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Front of package symbols as a tool to promote healthier food choices in Slovenia: Accompanying explanatory claim can considerably influence the consumer's preferences

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Abstract

Many nutrition and/or health symbols were introduced in different countries in the past years and Slovenia is no exception. The objective of our study was to examine familiarity with and perception of the Protective Food symbol (PF symbol) in Slovenia and to investigate consumers' associations related to the symbol, and the influence of symbols' appearance on their preferences. The study was conducted through online questionnaire with incorporated word-association tasks and conjoint analysis; GfK consumer panel and social media (Facebook) were used for recruitment of Slovenian adults (n=1050; 534 men, 516 women). The majority (78%) of the participants reported they had previously seen the PF symbol, and 64% declared familiarity with it. Familiarity was verified using a word-association task in which we analysed the nature of the symbol's description, distinguishing the description of symbol's visual appearance or its meaning. In this task, 73% of the participants described the symbol's meaning with reference to health or a healthy lifestyle, confirming their familiarity with it. Women and those responsible for grocery shopping were significantly more familiar with the symbol. The impact of the symbol's appearance on consumers' preferences was investigated using conjoint analysis consisting of two attributes – three different symbols found on foods in Slovenia (PF symbol, Choices programme symbol and Keyhole symbol), and accompanying worded claims. Although worded claims had less relative importance (29.5%) than the symbols (70.5%), we show that careful choice of the wording can affect consumers' preferences considerably. The lowest part-worth utility was observed without an accompanying claim, and the highest for the claim directly communicating health ("*Protects your health*"). The fact that most participants are well familiar with the PF symbol indicates the symbol's potential to promote healthier food choices, which could be further improved by an accompanying worded claim that clearly describes its meaning. In addition, the use of Facebook ads is shown to be a useful alternative recruitment method for research with consumers.

Keywords: food labelling, word association, Choices programme, Keyhole symbol, Facebook

1 Introduction

Selecting food is a dynamic process (Köster & Mojet, 2007) which often entails a consideration of price, taste, nutritional value and other factors, and involves a complicated decision-making process (Finkelstein & Fishbach, 2010; Sanlier & Seren Karakus, 2010). Sophisticated marketing techniques and the growing assortment of foods in the marketplace are making the consumer's selection and purchasing decisions very challenging (Lahti-Koski, Helakorpi, Olli, Vartiainen, & Puska, 2012).

While healthy dietary habits are crucial for preventing several chronic diseases, many consumers find it difficult to follow nutritional recommendations in practice. Two primary aspects of the consumer choice environment should be noted: (a) the availability of product information; and (b) consumers' prior experience with products. The presence or absence of knowledge and experience affects the types of information processed and the processing heuristics used by the consumer (Bettman & Park, 1980). In addition, there are limits to the amount of information consumers can effectively absorb (Jacoby, Speller, & Berning, 1974).

Food labels offer different cues that consumers consider when evaluating them, which could influence their purchase decision (Loebnitz, Schuitema, & Grunert, 2015; van der Merwe, Bosman, & Ellis, 2014). Ideally, food labelling should help consumers make healthier food choices (Lahti-Koski et al., 2012; Rayner et al., 2013; Vyth et al., 2010). Simplified food labels have been shown to enable a quicker choice of healthier food products (Erica van Herpen & van Trijp, 2011). Another approach is to use simple nutrition- and health-related messages, which can appear on labels as either worded or graphic elements. Use of nutrition and health symbols on foods that meet relevant nutritional criteria is another example of such an approach (Borgmeier & Westenhoefer, 2009). Consumers have been shown to prefer simple claims (Bitzios, Fraser, & Haddock- Fraser, 2011) and symbols (Andrews, Burton, & Kees, 2011; Feunekes, Gortemaker, Willems, Lion, & Van den Kommer, 2008), and that even those not interested in health might prefer to choose certain products labelled with such symbols (Vyth et al., 2010).

The communication of meaning in its direct, indirect, intentional and unintentional forms can be examined with semiotics that can help better understand human communication and behaviour (Echtner, 1999) since the image serves as a stimulus that influences cognition, interpretation and preference (Schroeder, 2002). Studying symbols' potential to help simplify complex information has become an important part of food and nutrition research related to consumer food choices and eating habits (Institute of Medicine, 2011). Recent research shows that symbols on food packaging are more important to consumers than worded information (Carrillo, Fiszman, Lähteenmäki, & Varela, 2014). Further, research shows that the comprehension of nonverbal symbolic signs requires a minimum level of cognitive effort (DeRosia, 2008; Fitzsimons et al., 2002) since simplified food labels can present complex nutrition information in a more straightforward and easier way (Sonnenberg et al., 2013). In order for a product to be recognised as healthier based on a symbolic meaning, the symbolic values must be effectively communicated to consumers. Symbols do not directly reveal healthfulness, but serve as a salient motive that can influence product evaluation (Chrysochou & Grunert, 2014). When consumers interpret health-related information on food labels, they must rely on the

information available and their existing knowledge (Lahteenmaki, 2015). A number of research studies have focused on evaluating health symbols (Emrich, Mendoza, & L'Abbe, 2012; Emrich et al., 2014), familiarity with them (Lahti-Koski et al., 2012; Neuman, Persson Osowski, Mattsson Sydner, & Fjellstrom, 2014; Vyth et al., 2009; Vyth et al., 2010) and a symbol's influence on consumers' product healthfulness evaluation or choice (Bialkova et al., 2014; Roberto et al., 2012; Steenhuis et al., 2010; Erica van Herpen, Hieke, & van Trijp, 2014; E. Van Herpen, Seiss, & van Trijp, 2012; Erica van Herpen & van Trijp, 2011), but very few have concentrated on consumers' associations with the symbol (Carrillo et al., 2014; Neuman et al., 2014).

