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Recall of government healthy eating campaigns by consumers in five countries

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Abstract:	<p>Objective: To examine awareness and recall of healthy eating public education campaigns in five countries.</p> <p>Design: Data were cross-sectional and collected as part of the 2018 International Food Policy Study. Respondents were asked whether they had seen government healthy eating campaigns in the past year; if yes (awareness), they were asked to describe the campaign. Open-ended descriptions were coded to indicate recall of specific campaigns. Logistic models regressed awareness of healthy eating campaigns on participant country, age, sex, ethnicity, education, income adequacy and BMI. Analyses were also stratified by country.</p> <p>Setting: Online surveys.</p> <p>Participants: Participants were Nielsen panelists aged ≥ 18 years in Australia, Canada, Mexico, UK and US ($n=22,463$).</p> <p>Results: Odds of campaign awareness were higher in Mexico (50.9%) than UK (18.2%), Australia (17.9%), US (13.0%) and Canada (10.2%) ($P<0.001$). Awareness was also higher in UK and Australia versus Canada and US, and US versus Canada ($P<0.001$). Overall, awareness was higher among males versus females and respondents with medium or high versus low education ($P<0.001$ for all). Similar results were found in stratified models, although no sex difference was observed in Australia or UK ($P>0.05$), and age was associated with campaign awareness in UK ($P<0.001$). Common key words in all countries included</p>

	<p>sugar/sugary drinks, fruits and vegetables, and physical activity. The top five campaigns recalled were Chécate, mídete, muévete (Mexico), PrevenIMSS (Mexico), Change4Life (UK), LiveLighter® (Australia), and Activate, Vive Mejor (Mexico).</p> <p>Conclusions: In Mexico, UK and Australia, comprehensive campaigns to promote healthy lifestyles appear to have achieved broad, population-level reach.</p>



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1 ABSTRACT

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3 countries.

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19 all countries included sugar/sugary drinks, fruits and vegetables, and physical activity. The top five
20 campaigns recalled were *Chécate, midete, muévete* (Mexico), *PrevenIMSS* (Mexico), *Change4Life*
21 (UK), *LiveLighter®* (Australia), and *Actívate, Vive Mejor* (Mexico).

22 **Conclusions:** In Mexico, UK and Australia, comprehensive campaigns to promote healthy lifestyles
23 appear to have achieved broad, population-level reach.

24

25 **Keywords:** diet; healthy eating; mass media; education campaign; awareness

26 INTRODUCTION

27 Public health education campaigns, including mass media and social marketing campaigns, aim to
28 increase knowledge and awareness of the importance of specific health behaviours, with the ultimate
29 goal of promoting public health.^{1,2} These campaigns can lead to positive health behaviour changes or
30 prevent negative changes, often with small but measurable population-level effects.³⁻⁵ Nutrition
31 education campaigns typically aim to communicate general healthy eating messages, alter consumption
32 of specific nutrients or foods, or raise awareness of national food-based dietary guidelines (FBDGs),
33 and are often combined with messages about increasing physical activity.⁶ However, education
34 campaigns are generally associated with increased awareness and understanding of healthy eating
35 concepts more than improved uptake of behaviours or health outcomes.⁷⁻¹¹ Indeed, a Canadian study
36 found that use and knowledge of the information in national FBDGs was low.¹² This highlights the
37 need for effective mass media campaigns to increase knowledge of intake recommendations and
38 encourage healthy behaviours.

39 Mass media and social marketing campaigns may have relatively small effect sizes in terms of
40 behaviour change,⁴ but the population impact can be considerable given their reach. Effective
41 campaigns typically include well-designed messages based on formative research and have sufficient
42 frequency and reach to be recalled by the target audience.¹³ Broad-reaching campaigns with
43 opportunities for multiple exposures are critical given the cluttered information environment in which
44 consumers receive frequent marketing messages from the food industry, which can often conflict or
45 distract from public health messaging. At the same time, achieving broad reach can be expensive given
46 the cost of implementation. One of the key questions in evaluating mass media campaigns is the extent
47 to which consumers can recall the campaign or its key messages. Message recall is an important
48 outcome as it represents a relatively 'objective' measure that is uninfluenced by social desirability
49 bias.¹⁴ Message recall and recognition tasks do not simply measure 'exposure'; they also reflect a
50 consumer's level of cognitive processing, which is associated with comprehension and attitudes.
51 Indeed, greater understanding of a message leads to improved message acceptance and recall. As a
52 result, message recall is often used as an indicator of advertising reach and impact.¹⁴⁻¹⁹

53 Given the call for further monitoring and evaluation of education campaigns and FBDGs,^{11,20} this study
54 aimed to examine awareness and recall of healthy eating campaigns across the five countries examined
55 in the International Food Policy Study (IFPS): Australia, Canada, Mexico, UK, and the US. A brief
56 overview of the campaigns implemented in each country prior to or during the study period

57 (November-December 2018) is provided below. Related literature available from published campaign
58 evaluations are also included, when available. The date of the latest revisions to each country's FBDGs
59 are also provided for context.

60 *Australia*

61 In Australia, approximately one hundred campaigns and programs focused on diet and healthy living
62 were implemented either by the Australian Federal Government, state and territory governments, or
63 large health-related non-governmental organizations (NGOs) in the decade preceding the study, ninety
64 percent of which continued into 2018. These included *LiveLighter*®, a healthy lifestyle promotion and
65 education program implemented in Victoria, Western Australia, and to a lesser extent, Northern
66 Territory and Tasmania that encouraged individuals to eat healthily, be active and maintain a healthy
67 weight, including, among other aspects, the use of graphic imagery designed to elicit shock.²¹ An early
68 evaluation found that the majority (54%) of respondents were aware of the *LiveLighter* campaign, with
69 higher recall among parents and adults with overweight.²² A later study found higher post-campaign
70 awareness (67%), including high viewership among respondents residing in areas of low socio-
71 economic status. It also found increased knowledge of the health risks of sugar-sweetened beverage
72 (SSB) consumption, decreased SSB consumption among frequent SSB consumers as well as
73 overweight SSB consumers, and an overall reduction in sugary food intake.²³ Another study examined
74 the *LiveLighter*® *Sugary Drinks* campaign, which centred around the visceral 'toxic fat' that
75 accumulates around organs and leads to negative health consequences. The study reported general
76 campaign success, with a significant decrease in frequent SSB consumption and increased knowledge
77 of the health risks of SSB intake in Victoria compared to South Australia (control state).²⁴ The healthy
78 lifestyle campaign *Make Healthy Normal*, implemented in New South Wales, was associated with high
79 campaign recognition (45%), yet only 9% of respondents could freely recall the campaign.²⁵
80 Qualitative research found high familiarity with the *Go for 2&5* fruits and vegetables (FV) campaign,
81 which was implemented in all states except Victoria, but poor understanding of serving sizes and low
82 acceptance of the recommended number of servings.²⁶ The most recent Australian Dietary Guidelines
83 were revised in 2013 and include the *Australian Guide to Healthy Eating*, a plate-based model to depict
84 recommended foods. While the Australian Dietary Guidelines underpin nutrition policy in Australia
85 and form the basis of the majority of nutrition education material produced and delivered by Australian
86 governments, at the time of writing there had been no major nationally-coordinated media campaigns
87 to promote the 2013 Australian Dietary Guidelines. In addition, Nutrition Australia (a national NGO

88 **and** not-for-profit organization) produced a healthy eating pyramid that also reflects the Australian
89 Dietary Guidelines, first released in 1982 and most recently updated in 2015.^{27,28}

90 *Mexico*

91 Several mass media campaigns focusing on healthy eating and physical activity were implemented
92 prior to or during the study period. The primary campaign was *Chécate, Mídete, Muévete* (Check,
93 Measure, and Move), **a national campaign** which aims to prevent overweight and obesity through
94 healthy diet, physical activity and regular physical check-ups.²⁹ *Chécate, Mídete, Muévete* was
95 originally introduced **in 2013** as part of the broader *PrevenIMSS* program, conducted by the public
96 healthcare agency Instituto Mexicano del Seguro Social (IMSS). Later, the campaign was scaled up at
97 the national level and adopted by other governmental healthcare providers, including the Instituto de
98 Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE) through the *PrevenISSSTE*
99 program, and the Secretaría de Salud (Ministry of Health). A 2016 study found 11% awareness of the
100 *Chécate, Mídete, Muévete* campaign, whereas a report by the Ministry of Health indicated that 57.4%
101 of survey respondents knew of the campaign.³⁰ In the latter study, among those aware of the campaign,
102 comprehension of campaign concepts ranged from 13.5% for the ‘Check’ component to 53.1% for the
103 ‘Measure’ component and 85.1% for the ‘Move’ component.³⁰ Both studies found higher awareness
104 among women.^{29,30} Higher awareness was also found among those with higher education, those with
105 overweight or obesity,²⁹ adults aged 20-39, and those residing in urban centres.³⁰ The Mexican FBDGs,
106 which feature a plate model, were last revised in 2015.³¹

