and appealing. This will reflect a combination of what diners like, what they believe is currently missing

from restaurant menus, and what they think defines healthy in a dish. Table 2 shows the items that diners wanted to see in restaurants. Diners were most interested in seeing changes in preparation techniques. The highest ranking items globally were 'steamed, baked or grilled instead of fried' (64.0%) and fresh ingredients used (63.6%). Plenty of vegetables, raw or cooked (59.0%) and items low in fat (58.8%) were also popular. There were significant differences in selections based on country (χ^2 on top 3 items ranged from 95.6–218.4, $p < .001$). 'Without additives' was high in the rankings for Turkey, China and Indonesia. Of the 20 changes listed in Table 2, globally, diners indicated that they

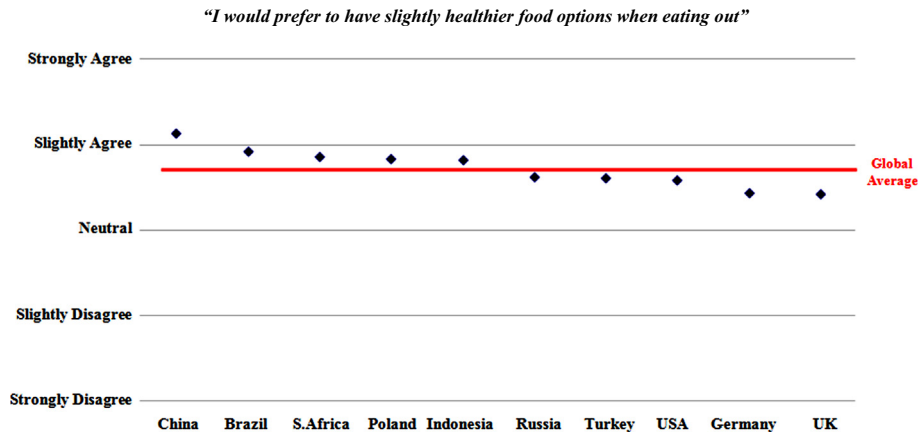


Fig. 2. The reaction of guests to the notion of small changes in restaurant menu's.

wanted to see on average 8.9 items out of the 20 choices available on restaurant menu's (SD = 4.8). This ranged from 7.5 items in China (SD = 4.2) to 10.4 items in South Africa (SD = 4.7). Only 1% of respondents did not select any of the presented items. Women were more interested than men in seeing steamed, baked or grilled items, plenty of vegetables and fresh ingredients in restaurants (χ^2 ranged from 36.2–13.3, $p < .001$). Older adults were significantly more interested in seeing steamed, baked or grilled items and plenty of vegetables on the menu, compared to younger adults (χ^2 ranged from 40.3 to 62.9, $p < .001$), but there was no age difference on wanting to see fresh ingredients used ($p > .05$). Note, the data split by gender and age groupings are not shown.

For chefs and operators to provide the most appealing menus it is important to know when they should put most emphasis on healthy menu items versus occasions when diners just want to treat themselves. As such we explored how likely diners were to choose a healthy option from the menu on several different occasions. The occasions when diners were likely to choose healthy

options are presented in Table 3 by time of day, time of week, and purpose. All country differences on all options were significant at $p < .05$, indicating large cultural differences between the evaluated countries. In terms of time of day, lunch was globally reported as the time of day when diners are most likely to choose a healthy option (65.4%), followed by dinner and then breakfast. This was largely due to lunch being the most common occasion to eat at a restaurant. At an individual country level, China and Russia rated breakfast as the most likely time to eat healthily, and USA, Poland, Turkey and Indonesia rated dinner as the most likely time. For time of the week, on average diners were more likely to choose healthy items on weekdays (Monday–Friday) and least likely to choose healthy items on Saturday and Sunday. This trend was repeated in all individual countries with the exception of Brazil, where diners were more likely to choose healthy on a Friday and Saturday night, compared to the rest of the days of the week. Purpose of healthy eating was relatively consistent across most countries, although the ratings varied in level, with

Table 2

Items that diners wanted to see in restaurants to make healthier menu's ($n = 5000$; 500 per country).