In past years, various nutrition and/or health symbols were introduced in different countries. While some present a condensed summary of nutritional information, others are simple symbols that can be used on foods that meet specific (nutritional) criteria (Latortue & Weber, 2010). The first such front-of-package (FOP) symbol was the Heart Guide symbol created by the American Heart Association (AHA) in 1987 (Institute of Medicine, 2011). In fact, heart health associations were pioneers in setting up such labelling schemes, while food manufacturers became involved with additional schemes after 2004 (Institute of Medicine, 2011). Several symbols were introduced in Europe, for example Sweden's *Keyhole symbol* in 1989 (Neuman et al., 2014), the Finnish Heart symbol in 2000 (Lahti-Koski et al., 2012), and the Choices Programme symbol in 2006 (Van der Bend et al., 2014; Vyth et al., 2010). In Slovenia, a symbol known as the *Protective Food* symbol (hereinafter PF symbol) was also introduced very early on, in 1992, by the Society of Cardiovascular Health of Slovenia (Jan, 2000; Pokorn, 2005) aiming to help consumers make healthier food choices, and to encourage the food industry to reformulate food products. The scheme was initially also promoted using government funding, but the promotion was minimised after the new EU nutrition and health claims regulation was introduced in 2007 (EC No. 1924/2006). Nevertheless, the symbol can still be found on about 2% of prepacked products in the food supply (Hieke et al., 2016; Pravst & Kusar, 2015).

Almost 17% of adults (Hlastan-Ribič, Šerona, Maučec Zakotnik, & Borovničar, 2012) and 20% of children (aged 11–15) (Adamson, 2013) are overweight in Slovenia, and a high prevalence of overall non-communicable diseases (NCDs) is observed (Murray et al., 2013). Among OECD (Organisation for Economic Co-operation and Development) countries, only Portugal, Canada, Greece and the USA have higher child obesity levels (Adamson, 2013). Considering these facts, a major national public health priority in a new national resolution (The Ministry of Health RS, 2015) is to promote healthy dietary choices and lifestyles. The PF symbol has been used in Slovenia for several years but its promotion has stagnated considerably in the last 10 years. A specific research project was launched by the *Ministry of Health* and the *Slovenian Research Agency* to evaluate use of the existing PF

symbol and provide information needed for a future policy decision on the use of FOP symbols as a possible tool for promoting healthy food choices in Slovenia.

The primary objective of the reported study was to investigate familiarity with and the perception of the Protective Food symbol (PF symbol) in Slovenia. We also investigated consumers' associations with the three FOP symbols found on foods in Slovenia (PF symbol, Choices Programme (hereinafter CP) symbol and Keyhole symbol), and the influence of the symbol's appearance (presence of various explanatory wordings) on their preferences. Given the PF symbol's presence in the market for over 20 years, our hypothesis was that the majority of consumers relates this symbol to health and/or a healthy lifestyle, indicating it could be a valuable starting point if the government were to decide to establish a national scheme for promoting healthy food choices in Slovenia. Another intention was to provide insights about how consumers understand FOP symbols, and how to improve this understanding. Given the wide use of the Internet (Seybert & Reinecke, 2014) the study was conducted using an online questionnaire, while recruitment involved use of a standard commercial consumer panel. Additional recruitment also occurred through social media (Facebook) to provide information on whether such a cost-effective technique can be used to reach specific target populations in research with consumers.

2 Methods

2.1 Design of the study

The online questionnaire was prepared using the SPSS Data Collection Software (a survey administered by GfK) and the web survey provider Ika.si (used in a social media campaign). The questionnaire included the following sections: (1) participants' socio-demographic characteristics; (2) a word-association task; (3) symbol recall; (4) a conjoint study; and (5) an evaluation of each symbol based on statements provided. In parts 2, 3 and 5 of the questionnaire, the symbols were presented without any additional text. In the conjoint study, the symbols were presented with selected worded claims or without a claim.

2.2 Recruitment of participants

A quota sample of 1,050 participants aged between 18 and 60 was obtained via two recruitment methods, a market research company consumer panel (N=500) and a social media campaign (N=550). The structure of the sample is comparable with the Slovenian population based on gender and age. For both methods combined, 78% of participants declared either sole or joint responsibility for the grocery shopping. All data were collected in October 2014. The participants' socio-demographic

characteristics are reported in **Table 1**. No significant differences were found in the participants' gender, age distribution, or education, or grocery shopping responsibility in the samples recruited by the consumer panel and social media. Similarly, no significant differences were found between both samples in relation to previous exposure to any of three tested symbols, therefore further analyses were conducted on a sample, compiled using both recruitment methods.

Recruitment using the consumer panel: The GfK Slovenia panel was used, which has approximately 9,100 members, of whom 500 were recruited via email based on their age (18–60 years) and gender (a ratio between males and females close to 1).

