

Persuasion knowledge activation versus health knowledge intervention: enhancing the effectiveness of Front-of-pack nutritional labels against misleading information

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Abstract

The rise in overweight and obesity is driving an increasing prevalence of noncommunicable and chronic diseases all around the globe, resulting in a heavier burden on individuals and higher costs for families and health systems. The presence of misleading information on food packaging exacerbates the situation by causing consumers to unknowingly choose less healthy options. Front-of-pack nutritional labels (FOPLs) have been reported as solutions to provide consumers with reliable information and be able to partially mitigate misleading information with negative consequences on consumers' health. However, FOPLs exposure presents some limitations as misleading information may divert consumer attention from FOPLs and lead them to misinterpret the product as healthier than it actually is. Therefore, further interventions are needed to empower consumers to be better informed and educated. Our exploratory experiment, including 79 participants, found that persuasion knowledge activation, compared to health knowledge intervention, are more effective in assisting Front-of-pack nutritional labels against misleading information. Hence, building of persuasion knowledge model, we examined the underlying mechanisms that motivate consumers to engage more effectively with health information (i.e., spread the negative word of mouth of products that contain misleading information), using a psychological reactance perspective.

Framing of the research.

Misleading or informative? The role of Front-of-pack nutritional labels in consumer recognition of misleading information.

Overweight and obesity have been linked to an increased risk of chronic and non-communicable diseases, such as cardiovascular diseases, cancer, and chronic respiratory diseases (WHO, 2024). Despite the increased awareness of the risks, the prevalence of overweight and obesity has risen significantly worldwide, with 43% of adults classified as overweight, and 16% living with obesity (WHO, 2024). Moreover, the prevalent use of deceptive and misleading information on food packaging, such as false nutrient content and misleading health claims, may exacerbate the issue (André et al, 2019; Pérez-Ferrer et al, 2019; Perry et al, 2018; Pulker et al, 2018). Particularly, this misleading information on unhealthy food undermines the well-established informative elements that healthy food widely use-authentic nutrient content and accurate health claims-that are intended to assist consumers in making healthier choices. Specifically, the misleading information appears with partially correct claims, which may legally and factually highlight the rich vitamin and mineral content of a product through nutrition claims, while the product as a whole is unhealthy due to high sugar content (Pérez-Ferrer et al, 2019). Similarly, to meet the criteria for a "low fat" claim, the fat content may be significantly reduced while other caloric ingredients are added to compensate for taste, ultimately resulting in a product that is less healthy overall (Schermel et al, 2016). Furthermore, there are more packaging cues that may lead consumers to misinterpret the food healthiness (de Sousa et al, 2022), such as "free from palm oil" or "free from genetically modified organism" (Hartmann et al, 2018), natural claims (Hooker et al, 2018), health trade labels (Berry and Romero, 2021), health related images (e.g., a brain image) (Delivett et al, 2022), packaging color and ecological claims (Hallez et al, 2023). Recent research gathered 3813 products from supermarket packaged food and reported that 67% of the products include health-related cues while the cues on the packages do not relate to higher nutritional value and cannot be a health indicator (Alcaire et al, 2023). While different legislations have been implemented worldwide to prevent misleading information (European Commission, 2024; FDA, 2024; Ministerio de Salud, 2016), these laws have

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several limitations, including low levels of compliance, challenges in monitoring the real adoption, and notably, the persistence of misleading practices that fall into a grey zone (Clement et al, 2017; Pulker et al, 2018). For instance, Pulker et al (2018) analyzed the packaging information of ultra-processed foods, such as breakfast cereals, snacks, and confectionery items, collected from supermarket. The study found that 56% of food packages contained nutrition claims but only 18% of these claims were compliant, while the remaining 82% being misleading. Additionally, 25% of the products featured health claims, with a compliance rate of 79% (Pulker et al, 2018). They reported that these products, which are typically high in added sugar and generally considered as unhealthy, often misuse claims to attract consumers. Moreover, marketers often comply with legislation in wording while still being misleading (Clement et al, 2017; Schermel et al, 2016).

This misleading information can be particularly harmful among consumers that are interested in pursuing a healthier diet, as they are more sensitive to the health information on packaged food. Ironically, these consumers might ultimately purchase less healthy foods for themselves due to misleading information (Miklavec et al, 2015). Notably, parents often (mis)interpret foods with misleading health information as healthier and show a higher intention to buy these less healthy options for their children, which is contrary to their intentions (Harris et al, 2011). For example, these parents interpret the 'antioxidants and vitamins' claim on the packaging as proof that the product can help prevent their children from getting sick, even if the nutrient content of product is below the average quality for the category.