107 *United Kingdom*

108 Numerous mass media campaigns were implemented by national and regional health authorities in the
109 UK in the years preceding the study. **While some were implemented specifically in Scotland or**
110 **Northern Ireland, the majority were conducted across the UK.** These included *Change4Life*, a national
111 diet and lifestyle campaign conducted by the National Health Service which comprises several diet-
112 related sub-campaigns (e.g., *5 A Day*, *Sugar Swaps*, *100 Calorie Snacks – 2 a Day Max*) aimed at
113 parents and families.³² A randomized trial found that *Change4Life* was associated with a high level of
114 interest and awareness (75%-96%), but few changes in attitudes or behaviours.³³ The UK dietary
115 guidelines (*Eatwell Plate*) were rebranded as the *EatWell Guide* in 2016.³⁴

116 *United States*

117 In the US, the primary campaign was the Obama administration's 2010-2018 *Let's Move*, a national
118 program which focused on physical activity and dietary habits.³⁵ The US FBDGs (*MyPyramid*) were
119 rebranded as *MyPlate* in 2011.³⁶

120 Several studies have examined nutrition education campaigns in the US. Community-based mass media
121 campaigns have been associated with positive dietary changes, including reductions in saturated fat and
122 cholesterol³⁷ and shifts from high- to low-fat milk³⁸ in US intervention compared to control
123 communities. However, public education campaigns aiming to increase FV consumption have led to
124 increased intake only in specific subsamples, such as Hispanic and non-smoking respondents or
125 Spanish speakers.^{39,40} Regarding campaign awareness, a 2007 study found that less than 10% of
126 respondents were aware of the National Cancer Institute's *Fruits and Veggies – More Matters* national
127 campaign and associated serving recommendation. In comparison, the former *5 A Day* campaign had
128 greater reach (29% familiarity), and campaign awareness was associated with following the serving
129 size recommendation.⁴¹

130 **Canada**

131 In Canada, no major dietary campaigns took place in the years leading up to the study. The 2015
132 *Nutrition Facts Education Campaign*, which aimed to increase understanding of the serving size and
133 percent daily value on prepackaged foods, was the most recent national dietary campaign.⁴² A 2016
134 study reported low knowledge of the percent daily value messaging communicated in the campaign.⁴³
135 It was announced that revisions to Canada's FBDGs would be implemented shortly after the current
136 study period, in January 2019.⁴⁴

137 **Study Objectives**

138 The objectives of this descriptive study were to: 1) test differences in awareness of healthy eating
139 campaigns among respondents in the five countries, including by socio-demographic factors; 2)
140 identify the campaign key messages mentioned by respondents; and 3) identify the specific campaigns
141 recalled by respondents. Given the greater presence of mass media campaigns in Australia, Mexico and
142 the UK compared to Canada and the US, higher awareness and campaign recall was expected in the
143 former three countries.

144

145 **METHODS**

146 Data are from the 2018 IFPS, conducted in Australia, Canada, Mexico, the UK and the US. Data were
147 collected via self-completed web-based surveys with adults aged ≥ 18 . Respondents were recruited
148 through Nielsen Consumer Insights Global Panel and their partners' panels. Email invitations with
149 unique survey access links were sent to a random sample of panelists within each country after
150 targeting for demographics; panelists known to be ineligible **due to age or country of residence** were
151 not invited. Potential respondents were screened for eligibility and quota requirements using age, sex,
152 and minimum device screen size **(to restrict respondents from completing the survey on a smartphone)**.
153 Surveys were conducted in English in Australia and the UK; Spanish in Mexico; English or French in
154 Canada; and English or Spanish in the US. Median time to survey completion was 40 min.
155 Respondents provided consent prior to completing the survey. Respondents received remuneration in
156 accordance with their panel's usual incentive structure (e.g., points-based or monetary rewards, chances
157 to win prizes). A full description of the study methods can be found in the IFPS: Technical Report –
158 2018 Survey (Wave 2).⁴⁵

159 *Measures*

160 *Sociodemographic variables* included country (Australia, Canada, Mexico, UK, US), age **(continuous)**,
161 sex at birth (male, female), ethnic group (Majority, Minority, Unstated); highest level of education
162 (Low, Medium, High, Unstated); **and** perceived income adequacy **(assessed by inquiring about the**
163 **respondent's "ability to make ends meet";** Very difficult, Difficult, Neither easy nor difficult, Easy,
164 Very easy). Original item wording is available in the IFPS 2018 survey. **Country-specific measures for**
165 **education and ethnicity were used in each country; coding of these measures is available in the IFPS:**
166 **Technical Report – 2018 (both available at www.foodpolicystudy.com/methods);** see Table 1 for
167 coding of response options.

168 *Body mass index (BMI) classification* was based on reported height and weight (Underweight (<18.5),
169 Normal weight (18.5-24.9), Overweight (25.0-29.9), Obese (≥ 30)).⁴⁶ Those with missing or implausible
170 values were classified as Unstated because there are potentially important differences among those who
171 do not report their height and weight in population-level surveys.⁴⁷

172 *Awareness of healthy eating campaigns* was assessed by asking, "Do you remember seeing any
173 educational messages or campaigns on healthy eating from the government or health authorities in the
174 past 12 months?" (Yes, No, Don't know, Refuse to answer). For the purposes of this paper, health
175 authorities included international agencies such as the World Health Organization, as well as country-
176 specific health-based NGOs.

177 *Recall of healthy eating campaigns* was assessed using an unaided recall technique.⁴⁸ Those who
178 responded ‘Yes’ to the question above were asked, “Can you briefly describe the message or
179 campaign?” (open-ended).

180 ***Data Analysis***

181 A total of 28,684 adults completed the survey. After excluding 5,860 respondents for missing region of
182 residence or poor data quality (including failing to select the current month from a list), the analytic
183 sample comprised 22,824 respondents. A sub-sample of 22,463 (Australia: n=4,083; Canada: n=4,238;
184 Mexico: n=4,064; UK: n=5,466; US: n=4,612) were included in the current analysis after excluding
185 respondents who refused to answer the campaign recall question (n=28) or had missing data on
186 ethnicity or education (n=333). Data were weighted with post-stratification sample weights constructed
187 using a raking algorithm with population estimates from the census in each country based on age
188 group, sex, region, ethnicity (except in Canada) and education (except in Mexico). Estimates reported
189 are weighted unless otherwise specified.

190 Content analysis was conducted such that the first author coded all open-ended descriptions of healthy
191 eating campaigns and developed a coding scheme based on unique keywords that emerged from
192 responses. A second investigator independently coded 20% of all English-language responses and
193 100% of French responses, and a third investigator coded 100% of Spanish responses. Inter-rater
194 reliability, calculated using joint probability of agreement, was 91.1% (English and French: 95.3%;
195 Spanish: 86.0%); remaining discrepancies were resolved via discussion.

196 Investigators in each country identified lists of campaigns *a priori* using a structured search strategy.
197 Investigators searched the websites of governments and health authorities responsible for health and
198 nutrition, as well as Google and Google Scholar, to identify campaigns related to healthy eating that
199 took place in a five-year period preceding and immediately following the study (2015-2020). For each
200 campaign identified, investigators listed the campaign name, dates, agency or organization, website,
201 key messages, and any other associated campaign elements. Recall of specific campaigns was
202 determined by matching respondents’ open-ended responses to the keyword lists and information
203 collected in the search strategy.

204 Recall of keywords and specific campaigns were reported using descriptive statistics. An adjusted
205 logistic model regressed awareness of a healthy eating campaign (1=Yes; 0=No/Don’t know) on
206 country, adjusting for age group, sex, ethnic group, education level, perceived income adequacy, and
207 BMI classification. Adjusted odds ratios (AOR) are reported. After stratifying the data by country,
208 separate binary logistic regression models were also conducted to evaluate differences in awareness of

209 healthy eating campaigns across levels of each of the aforementioned socio-demographic variables.
210 Analysis was conducted using SAS Studio release 9.4.