Recruitment using social media: Facebook (FB) was used, which has about 669,000 registered users aged 18–60 in Slovenia. A social media advertising campaign was launched using FB Ads Manager, which enables the targeted promotion of ads using various parameters, including age and gender. The campaign was carried out using 'website click' promotions. In a pre-test of using FB ads for web surveying, we determined that women are quite more responsive than men; considerable differences were also observed for different age groups. To assure the final sample's representative nature, the FB campaign was created using two identical ads, one targeting male and the other female users. We first started with the campaign targeting the male population; the campaign targeting women started after 250 male responses had been collected. The specific age distribution of the FB users was managed using a step-by-step approach: Both campaigns were launched for users aged 18 and above, until we reached 100 responses per campaign. In the next stage, the inclusion criteria were changed to solely target users above 30 years of age. This controlled approach enabled us to end up with a sample (**Table 1**) comparable to the general population in terms of age and gender.

2.3 *Stimuli*

The stimuli set consisted of three directive (Hodgkins et al., 2012) symbols that appear on products in the Slovenian market. The Slovenian PF symbol is the most commonly used in the marketplace, while the other two symbols are used in some European countries, but can only be found on a minority of (imported) products in the Slovenian food supply (Fig. 1).

2.4 *Word-association task*

Participants were shown each of the three symbols and asked to write anything that came to mind upon seeing the symbol. Word association (WA) is a quick, simple and useful qualitative method commonly used in both psychology and sociology (Roininen, Arvola, & Lähteenmäki, 2006). Words expressed through the WA task are supposed to be spontaneous productions with fewer constraints

on participants as opposed to interviews or closed questionnaires which yield more biased results (Wagner, Valencia, & Elejabarrieta, 1996). These data were collected at the start of the questionnaire; in the questionnaire's introduction there was no suggestion that the questionnaire (or the included symbols) were in any way related to food. It should be noted that in practice the PF and the CP symbols are used on foods with explanatory wordings (claims), which were not shown in the word-association task. This enabled us that all symbols used in the word-association task were directive, meaning they included no additional nutritional information (Hodgkins et al., 2012) - avoiding possible effects of the worded claims on the responses.

2.5 Conjoint analysis

Conjoint analysis is a method used to estimate the importance individuals assign to different predefined attributes (Green & Srinivasan, 1978). The conjoint analysis design consisted of two attributes – symbols (three different symbols: PF symbol, CP symbol, Keyhole symbol) and worded claims (four different variations: no claim, general claim “*I know what I eat*” (in Slovenian: “*Vem, kaj jem*”), a nutrition claim “*Rich in nutrients*” (in Slovenian: “*Bogat s hranili*”), a health claim “*Protects your health*” (in Slovenian: “*Varuje zdravje*”). The rationale for selecting these wordings is provided in the Discussion section. The worded claim was placed in accordance with actual use with the symbols with the exception of the Keyhole symbol which is generally not accompanied by a worded claim. The full factorial design produced 12 different combinations. In addition, we prepared a choice-based conjoint design where a fractional factorial design was used for the selection of profiles to be compared and the incomplete block design was used to generate the comparisons. The final design included 12 different comparisons, each consisting of three different choices. Each choice set was counterbalanced. For each choice set, the participants were asked “Which of the symbols shown below would you prefer on food packages to indicate that the food has better nutritional composition?”

2.6 Consumers' familiarity with and perception of the selected symbols

After being informed that the symbols could appear on food packages, for each of the three symbols participants were asked to indicate, on a 7-point Likert scale (with an additional “I don't know” option), the extent to which they agreed with the following statements: (a) I like the symbol; (b) I am familiar with the symbol; (c) the symbol is present on foods with better nutritional composition; (d) the symbol is intended for the consumer to enable an easier choice of food with better nutritional composition; and (e) the symbol is used for increasing sales of the food product. The order of presenting the symbols was randomised and balanced.

211 2.7 Data analyses

212 Participants' associations were first sorted to calculate the proportion of responses related with health,
 213 food or a healthy lifestyle. Since the proportion of such responses regarding the CP and Keyhole
 214 symbols was very low (14% and 4%, respectively) compared to the PF symbol (73%), more in-depth
 215 analysis was only performed for the latter symbol. Participants' associations with the PF symbol were
 216 sorted based on the description of the symbol – whether they were describing the symbol's appearance
 217 or the symbol's meaning. In addition, we categorised the symbol's associations based on references
 218 to health or a healthy lifestyle. For the main categorisation, an initial coding framework was
 219 developed and refined as the coding progressed, collapsing unused codes and adding codes based on
 220 recurring categories in the narratives. Two persons did the classification in the original language of
 221 the questionnaire. Associations that did not belong to any of the categories were coded as "Other".

222
 223 Conjoint analysis was performed with conjoint analysis software within the XLStat statistical
 224 software package (Addinsoft, version 2014.4.07). To test differences between recruitment methods,
 225 association task responses and participants' symbol evaluations, the chi-square and analysis of
 226 variance were used. All of these tests were performed with SPSS software (IBM, version 13.0).

227

228 3 Results

229 3.1 Word associations

230 The word-association task revealed major differences in participants' responses to the three
 231 investigated symbols. With the CP and Keyhole symbols, which are very rarely used on foods in
 232 Slovenia, the proportion of responses related with health, food or a healthy lifestyle was very low
 233 (14% and 4%, respectively). While the Keyhole symbol was most commonly associated with a
 234 keyhole or the Ludo board game, the CP symbol was mostly associated with phrases connected with
 235 sun/nature and tourism, although a series of other associations was also observed.