	Global (%)	USA (%)	UK (%)	Poland (%)	Brazil (%)	China (%)	S.Africa (%)	Germany (%)	Russia (%)	Turkey (%)	Indonesia (%)
<i>Preparation techniques</i>											
Steamed, baked or grilled	64.0	70.6	61.6	71.0	70.2	48.8	77.8	44.6	64.0	68.6	58.6
Fresh ingredients used	63.6	47.0	50.4	64.8	55.8	61.2	67.6	65.2	63.6	68.8	81.0
Prepared with healthy oils/fats	54.9	56.4	56.2	51.6	49.0	57.8	60.8	51.2	54.9	67.8	58.4
Local ingredients	31.6	31.6	32.2	24.2	28.0	22.6	32.4	32.4	31.6	46.2	34.0
<i>Adding healthy ingredients</i>											
Plenty of vegetables	59.0	59.8	55.8	65.4	55.6	45.4	68.8	59.6	59.0	51.0	64.4
Fish dishes	55.0	44.6	39.8	61.8	58.2	54.6	57.8	52.0	55.0	66.8	49.0
With lean meat	52.3	56.6	48.4	60.6	59.8	31.2	62.4	49.6	52.3	47.2	59.2
Grilled vegetables	41.3	58.0	40.4	41.0	48.6	13.2	58.6	38.4	41.3	52.4	15.2
<i>Removing 'unhealthy' ingredients</i>											
Low in fat	58.8	56.2	55.8	53.8	67.0	53.4	63.4	51.6	58.8	67.0	74.6
Without additives	52.1	43.8	40.0	19.8	41.6	61.2	50.6	46.6	52.1	77.4	73.2
Lower in calories	43.5	48.6	48.0	38.2	45.8	45.8	49.2	33.0	43.5	44.2	50.8
Low in sugar	41.0	42.4	45.2	28.6	45.0	41.0	53.6	35.2	41.0	36.6	55.2
Gluten free	27.2	23.2	16.8	16.0	28.2	13.6	29.6	23.6	27.2	35.4	37.6
No cream based sauces	22.3	19.8	27.2	32.2	20.2	18.4	29.2	21.0	22.3	15.6	19.2
Not seasoned with salt	22.1	38.2	33.4	30.2	21.2	13.4	25.4	10.6	22.1	30.6	7.8
<i>Serving style</i>											
Right sized portions	42.3	52.2	48.2	30.2	40.4	34.8	49.2	33.4	42.3	34.0	62.6
Smaller or half sized portions	27.4	41.6	35.0	23.2	36.8	13.2	42.4	28.8	27.4	20.2	20.0
<i>Offering alternative options</i>											
Healthier side dishes	57.1	60.0	50.8	54.0	55.2	60.2	70.8	54.0	57.1	44.6	63.0
Wholegrain options	39.4	50.6	34.2	49.2	49.0	15.8	58.2	40.8	39.4	41.4	27.0
Vegetarian dishes	32.0	30.2	31.0	26.4	34.0	46.8	37.0	32.4	32.0	12.6	40.6

Table 3
Factors influencing healthy choices on menu items ($n = 5000$; 500 per country).

