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Varying the Number of FOP Warnings on Hedonic and Utilitarian Food Products: Evidence from Chile

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ABSTRACT

FOP food-labeling systems seek to inform on a product's healthy/unhealthy state and signal a product's healthiness level. Research in this area has focused primarily on exploring the healthy/unhealthy dimension, leaving the effect of FOP schemes on the perception of healthiness under-researched. The objective of this study is to evaluate how an increase or decrease in the number of warning signs in the packaging of food products affects the healthiness perception of the consumer and the subsequent purchase intention. This examination is developed by comparing utilitarian and utilitarian food products as a means to examine whether FOP labeling effects are moderated by prior buying motivations. Results show that a different number of warnings is correctly perceived and used by consumers. Results also reveal that utilitarian products are more affected by the presence of one warning and in the case of these products these differences disappear when the number of warnings increases.

KEYWORDS

FOP labels; Chilean warning system; consumer responses; product type

Antecedents

Front of pack (FOP) schemes are designed to help consumers better understand the nutrient composition of food products and guide them toward the selection of healthier ones. For this reason, the majority of FOP food-labeling systems seek not only to inform if a product is healthy/unhealthy, but also to signal a product's healthiness level. This level is indicated by flagging a food product with more/less red signs (Traffic Light and Nutri-Score systems), black octagons (Chilean scheme) or stars (Health Star Rating and Guiding Stars labels). In this way, FOP schemes help consumers develop comparisons within and across product categories (Cecchini & Warin, 2016).

It is interesting to note that the pieces of research examining the effectiveness of FOP labels have usually compared the presence/absence of these seals, leaving under-researched the effects of different levels of healthiness indicated by varying FOPs schemes (Kees, Royne, & Cho, 2014). Thus, a complementary area of investigation in examining the impact of food labels should consist of an

examination of how FOP labels affect consumers based on the healthiness level they signal (Ares et al., 2018a). For that reason, this paper aims to evaluate the effects on consumers of increasing or decreasing the number of warning signs in the packaging of food products. More specifically, it examines whether the *healthiness perception* (HP) and *purchase intention* (PI) are affected not only by the presence of warnings, but also by the variation in their number on the product. This is a relevant issue because a significant number of food products have health warnings, and there have been some interesting initiatives on the part of the industry to reformulate them in order to decrease or eliminate the presence of these health labels. In fact, a recent study showed that about 80% of foods and beverages available in the Chilean supermarkets were flagged with at least one warning label in 2019 (Kanter, Reyes, Swinburn, Vandevijvere, & Corvalán, 2019), and more than 15% of them have reformulated their compositions and thus decreased the number of seals on their packs since the policy was enacted in 2016 (INTA, 2018, 2019).

The evaluation of the role of the number of warnings is developed using products traditionally associated with different consumption motivations. Since prior evidence has shown that the effects of FOP schemes may vary according to the product characteristics, such as the prior perception of healthiness of the product (Araya, Elberg, Noton, & Schwartz, 2019; Ares et al., 2018a), the exploration of products that are considered hedonic and utilitarian provides a complementary perspective. Hedonic (related to enjoyment and pleasure) and utilitarian food products (associated with functional benefits) are understood and processed in a different way by consumers, which may lead to different subsequent attitudes and behaviors (Cramer & Antonides, 2011; Dhar & Wertenbroch, 2000; Huang & Lu, 2016). Therefore, this study examines not only if the presence of unhealthiness cues (number of black octagons or warnings) influences consumer perception and subsequent food selection, but also whether these effects may be dictated by products whose consumption is more hedonically or functionally motivated.

This study is carried out in the context of the Chilean food labeling system (see Figure 1).¹ This is a new FOP scheme recently implemented by the Chilean authorities as a compulsory policy which consists in flagging with one, two, three or four black octagons (similar to stop signs) those food products rich in calories, saturated fat, sugar, and sodium. In that way, this system seeks to provide information about the unhealthy character of a food product incorporating a warning sign for each critical ingredient that exceeds the levels stipulated by regulation (Corvalán, Reyes, Garmendia, & Uauy, 2013, 2018). Recent pieces of research have supported the advantages of this system over traditional FOP labeling schemes in terms of (1) offering

¹Chile is the second country with the highest overweight and obesity rates among the countries within the Organization for Economic Cooperation and Development (OECD, 2014).





		Date of implementation			
		June 2016	June 2018	June 2019	
	Energy	Food (Kcal/100g)	350	300	275
		Liquid (Kcal/100ml)	100	80	70
	Sodium	Food (mg/100g)	800	500	400
		Liquid (mg/100ml)	100	100	100
	Total Sugars	Food (g/100g)	22,5	15	10
		Liquid (g/100ml)	6	5	5
	Saturated Fats	Food (g/100g)	6	5	4
		Liquid (g/100ml)	3	3	3

Figure 1. Warning labels used and critical nutrient limits defined by the Chilean regulation according to the date of implementation (Source: Rodríguez & Pizarro, 2018).

a simple evaluation of food products based on binary information about each critical nutrient, and (2) decreasing the purchase intention of unhealthy products (Khandpur et al., 2019; Machín, Curutchet, Giménez, Aschemann-Witzel, & Ares, 2018; Valverde-Aguilar, Espadín-Alemán, Torres-Ramos, & Liria-Domínguez, 2018). These benefits have encouraged several other countries such as Peru, Uruguay, Canada, Brazil and Israel to evaluate the implementation of a Chilean-like FOP labeling scheme (Ares et al., 2018a; Mandle, Tugendhaft, Michalow, & Hofman, 2015; Tortora, Machín, & Ares, 2019).