211

212 RESULTS

213 Sample characteristics in each country are shown in Table 1. **Approximately half the sample was**
214 **female (51.3%); 80% were part of a majority ethnic group; and over one third (34.8%) had a high**
215 **education level.**

216 [TABLE 1 HERE]

217 *Overall awareness of healthy eating campaigns*

218 A total of 21.5% (4,824) respondents across all countries reported seeing a public health campaign on
219 healthy eating in the past 12 months. General awareness of healthy eating campaigns varied
220 significantly by country. **As shown in Table 2, respondents in Mexico (50.9%) were significantly more**
221 **likely to report seeing a healthy eating campaign compared to those in the UK (18.2%), Australia**
222 **(17.9%), the US (13.0%), or Canada (10.2%). Respondents in both Australia and the UK were also**
223 **more likely to report seeing a campaign than respondents in Canada or the US, whereas there was no**
224 **difference between those in Australia and the UK. Respondents in the US were more likely to report**
225 **seeing a campaign than respondents in Canada.**

226 The model also revealed several socio-demographic differences in campaign awareness. Overall, males
227 (22.8%) and those with medium (19.5%) or high (30.3%) education levels were significantly more
228 likely to report seeing a campaign than females (20.2%) and those with low education levels (15.4%),
229 respectively. Those classified as having **unstated BMI (29.9%) were significantly more likely to report**
230 **seeing a campaign than those with normal weight (20.9%), with no differences observed between other**
231 **BMI classifications (P>0.05). As age increased, respondents were significantly more likely to report**
232 **seeing a campaign.** There was no main effect of ethnic group or perceived income adequacy (Table 2).

233 [TABLE 2 HERE]

234 As shown in Table 3, when examining socio-demographic differences in campaign awareness in each
235 country separately, the same basic pattern of results emerged, with some exceptions. For example,
236 significantly higher **likelihood of** awareness among males compared to females was found only in
237 Canada, Mexico and the US. Significant differences in awareness by education were observed,
238 whereby **likelihood of** awareness was significantly higher in those with a high level of education

239 (except in Canada) or medium level of education (except in Canada and Mexico). Differences by BMI
240 classification were also observed in all countries except Mexico: compared to those with normal
241 weight, those with unstated BMI were significantly more likely to report seeing a campaign.
242 Additionally, in the UK, those with overweight were significantly *less* likely to report seeing a
243 campaign than with normal weight. As per above, there was no effect of income adequacy in any
244 country. Significantly higher **likelihood of awareness was also observed** among **older respondents** in
245 the UK and among minority groups in the US.

246 [TABLE 3 HERE]

247 ***Key messages mentioned by respondents***

248 **Of the 4,824 respondents who reported seeing a campaign, 3,711 provided ‘valid’ responses. The**
249 **remaining responses were nonsensical (n=106); irrelevant comments or qualitative campaign feedback**
250 **(e.g., “Great”) (n=319); did not specify the message in the campaign (n=473), or described the source**
251 **but not content of the message (n=215).** Figure 1 shows the top ‘keywords’ mentioned in open-text
252 responses by the **subgroup of respondents** who provided a ‘valid’ answer **when asked to describe the**
253 **message or campaign they saw.** Supplementary Table 1 shows frequencies of all identified keywords
254 among all respondents. As shown in Figure 1, whereas respondents in Canada and the US were most
255 likely to make generic references to healthy eating or dietary habits, the most common keywords
256 mentioned in valid responses in the UK and Australia were sugar (35.6%) and sugary drinks (27.1%),
257 respectively. Indeed, sugar, sugary drinks and/or sugar taxes were common campaign topics overall
258 and were mentioned in at least 6% of valid responses in each country. Fruits and vegetables were also
259 commonly mentioned in all countries, ranging from 8.6% of responses in Mexico to 17.8% in the UK.
260 Many respondents also mentioned physical activity: it was by far the most commonly used keyword in
261 Mexico (35.1%), the third-most common in Australia (13.7%), and was mentioned in 8.9%-10.6% of
262 responses in the remaining countries.

263 [FIGURE 1 HERE]

264 ***Specific campaigns recalled***

265 Across countries, three of the top five ‘campaigns’ freely recalled were from Mexico, and two were
266 from the UK and Australia: 1) *Chécate, mídete, muévete* (Mexico; n=451); 2) *PrevenIMSS* (Mexico;
267 n=280); 3) *Change4Life* (UK; n=171); 4) *LiveLighter®* (Australia; n=104); and 5) *Actívate, Vive Mejor*
268 (Mexico; n=86). As shown in Table 4, national FBDGs were among the top 10 ‘campaigns’ mentioned

269 in all countries except Mexico, where *La jarra del buen beber*—a more widely known pictorial guide
270 to healthy beverage intake developed by the government⁴⁹—was among the top 10.

271 [TABLE 4 HERE]

272 DISCUSSION

273 Study results showed that across countries, respondents in Mexico were substantially more likely to
274 report seeing a healthy eating campaign. This higher campaign awareness appears to be largely
275 associated with *Chécate, Midete, Muévete*, which was implemented from 2013-2019 and was one of
276 the few campaigns in the country with continued social media presence in 2018. The campaign's
277 ongoing nature and salient advertisements, which included a catchy jingle⁵⁰ and **paid** dissemination
278 through TV, radio, print media, and the internet, among other avenues, may have contributed to its
279 wide reach **and shaping of public opinion. In fact, the presidential administration drastically overspent**
280 **its social communication budget in 2018, with the Ministry in Health reporting the largest spending on**
281 **social communication.**⁵¹ Overall, the campaign was recalled by 24.2% of Mexicans who provided a
282 valid open-text response—or 11% of all Mexican respondents—consistent with the 11% of Mexican
283 survey respondents who were aware of the campaign in a 2016 study,²⁹ but substantially lower than the
284 57% reported by the Ministry of Health.³⁰ The latter study may have used a recognition task, which
285 generally leads to higher awareness (see below). Both the 2016 study and the current study found
286 higher campaign awareness among those with higher education levels²⁹; however, unlike previous
287 studies which found significantly higher campaign awareness among women,^{29,30} the current study
288 found similar campaign awareness across the sexes, with males slightly more likely to recall the
289 campaign than females.

290 As expected, respondents in the UK and Australia also had higher overall awareness of healthy eating
291 campaigns compared to Canada and the US, although they followed Mexico by a wide margin (<20%
292 awareness in both countries versus 51% in Mexico). Several of the major mass media campaigns
293 described earlier, including *Change4Life* in the UK and *LiveLighter*® in Australia, were among the top
294 campaigns described by respondents, indicating their wide reach (see Table 3). Free recall is generally
295 lower than recognition,⁴⁸ which may explain the lower levels of campaign awareness found in the present
296 versus previous studies which asked participants about specific campaigns.^{22,24,33} Numerous campaigns
297 on healthy eating occurred in both Australia and the UK during the study period, and there may be several
298 reasons for the lower level of awareness compared to Mexico. For one, many campaigns identified were
299 **implemented only in specific states/regions rather than nationally, were** targeted at specific settings or

300 subgroups, and may be better described as social marketing campaigns, which utilize marketing concepts
301 to encourage socially responsible behaviours.^{1,2} Additionally, campaigns launched in the months
302 preceding the study may not yet have garnered sufficient exposure to be freely recalled.

303 In Canada and the US, where there were few major mass media campaigns on healthy eating in the
304 years preceding the study, FBDGs were the most commonly recalled message about healthy eating.
305 This suggests an overall awareness of the existence of FBDGs in both countries, perhaps **at least**
306 **partially attributed** to dissemination by schools and medical practices, **resulting in established**
307 **knowledge of the FBDGs among adults**. Additionally, in Canada, many respondents may have heard
308 about the upcoming revisions to the national FBDGs.⁴⁴ In the US, FBDGs were the top two messages
309 listed, with more respondents mentioning the food pyramid than the plate model, despite the fact that
310 *MyPlate* was released more recently (2011) than *MyPyramid* (2005).⁵² Interestingly, the food pyramid
311 was mentioned in all countries, despite the US being the only country examined that had a pyramid
312 model in 2018. In Australia, this may be attributed to the fact that **the NGO** Nutrition Australia has
313 used a food pyramid since the 1980s and continues to update it (in line with the Australian Dietary
314 Guidelines), despite the Australian Government's introduction of a plate model in 1998.^{27,28} Similarly,
315 Mexico utilized a pyramid model before the *Plato del buen comer* (plate model), which was introduced
316 in 2006.⁵³ Respondents in other countries may have been exposed to the pyramid model via sharing of
317 online resources.