	Global (%)	USA (%)	UK (%)	Poland (%)	Brazil (%)	China (%)	S.Africa (%)	Germany (%)	Russia (%)	Turkey (%)	Indonesia (%)
Occasions for healthy eating^b											
<i>Time of day</i>											
Breakfast	58.9	35.8	45.4	65.4	70.2	77.2	57.6	46.0	62.4	64.2	64.4
Lunch	65.4	56.0	66.8	58.2	83.0	72.8	72.4	56.8	54.6	62.8	70.2
Dinner	61.7	57.0	55.4	58.8	70.6	74.4	63.6	52.2	47.4	67.4	70.4
<i>Time of week</i>											
Monday	62.0	54.4	60.2	59.6	69.4	74.0	69.0	45.4	60.2	61.2	67.0
Tuesday	61.8	54.2	60.2	57.8	69.6	72.8	70.6	45.6	58.8	60.8	68.0
Wednesday	62.1	53.8	60.8	57.6	68.4	76.4	68.2	46.6	58.2	61.6	69.4
Thursday	61.4	54.0	60.0	55.6	68.0	75.4	67.6	46.8	57.6	60.6	68.0
Friday	59.1	49.0	53.6	55.6	75.4	74.4	54.4	49.0	51.4	59.8	68.2
Saturday	53.3	45.4	46.2	50.8	73.2	71.4	45.6	46.2	41.8	50.8	62.0
Sunday	53.0	46.2	47.6	51.2	68.4	70.0	52.0	45.6	40.8	49.8	58.0
<i>Purpose</i>											
Trying to manage weight	68.7	67.0	71.2	71.8	66.6	69.6	79.0	64.4	59.8	67.6	70.2
When I am not feeling healthy	63.8	54.2	60.2	70.8	63.0	72.4	67.0	52.6	61.4	66.4	70.2
Someone else chooses healthy	61.1	52.0	53.4	65.0	64.6	82.8	64.4	47.4	52.0	62.4	67.4
At a business meeting	52.4	44.6	46.6	57.8	61.6	59.2	60.2	45.4	47.4	54.0	47.0
In preparation for an event	49.4	41.4	55.0	56.4	62.8	58.8	51.8	39.6	38.8	47.6	41.8
When life is hectic	45.5	32.0	38.8	47.2	68.4	57.0	42.4	37.4	48.4	43.6	39.4
Depending on the weather	43.1	31.4	49.0	43.4	49.0	55.2	43.4	38.4	32.6	43.8	45.2
Barriers to healthy eating^a											
Healthy options are expensive	57.1	56.2	45.6	69.4	59.2	65.8	57.4	48.6	51.4	60.2	57.0
Healthy options are not tasty	43.1	40.2	46.6	41.6	38.8	38.0	43.4	31.6	58.0	46.2	46.8
Healthy options are not filling	45.4	41.6	48.8	51.4	39.2	41.6	47.2	27.8	63.8	47.2	45.0

Bold items indicate the top 3 items per category.

^a Percentages reflect those participants who "slightly" or "strongly" agreed to these statements.

^b Percentages reflect those participants that recorded that they were likely to choose healthy on these occasions: "very often" or "quite often".

'trying to manage weight', 'when I am not feeling healthy' and 'when someone else chooses healthy' being the top three reported reasons for choosing healthy. The only exceptions to this were people in the United Kingdom, who also rated 'getting ready for an event' in the top three, and Brazil who reported 'when life is hectic' in the top three reasons to choose healthy. The majority of age and gender differences were significant at $p < .05$, in general women selected all of the "healthy eating occasions" options more frequently with men and the selections decreased with increasing age.

3.3. The barriers diners face in choosing healthier restaurant meals

Developing menus to ensure that diners want to order the healthier items requires an understanding of what the diners think of current healthy options. Table 3 presents the diner reactions to perceived barriers to choosing healthy options on menus. Globally, 57.1% of diners reported that they thought that healthy items tended to be more expensive, 43.1% of diners thought that healthy options don't usually sound as if they would be tasty and 45.4% of diners conveyed that often healthy options are not filling. There were significant differences between the countries in terms of taste ($\chi^2 = 90.7$, $p < .001$), satiation ($\chi^2 = 155.3$, $p < .001$) and expense ($\chi^2 = 97.7$, $p < .001$). Russian diners were more convinced than other countries that healthy items were not very tasty or satiating. Among all countries Brazil had the highest opinion of healthy menu items, having among the lowest ratings of dissatisfaction with the taste and satiation of healthy dishes. Compared to women, men thought that healthier dishes were less tasty (47% compared to 43%, $\chi^2 = 27.9$, $p < .001$), and less satiating (51% compared to 45%, $\chi^2 = 54.9$, $p < .05$). There was no difference in terms of expense ($p > .05$). Compared to older adults, younger adults thought healthy meals were less tasty (46% in adults aged 18–24 compared to 37% in adults aged 55–64: $\chi^2 = 23.7$, $p < .001$), less satiating (47% in adults aged 18–24 compared to