Theoretical background

a)The effects of varying the number of warnings on HP and PI of food products

Critical nutrients are an important element in the design of diverse FOP label policies. The most common nutrients that have been included in FOP nutrition labeling schemes include sodium, fats (saturated, *trans*) and total sugars. When a food product exceeds specified limits of sodium, sugar, calories and saturated fat, highlighted symbols such as red lights or black octagons are displayed (Kanter, Vanderlee, & Vandevijvere, 2018). From a rational perspective, it would be expected that when a food product is flagged with warnings, consumers would examine it qualitatively given that a food product high in sodium is not the same as high in sugar and/or saturated fats. Nevertheless, it has been observed that FOP labels essentially operate as a quantitative guide assisting -or *nudging* (Thaler & Sustain, 2008)- consumers in making healthier decisions (Soraghan et al., 2016). In fact, surveys and focus groups carried out in Chile have reported that people mention “the amount of warnings” (regardless their specific critical ingredient) as a key variable that consumers use in their decision-making process (INTA, 2018; MINSAL, 2016).

Only few pieces of research have reported disaggregated results of actual consumer effects based upon a food product’s healthiness level depicted on

its packaging by FOP labels (Ares et al., 2018a). These pieces have demonstrated how this variable has a certain effect on consumer responses. In the case of HP, Lundeberg, Graham, and Mohr (2018) carried out the only study examining this issue. They compared Traffic Light and Star-Based schemes for a variety of food products. Their results showed the significant effect of FOP labels on HP only in the particular case of the star-based system: products depicting more stars -flagged as healthier- were rated as healthier than products with fewer stars -flagged as unhealthier. Regarding PI, the work of Lundeberg et al. (2018) also observed that -regardless the FOP scheme- participants were more likely to indicate they would purchase the healthiest foods. Hamlin and McNeill (2018) evaluated the Health Star System in a longitudinal study that compared cereals rated as unhealthy (2 stars) and healthy (5 stars). They reported that FOP labels exerted a negative, but limited influence upon consumer choice behavior. In the case of Chilean evidence, a recent study has shown that 58% of the interviewees mentioned that they are selecting food products with less warnings (INTA, 2019). Thus, the first group of hypotheses are posited for the Chilean FOP label system:

H1_a: *Food products with a greater number of seals (black octagons) will have a more negative HP than those with fewer seals.*

H1_a: *Food products with a greater number of seals (black octagons) will have a lower PI than those with fewer seals.*

b)The mediating effect of HP on PI

Aside from the evidence of an association between the number of seals and both HP and PI, it is important to bear in mind that these outputs should not be treated only as separate dependent variables. Food labeling policy aims to assist people in providing a more accurate perception of product healthiness, which should help them make healthier food choices. This means that healthy food choices should be understood as an indirect effect of FOP labels on consumers through healthy perception (Huang & Lu, 2016; Tijssen, Zandstra, Graaf, & Jager, 2017).

Although it would be expected that being aware of product healthfulness would lead to the purchase intention of healthier food products by consumers, several authors have proposed that consumer food choice is a more complex process, and healthiness is only one of its many dimensions (Cawley et al., 2015; Findling et al., 2018; Ikonen, Sotgiu, Aydinli, & Verlegh, 2019). In this vein, Radder and Le Roux (2005) have proposed a framework in which healthiness stands as one of the key consumer-related elements which also include sensory variables, habits and demographics in consumer food choice. Changes in consumers' food choices are expected to occur if consumer healthfulness perception is modified. It has been proposed that

providing information about product unhealthfulness, FOP labels should negatively influence consumer intentions to consume that food product (Ares et al., 2018a).

Since no studies have tested the relationship between HP and PI in the specific context of FOP labels, evidence from studies in related areas provide insights into the relationship between HP and PI. In general terms, these studies have supported the idea that HP is a significant antecedent of food PI, particularly among those more concerned about health (Zandstra et al., 2001). For instance, Dobrenova, Grabner-Kräuter, and Terlutter (2015) examined the country-of-origin (COO) effects in the context of functional foods and functional ingredients. They reported not only a moderating COO-effect, but also a positive impact of healthiness perception of ingredients on purchase intention. In a similar fashion, Huang and Lu (2016) studied how the choice of color in food packaging and the nutrition-content labels influence the consumer's responses to utilitarian and hedonic food products. Results show that utilitarian foods in blue-colored packages were perceived to be healthier, which subsequently influenced the purchase intention of food products. Therefore, it is proposed that:

H2: Consumer's perception of HP mediates the effect on consumers between the presence of a different number of seals and PI.