318 Memory biases may have been at play in this study, such as forward telescoping, in which more distant
319 events feel more recent, or the spacing effect, in which memory is enhanced with repeated exposures
320 spread out over time.⁵⁴ Indeed, several of the top 10 campaigns listed in each country were either
321 ongoing (e.g., Australia: *LiveLighter*®, *Healthier Happier*, *Rethink Sugary Drink*, *Make Healthy*
322 *Normal*, *Try for 5*; Canada: *ParticipACTION*; Mexico: *PrevenIMSS*, *PrevenISSSTE*; UK: *Change4Life*,
323 *5 A Day*, *Eatwell Guide*, *Sugar Swaps*, *One You*; US: *Let's Move*), or no longer in effect at the time of
324 the study (e.g., Australia: *Go for 2&5*; Mexico: *Activate*, *Vive Mejor*; US: *Pouring on the Pounds*). As
325 in Mexico, the major campaigns recalled in Australia and the UK—including *LiveLighter*®, *Healthier*
326 *Happier*, *Change4Life* and *5 A Day*—were conducted over multiple years and still actively promoted
327 (in some cases, since the early 2000s), which likely contributed to their recall.

328 In addition, although participants were asked about healthy eating campaigns run by governments or
329 health authorities, several commercially sponsored and/or physical activity-related campaigns were
330 recalled. **This may have stemmed from the public's lack of awareness regarding the agency responsible**

331 for producing each campaign (e.g., government, NGO vs. commercially-sponsored campaigns). Indeed,
332 the top four campaigns recalled across countries included elements of both healthy eating and physical
333 activity, and the fifth focused exclusively on physical activity. Commercially sponsored and/or physical
334 activity campaigns were recalled especially in Canada and the US, where there were few government-
335 run campaigns about healthy eating. For example, the well-known physical activity programs
336 *ParticipACTION* and *Body Break* were among the top 10 campaigns recalled in Canada, as was *Carrot*
337 *Rewards*, an industry-sponsored mobile application that allowed consumers to earn rewards points by
338 increasing their step count. In the US, after the FBDGs, the next most commonly cited program was the
339 Obama administration's *Let's Move* campaign, which encouraged both healthy eating and physical
340 activity.³⁵ The *Got Milk?* campaign, which promotes milk consumption and is sponsored by the dairy
341 industry, was also among the top 10 in the US.⁵⁵ In Mexico, the most frequently mentioned keyword
342 was physical activity, in line with previous reports indicating that the 'Move' component of the
343 *Chécate, Mídete, Muévete* campaign was the most understood.³⁰ In addition, the Mexican National
344 Commission of Physical Culture's *Activate, Vive Mejor* campaign promoted physical activity.

345 While the majority of responses could not be linked to specific campaigns, the keywords mentioned by
346 respondents provide insight into public awareness of the specific campaign themes or concepts. Sugar
347 and/or sugary drinks were among the top five keywords mentioned in four countries and among the top
348 10 in Mexico. This aligns with the media campaigns and policy measures in place at the time of the
349 study. For example, in the UK, campaigns focusing on sugar—including *Sugar Smart* and *Sugar*
350 *Swaps*, a *Change4Life* sub-campaign—were ongoing at the time of the study, and the Soft Drinks
351 Industry Levy ('sugar tax') was implemented in April 2018.⁵⁶⁻⁵⁸ Correspondingly, sugar, sugary drinks
352 or sugar taxes were collectively mentioned in close to 60% of UK responses. In Australia, ongoing
353 campaigns related to reducing consumption of sugar and sugary drinks included *Rethink Sugary Drinks*
354 (including *Don't be Sucked In*) and *Kids are Sweet Enough*.⁵⁹⁻⁶³ *Rethink Sugary Drink* was the fourth
355 most commonly recalled campaign, and sugar, sugary drinks or sugar tax were collectively mentioned
356 in over 40% of responses. In addition, 4% mentioned the 'toxic fat' that accumulates around internal
357 organs – a central message of the *LiveLighter*® campaigns. Moreover, mainstream discourse regarding
358 the health consequences of sugar may have influenced recall of messages related to sugar. For example,
359 the popular 2014 documentary *That Sugar Film* spawned *That Sugar Movement* in Australia,⁶⁴ and may
360 have contributed to the salience of messages about sugar. Similar diet and health related documentaries
361 were released around the same time in Canada and the US.^{65,66} In Mexico, the 2016 campaign *No dañes*
362 *su corazón* ("Don't harm your child's heart") focused on reducing children's sugary drink consumption

363 to prevent obesity, cardiovascular disease and diabetes.⁶⁷ In Canada and the US, where there were no
364 widespread campaigns about sugar at the time of the study, references to sugar may have stemmed
365 from knowledge of the FBDGs, which discourage eating foods high in sugar, sodium or saturated
366 fats,^{36,68} or from a widespread trend towards reducing sugar,⁶⁹ which is supported by World Health
367 Organization recommendations.⁷⁰ FVs were also commonly mentioned by respondents in every
368 country, which is perhaps unsurprising given that FV intake is a key component of national FBDGs in
369 all countries.^{27,36,53,68,71} Adequate FV intake was also the focus of several major campaigns, including
370 *Go for 2&5* and *Try for 5* in Australia, *5 al Día* in Mexico, and *5 A Day* in the UK.

371 Finally, campaign recall differed somewhat across socio-demographic groups. We did not observe
372 differences in campaign recall by age (except in the UK), income adequacy, or BMI classification
373 (except for a difference between those who did versus did not provide their height and weight/**provided**
374 **implausible values**). In contrast, those with higher education were more likely to report seeing healthy
375 eating campaigns than those with lower education levels in all countries except Canada, as were males
376 compared to females in Canada, Mexico and the US. Previous studies examining healthy eating
377 campaigns have shown mixed results with regard to socio-demographic differences: some reported no
378 differences in campaign awareness by sex, BMI or SES,^{22,24} whereas others have found higher
379 awareness among higher socio-economic groups,^{29,41} and differences in campaign awareness by
380 ethnicity,⁴¹ sex and/or age.^{23,25,29,41} Similarly, a review examining differences in the impact of physical
381 activity campaigns by socio-economic status found mixed results with regard to differences by SES.⁷²
382 Qualitative research suggests that campaign effectiveness can be improved among individuals of lower
383 socio-economic status by drawing their attention toward specific health issues (e.g., current weight or
384 consumption levels).⁷³ Research should further examine the factors influencing recall of public health
385 campaigns and/or how to ensure broad reach across diverse socio-economic groups, especially given
386 the need to address nutrition-related health disparities.

387 ***Strengths & Limitations***

388 This study benefited from a large sample size and findings from five countries with diverse populations
389 and different levels of government-initiated healthy eating education campaigns. However, other than
390 in Mexico, specific campaign recall was low, with many campaigns reported by less than 1% of
391 respondents in a given country. Although this likely reflects true differences in campaign reach, it may
392 also reflect measurement issues. Specifically, the use of an open-text question in a larger survey likely
393 resulted in lower engagement with the question compared to other possible formats (such as measures
394 of aided recall or 'recognition'), which tend to produce higher estimates of exposure due to the lower

395 level of cognitive effort required,⁴⁸ or compared to in-person or telephone surveys, which are more
396 likely to encourage responses to open-ended questions. In addition, many respondents did not mention
397 campaigns by name; in such cases, campaigns were identified based on keywords and descriptions.
398 While all efforts were made to link participant responses to specific campaigns, considering these
399 limitations, the proportion mentioning each campaign should be considered an underestimate, and
400 between-group differences in overall campaign recall should be the central focus of study findings.
401 Several campaigns identified were also targeted at specific sub-groups or settings, which may not have
402 been adequately represented in the sample. **Ensuring that campaign messages and/or delivery channels**
403 **are tailored to target audiences based on culture or socio-demographic characteristics such as age, sex**
404 **or ethnicity may be an important factor in campaign engagement.⁵ The current study did not assess**
405 **campaigns for this type of message content; however, this is a direction for future research.** Moreover,
406 previous research indicates that campaigns are more likely to be recalled by those who are interested in
407 the topic and/or who consume a lot of media; further research should examine these factors as
408 covariates.⁴⁸ Given inconsistencies in the terminology used to describe mass media campaigns, the
409 search strategy used to identify health eating campaigns may have failed to distinguish public health-
410 related initiatives from broader ‘social advertising’ or ‘social marketing’ efforts **that may or may not**
411 **have been funded by industry.** Future research should distinguish between these initiatives when
412 examining campaign awareness.² Finally, respondents were recruited **for an online panel** using non-
413 probability-based sampling; therefore, the findings do not provide nationally representative estimates.
414 For example, although the data were weighted by age group, sex, region, ethnicity (except in Canada)
415 and education (except in Mexico), the Mexico sample had notably higher levels of education than
416 census estimates, while BMI was similar or somewhat lower than national estimates across the five
417 countries. In addition, there were notably higher levels of missing data for BMI in the UK.

