LES EFFETS DE L'ÉTIQUETAGE SUR LA PEUR DU CONSOMMATEUR: LE CAS DE MULTIPLES CATEGORIES D'ALIMENTS FONCTIONNELS ENRICHIS EN ACIDES GRAS OMÉGA-3.

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Résumé: Le but de cet article est de tester: a) l'effet de différentes catégories d'aliments fonctionnels enrichis en aides gras oméga-3 sur le sentiment de peur des consommateurs et b) les effets d'interactions entre différentes catégories d'aliments fonctionnels et des informations apparaissant sur les étiquettes de ces produits dont la traçabilité, l'allégation santé et la vérification de l'allégation santé. Une ANOVA mixte de type inter et intra-sujets a été utilisée. Les résultats montrent que les catégories d'aliments fonctionnels enrichis en oméga-3 ont un effet significatif sur la peur des consommateurs. De plus, la traçabilité et la vérification de l'allégation santé, chacune, interagit avec les catégories d'aliments fonctionnels. Les résultats de cette étude présentent un intérêt particulier pour l'industrie des aliments fonctionnels, ainsi que pour les décideurs dans l'arène des politiques publiques.

Mots clef: «Aliments fonctionnels, étiquetage, peur, ANOVA».

THE EFFECTS OF LABELING INFORMATION ON CONSUMER FEAR: THE CASE OF MULTIPLE FUNCTIONAL FOOD CATEGORIES ENRICHED WITH OMEGA-3 FATTY ACIDS

Abstract: The aim of this paper is to investigate: a) the effect of different functional food product categories (FPC) enriched with omega-3 fatty acids on consumer fear and b) the interaction effects among FPC and each of the following information cues typically presented on product labels: *traceability*, *health claim*, and *verification of health claim* on consumer fear. A mixed between-within-subjects ANOVA design was implemented. Results indicate that FPC had a significant main effect on consumer fear. Moreover, traceability and verification of health claim independently interacted with FPC. Findings are of particular interest to the functional foods industry as well as to policy makers.

Keywords: «Functional foods; labeling information; consumer fear, ANOVA».

THE EFFECTS OF LABELING INFORMATION ON CONSUMER FEAR: THE CASE OF MULTIPLE FUNCTIONAL FOOD CATEGORIES

Introduction

Functional foods are conventional foods which have been enhanced with bioactive ingredients (e.g. probiotics, omega-3 fatty acids, fibres, etc.). The functional enhancements of foods have been found to improve health and reduce the risk of disease beyond a food's basic or unaltered nutritional value (Diplock et al., 1999; Roberfroid, 2000; AAFC, 2015; Galland, 2013). Several categories of foods have been involved functional enhancements worldwide including various meat, dairy, confectionery, bakery, and soft drinks products (Kotilainen et al., 2006; Menrad, 2003).

Despite the healthy image of functional foods and the scientific evidence in support of their various benefits, consumers reportedly remain uncertain about their functionality, health impact and safety (Moorsel, Cranfield, and Sparling, 2007; Niva, 2007; Siedlok, Smart, and Gupta, 2010; Verbeke, 2005a). To overcome uncertainty, consumers typically use a variety of labeling information including contents/ingredients, nutritional value, traceability, production methods, provenance, and proffered health claims as proxies or heuristics to form expectations and to make inferences with respect to the impact, quality and safety of food products (Verbeke, 2005b).

Past studies which have investigated the effects of information cues on consumer evaluation of foods have revolved around the notions of *traceability*[1] (e.g., Hobbs et al., 2005), *health claim* (e.g., Hoefkens and Verbeke, 2013; Sabbe et al., 2009; van Trijp and van der Lans, 2007; Verbeke et al., 2009) and *verification of health claim* (Cox et al., 2011; Hailu, et al., 2009). Nevertheless, research with respect to the interaction effects of these cues on attitude and purchase intentions toward various categories of functional food products remains scant. Moreover, previous studies in the area of functional foods have prevalently focused on single food product categories (e.g., fruit juices, yoghurts, spreads, breads, margarines, or soups) rather than multiple food product categories as carriers for functional ingredients (Hoefkens and Verbeke, 2013; van Kleef, van Trijp and Luning, 2005; Verbeke Scolderer and Lähteenmäki, 2013). To our knowledge, none has considered an exhaustive array of functional food product categories. In turn, the present study is comprehensive in that it considers five food products categories enriched with omega-3 fatty acids, namely: meat products (beef, chicken, pork, etc.), eggs, cereal products (sliced bread, pita, tortilla, bagel, breakfast cereal, pasta, couscous, etc.), dairy products (milk, kefir, yogurt, cheese, etc.), and processed fruit or vegetable products (fruit juices, vegetable juices, etc.). The selected food categories for the current study reflect those proposed in the «*Eating Well with Canada's Food Guide*» (Health Canada, 2011).