c)The moderating effect of utilitarian/hedonic products on consumer responses

The classification of hedonic versus utilitarian represents the idea of a consumer's prior motivations related to either (1) affective (hedonic) gratification from sensory attributes, or (2) instrumental, utilitarian functions or consequences of consumption (Cramer & Antonides, 2011). Although the vast majority of products seek to provide consumers with a combination of hedonic and utilitarian benefits, there are many product categories that can be classified as primarily *hedonic* or *utilitarian* (Maehle, Iversen, Hem, & Otnes, 2015). Thus, a food product can be labeled as hedonic (for example, a chocolate) if its perceived benefits are mainly associated with the pleasure gained from the taste and/or another organoleptic property. In contrast, utilitarian food products (for instance, a yogurt or a glass of milk) are those goods which consumption is principally related to its functionality - which included elements such as its nutritional value, price or quality (Khan, Dhar, & Wertenbroch, 2005). Research on consumer responses to utilitarian/hedonic products has demonstrated that despite the appealing character of hedonic food products (which may make them more attractive in the short term), utilitarian motivations also exert a significant effect on consumer response depending on the person, prior motivations, context, and so on

(Cervellon & Dubé, 2005; Cramer & Antonides, 2011; Okada, 2005; Visschers & Siegrist, 2009; Wansink & Chandon, 2006).

It has been proposed that the consumer's decision-making process differs for hedonic and utilitarian products. In the case of hedonic foods, consumer judgment is based on an intuitive type of reasoning, in which a person might be more vulnerable to the use of heuristics (such as loss aversion) and shortcuts in a choice situation (the implicit association between unhealthy and tasty). In contrast, the decision-making process for utilitarian food choice is dominated by higher levels of involvements and cognitively oriented benefits such as nutrition, well-being and health (Cramer & Antonides, 2011; Khan et al., 2005). As a result, consumers respond with different sensitivity to losses and gains when these evaluations are related to either hedonic or utilitarian goods. In fact, evaluation and choice of hedonic foods were more positive in forfeiture than in acquisition choices compared to utilitarian foods, which support the idea that hedonic foods exhibit a stronger loss aversion. Moreover, choice of utilitarian food products was more related to information and available cognitive resources, usually related to acquisition choices -which stimulate more spontaneous cognitive elaboration (Cramer & Antonides, 2011; Dhar & Wertenbroch, 2000).

Consequently, one would expect that when consumers face decisions over food products flagged with warnings, they would respond to utilitarian and hedonic food products in different ways. The presence of health warnings on utilitarian food products should have a stronger effect because these seals (indicating unhealthiness) act as an informational stimulus, which contradicts -at least partially- prior motivations to consume utilitarian foods. To contrast, in the case of hedonic products, FOP labels should have a more limited effect due to the prior motivation to consume them and the presence of heuristic information processing, which activates a loss aversion cognitive bias. This could explain the results of a study developed by Ares et al. (2018a) evaluating the HP and PI of eight products, each of which consisted in a different nutritional composition (lentils, canned green beans, breakfast cereals, yogurt, orange juice, bread, mayonnaise and potato chips), which showed that the effect of FOP schemes on consumer responses varied across these products depending on the prior perception of a product's level of healthiness. In this vein, those products customarily defined as healthy were more affected by FOP schemes (see also Talati et al., 2018). Thus, it is proposed that for the Chilean FOP scheme:

H3_a: Utilitarian food products will be more affected in terms of HP than hedonic ones by the increase in the number of warnings.

H3_b: Utilitarian food products will be more affected in terms of PI than hedonic ones by the increase in the number of warnings.

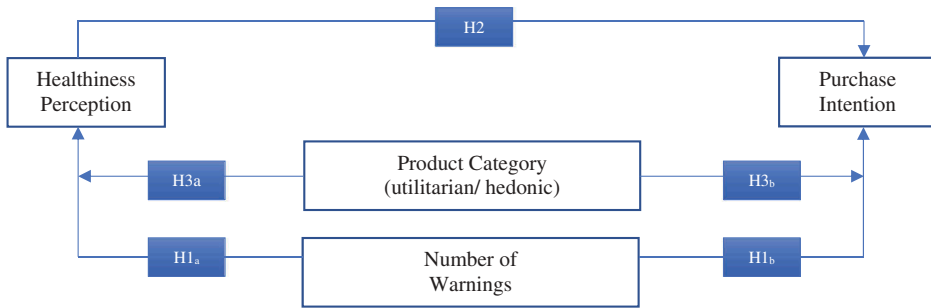


Figure 2. Model diagram for the moderating effect of the product type (utilitarian/hedonic) on consumer responses to the presence of warnings, and the mediating effect of healthiness perception on purchase intention of them.

Therefore, this study tests the model represented in [Figure 2](#). This model proposes that the effect of the number of warnings on purchase intention is mediated by the healthiness perception of the product and moderated by the hedonic/ utilitarian quality of it.

Materials and Methods

This piece of research examines the effects (HP and PI) of the warning system when consumers face the decision of buying certain product categories associated with different motivations (hedonic vs. utilitarian). This study presents a 4 (number of warnings) X 2 (product type) factorial design, which was carried out with a sample of 320 subjects. Each participant was randomly assigned to one condition (see [Table 1](#)).