236 On the contrary, a much higher proportion of responses related with health, food or a healthy lifestyle
 237 was observed for the most commonly used FOP symbol in Slovenia – the PF symbol (73%) – which
 238 was therefore further analysed based on the description of the symbol.

239

240 3.1.1 Appearance vs. meaning

241 Results of the word-association task for the PF symbol are presented in **Table 2**. Most participants
 242 described the symbol's meaning (78%) rather than its appearance (22%). As anticipated, participants
 243 who had seen the symbol before were more likely to describe its meaning rather than its appearance.
 244 Significant differences in symbol description were also observed between genders ($p = .006$), levels
 245 of education ($p < .001$) and levels of responsibility for grocery shopping ($p = .020$). Women were

more likely to describe the symbol's meaning compared to men. This was also the case in more formally educated participants (highest ratios observed for postgraduates (86%) and those who declared their sole/joint responsibility for grocery shopping).

3.1.2 Categorisation of associations

To provide more information on the consumers' associations with the PF symbol, we next investigated only how the symbol's meaning was described (**Table 3**). Responses were arranged in the following categories:

- (a) *separate description of food and health* (without a relationship between food and health, e.g. health, apple; or apple, healthy for the heart);
- (b) *health-related food description* (descriptions relating food to health and vice versa, e.g. healthy diet, healthy foodstuff, healthy food, food healthy for the heart);
- (c) *general health-related descriptions* (e.g. healthy life, health-friendly);
- (d) *specific health-related descriptions* (e.g. healthy heart, good for the heart (and vascular system));
- and
- (e) *other* (responses which did not fit in any previous category).

Descriptions of the PF symbol were mostly associated with health or a healthy lifestyle (91% of the descriptions of the meaning, corresponding to 73% of the participants included in the association analysis study). Almost half the descriptions of the meaning (47%) were categorised as a specific health-related description, while 16% were general health-related descriptions. Associations with food were also common (28%: 19% and 9% for *health-related food description*, and *separate description of food and health*, respectively). The most common verbatim phrase used by 7.4% of participants describing the symbol's meaning was "healthy heart", followed by "healthy for the heart" (4.7%), "good for the heart (and vascular system)" (2.7%) and "healthy diet" (2.2%). Statistically significant differences were observed between genders ($p = .026$) and between participants who had or had not seen the symbol before ($p < .001$).

3.2 Assessment of consumers' preferences using conjoint analysis

In the next stage, we explored what kind of symbol consumers would prefer on labels to indicate healthier foods. The influence of the symbol's appearance on consumers' preferences was investigated using conjoint methodology. The analysis was first conducted on a whole sample ($N=1050$), using two attributes – the selected symbols (**Figure 1**) and the accompanying worded claims. As reported in **Table 4**, the relative importance was higher for the symbols (70.5%) than for the accompanying claims (29.5%). Part-worth utilities show that participants overall prefer the PF

281 symbol (0.720), followed by the CP symbol (0.315) and did not like the Keyhole symbol (-1.035).
 282 With regard to the accompanying worded claims, positive part-worth utilities were observed for the
 283 health claim “Protects your health” (0.336) and the general claim “I know what I eat” (0.193), whereas
 284 negative part-worth utilities were observed for the nutrition claim (-0.130), and where no claim was
 285 present (-0.399). Additional analysis was conducted on a sub-sample of participants that have not
 286 seen the PF symbol (N=224), showing similar relative importance (67.1% for the symbols, and 32.9%
 287 for accompanying claims), and same order of part-worth utilities, but with some differences in their
 288 magnitude (0.556 for the PF symbol, 0.426 for the CP symbol and -0.982 for the Keyhole symbol).

289
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 291 accompanying claims (29.5%). Part-worth utilities show that participants overall prefer the PF
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 295 negative part-worth utilities were observed for the nutrition claim (-0.130), and where no claim was
 296 present (-0.399).

297

298 **3.3 Assessment of consumers’ familiarity with and perception of the selected symbols**

299 In all, 78% of the participants reported that they had previously seen the PF symbol, three-quarters
 300 of whom specified that they observed it on foods and/or associated the symbol with the Society of
 301 Cardiovascular Health of Slovenia, which is operating the PF symbol scheme. To provide further
 302 insights into the familiarity with and perception of all three symbols included in our survey,
 303 consumers were asked to indicate the extent to which they agreed with various statements using a 7-
 304 point Likert scale, with an additional “I don’t know” option (**Table 5**). The PF symbol received the
 305 highest ratings for every statement provided. On the contrary, the Keyhole symbol received the lowest
 306 scores for each statement, while the CP symbol was rated in between. Participants liked the PF and
 307 CP symbols equally, while familiarity with the PF symbol was considerably higher. It should be
 308 mentioned that a notable proportion of participants selected the “I don’t know” option when
 309 evaluating the CP and Keyhole symbols, while this was less common with the PF symbol.
 310 Interestingly, no significant differences were observed for the PF and CP symbols when rating the
 311 statement that the symbol is used by the industry to increase sales of the food product; relatively high
 312 scores were received for both symbols (4.8 ± 1.8 , 4.7 ± 1.7 , respectively).