418 ***Implications for Policy and Practice***

419 Although participants were asked to recall government healthy eating campaigns, a large proportion
420 freely recalled other messages: campaigns related to other aspects of a healthy lifestyle, such as
421 physical activity; policy measures/initiatives that may or may not have been associated with mass
422 media campaigns (e.g., sugar taxes and/or new FBDGs); and marketing campaigns led by NGOs. This
423 suggests that when parsing out information from a cluttered information environment, consumers may
424 recall healthy lifestyle messages but not necessarily their source (i.e., government or health authority
425 versus industry). Industry-sponsored messages may well lead to recall of positive messages about
426 eating.^{74,75} However, industry-sponsored ads are ultimately designed to create positive associations

427 with a specific brand or product, which more often than not involve pre-packaged or processed foods,
428 which tend to be of poorer nutritional quality.^{76,77} Moreover, some campaigns are implemented by
429 Social Aspects/Public Relations Organizations; i.e., industry-funded groups that promote policies
430 favourable to the industry while at the same time promoting an image of social responsibility. Research
431 indicates that campaigns implemented by these organizations rather than public health agencies tend to
432 increase positive associations of unhealthy behaviours (such as alcohol consumption) and may detract
433 from the salience of public health messages.⁷⁸ Governments or health authorities therefore should
434 consider increasing the salience of their institutional attributions when developing mass media
435 campaigns in order to distinguish them from industry-sponsored ads. Literature from nutrition labelling
436 suggests that government attributions increase the believability of messages and the likelihood that they
437 will influence consumer choice.⁷⁹ Secondly, because consumers do not necessarily distinguish between
438 the various aspects of a healthy lifestyle (i.e., nutrition and physical activity) when recalling campaign
439 messages, researchers aiming to evaluate the efficacy of mass media campaigns should consider
440 examining changes in awareness, knowledge, attitudes or behaviours that are broader than the specific
441 campaign objectives. Finally, because higher campaign awareness was documented among those with
442 higher levels of education, it is important that mass media campaigns include strategies to reach
443 particular subsets of the population, including those of lower socio-economic status. This could be
444 facilitated by conducting formative work in the form of focus groups and/or pilot testing of campaign
445 materials among target groups to increase engagement.³ From a broader perspective, given previous
446 evidence that social marketing campaigns risk increasing existing socio-economic disparities in health
447 outcomes, comprehensive approaches, including policy changes, may be required to broadly address
448 dietary issues in the population.⁸⁰

449 **Conclusions**

450 The high levels of campaign recall observed among those who provided responses in Mexico, Australia
451 and the UK demonstrate the potential for public health education campaigns to have wide reach at the
452 population level. Further research is required to examine whether consumers distinguish messages
453 disseminated by public health agencies versus industry-sponsored organizations.

Table 1. Weighted sample characteristics, 2018 International Food Policy Study (n=22,463)

Socio-demographic characteristic	Total (n=22,463)	Australia (n=4,083)	Canada (n=4,238)	Mexico (n=4,064)	UK (n=5,466)	US (n=4,612)
	% (n)					
Sex						
Male	48.7% (10,949)	49.1% (2,004)	49.6% (2,101)	47.7% (1,937)	48.8% (2,665)	48.6% (2,665)
Female	51.3% (11,514)	50.9% (2,079)	50.4% (2,136)	52.3% (2,127)	51.2% (2,801)	51.2% (2,801)
Age (years); mean (SD)	46.0 (16.8)	46.5 (16.9)	48.3 (17.1)	39.5 (13.9)	48.1 (17.2)	46.8 (16.7)
18-29	22.2% (4,988)	21.7% (887)	19.7% (834)	29.8% (1,212)	19.5% (1,066)	21.4% (988)
30-44	26.3% (5,914)	26.6% (1,085)	24.5% (1,040)	32.1% (1,305)	24.4% (1,334)	24.9% (1,151)
45-59	26.0% (5,846)	24.4% (998)	25.7% (1,087)	28.6% (1,161)	26.0% (1,421)	25.6% (1,178)
≥60	25.4% (5,715)	27.3% (1,113)	30.1% (1,276)	9.5% (386)	30.1% (1,645)	28.1% (1,295)
Ethnic group*						
Majority group	80.0% (17,980)	75.5% (3,082)	79.3% (3,362)	78.8% (3,203)	88.9% (4,860)	75.3% (3,473)
Minority group	20.0% (4,483)	24.5% (1,001)	20.7% (876)	21.2% (861)	11.1% (605)	24.7% (1,139)
Education level**						
Low	43.0% (9,662)	42.1% (1,721)	41.8% (1,770)	19.7% (800)	48.6% (2,657)	58.8% (2,714)
Medium	22.2% (4,991)	32.3% (1,317)	33.7% (1,426)	13.1% (533)	23.1% (1,264)	9.8% (451)
High	34.8% (7,810)	25.6% (1,045)	24.6% (1,042)	67.2% (2,731)	28.3% (1,545)	31.4% (1,448)
Perceived income adequacy ("ability to make ends meet")						
Very difficult/Difficult/Unstated	31.2% (7,007)	29.0% (1,184)	28.9% (1,225)	44.2% (1,795)	25.7% (1,407)	30.3% (1,397)
Neither easy nor difficult	36.4% (8,179)	37.1% (1,514)	36.7% (1,554)	38.6% (1,569)	36.2% (1,980)	33.9% (1,563)
Easy/Very easy	32.4% (7,277)	33.9% (1,385)	34.4% (1,459)	17.3% (701)	38.0% (2,079)	35.8% (1,652)
BMI Classification						
Underweight	3.0% (665)	2.9% (118)	3.3% (141)	2.1% (86)	3.0% (163)	3.4% (158)
Normal weight	34.0% (7,639)	34.9% (1,426)	32.6% (1,382)	39.3% (1,596)	33.9% (1,850)	30.0% (1,384)
Overweight	26.8% (6,062)	25.0% (1,023)	27.9% (1,181)	29.1% (1,181)	25.7% (1,405)	26.8% (1,235)
Obesity	20.1% (4,526)	19.9% (812)	23.5% (996)	15.1% (612)	16.1% (880)	26.6% (1,225)
Unstated***	16.1% (3,607)	17.2% (704)	12.7% (538)	14.5% (590)	21.3% (1,167)	13.2% (608)

BMI, body mass index. *Ethnicity was categorized as 'majority' if participants identified themselves as 'white', predominantly English-speaking or non-Indigenous; criteria were based on the most appropriate terminology in each country. **Education was coded as low, medium or high according to country-specific criteria related to the highest level of education completed. ***Respondents with implausible height and/or weight were grouped with unstated BMI.

Table 2. Proportion of respondents who reported seeing a healthy eating education campaign, among all respondents (n=22,463)

Socio-demographic characteristic	AOR, 95% CI, p-value
Country	F(4, 22459)=305.74, P<0.001
Mexico vs. Australia	4.64, 4.08-5.28, P<0.001
Mexico vs. Canada	8.76, 7.53-10.19, P<0.001
Mexico vs. United Kingdom	4.62, 4.09-5.22, P<0.001
Mexico vs. United States	6.39, 5.60-7.28, P<0.001
Australia vs. Canada	1.89, 1.62-2.20, P<0.001
Australia vs. United Kingdom	1.00, 0.88-1.13, P=0.95
Australia vs. United States	1.38, 1.20-1.58, P<0.001
United Kingdom vs. Canada	1.90, 1.63-2.20, P<0.001
United Kingdom vs. United States	1.38, 1.21-1.58, P<0.001
United States vs. Canada	1.37, 1.17-1.61, P<0.001
Sex	F(1,22462)=21.27, P<0.001
Male	1.21, 1.12-1.32, P<0.001
Female (<i>ref</i>)	(<i>ref</i>)
Age	F(1, 22462)=5.68, P=0.02
(<i>continuous, years</i>)	1.00, 1.00-1.01, P=0.02
Ethnic group	F(1, 22462)=1.94, P=0.16
Majority group (<i>ref</i>)	(<i>ref</i>)
Minority group	1.09, 0.97-1.22, P=0.16
Education level	F(2, 22461)=34.33, P<0.001
Low (<i>ref</i>)	(<i>ref</i>)
Medium	1.31, 1.17-1.47, P<0.001
High	1.52, 1.38-1.68, P<0.001
Perceived income adequacy (“ability to make ends meet”)	F(2, 22461)=1.28, P=0.28
Very difficult/Difficult/Unstated (<i>ref</i>)	(<i>ref</i>)
Neither easy nor difficult	1.03, 0.93-1.14, P=0.58
Easy/Very easy	1.09, 0.98-1.21, P=0.12
BMI Classification	F(4, 22459)=35.68, P<0.001
Underweight	1.13, 0.86-1.48, P=0.39
Normal weight (<i>ref</i>)	20.9% (<i>ref</i>)
Overweight	20.4%; 0.99, 0.89-1.09, P=0.79
Obesity	17.7%; 1.03, 0.91-1.16, P=0.68
Unstated	29.9%; 1.98, 1.75-2.23, P<0.001

AOR, adjusted odds ratio; BMI, body mass index; ref, reference group. Binary logistic regression model tested for odds of reporting seeing a healthy eating campaign (Yes vs. No/Don't know). Significant effects (P<0.05) are indicated in bold.