Two independent variables were used in this study: (1) product type, which was operationalized as utilitarian versus hedonic; and (2) number of warnings, ranging from 0 (control group) to 3 stop signs² (“high in ... [critical nutrient]”). A pretest with 30 individuals (18–30 years) was developed to evaluate a list of several convenience products as mainly utilitarian or mainly hedonic, using the scale proposed by [Batra and Ahtola \(1991\)](#). Four products, two of which were utilitarian (cereal bar and margarine), and two of which were hedonic (ice cream and ketchup), were selected based on the product’s high scores on this scale, but not in general product attractiveness. In a second pretest, the images of these products with brands that do not operate in the local market were presented to a different sample of 25 individuals. The objective was to evaluate the degree of attractiveness associated with each packaging (in a 1-to-10 scale) in order to select products whose packaging were similarly rated in attractiveness (about 5) for the study.

²In practice, the number of warning among food products flagged in Chile ranged from 1 to 3 black stop signs (there were very few food products flagged with 4 black octagons).

Table 1. Sample of the study.

	Control	1 warning	2 warnings	3 warnings	Total
Utilitarian	40	40	40	40	160
Hedonic	40	40	40	40	160
Total	80	80	80	80	320

Dependent variables were the HP and PI. Regarding the perception of healthiness, it refers to the degree to which a food product is perceived as a good for the physical (or mental) health condition (Provencher, Polivy, & Herman, 2009). Although several scholars have suggested that nutritional information may be subject to heuristic processing by an important proportion of people, evidence has demonstrated that, irrespective the style of cognitive processing, health perception could be considered as one of the most important determinants of food product selection (Ikonen et al., 2019). It was measured using a single question (7-point semantic differential from totally unhealthy to totally healthy), as used by Koenigstorfer, Groeppel-Klein, and Kamm (2014) and other authors (see, for example, Dixon, Scully, Wakefield, White, & Crawford, 2007). In the case of purchase intention, it is important to be considered that the ultimate objective of food labeling is to influence consumer behaviors. This variable has been treated in the literature using different proxies such as willingness to try, actual selection or purchase intention, being the latter the most frequently used measure. It was measured using the 7-point scale used by Grewal, Krishnan, Baker, and Borin (1998), which is composed of three items: ‘I would purchase this product’, ‘I would consider buying this product at this price’; and ‘The probability that I would consider buying this product’ ($\alpha = 0.887$).

In addition, different covariates were measured because prior research has mentioned as potentially depicting a significant effect: (1) General Health Interest (GHI) refers to the interest of eating healthily and was measured using the seven-point semantic differential scale designed by Roininen, Lähteenmäki, and Tuorila (1999), which is composed of eight items ($\alpha = 0.881$). This variable was included because prior research has demonstrated that the usage of FOP schemes is associated with consumer health interest (Grunert, Fernández-Celemín, Wills, Bonsmann, & Nureeva, 2010); and (2) Body Mass Index (BMI), asking for participants’ weight and height, which allowed researchers to compute it ($\text{weight (kgs.)}/\text{height (m)}^2$). This variable has also been associated with the usage of labels: the higher the BMI is, the less FOP schemes are consulted (Bonanno, Bimbo, Cleary, & Castellari, 2018). Finally, the questionnaire asked participants to rate products as hedonic/utilitarian as a mean to check the manipulations of the study.

The study was carried out using the online Qualtrics® platform. Invitations to participate were sent via e-mail to a database of the current and recent postgraduate students from a large university in Chile. These

invitations were sent in March 2019 and they asked students to participate in a study related to food labels. In this study, no incentives were offered to the students for participating. We decided to make use of a purposive sample because it limits the range of sociodemographic variables because it avoids some bias such as age, income and educational status (Goodman, Vanderlee, Acton, Mahamad, & Hammond, 2018). Therefore, this sample is constituted by educated people, millennials, belonging to the top-two income quintiles of Chile.

After reading the informed consent and agreeing to take part in the study, participants were asked whether they were household shoppers and inquired about their disposition to consume certain types of foods (we included here a list that included among others the products incorporated in this study: if a participant rejected the product evaluated, the questionnaire was eliminated on the study). Then, 320 participants (54% females, $M_{age} = 23,49$, $SD = 5.55$) were presented with one of the four products which could be flagged with 0 (no flags), 1, 2, or 3 stop signs (such as an ice cream, which could have 0, 1, 2 or 3 warnings) (Figure 3). The product and number of stop signs were randomly assigned to avoid order bias and other similar response biases. They were asked to rate the product and about covariates, hedonic/utilitarian evaluation of the product (manipulation check) and some demographic information.

Data were examined using an ANCOVA test to evaluate the main effects of the independent variables examined in this study. In addition, the PROCESS macro in SPSS (Model 8) was used to examine the potential mediating moderation effects described in the model diagram of this study (Hayes & Preacher, 2014; Hayes & Rockwood, 2017).