313

4 Discussion

4.1 Consumers' awareness, perception and associations with the PF symbol

Information found on food labels, including nutrition and health claims and symbols, could influence consumers' perceived healthfulness of a product, and food preferences. When food labelling elements stimulate consumers to purchase (and consume) foods whose nutritional composition is superior to other foods within the category, this can contribute to healthy dietary choices, reducing the risks for a number of common global NCDs. However, to efficiently apply this approach in practice it is important to understand how consumers perceive health-related elements on food labels. In Europe, some FOP symbols are being extensively promoted and their use is increasing in certain countries. An example of such symbols are the CP symbol (used in the Netherlands, France and the Czech Republic (Van der Bend et al., 2014)) and the Keyhole symbol, a common Nordic label for healthier food products (Neuman et al., 2014). A big difference between them lies in management of the symbol. While the CP symbol is managed by an independent company (and related to fees for companies which use the symbol) (Van der Bend et al., 2014; Vyth et al., 2010), the Keyhole symbol has a governance structure and does not involve a licensing procedure (Van der Bend et al., 2014).

FOP symbols are recognised as a possible important element in the promotion of healthy dietary choices in the new Slovenian *Resolution on the national programme on nutrition and physical activity for health 2015–2025* (The Ministry of Health RS, 2015). However, while the *Protective Food* (PF) symbol has been used in Slovenia for more than 20 years, its promotion has stagnated considerably in the last ten years, and policy-makers need to decide to either support/upgrade the existing scheme or opt for a new scheme, possibly one whose use is increasing in other European countries. However, before making further policy decisions on this topic, data about consumers' awareness and perception of the FOP symbols, particularly the PF symbol, are needed.

Our study primarily focused on the PF symbol. Considering the growing use of the CP and Keyhole symbols in certain European countries, and the fact we were able to find some (imported) foods labelled with these symbols in the Slovenian market, we decided to include them in our study. We should note that, to our knowledge, these two symbols were never actively promoted in Slovenia, and did not expect familiarity with these symbols in an important share of the population. Nevertheless, the data about these two symbols are valuable for several reasons, including as a reference for comparison with the PF symbol and to better understand the perception of the symbols' appearance among those unfamiliar with the symbol. Such data will also be useful while planning the development of schemes and planning their promotion in environments where schemes are not yet used.

349

350 We showed that most participants (78%) declared they had previously seen the PF symbol. While the
 351 differences between age groups were not significant, the lowest exposure to the symbol was observed
 352 in the youngest participants (18–29 years; 73%). This can be explained by the symbol's limited
 353 promotion, particularly in this age group. The symbol is managed by the Society of Cardiovascular
 354 Health of Slovenia, which has about 8,000 members and organises various health-related educational
 355 events for the public where the symbol is promoted. However, its activities chiefly target adults at
 356 risk for the development of cardiovascular diseases so younger people are somewhat less exposed to
 357 the symbol.

358

359 The word-association task revealed that the majority of participants described what the symbol is
 360 communicating rather than its appearance, especially if they had seen the symbol before. The
 361 proportion of adults familiar with the symbol was high considering the limited dissemination of the
 362 symbol. Familiarity with the symbol is a two-step process where the symbol must first be recognised
 363 and, second, the symbol needs to be linked to a proper meaning (recall) (Zajonc, 1968). In the last 15
 364 years, familiarity with the symbol among Slovenian adults has increased, from approximately 40%
 365 (Jan, 2000) to 64% as found in our study. Moreover, 73% of the participants who stated they had seen
 366 the symbol before were able to correctly define the symbol's meaning. These results are similar to
 367 those reported in the Netherlands, where 62-88% of respondents reported familiarity with the CP
 368 symbol (Vyth et al., 2010; Vyth et al., 2009) and those in Sweden, where 65% of participants
 369 understood the meaning of the Keyhole symbol (Larsson, Lissner, & Wilhelmsen, 1999).

370

371 In line with the results of previous research, participants referred to health in relation to the heart
 372 symbol with a non-verbal health mention (Carrillo et al., 2014). Since the image of a heart tends to
 373 be linked to health (Carrillo et al., 2014), which is closely related to lifestyle, it is no surprise that the
 374 majority of participants in our study linked the PF symbol to health and/or a healthy lifestyle. Symbols
 375 represent a set of attributes whose promotion has given them certain meaning. That is why the heart
 376 symbol can be related to heart health (Purnhagen, van Herpen, & van Kleef, 2015). Almost half the
 377 participants described the symbol with specific health descriptors (mainly heart-related), while less
 378 than one-third indicated a food relationship. Women tended to more commonly relate the symbol to
 379 a specific health description as opposed to men (Table 3, $p < .05$) and the same stands for people who
 380 had seen the symbol in comparison to those who had not (Table 3, $p < 0.001$). This could be related
 381 to the fact that a bigger proportion of women stated they were solely responsible for grocery shopping
 382 than men and are therefore more familiar with the symbol. Some other studies also reported that

women are more familiar with the national health symbol than men are (Lahti-Koski et al., 2012; Larsson et al., 1999).

385

386 ***4.2 Consumers' preferences and perception of FOP symbols***

387 Moreover, we studied the participants' preferences for different health symbols that appear on food
 388 labels in combination with different accompanying worded claims. The study was conducted with
 389 three differently worded claims, of which one is a nutrition claim ("Rich in nutrients"), one could be
 390 considered a health claim ("Protects your health") and in history was already used on foods in
 391 Slovenia, while the last one may be considered a general claim ("I know what I eat"). Such claim is
 392 used as part of the CP symbol in some countries, for example the Czech Republic. From the regulatory
 393 point of view, the use of a general claim such as "I know what I eat" is more convenient than the use
 394 of nutrition or health claims, which need to be in line with quite strict EU nutrition and health claims
 395 (EC No. 1924/2006).