Table 3. Proportion of respondents who reported seeing a healthy eating education campaign, among all respondents in each country (n=22,463)

Socio-demographic characteristic	Australia (n=4,083)	Canada (n=4,238)	Mexico (n=4,064)	UK (n=5,466)	US (n=4,612)
TOTAL	17.9% (731)	10.2% (430)	50.9% (2,068)	18.2% (994)	13.0% (601)
Sex	$X^2(1)=0.07, P=0.80$	$X^2(1)=15.43, P<0.001$	$X^2(1)=5.65, P=0.02$	$X^2(1)=0.54, P=0.42$	$X^2(1)=16.38, P<0.001$
Male	18.2% (364)	12.2% (255)	53.5% (1,036)	18.5% (492)	15.8% (353)
Female (<i>ref</i>)	17.7% (367)	8.2% (175)***	48.5% (1,032)*	17.9% (502)	10.5% (248)***
Age (years)	$X^2(1)=1.74, P=0.19$	$X^2(1)=0.00, P=0.97$	$X^2(1)=0.85, P=0.47$	$X^2(1)=13.47, P<0.001$	$X^2(1)=0.29, P=0.59$
Ethnic group	$X^2(1)=1.17, P=0.28$	$X^2(1)=0.36, P=0.55$	$X^2(1)=0.67, P=0.41$	$X^2(1)=2.21, P=0.14$	$X^2(1)=5.67, P=0.02$
Majority group (<i>ref</i>)	17.2% (531)	9.7% (326)	51.5% (1,648)	17.8% (864)	12.0% (416)
Minority group	20.0% (200)	11.9% (104)	48.8% (420)	21.4% (130)	16.3% (185)*
Education level	$X^2(2)=6.27, p=0.002$	$X^2(2)=0.61, P=0.54$	$X^2(2)=4.61, P=0.010$	$X^2(2)=15.05, P<0.001$	$X^2(2)= 12.09, P<0.001$
Low (<i>ref</i>)	15.2% (261)	9.7% (171)	45.4% (363)	15.2% (404)	10.5% (285)
Medium	19.8% (261)**	9.8% (139)	48.5% (258)	19.7% (248)***	14.6% (66)**
High	20.1% (210)**	11.5% (120)	53.0% (1,446)**	22.1% (342)***	17.3% (250)***
Perceived income adequacy (“ability to make ends meet”)	$X^2(2)=0.10, P=0.90$	$X^2(2)=1.88, P=0.15$	$X^2(2)=0.91, P=0.40$	$X^2(2)=0.87, P=0.42$	$X^2(2)=1.94, P=0.14$
Very difficult/Difficult/Unstated (<i>ref</i>)	17.9% (212)	8.9% (109)	49.4% (886)	18.3% (257)	11.7% (163)
Neither easy nor difficult	17.6% (266)	9.9% (154)	51.5% (807)	18.4% (365)	12.1% (190)
Easy/Very easy	18.3% (254)	11.5% (167)	53.5% (375)	17.9% (372)	15.0% (248)
BMI Classification	$X^2(4)=12.48, P<0.001$	$X^2(4)=22.70, P<0.001$	$X^2(4)=0.99, P=0.41$	$X^2(4)=6.57, P<0.001$	$X^2(4)=21.64, P<0.001$
Underweight	18.0% (21)	12.0% (17)	40.0% (34)	17.7% (29)	14.0% (22)
Normal weight (<i>ref</i>)	15.0% (214)	8.3% (115)	50.0% (797)	17.8% (330)	10.0% (138)
Overweight	16.0% (164)	7.4% (87)	52.0% (614)	15.4% (216)*	12.1% (149)
Obesity	16.4% (133)	7.7% (77)	51.1% (313)	17.0% (150)	10.4% (128)
Unstated	28.4% (200)**	25.0% (134)***	52.5% (310)	23.1% (269)***	27.0% (164)***

BMI, body mass index; ref, reference group. X^2 , chi-squared test. Separate logistic regression models were conducted in each country, testing for odds of reporting seeing a healthy eating campaign (Yes vs. No/Don't know). Proportions that are significantly different from the reference group are bolded and indicated with asterisks (* $P<0.05$, ** $P<0.01$, *** $P<0.001$); significant chi-squared tests ($P<0.05$) are also indicated in bold.

Table 4. Top 10* education campaigns mentioned in unaided recall task, among all respondents in each country (n=22,463)

#	Australia (n=4,083)		Canada (n=4,238)		Mexico (n=4,064) % (n)		UK (n=5,466)		US (n=4,612)	
1	<i>LiveLighter®</i>	2.6% (104)	<i>Canada's Food Guide</i>	1.1% (46)	<i>Chécate, midete, muévete</i>	11.1% (451)	<i>Change4Life</i>	3.1% (171)	<i>Food Pyramid</i>	0.7% (31)
2	<i>Healthier Happier</i>	1.3% (52)	<i>Carrot Rewards</i>	0.3% (13)	<i>PrevenIMSS</i>	6.9% (280)	<i>5 A Day</i>	1.5% (80)	<i>MyPlate</i>	0.4% (20)
3	<i>Go for 2 & 5</i>	0.4% (15)	<i>ParticipACTION</i>	0.3% (11)	<i>Actívate, Vive Mejor</i>	2.1% (86)	<i>Eatwell Guide</i>	0.5% (30)	<i>More Matters; Let's Move (M. Obama)</i>	0.3% (14)
4	<i>Rethink Sugary Drink</i>	0.3% (13)	<i>Food Pyramid</i>	0.1% (6)	<i>Que este no sea su futuro</i>	1.5% (63)	<i>100 Calorie Snacks - 2 a Day Max</i>	0.4% (21)	<i>Pouring on the Pounds</i>	0.2% (8)
5	<i>Move it Aus</i>	0.3% (11)	<i>Les aliments d'ici sont remarquables</i>	0.1% (2)	<i>Resta kilos suma vida</i>	0.8% (33)	<i>Sugar Swaps</i>	0.3% (19)	<i>Got Milk?; Podría Tener Prediabetes</i>	0.1% (5) 0.1% (5)
6	<i>Give Colour a Spin</i>	0.3% (10)	<i>Body Break</i>	<0.1% (1)	<i>Mente sana en cuerpo sano</i>	0.4% (14)	<i>Jamie Oliver</i>	0.1% (7)	<i>SNAP</i>	0.1% (4)
7	<i>Australian Dietary Guidelines; Try for 5</i>	0.2% (7)	--	--	<i>PrevenISSSTE cerca de ti</i>	0.3% (13)	<i>Ben's Beginners; Sugar Smart</i>	0.1% (4)	<i>First Five</i>	0.1% (3)
8	<i>Make Healthy Normal</i>	0.2% (6)	--	--	<i>5 al día</i>	0.2% (10)	<i>Eatwell Plate; One You</i>	0.1% (3)	<i>National Nutrition Month; Milk Life; Play60</i>	0.1% (2)
9	<i>Health Star Rating</i>	0.1% (5)	--	--	<i>Sin hambre</i>	0.1% (5)	<i>Couch to 5K; Junk Free Checkouts; Live Well; Smart Swaps</i>	<0.1% (2)	<i>Basado en Hechos; Feeding America; Live Longer with Earth Fare; Save the Food; Shape your Future; Sip Smarter; Sugar Bites</i>	<0.1% (1)
10	<i>Find Your 30; Get Healthy</i>	0.1% (4)	--	--	<i>La jarra del buen beber</i>	0.1% (4)	<i>Go Sober for October; Be Food Smart; Drink Aware; Eat Better Feel Better; Eat Smart; Food4Health; Healthy Start; Obesity is a</i>	<0.1% (1)	<i>Go Red for Women</i>	<0.1% (<1)

*cause of cancer too; The
Daily Mile*

*Campaigns with the same proportion of responses are separated by semi-colons.