The use of front-of-pack nutritional labels that are easy to understand, as a prioritized policy encouraged by WHO (2024), have been demonstrated to be an effective solution to mitigate misleading information. FOPLs are generally considered as more trustful and useful than other sources on food packages (He et al, 2023; Mazzù, et al, 2022; Mazzù et al, 2023). When existed together with misleading information (i.e., nutrient claims), FOPL has been shown to influence consumers' perceptions of a product's healthiness while misleading health information like nutrient claims do not have the same effect (Mazzù et al, 2021; Schnettler et al, 2019). Overall, FOPL has demonstrated greater relative importance than misleading information in influencing consumers' healthful perception of the product (Nobrega et al, 2020) and the existence of FOPL can sometimes eliminate the influences from misleading health information (Stoltze et al, 2021).

On the other hand, FOPL has also shown some limitations in resolving misleading health information (Mazzù et al, 2024). While front-of-pack nutritional labels can correct the bias generated by misleading information, it could happen only when consumers pay attention to the FOPL (Talati et al, 2017). Nevertheless, misleading information from graphics on food packaging are usually more appealing to attention and therefore influences consumer healthiness perception even when individuals are encouraged in advance to pay attention to FOPL information (Bone and France, 2001). Medina-Molina and Perez-Gonzalez (2021) reported that health claims that may be misleading exceed the influence of front-of-pack nutritional labels in informing consumers of the product healthiness. Similarly, recent studies reported that misleading nutrition claims cancel out the unhealthy indication suggested by Nutri-Score E (Janssen and Bogaert, 2023). Moreover, FOPLs may be perceived as a healthy symbol and therefore induce individuals to consider the product as healthier both for healthy and unhealthy food (Ikonen et al, 2020).

In response, policymakers and leading public health communicators actively employ knowledge-based interventions, such as educating consumers on effectively interpreting food labels (European Commission, 2024a) and informing consumers about the presence of misleading elements on the food package (European Commission, 2024b). One challenge to the effectiveness of such information is that it is often cognitively demanding (Gokani, 2024).

Persuasion knowledge model and psychological reactance as the empowering mechanism

The persuasion knowledge information (also referred to as disclosure of persuasion attempt of the company) may inform consumers about the food label elements more effectively.

The persuasion knowledge model (Friestad and Wright, 1994) explains how consumers develop their capabilities of recognizing and interpreting the persuasion attempts from marketers and in turn execute their own coping strategies, such as ignoring or discounting these persuasion tactics. Misleading elements on food packages, often used as a persuasive tactic to make the products appear healthy and influence consumers to purchase them, therefore, fall into the category of persuasion attempts. A recent meta-analysis has shown that persuasion knowledge can counteract marketers' persuasion effect (e.g., advertising) by 50%, which represents a substantial impact (Eisend and Tarrahi, 2022). When persuasion knowledge is activated, individuals show primarily emotional and behavioral responses, indicating that responses are automatic and fast reacting (Eisend and Tarrahi, 2022).

Although the persuasion knowledge model explains the heightened consumer responses to persuasion attempts, the underlying motivation driving these responses remains unclear (Eisend and Tarrahi, 2022; Eisend et al, 2020). In our research, we aim to use psychological reactance as the theoretical framework to explain how interventions leveraging persuasion knowledge can empower consumers to counter misleading information.

Psychological reactance theory (Brehm, 1966) posits that consumers have the need to be autonomous, such that when they feel their freedom of choice is threatened, a motivational state aimed at restoring their sense of freedom is activated. The motivation state drives individuals to respond emotionally with anger toward the subject, restricting their freedom and cognitively by arguing against the persuasive content. This motivational state has been widely studied in health communication literature, where persuasive messages promoting healthy eating are often perceived as threats to freedom. In turn, consumers not only reject the health-related messages but also feel anger toward the communicator (Lombardini and Lankoski, 2013; Lu and Cai, 2023). However, the threats that can be posed by unhealthy food promotion have been overlooked in psychological reactance literature, as people don't appear to be persuaded to exclusively choose unhealthy

options. On the other hand, the lying intention behind misleading information serves as a barrier to healthier choices. Therefore, consumer coping strategies within the persuasion knowledge model may align with the psychological reactance responses.

Purpose of the paper: This research aims to explore whether persuasion knowledge, compared to health knowledge, contributes to increased consumer negative word of mouth about the product and to examine the underlying mechanism for this effect. Specifically, we integrate two theories-the persuasion knowledge model and psychological reactance theory-to investigate whether reactance responses serve as the empowering mechanism linking the activation of persuasion knowledge to consumer coping strategies in response to misleading persuasive attempts.