396 Imagery is a powerful tool that can influence attitudes and, further, the mechanisms for processing
 397 images differ from those that are verbally presented (Branthwaite, 2002; Edell & Staelin, 1983).
 398 Conjoint analysis showed that participants were generally more inclined to symbols than claims. This
 399 agrees with a previous study on symbols and health claims (Carrillo et al., 2014). This could be partly
 400 related to their health motivation since higher motivation leads to deeper processing of information,
 401 which could result in a bigger impact of claims, while for consumers with less health motivation this
 402 may lead to more superficial information processing and a greater influence of imagery (Chrysochou
 403 & Grunert, 2014). As expected, the study revealed a stronger preference for the PF symbol. This
 404 symbol has long been present on foods in the Slovenian market and consumers are thus more familiar
 405 with it. It was previously shown that repeated exposure can enhance the liking of stimuli (Zajonc,
 406 1968) and therefore affect attitude formation that is independent of conscious recognition (Hansen &
 407 Wänke, 2009). Therefore, we also conducted an analyses on a sub-sample of participants, which were
 408 not familiar with the PF symbol: the preferences for the CP symbol were still strongest, but notably
 409 lower in comparison to the results for the whole sample (part-worth utility 0.772 for the CP symbol
 410 on the whole sample, and 0.556 on the sample of participants, not familiar with the PF symbol). The
 411 preference for the CP symbol was also positive in both analyses, which could be explained with its
 412 design. For example, some colours have the potential to evoke associations with health, meaning they
 413 can also strengthen the messages (Wasowicz, Stysko-Kunkowska, & Grunert, 2015). However,
 414 participants did not like the Keyhole symbol. This might be related to the fact that consumers are
 415 unfamiliar with the symbol and its meaning; accordingly, they did not associate its appearance with
 416 healthier foods. Previous research showed that familiarity with food labelling information is an

important determinant of consumers' attention (Bialkova & van Trijp, 2010) and can further influence assessment of a product (Carrillo, Varela, & Fiszman, 2012).

Within the worded claims, which were presented together with the symbol, the participants showed a stronger preference for the health claim "*Protect your health*". This claim was actually already used together with the PF symbol up until 2007, before the EU regulation on nutrition and health claims on foods was accepted. This might have affected the participants' preference for the claim because consumers tend to have a positive preference for claims they are familiar with (Miklavec, Pravst, Grunert, Klopčič, & Pohar, 2015). Considerably lower but still positive part-worth utility was observed for the general claim "*I know what I eat*", while participants did not like the nutrition claim "*Rich in nutrients*". The lowest part-worth utility was observed if no worded claim was added (**Table 4**). Consumers might thus still prefer additional information that can help them understand the symbol. Evidence shows that consumers prefer symbols that give additional information about the nutrient quality of food (Mejean, Macouillard, Péneau, Hercberg, & Castetbon, 2013). In addition, worded information can often provide a supporting message that helps interpret the image (Meggs, 1992).

Results of the conjoint study are in agreement with consumers' awareness of the symbols. While 78% of the participants reported they had previously seen the PF symbol, much lower ratings were reported for the CP and Keyhole symbols (22% and 11%, respectively). Similar results were observed when the participants were asked if they were familiar with those symbols (**Table 5**): 64% of the participants agreed (or strongly agreed) they were familiar with the PF symbol, but only 16% and 6% with the CP and Keyhole symbols, respectively. Considering that these two symbols have not been promoted in Slovenia, this was expected, despite their greater use in other countries.

However, we should mention considerable differences in liking the tested symbols. The appearance of the Keyhole symbol is not directly related with food or health, and the message behind the symbol is unknown to Slovenian consumers. For example, beside keyhole and the Ludo board game, typical phrases used in the word-association task included security, human figure, etc. This shows that participants did not relate the Keyhole to foods or health. Low scores for liking were therefore observed (**Table 5**: 3.2 ± 1.8). On the contrary, significantly higher liking scores were observed for the CP symbol, which is also found on very few products in the Slovenian market, but its design and colours were probably the factors that influenced the higher liking scores (5.5 ± 1.5), which were comparable with the much better recognised PF symbol (5.5 ± 1.5). This was somewhat surprising because the word-association task revealed quite a variety of phrases associated with the CP symbol

(in addition to the most common phrases – sun/nature and tourism – participants also mentioned OK tick, bird, quality, etc.), although it was also previously reported that consumers have a positive attitude to the CP symbol and make associations with health and naturalness (Wasowicz et al., 2015). In addition, women gave a higher liking score for all of the symbols, which is in line with other studies (Lahti-Koski et al., 2012; Vyth et al., 2009). Over a quarter of the participants chose the “*I don’t know*” option when evaluating the CP and Keyhole symbols, with the exception of statements related to liking and familiarity. Since familiarity with both symbols was low, this could be expected. Manisera and Zuccolotto (2014) suggest that the “*don’t know*” response carries information about the consumer’s ambiguity regarding a certain response.