37% in adults aged 55–64: $\chi^2 = 22.7$, $p < .001$), and more expensive (59% in adults aged 18–24 compared to 50% in adults aged 55–64: $\chi^2 = 30.1$, $p < .001$). Correlational analyses were used to evaluate the associations between ratings on expense, taste and satiation of current healthy menu offerings. Analyses revealed that ratings on taste and satiation were strongly positively correlated to each other ($r = .528$, $p < .001$), indicating that if a diner thought a healthy item was less tasty, they also thought it was less satiating. The association of taste and satiation to expense was also positive and significant, but the associations were less strong (association between taste and expense, $r = .290$, $p < .001$ & satiation to expense: $r = .352$, $p < .001$).

3.4. Diner reactions in different target groups

When looking at those who identified as non-meat eaters, 30% of vegetarians/vegans/pescatorians were satisfied with current healthy options, which was significantly higher than meat-eaters (only 16.6% were satisfied: $\chi^2 = 58.57$, $p < .001$). They were also more interested in small changes than those that chose a meat-based diet ($F(1,1) = 79.2$, $p < .001$). Diners who reported food allergies or intolerances were more satisfied with current healthy options (21%) than those without food allergies or intolerances (17.2%: $\chi^2 = 9.1$, $p < .001$) and they were more interested in small changes ($F(1, 1) = 13.4$, $p < .01$). More people with food allergies or intolerances reported that healthy meals were expensive (60.3% vs. 56.4% among people without food allergies of intolerances: $\chi^2 = 4.5$, $p < .05$).

4. Discussion

The current study sought to provide new international insights into the desires and barriers of diners in choosing healthy restaurant meals. In light of this we evaluated what diners wanted to see on restaurant menu's, what changes they wanted to see made,

when they wanted healthier meals and understand the importance of the potential barriers of price, taste and satiation.

Remarkably, only 18% of diners globally surveyed were completely satisfied with current healthy options on restaurant menus. Notably, 43% indicated room for improvement. This suggests a definite need to change for chefs and operators in their current menus and overall should act as a wakeup call to the industry. This is particularly important as higher satisfaction with current healthy options was associated with eating at restaurants more often and every restaurant wants to provide satisfaction to its patrons and potentially increase the number of diners.

The majority of diners were interested in seeing small, healthier changes to the menu. This supports the notion that small changes are an important strategy to making improvements to the healthiness of restaurant menus. Diners are caught at the intersection of wanting to eat healthy but also wanting to treat themselves on the weekend or for special occasions. Small changes can appeal to a diner whereas a total overhaul of a restaurant menu or favorite dish is less appealing to diners. A joint report of the American Society for Nutrition, the Institute of Food Technologists, and the International Food Information Council advocates for the small change approach to help address the obesity epidemic (Hill, 2009). The report identifies several ways that small changes, such as the ones identified by the participants of our research, could have a positive impact on health. This is important as small changes are more feasible to achieve and maintain than large changes and that even small changes can have a big effect on body weight regulation. Furthermore, the small change approach can help mitigate the environmental factors that encourage and promote overeating, which can work for or against those who want to reduce calories (Wansink et al., 2009). We tend to underestimate calories consumed in restaurant meals and we eat “mindlessly.” By making small changes to restaurant meals, chefs and food service operators could make a valuable contribution to reducing energy intake and increasing healthiness of food consumption of diner’s throughout the world. Moreover, given the high level of interest of diners in seeing more items on the menu which are nutrient dense, such as more vegetables and fish dishes, small changes made by chefs may also be able to impact on the overall energy density of diner’s diets which is linked to higher satiation and better health (Nicklas, Drewnowski, & O’Neil, 2014).