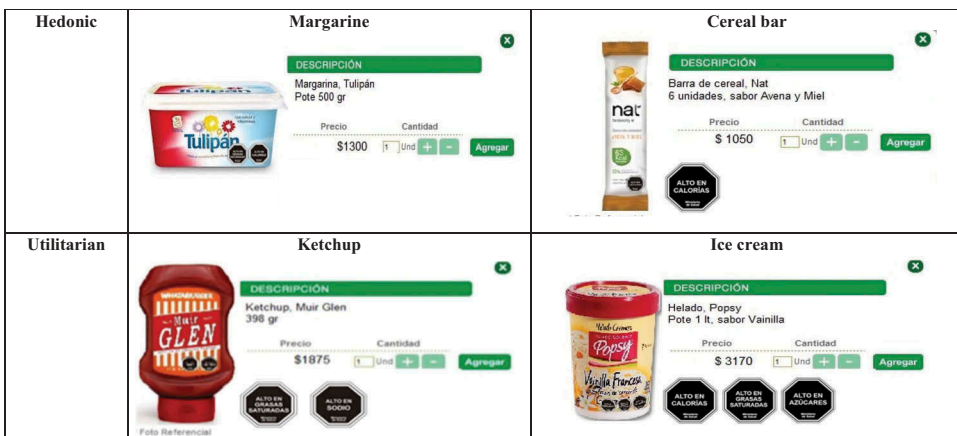


Figure 3. Examples of products and images used in the study (control group without warning, and examples with one, two and three warnings).

Results

Manipulation checks

Although the study selected the type of products using a pretest, the final version of the questionnaire included again an evaluation of the products as hedonic/utilitarian to check the manipulations used in this study (Batra & Ahtola, 1991). Results showed significant differences between the utilitarian (margarine and cereal) and hedonic (ketchup and ice cream) food products ($F(7) = 8.409, p = .000$), but not within each category. In addition, no differences were among the groups on terms of age ($F(7) = 0.489, p = .842$), and sex ($X^2 = 1.181, df = 7, p = .758$).

The effect of the number of warnings on consumer responses

To examine the effect of the number of warnings on HP, a two-way ANCOVA test was carried out with General Health Interest and BMI as covariates. Results showed that the model explained about 40% of the variance (Adjusted $R^2 = 0.411$). In addition, a main effect was detected for the number of stop signs ($F(1) = 112.738, p = .000$), and no significant effects were observed for the covariates BMI ($F(1) = 0.618, p = .432$) and GHI ($F(1) = 1.911, p = .167$).

As it is shown in Figure 4, the more stop signs (warnings) there were on the packaging of a particular product, the unhealthier it was perceived to be (regardless of the type of product). In fact, post hoc comparisons using the Tukey HSD test indicated that the healthiness score for the control group (no warnings) was higher than the score for the presence of one ($p = .000$), two ($p = .000$) and three warnings ($p = .000$). In a similar fashion, one warning condition score was significantly higher than the score of two ($p = .000$), and three warning conditions ($p = .000$). Similarly, the presence of two warnings was

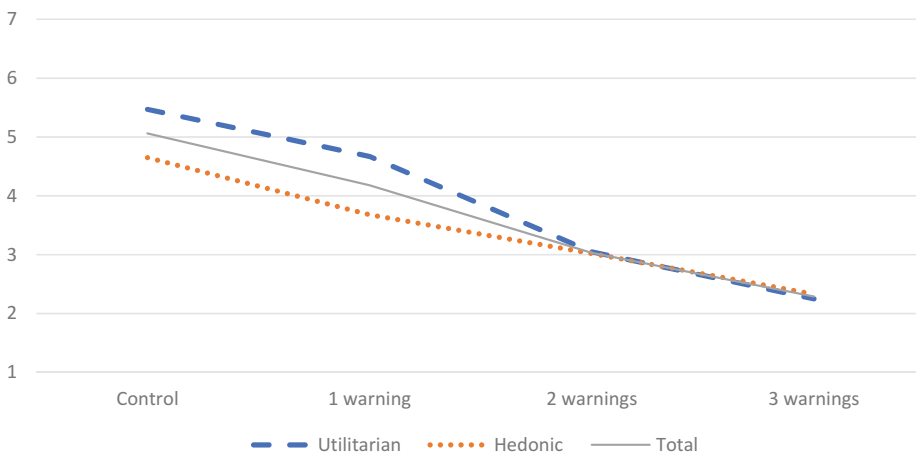


Figure 4. Results of healthiness perception.

associated with a higher HP than the presence of three warnings ($p = .000$). Polynomial contrast depicted a significant linear tendency in the effect of the increase in the number of warnings on HP ($F(1) = -2.125, p = .000$). Thus, these results fully support the first Hypothesis of this study in terms of the positive role the number of warnings plays in the decrease of the HP of a food product (H1_a).

The effect of the number of warnings (independent variable) on PI (dependent variable) was tested using ANCOVA test, considering General Health Interest and BMI as covariates. Results showed that the model explained about 30% of the variance ($R^2 = 0.279$), which is lower than the figure observed in the case of HP. A main effect was detected for the number of warnings ($F(3) = 62.596, p = .000$). In the case of the covariates, neither a significant effect was observed for BMI ($F(1) = 0.029, p = .911$) nor for GHI ($F(1) = 0.247, p = .619$).