4.3 Additional discussion and conclusions

The study was conducted using two recruitment methods, namely by use of a standard commercial consumer panel, and social media (targeted FB advertising). We demonstrated that the controlled social network recruitment of participants can yield a similar socio-demographic sample compared to recruitment via an agency. Similar results were previously reported in a study targeting adolescent girls where FB recruitment was compared with traditional methods (Jones, Saksvig, Grieser, & Young, 2012). Given that we did not observe significant differences between the two samples, it is relevant to ask whether targeted FB advertising can be considered as a cost-effective technique to reach specific target populations. Literature reports show that this is not necessarily the case. For example, Heffner, Wyszynski, Comstock, Mercer, and Bricker (2013) used six recruitment channels of which social media had the lowest cost-efficiency, while the contrary was reported in a study where FB recruitment of young adult smokers proved to be cost-effective (Ramo, Rodriguez, Chavez, Sommer, & Prochaska, 2014). In our study, the (external) cost of the recruitment per participant was also lower in the case of FB advertising, yet we should note that: (a) the FB recruitment required careful control of the recruitment throughout the whole recruitment period (increasing the internal costs); and (b) a considerable proportion of the FB advertising budget was related to the recruitment of adults over 30 years, particularly men. In our case, the average cost per participant was reduced because of the lower advertising prices for the ads targeting women, whereas if we had targeted men only this would have easily exceeded the recruitment cost when using commercial consumer panels.

Some limitations of the study should be mentioned. Considering the recruitment methods and the fact the study was conducted using an online questionnaire, we did not reach the population that has no access to the Internet. While in some countries specific consumer panels are organised so as to assure the representative structure of the panel (for example, by providing Internet access to those without such access), all panels available in Slovenia recruit among Internet users only. Nevertheless, such

consumer panels (usually provided by the agencies) are commonly used in studies investigating consumer behaviour (Carrillo et al., 2014; Emrich et al., 2014; Vyth et al., 2009). While such studies could be limited in their representativeness of the population (Szolnoki & Hoffmann, 2013), this can also be the case with standard recruitment methods due to limited responsiveness of the participants (Tolonen, Ahonen, Jentoft, Kuulasmaa, & Helda, 2015). We should also note the considerable growth in use of the Internet and social media, both globally (Golbeck, 2015) and in Slovenia, where the Internet is available in 78% of households and most Internet users also use social media (Seybert & Reinecke, 2014; Zupan, 2015). Nevertheless, while the structure of our sample is comparable with the Slovenian population based on gender and age, we determined lower proportion of participants with lower education (primary school or less: 4% vs. 13% in the Slovenian population). Another study limitation is that the conjoint study was conducted using images of symbols, without the food package. This was decided on to exclude the possible influence of the matrix food. For example, in practice FOP symbols can be found on a variety of foods, and some of those (for example yoghurts) might be perceived by consumers as healthier than others (vegetable fats, for example), which could also have a major impact on perception of the FOP symbol. However, in order to make the task more realistic the study question was formulated in such a way that participants needed to imagine the presence of the symbol specifically on a food package (but without noting the food type). Further, we should also note that the tested worded claims used in the conjoint study cannot be extrapolated or generalised to different claims.

In conclusion, the majority of the participants, particularly those responsible for grocery shopping, is well familiar with the Protective Food (PF) symbol. They remembered having seen it on foods and described it by referring health or a healthy lifestyle. Consumers' familiarity with the symbol is crucial in order for it to be able to influence their food choices and, given the results of this study, the PF symbol has the potential to influence consumers' food choices. However, about one-third of the participants responsible for grocery shopping is still poorly familiar with the symbol, and these are quite evenly distributed across all age groups included. We have shown that the PF symbol's potential to promote healthy food choices could be further improved with a clear accompanying worded claim describing its meaning. Among the tested claims, the strongest effect was measured for the health claim "*Protects your health*". Future studies should focus on assessing the effects of the FOP symbol on consumers' behaviour also by using choice experiments in specific food categories, and real-life interventions in the shopping environment. The PF symbol can of course only promote healthy choices if it is actually used on foods with a favourable nutritional composition. The next phases of our research project are therefore focused on assessing how healthy in fact are foods labelled with the

521 PF symbol compared to foods not involved in this voluntary labelling scheme, and on evaluating the
522 motives, experiences and limitations of PF symbol use among food business operators.

523

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 723 19.08.16

724

1 **Table 1**

2 Socio-demographic and other characteristics of the participants by recruitment method (N=1050)

	Total n (%)	Market research agency n (%)	Social media n (%)	<i>p</i> -value ¹	Slovenian population (%) ²
Gender					
<i>Male</i>	534 (51%)	258 (52%)	276 (50%)	.646	51.5%
<i>Female</i>	516 (49%)	242 (48%)	274 (50%)		48.5%
Age group					
<i>18-29</i>	253 (24%)	127 (25%)	126 (23%)	.348	23%
<i>30-39</i>	251 (24%)	110 (22%)	142 (26%)		25%
<i>40-49</i>	296 (28%)	148 (30%)	147 (27%)		25%
<i>50-60</i>	250 (24%)	115 (23%)	135 (25%)		27%
Education					
<i>Primary school or less</i>	30 (3%)	8 (2%)	22 (4%)	.065	13%
<i>High school</i>	510 (49%)	236 (47%)	274 (50%)		46%
<i>Undergraduate</i>	286 (27%)	141 (28%)	145 (26%)		30%
<i>Postgraduate</i>	224 (21%)	115 (23%)	109 (20%)		11%
Grocery shopping responsibility					
<i>Solely</i>	544 (52%)	275 (55%)	269 (49%)	.983	
<i>Jointly</i>	280 (27%)	149 (30%)	131 (24%)		
<i>No</i>	226 (22%)	76 (15%)	150 (27%)		

3 ¹ *p*-values of the differences in characteristics between the recruitment methods: no significant differences (*p* > .05).