Diners in our study wanted to see changes made to preparation techniques with the most interest in steaming, baking, and grilling foods, along with the use of fresh ingredients prepared using healthier fats and oils. They also wanted to see the addition of healthy ingredients including the use of more vegetables, fish, and lean cuts of meat. These changes point to not only what diners want but what they see missing in today’s restaurant offerings. It is also interesting that the positive changes were more often mentioned than negative changes (i.e., removing ingredients deemed to be unhealthy such as cream-based sauces or high in sodium). This implies that chefs and food service operators have an opportunity to add healthy ingredients and promote healthy food preparation techniques without dwelling on the negatives (low fat or low sodium). There were strong gender, age and country influences on the small changes that diners wanted to see, which should be taken into account by chefs and food service operators in various countries.

Understanding when diners want healthier meals could help chefs and operators to decide when they need to increase or highlight healthier options. Certain meals (lunch, dinner), days of the week (Monday to Friday) and certain occasions (managing weight, when a friend chooses healthy or when not feeling well) were key triggers for choosing healthy options. This is of note to chefs and operators, as they know that most diners on these occasions are already interested in eating more healthily, but it indicates that extra effort needs to be made on other occasions (e.g., breakfast

and on weekends when diners are not as likely to be looking for healthy options). Interestingly choosing these options were strongly related to frequency of eating out, indicating that people who eat out more frequently are more likely to eat more healthily than those who eat out less. It is therefore important for chefs and operators to be aware that they may have different challenges from “regular” diners from those who are less frequent diners. In a study on healthy dining, it was found that subtle reminders on health and nutrition on the menu increased the selection of healthier options among dieters (Papies & Veling, 2013). It was concluded that expanding the options of tasty, less caloric foods at comparable prices to other offerings of the menu could make restaurants more desirable to the health conscious diner.

Despite the positive comments from diners, we also identified perceived barriers. More than half reported that they thought that current healthy options were too expensive and slightly less than half thought that healthy items would not taste good or be satiating. This indicates strong room for improvement in how chefs and operators develop their menus. Although this can be difficult for Chefs and operators to achieve, changes do not need to involve entire renovations of their menu’s, but can involve making small changes to their top dishes so they become slightly healthier. Chefs and operators can also improve the descriptions of their healthier dishes, beyond simply stating “healthy option”, so they sound more appealing to diners and inspire them to choose that dish. This is vital, as diners eat with all of their senses and the words they see to describe menus can have a big impact on choice. Descriptive names not only improve the perception of the how the item will taste and the enjoyment of the food, but it also improves the sales and leaves a favorable impression of the restaurant in the diner’s mind (Wansink, van Ittersum, & Painter, 2005).

One striking finding from the current study was the strong inter-country differences in terms of desires and barriers to choosing healthy meals in restaurants. For example, in Brazil and China the frequency of choosing health meals was much higher than in Germany and Russia. Moreover, in Indonesia and China the current level of satisfaction was quite high compared with the UK and Germany, where complete satisfaction with current offerings was quite low. These inter-country differences could result from a myriad of influences, for example they could represent a large difference in current meal offerings in the countries, the traditional eating patterns and the perception of foods as healthy or otherwise. Irrespective of the cause of these differences the implication is clear that interventions and programs to improve the healthiness of restaurant meals need to be tailored to local markets and needs to ensure they are appealing to local diners.