For Peer Review

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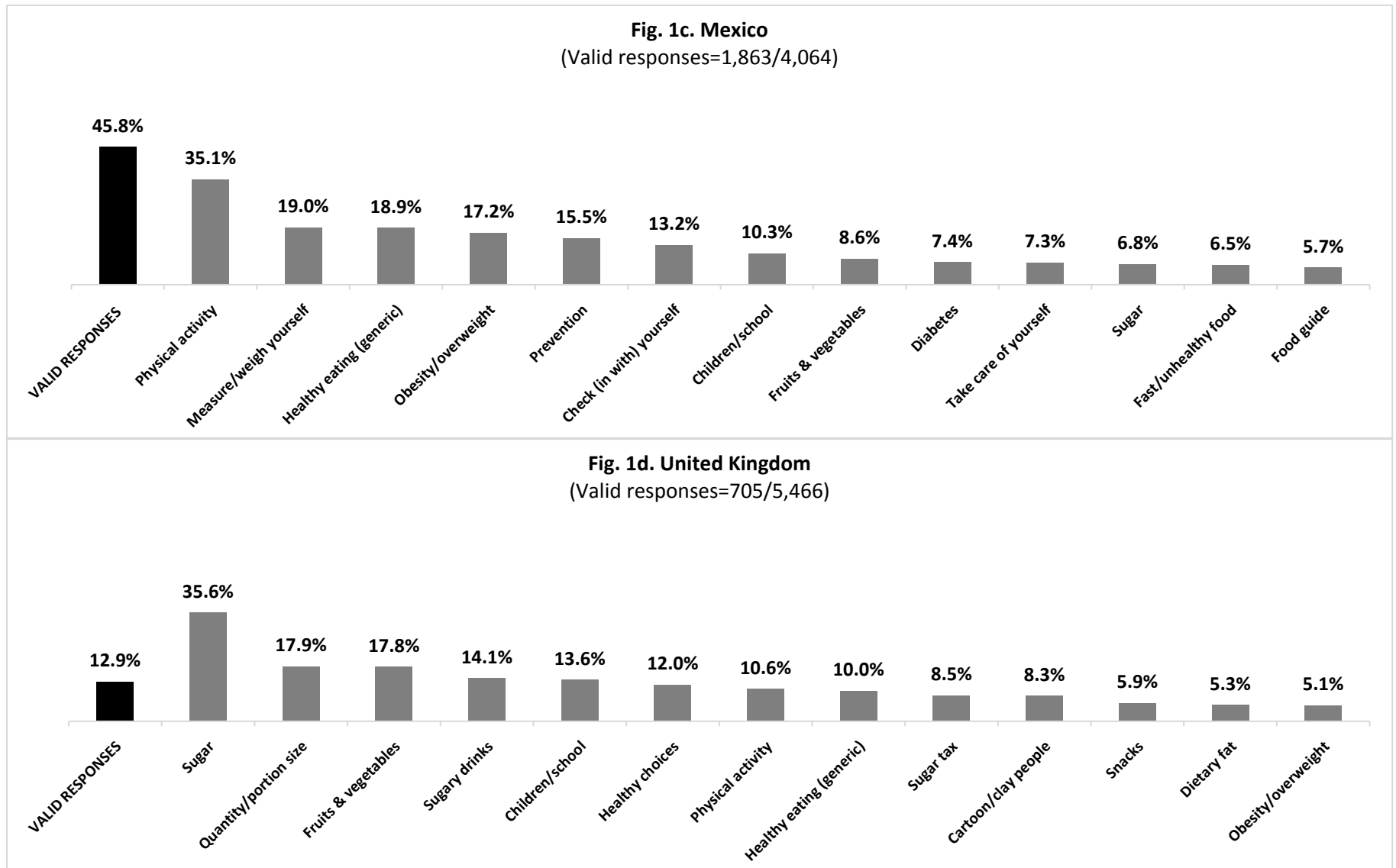
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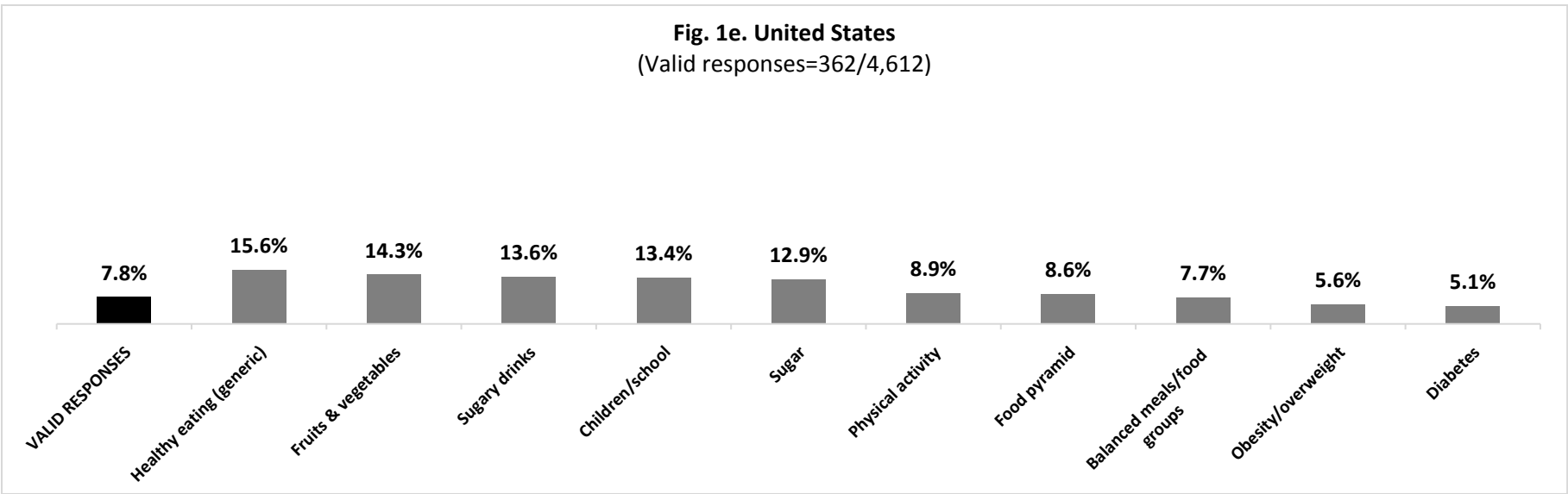
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For Peer Review

Figure 1. Keywords mentioned by at least 5% of respondents in each country who provided valid answers to the question, “Do you remember seeing any educational messages or campaigns on healthy eating from the government or health authorities in the past 12 months?” (n=3,711)*







*Note: of the 4,824 respondents who reported seeing a campaign, 3,711 provided valid responses. The remaining responses were nonsensical (n=106); irrelevant comments or qualitative campaign feedback (e.g., "Great") (n=319); did not specify the message in the campaign (n=473), or described the source but not content of the message (n=215). Values shown for keywords are proportions of the total valid responses in each country.