Data in Figure 5 show that an increase in the number of warnings was associated with a significant decrease in the PI. In fact, the Tukey HSD post hoc test depicted significant differences between the control group and those products with one ($p = .000$), two ($p = .000$), and three warnings ($p = .000$), between those flagged with one and two warnings ($p = .040$), and also between treatment groups with two and three warnings ($p = .000$). In addition, a polynomial contrast showed a significant linear tendency in the effect of the increase in the number of warnings on PI ($F(1) = -1.470, p = .000$). These results provide support for Hypothesis 1_b of this study: products with more warnings exhibited lower PI than those with fewer warnings.

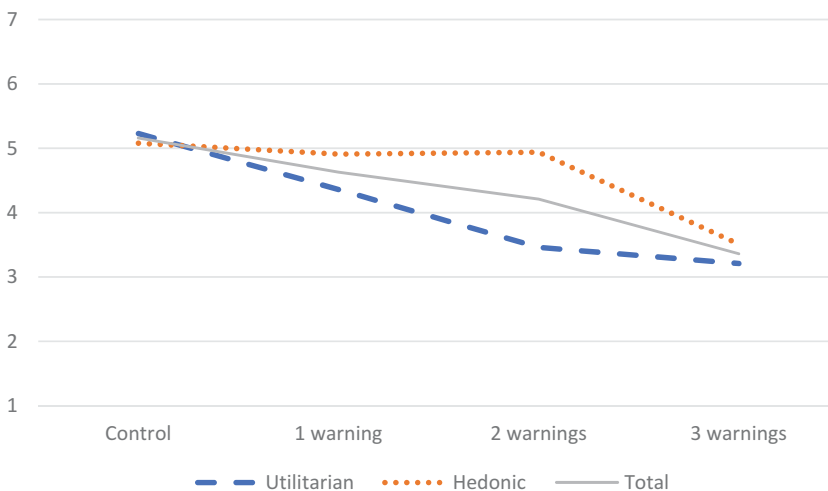


Figure 5. Results of purchase intention.

Moderated mediating analyses

To examine the moderating role of the product type on HP and PI as well as the mediating effect of the former over the latter variable, a moderated mediation analysis was carried out using the PROCESS macro in SPSS (Model 8) with 10,000 bootstraps. Results showed that the complete model was significant ($F = 44.532$, $p = .000$) and accounted for 45% of the variance ($R^2 = 0.4499$).

a) The mediating role of the perception of healthiness on purchase intention

Regarding the mediating effect of HP on the PI of food products after exposing them to FOP warning scheme, results showed a significant mediation ($b = -.1474$, $t = -3.6084$, $p = .000$, $LLCI = -2.5126 - ULCI = -1.6374$). In fact, an increasing perception of healthiness was associated with a decrease in the intention of purchasing the food product. Therefore, it was possible to observe a partial mediation of HP on PI, because the effect of the number of warnings on PI was direct (as H_{1b} showed) and also mediated through HP. Consequently, this result partially supports Hypothesis 2 of this study, because the mediation is partial and not complete (Baron & Kenny, 1986).

b) The moderating role of product type on healthiness perception

Results of the analysis showed a significant direct effect of the product type on the HP ($b = .7827$, $t = 3.4553$, $p = .001$, $LLCI = .3376 - ULCI = 1.2279$), in which utilitarian products were perceived as healthier than hedonic ones. In addition, a significant interaction between the number of warnings and product type on healthiness perception was observed in the case of products with two ($b = -.7377$, $t = -2.3038$, $p = .027$, $LLCI = -1.3670 - ULCI = -.1085$) and three warnings ($b = -.8270$, $t = -2.5807$, $p = .010$, $LLCI = -1.4566 - ULCI = -.1973$), but not in the case of those flagged with one warning ($b = .2071$, $t = -.6477$, $p = .518$, $LLCI = -.4211 - ULCI = .8353$). Finally, the covariates GHI and BMI did not depict a significant effect.

Further analyses showed the shape of the interaction. Compared with the scores of the control group (in which hedonic products were healthier), hedonic and utilitarian products depicted parallel decreases when they were flagged with one warning ($F(1) = 14.734$, $p = .000$). Nevertheless, among those with two and three black octagons the curved converged and the differences disappeared.