Furthermore, the dependent variables included across past studies of functional foods were for the most part attitudinal and behavioral in character. Singular emotions as dependent variables remain grossly understudied in this area and were rarely alluded to in studies despite their important role in consumer behavior (see Bagozzi, Gopinath and Nyer, 1999). According

[1] Traceability has been widely examined in the case of conventional foods. However, to our knowledge, it has never been examined with respect to functional foods.

to Perugini and Bagozzi (2001), emotions are evoked by cognitive appraisals or evaluations and they have significant and important influences on volitions, which determine intentions, which, in turn, influence (goal-directed) behaviour. As such, emotions serve as mediating factors between cognitive assessments and consequent behaviors (Frijda, 1986). Accordingly, it is argued herein that the information cues provided on functional food product labels can elicit a variety of emotional states which, in turn can impel or inhibit consumption-related behaviors.

In this paper, we focus on the emotion *fear*. Fear is essentially a basic negative emotion (Ekman, 1992). It is functional in the Darwinian perspective in that it tends to give rise to avoidant or aversive patterns of behaviors (Frijda, 1986; Öhman and Mineka, 2001). Fear has also been associated to a greater likelihood that a decision will be deferred (Luce, 1998). Fear can be elicited by perceived threats and punishment contingencies (i.e., anticipated negative outcomes) (Roseman, 1991; Scherer, 1997) and it is essentially part of an individual's threat management system (Bracha, 2004). With respect to foods, fear can be evoked by technological innovations in the food industry in general and by processed foods in particular (Cox and Evans, 2008). It is clearly associated to food choice and food consumption behavior (Verneau et al., 2014). The specific aims of this paper are to investigate: a) the effects of different functional food product categories on consumer fear and b) the interactions among *traceability*, *health claim*, and *verification of health claim* as information cues as well as multiple functional food product categories with respect to their effects on consumer fear.

Hypotheses

Main effect of Food Product Categories. A growing body of literature suggests that the acceptance of functional foods depends to a great extent on the basic product that serves as a carrier for the functional ingredient (Ares and Gambaro, 2007; Jonas and Beckmann, 1998; Poulsen, 1999; van Kleef, van Trijp, and Luning, 2005). Moreover, certain food product categories such as meats have tended to evoke greater safety concerns and greater perceived risks and threats to health among consumers (Chen, Anders, and An, 2013). This gives rise to our first hypothesis: **(H1): Levels of consumer fear differ significantly across food product categories enriched with omega-3 fatty acids.**

Two-way interaction effect between Traceability and Food Product Categories. Following a number of crisis situations and scandals involving food quality and safety (Hobbs, 2004; Verbeke, 2005b), it has been vehemently argued that traceability systems help restore consumer confidence (Hobbs, 2004; van Rijswijk et al., 2008). Rendering a food traceable can reduce possible anxieties about food safety and act as a quality assurance signal (Hobbs et al., 2005; van Rijswijk et al., 2008). Moreover, in the extant literature on traceability, it is evident that the importance of traceability is consistently evoked more with respect to certain food categories than others for a variety of reasons including salient food crises, health risks, consumer safety concerns, and ensuing regulations by governing bodies. This is particularly evident with respect to products derived from animals (see Ene, 2013). The following hypothesis is proposed: **(H2): The impact of traceability on consumer fear towards foods enriched with omega-3 fatty acids is moderated by food product categories.**

Two-way interaction effect between Health Claim and Food Product Categories. It has been argued that the evaluation of proffered health claims is partly determined by perceptions of healthiness with respect to the basic food constituting a processed food product. In turn,

this suggests that certain health claims are more fitting to certain food products (Bech-Larsen and Grunert, 2003; Roe, Levy, and Derby, 1999). In sum, resorting to health claims is perhaps more fitting to some functional food product categories than others. **(H3): The impact of health claim on consumer fear towards foods enriched with omega-3 fatty acids is moderated by food product categories.**

Method

Participants and experimental design. A total of 463 university students at various universities in the Montreal and Ottawa areas (in Canada) participated in the study. Almost all respondents (99%) were less than 25 years old and were single (98%). About 47 % were male and 30% had an annual income of $25 000 or less. The design was a mixed (2 x 3) x (2 x 5) between-within subjects design, with Traceability (T) (2 levels: completely traceable vs. not traceable) and Health Claim (HC) (3 levels: functional vs. disease risk reduction vs. disease prevention) as the two between-subjects factors and Verification of Health Claim (VHC) (2 levels: A government agency or a non-government agency) and functional food product categories (FPC) enriched with omega-3 fatty acids (5 levels: meat products, eggs, cereal products, dairy products, and processed fruit and vegetable products) as the two within-subjects factors involving repeated measurements thereby yielding a two-between and two-within factorial ANOVA design. Implementation of this design required the use of six variants of the questionnaire so as to operationalize the six between-subjects conditions involving treatments. Thus, each respondent completed a single questionnaire assessing ten written vignettes. The presentation format was invariant across the ten vignettes (see d'Astous and Séguin, 1999; Leclerc, Schmitt, and Dubé, 1995). The level of consumer fear was repeatedly assessed on a Likert scale via the following statement: *''The thought of consuming a [insert food product category] alone or with significant others makes me feel fear:* (0) '*Not at all'* and *(10) 'Very much'*.