Supplemental Table 1. Keywords generated from open-text responses to the question “Do you remember seeing any educational messages or campaigns on healthy eating from the government or health authorities in the past 12 months?” by country (weighted data, all respondents) (n=22,463)

	Australia (n=4,083)	Canada (n=4,238)	Mexico (n=4,064) % (n)	UK (n=5,466)	US (n=4,612)
Abdomen/gut	0.2% (10)	--	--	--	--
Alcohol	0.1% (5)	<0.1% (1)	0.2% (8)	0.3% (16)	<0.1% (1)
'App' (i.e. smartphone app)	--	0.3% (13)	--	0.1% (3)	--
Artificial sweeteners	<0.1% (1)	--	0.1% (2)	--	<0.1% (1)
Balanced diet/meals or food groups	0.3% (12)	0.3% (14)	1.6% (65)	0.1% (6)	0.6% (28)
Body fat (<i>inside body/around organs; excl. dietary fat and obesity</i>)	0.9% (36)	--	--	--	--
Bone health	0.1% (2)	0.1% (3)	--	--	<0.1% (1)
Breakfast	--	0.1% (6)	0.1% (5)	<0.1% (1)	<0.1% (1)
Caffeine	--	<0.1% (1)	--	--	<0.1% (<1)
Calories (<i>excl. calorie labelling</i>)	0.1% (2)	<0.1% (2)	0.3% (10)	0.4% (22)	<0.1% (2)
Cancer	0.7% (29)	--	0.1% (6)	0.1% (5)	--
Carbohydrates	--	0.1% (3)	0.2% (8)	<0.1% (2)	0.1% (3)
Cartoon/plasticine/clay family/figures	--	--	--	1.1% (58)	--
Check (in with) yourself (<i>Mexico: 'chécate'</i>)	--	--	6.0% (246)	--	--
Children/youth/girls, school, lunchboxes or school meal provision	0.7% (27)	0.5% (20)	4.7% (193)	1.8% (96)	1.1% (49)
Colour (<i>incl. colour wheel</i>)	0.3% (11)	--	0.1% (3)	--	--
Cooking	--	--	<0.1% (2)	0.2% (8)	<0.1% (1)
Death	<0.1% (1)	--	0.2% (9)	0.1% (3)	<0.1% (2)
Dental health	1.0% (39)	0.1% (5)	0.1% (3)	0.1% (5)	<0.1% (1)
Diabetes	0.3% (11)	0.5% (19)	3.4% (138)	0.5% (27)	0.4% (18)
Diet/nutrition plan	0.1% (3)	--	0.1% (4)	<0.1% (2)	<0.1% (1)
Dietary fat (<i>all types</i>)	0.6% (26)	0.2% (8)	1.8% (71)	0.7% (37)	0.2% (10)
Doctor/surgeon (<i>Mexico: check in with the doctor/go to the IMSS</i>)	0.4% (18)	--	1.5% (60)	0.1% (3)	--
Eat local/seasonal	--	0.1% (4)	<0.1% (2)	--	<0.1% (<1)
Eating disorders	<0.1% (1)	--	<0.1% (2)	--	--
Family	--	--	0.4% (16)	0.4% (23)	<0.1% (2)
Fast/junk/takeaway/unhealthy food	0.8% (31)	0.1% (2)	3.0% (121)	0.4% (24)	0.2% (9)
Fibre/whole grains	<0.1% (1)	0.1% (6)	--	<0.1% (2)	<0.1%
Food guide (<i>incl. name of country-specific dietary guidelines; excl. Food Pyramid</i>)	0.1% (6)	1.0% (41)	2.6% (105)	0.5% (29)	0.3% (14)
Food insecurity	--	<0.1% (2)	0.3% (11)	--	0.1% (6)
Food pyramid	0.1% (5)	0.1% (6)	0.4% (16)	<0.1% (1)	0.7% (31)
Food safety or food/lettuce recall	0.1% (3)	0.1% (4)	0.1% (4)	<0.1% (1)	0.3% (13)
Fruits and/or vegetables	1.5% (59)	0.7% (29)	4.0% (161)	2.3% (125)	1.1% (52)
General healthy lifestyle	1.3% (51)	0.2% (7)	0.6% (23)	0.3% (17)	0.2% (9)
Grains (<i>general; excl. whole grains</i>)	--	0.1% (3)	0.3% (12)	--	<0.1% (1)
Health Star Rating	0.1% (5)	--	--	<0.1% (1)	--
Healthy beverages or water	0.2% (7)	0.1% (2)	1.5% (62)	0.1% (8)	0.3% (15)

Healthy choices (<i>when eating or grocery shopping, 'breaking up with bad habits'</i>)	0.5% (21)	<0.1% (2)	0.4% (18)	1.5% (85)	0.2% (8)
Healthy eating (<i>generic</i>)	1.0% (40)	1.0% (44)	8.6% (351)	1.3% (71)	1.2% (57)
Heart health (<i>incl. heart attack, stroke, hypertension, cholesterol</i>)	0.3% (11)	0.3% (14)	0.7% (28)	0.2% (10)	0.1% (5)
Holiday eating	<0.1% (1)	--	<0.1% (1)	--	<0.1% (1)
Live longer	<0.1% (1)	--	0.1% (5)	<0.1% (2)	<0.1% (2)
Measure/weigh yourself (<i>Mexico: 'midete' in the context of physical measurements</i>)	--	--	8.7% (353)	--	--
Meat (<i>incl. seafood</i>)	0.1% (5)	0.2% (10)	0.5% (22)	0.2% (11)	0.2% (9)
Mental health	<0.1% (1)	--	0.1% (2)	--	0.1% (3)
Menu/calorie labelling	--	0.1% (3)	--	--	<0.1% (1)
Milk or dairy	<0.1% (1)	0.6% (24)	0.1% (4)	--	0.3% (15)
Moderation/restraint (<i>Mexico: 'midete' in the context of dietary moderation/restraint</i>)	<0.1% (1)	--	0.6% (25)	--	<0.1% (1)
Natural/whole foods	--	<0.1% (1)	0.2% (7)	<0.1% (1)	0.1% (3)
Nutrition facts table or nutrition labelling (<i>excl. Health Star Rating</i>)	0.2% (8)	0.1% (5)	0.1% (2)	<0.1% (1)	--
Obesity (<i>incl. overweight, weight gain, being 'fat'/'chubby'</i>)	0.7% (30)	0.2% (10)	7.9% (321)	0.7% (36)	0.4% (20)
Older adults/elderly people	<0.1% (<1)	<0.1% (1)	0.2% (9)	--	<0.1% (1)
Organs	0.4% (15)	--	--	--	--
Parents/role modelling	0.1% (3)	<0.1% (1)	0.4% (17)	0.4% (19)	0.1% (3)
Physical activity (<i>incl. reducing sedentary behaviour, Mexico: 'muévete, 'activate'</i>)	1.7% (69)	0.6% (25)	16.1% (655)	1.4% (75)	0.7% (32)
Prevention (<i>Mexico: incl. PrevenIMSS, PrevenISSSTE</i>)	0.1% (6)	<0.1% (<1)	7.1% (288)	0.1% (4)	<0.1% (1)
Processed/package/canned food	0.1% (3)	<0.1% (1)	0.3% (11)	0.1% (5)	<0.1% (2)
Protein or meat alternatives (<i>excl. meat</i>)	<0.1% (1)	0.1% (2)	0.1% (5)	--	0.1% (3)
Quality of life (<i>incl. 'live better'</i>)	0.4% (17)	0.1% (3)	0.8% (34)	<0.1% (2)	0.1% (3)
Quantity/portions (<i>incl. specific amounts, consume less in general, Mexico: 'suficiente'</i>)*	1.1% (47)	0.3% (15)	1.4% (57)	2.3% (126)	0.4% (18)
Salt/sodium	0.1% (3)	0.1% (3)	0.5% (21)	0.4% (21)	0.2% (9)
Snacks/snacking	0.1% (2)	<0.1% (1)	0.1% (2)	0.8% (42)	--
Song	--	--	0.3% (14)	--	<0.1% (1)
Sugar (<i>incl. sweets; excl. sugary drinks, sugar tax and carbohydrates</i>)	1.8% (73)	0.9% (37)	3.1% (126)	4.6% (251)	1.0% (47)
Sugar tax	0.2% (9)	<0.1% (1)	0.3% (14)	1.1% (60)	<0.1% (2)
Sugary drinks (<i>incl. sugary/soft/frozen drinks or soda/pop</i>)	3.4% (137)	0.4% (16)	1.3% (52)	1.8% (100)	1.1% (49)
Take care of yourself/love yourself	--	<0.1% (1)	3.4% (136)	--	--
Toxic (<i>context 'toxic fat'</i>)	0.5% (20)	--	--	--	--
Variety (<i>eat a varied/diverse diet</i>)	0.1% (3)	<0.1% (1)	0.2% (10)	--	--
Vitamins, minerals or specific nutrients not listed above	--	<0.1% (1)	0.1% (3)	--	0.1% (3)
Weight loss/maintenance	0.1% (4)	0.1% (2)	1.5% (60)	0.1% (3)	0.1% (6)
You are what you eat	--	--	0.2% (8)	<0.1% (1)	--

*Quantity code was not used for responses referring to reducing consumption of specific foods/nutrients (e.g., fat, sugar, salt/sodium, fast food, calories); in these cases, the specific codes for fat, sugar, salt/sodium, fast food, calories, respectively, were used. IMSS: Mexican Institute of Social Security, which provides public health care.