Thus, it was observed that the effect of increasing the number of warnings on HP also depended on the type of products, which provided support for Hypothesis 3_a in terms of the partial moderating effect of the product type on the effect of the number of warnings. When food products were flagged with one warning, they tended to keep prior differences in the HP (utilitarian perceived as healthier than hedonic food as observed in the control group), nevertheless, when they were flagged with two or three stop signs, these prior differences disappeared. Although the number of warnings significantly affected both

utilitarian and hedonic products, the effect on healthiness was more pronounced and faster among those products consumed for functional reasons than among those products consumed for pleasure.

c) The moderating role of product type on purchase intention

In the case of PI, results showed a significant direct effect for the product type ($b = -.5410$, $t = -4.1745$, $p = .000$, $LLCI = -.6751$ - $ULCI = -.4412$) in which hedonic products depicted in general a higher PI than utilitarian ones. Moreover, a significant interaction between the number of warnings and product type on PI in all the cases: products flagged with one ($b = -.7590$, $t = -2.6846$, $p = .008$, $LLCI = -1.3146$ - $ULCI = -.2034$), two ($b = -1.357$, $t = -4.8326$, $p = .000$, $LLCI = -1.9351$ - $ULCI = -.8163$) and three warnings ($b = -.6427$, $t = -2.2529$, $p = .025$, $LLCI = -1.2033$ - $ULCI = -.0821$). The covariates GHI and BMI included in the model did not show a significant effect.

Subsequent comparisons between hedonic and utilitarian products showed that they did not depict significant differences in the control group, but among those products with one ($F(1) = 6.775$, $p = .010$) and two warnings ($F(1) = 42.138$, $p = .010$) significant differences were observed (the latter showed stronger PI). No differences between hedonic and utilitarian products were again detected (as in the control group) when they were flagged with three black octagons. In other words, both types of products depicted similar PI in the control group (no warnings). The use of this FOP system (one and two stop signs) had an immediate negative effect on utilitarian food products PI, an effect which was not made evident in the case of hedonic products. Finally, when these products were flagged with three warnings the differences between product types again disappeared. Consequently, the results of the study support Hypothesis 3_b, which states that product type partially moderates the effect of the number of warnings on consumer PI.

Discussion and Conclusion

This study examined the consumer responses (healthiness perception and purchase intention) to the Chilean FOP labeling system varying the number of warnings and examining the moderating role of product type. First, variables included in this study (i.e. number of warnings and product type) depicted an interesting explicative power over consumer responses (healthiness perception and purchase intention). It provides a first insight into the relevance of the variables included here. In addition, it highlights that FOP schemes have a stronger predictive power in the case of health perception than in the case of purchase intention. This insight follows the same line of thinking of several previous studies, in which it has been stated that the effect of FOP labeling system on consumer's healthier choices is significant but complex: affected by both personal and situational variables like the type of product and the motivation associated the consumption (Cecchini & Warin, 2016).

The results of this piece of work may be summarized into three main findings. The first one is related to the importance of the healthiness rating as described by FOP schemes (number of warnings). This study provides evidence that, at least in the Chilean warning system, the presence of a different number of warnings seems to be correctly perceived and used by consumers. In the same vein of the studies developed by Talati et al. (2017) and Lundeberg et al. (2018), this piece of research supports that the Chilean warning system (as other directive schemes) tends to be useful in helping people more clearly perceive the healthiness of a product according to the amount of warnings (rather than the quality of the information provided by each one). In practice, results of this study provide empirical evidence which supports what consumers have declared in surveys and qualitative studies in terms of using the number of warnings as a clue for healthiness evaluation of food products and their decision-making about them. Moreover, the findings adequately support the decision of the Chilean Health Ministry to encourage consumers to “prefer food products with less warnings or no warnings” by means of information campaigns that promote healthy food choices (Corvalán et al., 2018).

Since the number of warnings (stop signs in this case or stars in the case of the health Star system) represents a schema simpler than others (such as the Traffic Light System or the GDA, which present a more challenging interpretive task for the consumers), the effectiveness observed in this study (and the changes according to the number of stop signs) seems to provide support to those that suggest that dietary choices may be affected by automatic (or at least semi-automatic) responses to contextual food cues, which include size, health claims, and labeling (Cohen & Babey, 2012). Theoretically speaking, warning systems seems to act not only as traditional pieces of information processed in a centralized way, but also as heuristic visual cues that help individuals make better decisions over other potentially misleading indications on the packaging (Gomez, 2013; Petty & Cacioppo, 1986). In other words, simpler warning schemes could not only inform, but also ‘nudge’ better dietary options by adding a key element (amount of warnings) to the presentation of food products to consumers (Andor, Gerster, & Sommer, 2016; Wilson, Buckley, Buckley, & Bogomolova, 2016).

A second main result of this study is the mediating effect of HP on PI. As several studies in related topics have proposed, although there is no linear relationship between these variables, healthiness perception is a significant antecedent of purchase intention. From a practical viewpoint, this result reinforces the relevance of informing consumers about the critical ingredients in order to empower them to choose healthier products (Khandpur et al., 2019).