4 ² characteristics of the Slovenian population according to Slovenian statistical office's SI-Stat Data Portal
5 (<http://pxweb.stat.si/pxweb/dialog/statfile1.asp>)

6 **Table 2**

7 Nature of the PF symbol's description in relation to participants' characteristics (N=1026)

	n	Associations related to the symbol		<i>p</i> -value ¹
		Appearance (%), n=203	Meaning (%), n=823	
Gender				
<i>Male</i>	514	23%	77%	.006
<i>Female</i>	512	16%	84%	
Age group				
<i>18-29</i>	243	19%	81%	.272
<i>30-39</i>	247	17%	83%	
<i>40-49</i>	291	20%	80%	
<i>50-60</i>	245	24%	76%	
Education				
<i>Primary school or less</i>	29	31%	69%	<.001
<i>High school</i>	494	23%	77%	
<i>Undergraduate</i>	281	17%	83%	
<i>Postgraduate</i>	222	14%	86%	
Grocery shopping				
<i>Solely</i>	536	18%	82%	.020
<i>Jointly</i>	271	19%	81%	
<i>No</i>	219	26%	74%	
Seen the symbol before				
<i>Yes</i>	802	16%	84%	<.001
<i>No</i>	224	34%	64%	

8 Notes: ¹ *p*-values of the differences in characteristics between the groups: highly significant differences (*p* < .001); very
9 significant differences (*p* < .01); significant differences (*p* < .05). Analyses performed for 1,026 participants; 24
10 participants were excluded because they did not provide a response in the word-association section of the questionnaire.

11 **Table 3**

12 Participants' associations related to how the meaning of the PF symbol was described (N=823)

	Total (n)	Separate description of food and health	Health- related food description	General health- related description	Specific health- related description	Other	<i>p</i> -value ¹
	823	9%	19%	16%	47%	9%	
Gender							
<i>Male</i>	395	10%	21%	16%	42%	11%	.026
<i>Female</i>	428	8%	17%	17%	52%	6%	
Age group							
<i>18-29</i>	197	16%	13%	19%	40%	12%	.196
<i>30-39</i>	205	10%	21%	12%	48%	9%	
<i>40-49</i>	234	5%	21%	15%	53%	6%	
<i>50-60</i>	187	6%	19%	19%	47%	9%	
Education							
<i>Primary school or less</i>	20	5%	15%	10%	50%	20%	.196
<i>High school</i>	380	9%	18%	17%	45%	11%	
<i>Undergraduate</i>	232	7%	20%	16%	47%	9%	
<i>Postgraduate</i>	191	11%	17%	16%	51%	4%	
Grocery shopping							
<i>Solely</i>	442	8%	20%	17%	48%	7%	.548
<i>Jointly</i>	220	10%	16%	15%	49%	10%	
<i>No</i>	161	10%	18%	16%	43%	13%	
Seen the symbol before							
<i>Yes</i>	676	9%	22%	15%	49%	5%	<.001
<i>No</i>	147	11%	5%	20%	37%	27%	

13 Note: ¹ *p*-values of the differences in characteristics between the groups: highly significant differences (*p* < .001); very
14 significant differences (*p* < .01); significant differences (*p* < .05). Analyses performed using the word-association task
15 data for 823 participants, which described the PF symbol with a meaning (see Table 2).

16 **Table 4**

17 Part-worth utilities of each attribute for all participants (N=1050)

Attribute	Attribute level	Total
Symbol	Protective food symbol (PF symbol)	0.720
	Choices Programme symbol (CP symbol)	0.315
	Keyhole symbol	-1.035
	<i>Relative importance (%)</i>	<i>70.5^a</i>
Worded claim	No claim	-0.399
	General claim (“I know what I eat”)	0.193
	Nutrition claim (“Rich in nutrients”)	-0.130
	Health claim (“Protects your health”)	0.336
	<i>Relative importance (%)</i>	<i>29.5^a</i>

18 Note: ^a Mean relative importance for each attribute

19 **Table 5** Participants' perceptions of the selected symbols

Statement	Symbols						<i>p</i> -value ²
	Protective food symbol		Choices Programme symbol		Keyhole symbol		
	Mean ¹	SD	Mean ¹	SD	Mean ¹	SD	
I like the symbol.	5.5 (n=1037)	1.5	5.5 (n=1026)	1.5	3.2 (n=1001)	1.8	< .000
I am familiar with the symbol.	5.5 (n=1023)	1.7	3.6 (n=960)	1.9	2.4 (n=965)	1.6	< .000
The symbol is present on foods with better nutritional composition.	5.6 (n=917)	1.4	4.6 (n=711)	1.6	3.2 (n=661)	1.7	< .000
The symbol is intended for consumers to enable them an easier choice of foods with better nutritional composition.	5.5 (n=936)	1.4	4.8 (n=765)	1.6	3.5 (n=699)	1.8	< .000
The symbol is used for increasing sales of the food product.	4.8 (n=910)	1.8	4.7 (n=780)	1.7	3.9 (n=735)	1.9	< .000

20 Notes: ¹ Measured using a Likert scale 1 (strongly disagree) to 7 (strongly agree) with the exclusion of participants who
21 selected the “I don’t know” option. ² *p*-values of the differences for statement between the groups: highly significant
22 differences (*p* < .001)



23

24 **Fig. 1** The symbols used in the study (from left): Protective food symbol (PF symbol), Choices
25 Programme symbol (CP symbol), Keyhole symbol