This research establishes the needs and barriers of diners, however further research will also help to enhance our knowledge and the ability to provide targeted services. For example, we now know what type of small changes diners want to see, but it is also of interest to determine which type of dishes diners are prepared to see changes on. It is also of use to know more about the best approach to communicating small changes to diners. In the past, many chefs and food service operators have taken a “stealth health” approach. That is, the dish might be healthier but there is no desire to call out the healthy features for fear diners will reject it. However, there is some indication that health and nutrition is a growing trend in the restaurant industry. The National Restaurant Association’s What’s Hot 2015 Chef Survey reveals that health and nutrition are “hot” with diners, especially healthier children’s meals, vegetarian dishes and sustainable sourcing (National Restaurant Association, 2015). Transparency on the menu might be the right complement to a stealth approach to health and nutrition in the food service industry. Either way, menu items with appealing descriptions that show no taste compromise are of interest to the vast majority of diners.

The current study had several strengths, such as a comprehensive questionnaire and an international population. However, there are also some limitations which should be taken into account when interpreting the findings. First, the current study was completed using an online panel which was restricted to those that ate out at least once per week, which may have led to an underrepresentation of people from a lower socioeconomic status in the sample. This could limit the generalisability of current findings to current restaurant eaters and those that are from a slightly higher socioeconomic status. Second, the definition of 'healthy' in the current study was deliberately left undefined to study respondents, as (a) 'healthiness' of meals is hard for diners to gauge, and (b) we wanted to understand without educating diners what they currently thought of restaurant meals in terms of their own perception of healthiness. While this gives interesting insights into current perceptions of diners it could mask some findings, for example in cases where diners inaccurately perceive some restaurant meals as healthy. Finally, some of the terms used in the questionnaire, such as the meal times and occasions, may be less appropriate for some cultures which may affect the interpretation of the results for some countries, however they were chosen to provide a comparison point across countries.

Bringing healthier meals to restaurants that are appealing to diners could have an impact on overweight and obesity. However, improving health in these settings is not just the responsibility of chefs and operators, there are also many other key players that are needed to work together to ensure success. While chefs and operators can make a kick start to leverage efforts, everyone associated with the food service industry needs to participate, all the way from governments to diners. All of these key players are involved in either indirect changes (e.g., new regulations) or direct changes (e.g., enabling individual behavior change through education and awareness programmes). Given the large number of chefs and operators and the large number of meals catered for, these small, but vital changes can really add up to make a big difference towards the global overweight and obesity epidemic.

5. Conclusions

In summary, the majority of diners were not completely satisfied with current healthy options, highlighting the need for improvement. Diners wanted to see small, healthy changes and responded clearly about which items they wanted to see included by chefs and operators on menus to make them healthier, if they are not already present on menus. Overall, healthy options were often linked to lower taste and satiation and higher price, as such menus reporting healthy dishes need to be altered to ensure these barriers are overcome. Diners had clear preferences for when they wanted healthier meals. Chefs and operators from all sized operations (small independent to large multi-unit food service) can use this information to know when to highlight healthier meals, and when more work is needed to sell these dishes. Differences in the needs and wants of diners per socio-demographic and personal factors were present indicating the need to tailor menus and the manner of selling meals locally.

Conflict of interest

R.S.N., R.vd.M., A.B. and L.C. are employees of Unilever R&D. Unilever produces foods which are marketed to fit in a healthy diet

and lifestyle and is the owner of the Unilever Food Solutions Service. "Seductive Nutrition™" is a trademarked term, owned by Unilever Food Solutions. CR was sponsored for her time given to this research by a grant from Unilever and is on the speaker's bureau for the Gatorade Sports Science Institute.

Author involvement and disclosures

All authors have been involved in the design of the study, drafting or revising of the manuscript for intellectual content and approved the final version to be published. Preliminary data from this research in a basic form was released as a non-academic PR material report "Seductive Nutrition" in a Unilever series entitled the World Menu Reports. A copy of this booklet can be downloaded at: <http://www.ufs.com/company/media-center/world-menu-report/world-menu-report-3>.

Acknowledgements

We would like to thank the participants for their time and effort. We would also like to acknowledge the efforts of everyone involved in the data collection process and development of the Seductive Nutrition™ service, in particular Mathilde Terink, Bas van Waveren, Kees van Erp, Lynn Gately and Eva Skoog.

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