From a theoretical perspective, the study supports the relevance of HP as a key variable in a consumer’s decision to purchase a food, as literature in food science has proposed, and the significance of this variable is consistent with one of the assumptions of the food labeling policy (Dobrenova et al.,

2015). Since HP is a considerable factor in choosing food products, it has been incorporated in several models such as the Health Belief Model, Social Cognitive Theory and the Theory of Planned Behavior (Conner & Norman, 2005; Gorton & Barjolle, 2013). Nevertheless, it is important to bear in mind that HP had a partial mediation effect (not a complete one) on the number of warnings and PI. In fact, this study also observed the direct effect of the presence of warnings on PI, as several other studies had also reported (Cecchini & Warin, 2016). This finding has at least two important implications. Conceptually speaking, it means that food choice models should consider FOP labels not only as an antecedent of healthiness, but also as an antecedent (or part of a factor, such as product quality or social reputation) of consumer purchase intention (Bonaiuto et al., 2012; Furst et al., 1996). In terms of methodology, the presence of a partial mediation of HP on PI provides evidence supporting the use of both HP and PI as dependent variables in measuring FOP label effectiveness. To examine only one of these variables would leave part of the effects of FOP labels outside of the evaluation and not provide a full account of the effects of this policy on consumers (Ikonen et al., 2019).

The third main result of this study is related to the moderating role of the prior shopping motivation on the effectiveness of food labeling. In this case, the distinction between utilitarian and hedonic food was included in an effort to explore a classification different from the related healthy/unhealthy perception of products. As expected, it was observed that -as a whole- utilitarian products were perceived as significantly healthier than hedonic ones (Cramer & Antonides, 2011), which seems to be based on the prior perception of these product types (Sobal & Bisogni, 2009). It is interesting that the difference in the effects of warnings on hedonic and utilitarian food products on PI remained when they were flagged with one stop sign. Nevertheless, when they were flagged with two and three warnings these differences disappeared. Similarly, the presence of one and two warnings significantly affected the PI in the case of utilitarian food; in contrast hedonic ones depicted a significant decrease in PI only when they were flagged with three warnings. The idea that the presence of warnings tends to affect more utilitarian food products than hedonic food is supported, consistent with prior research in the case of products previously perceived as healthy and unhealthy respectively (Ares et al., 2018a; Mhurchu, Eyles, Jiang, & Blakely, 2018).

A utilitarian product -expected to be and perceived as healthier than a hedonic one- is usually more severely and immediately affected by the presence of warnings in terms of purchase intention. Although people may recognize it as a healthier product, it is possible that the mere presence of a warning on its packaging may fail to confirm people's expectations, thus affecting the consumer's disposition and preference toward that product type (Cardello & Sawyer, 1992). On the other hand, consumers would accept a lower healthiness level (as

well as expect an increase in tastiness) when buying a hedonic food product. Then, the presence of one warning on these kinds of food products falls within prior expectations. These expectations were not met in the case of two or three warnings. So, the evaluation of healthiness and intention to purchase significantly decreased at that point. In the opposite case, a good level of healthiness is expected when a utilitarian food good is selected. So, these products suffered an immediate consumer punishment when they were flagged with just one warning (Blackmore, Hidrio, Godineau, & Yeomans, 2020; Deliza & MacFie, 1996). These different patterns allow one to illustrate that food choice decisions are complex, multifaceted, situational and dynamic processes (Sobal & Bisogni, 2009). Since the evaluation of food is a perceptual/evaluative construct, it is subject to the influences of context and expectations (Cardello, 1994).

In terms of implications, this study provides support for the use of warnings in a FOP food-labeling policy. Although a comparison between the Chilean warning system and other alternative FOP labeling systems was not developed in this study, results of this piece of research complement what prior studies have mentioned in terms of the significant effect of this FOP scheme (Campos et al., 2011; Cawley et al., 2015; Cecchini & Warin, 2016; Thorndike, Riis, Sonnenberg, & Levy, 2014). Warnings seem to have the power to act as heuristic and/or formal information, depending on the individual (Andor et al., 2016). Nevertheless, it is important that there also be other heuristics that may affect the decision-making process. For instance, utilitarian products are perceived as healthier than hedonic ones (regardless of the number of warnings). In this line, there is a need to counterbalance the bias effect of the category-based heuristic with other policy actions such as education that might make consumers conscious of a product's relative nutritional value (Gomez, 2013).

Regarding companies, results of this study encourage them to reformulate products in order to reduce the number of warnings or eliminate them. Evidence exposed here reflects that reaching a decrease in the number of warnings may be associated with a better perception of healthiness and an increase in the purchase intention among consumers, which could be particularly powerful in the case of utilitarian products (Mandle et al., 2015; Mantilla Herrera et al., 2018). As prior research has reported, reformulated products depicted an increase effect on consumer purchase intention, particularly for non-market leaders (Ares et al., 2018b).

It is worth noting that this study has a number of limitations. One of them is the representativeness of the sample. This is a purposive sample, composed by young and educated people, which impose bias in the results. Those with lower levels of education have demonstrated poorer responses to labeling systems (Liu, Hoefkens, & Verbeke, 2015). In addition, young samples tend to have a higher likelihood of understanding correctly the information of labels compared to older age groups (Goodman et al., 2018). Then, findings

of this study need to be contrasted with results from other sociodemographic segments of the population. Another limitation is that the Chilean system uses only four critical nutrients. In this regard, it could be hypothesized that an increase in the number of warnings may introduce a contextual variable affecting those products depicting only one less warning (Sobal & Bisogni, 2009). Finally, further research should also try to link attitudinal research (like this one) with studies which present aggregate data on real-life food product consumption changes in retail stores (INTA, 2018).

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