Results

ANOVA results are reported in Table 1. The main effect of functional FPC on consumer fear was significant. Therefore, H1 was supported. In other words, levels of consumer fear differed across functional FPC enriched with omega-3 fatty acids. Specifically, consumers felt relatively greater fear toward functional meat products (M= 1.977), followed by processed functional fruit or vegetable products (M= 1.576) and by eggs (M= 1.517). Dairy products enriched with omega-3 fatty acids emerged as somewhat less evocative of fear (M= 1.508). Finally, functional cereal products evoked the least fear amongst participants (M= 1.308). A subsequent post hoc Bonferroni pairwise comparison test revealed that there were in fact significant differences between the following functional food product categories: Meat products and eggs (p= .000 < .05); meat products and cereal products (p= .000 < .05); meat products and dairy products (p= .000 < .05); meat products and processed fruit or vegetable products (p= .001 < .05); eggs and cereal products (p= .027 < .05); cereal products and dairy products (p= .015 < .05); and cereal products and processed fruit or vegetable products (p= .002 < .05). With respect to the hypothesized two-way interaction effects, only the interaction effect T x FPC emerged as significant. Thus, H2 was supported whereas H3 was rejected. A *Post hoc* Bonferroni comparison test was subsequently carried out to identify significant differences between pairs of treatment means. These tests revealed that: (a) consumer fear was lower for completely traceable enriched meat products (M = 1.680) than for non-traceable enriched meat products (M = 2.275, p= .008 < .05); (b) consumer fear was lower for completely traceable enriched dairy products (M= 1.231) than for non-traceable

enriched dairy products (*M*= 1.786, p= .006 < .05). In Table 1, it is also noteworthy that the VHC x FPC interaction effect emerged as significant. A subsequent *post hoc* Bonferonni comparison test revealed that consumer fear was lower for functional dairy products when the heath claim was verified by a government agency (*M*= 1.348) as opposed to when it was verified by a non-government agency (*M*= 1.668, p= .001 < .05); and consumer fear was lower for functional processed fruit or vegetable products when the heath claim was verified by a government agency (*M*= 1.481) as opposed to a non-government agency (*M* = 1.670, p= .049 < .05).

Table 1: ANOVA Results

Effect	***Fear***		
	F	***P***	***Formulated hypothesis***
FPC	17.292	0.000**	H1
T x HC	1.499	0.224	-
T x VHC	1.280	0.258	-
HC x VHC	0.983	0.375	-
T x HC x VHC	1.177	0.309	-
T x FPC	3.458	0.013*	H2
HC x FPC	0.403	0.891	H3
VHC x FPC	4.386	0.004**	-

(*) Significant at $\alpha < 0.05$; (**) Significant at $\alpha < 0.01$

Discussion and conclusion

For the sake of brevity, it is of particular interest to point out that consumer fear levels differ across functional food product categories. In fact the combination of a product with a healthy image (fruit juice) along with a less natural type of enrichment (omega-3 fatty acids as opposed to fiber, for instance) is perhaps perceived as being 'less natural' or 'less wholesome'. In turn, this perception results in lower consumer evaluations (see Verbeke et al., 2009). Furthermore, a noteworthy finding of this study rests on the hypothesized significant two-way interaction effect reported above in that the effect of traceability on consumer fear is moderated by functional FPC. It is also noteworthy in Table 1 that the effect of VHC on consumer fear differs across FPC. The 'raison d'être' of these two-way interaction effects can perhaps be best explained with reference to the use of heuristics in information processing. Specifically, the inherent low-involvement nature of food products (see Verbeke 2005b) is not likely to result in information processing of cues and in decision-making processes which are highly cognitively-laden or systematic in character. It is more likely to result in reliance on the use of simpler heuristics such as the traceability system and the trustworthiness of verification agencies. Regarding the absence of a significant interaction effect between HC and FPC on fear, possible explanations may involve the complexity of health claims (Verbeke et al., 2009), the presence of too much information on food packaging (Tonkin et al., 2015), and/or the low intensity consumer motivations to process health claim information (Hung et al., 2016). In general, these findings should serve as impetus for functional food manufacturers to closely cooperate with policy makers in order to facilitate, reinforce and legitimize the greater use of T and VHC in their marketing efforts through reliable and valid verification practices and protocols put in place by credible government agencies. The main limitation of this study rests in the use of a sample of undergraduate students. Future studies should involve respondents with more diverse socio-demographic backgrounds. For instance, gender and age have been found to affect consumer reactions to functional foods and to health claims (Ares and Gambaro, 2007; Verbeke, 2005b).

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