Hypotheses:

H1: Informing consumers about the persuasion knowledge (i.e., lying intention of the food company), compared to healthiness knowledge (i.e., the unhealthiness of the food products), results in higher likelihood of spreading negative word-of-mouth about the food.

H2: The differential impact of these two types of information exposure on consumers' negative responses toward the food product and the company is mediated by reactance responses, including anger and counterargue intention.

Methodology.

Study Population: We conducted a class experiment in an Italian university. We collected data from 79 participants ($M_{age} = 21.89$, $SD = 0.95$; 48.1% female, 51.9% male).

Research design: Respondents were informed that the study is about packaged food and engaged in an evaluation task after been randomly assigned to one of two conditions categorized by knowledge intervention type ((i) persuasion knowledge; (ii) health knowledge) (see Appendix A). We measured participants' negative word of mouth of the product (Voorhees et al, 2006; 3-item), anger (Dillard and Shen 2005; 4-item), and counterarguing (Nabi et al. 2007; 4-item).

Manipulation check

At the end of the main study, the manipulation check was added with the same 79 participants from the Italian University. Participants were asked to indicate the extent to which they thought the company had lying intention (Argo et al, 2006, 4-item). The results showed that the manipulation was successful, with $M_{(persuasion\ knowledge)} = 4.30$ ($SD = 1.21$) scoring significantly higher than $M_{(health\ knowledge)} = 3.71$ ($SD = 1.23$) ($t = -2.17$, $df = 77$, $p = 0.01$).

Results. The independent t-test results confirm H1 and show the consumer negative word of mouth of the product when informed with persuasion knowledge, $M_{(NWOM_persuasion\ knowledge)} = 4.14$ ($SD = 1.27$) scoring significantly higher than health knowledge, $M_{(NWOM_health\ knowledge)} = 3.09$ ($SD = 1.27$) ($t = -3.67$, $df = 77$, $p < 0.01$). Moreover, consumer anger response when informed with persuasion knowledge shows $M_{(anger_persuasion\ knowledge)} = 3.52$ ($SD = 1.75$) scoring significantly higher than informed by health knowledge, $M_{(anger_health\ knowledge)} = 2.08$ ($SD = 1.24$) ($t = -4.26$, $df = 77$, $p < 0.01$). Consumer counterarguing response shows that $M_{(counterargue_persuasion\ knowledge)} = 3.87$ ($SD = 0.94$) scoring significantly higher than $M_{(counterargue_health\ knowledge)} = 3.18$ ($SD = 1.10$) ($t = -3.00$, $df = 77$, $p = 0.004$).

Simple mediation: we employed simple mediation test with knowledge type as independent variable, consumer anger response and counterargue as mediators, and consumer negative word-of-mouth as dependent variable.

A mediation analysis (process model 6, Hayes, 2022) confirms H2 and suggests that when consumers are exposed to persuasion knowledge, compared to health knowledge, consumers exhibit an increased level of anger towards the food company ($b = 0.73$, $t = 4.26$; $p < 0.01$), which in turn increases counterargue intentions toward the food company ($b = 0.35$, $t = 5.31$, $p < 0.01$). Furthermore, the increased anger is positively associated with a higher negative word-of-mouth of the food ($b = 0.29$, $t = 3.29$, $p < 0.01$) and the increased counterargue intention is positively associated with a higher negative word-of-mouth of the food ($b = 0.49$, $t = 3.86$, $p < 0.01$). Specifically, the direct positive effect of persuasion knowledge exposure on negative word of mouth is not statistically significant ($b = 0.15$, $[SE] = 0.12$; $[CI] = -0.10, 0.39$). Importantly, the indirect positive effect of persuasion knowledge exposure on negative word of mouth-through anger-is statistically significant ($b = 0.21$, $[SE] = 0.08$; $[CI] = 0.08, 0.40$); the indirect positive effect of persuasion knowledge exposure on negative word of mouth-through anger and counterargue intentions-is statistically significant ($b = 0.13$, $[SE] = 0.05$; $[CI] = 0.05, 0.24$). The study results indicate that, when exposed to persuasion knowledge, compared to health knowledge, which informs consumers misleading information on food, consumers show higher willingness to spread negative word of mouth, mediated by an increased anger and counterargue intention.

Research limitations. The sample size is limited to 79 participants due to the class size. However, all the students were highly motivated to complete the experiment, as participation offered extra credit for the final exam, ensuring a high quality of responses. This research is based on a sample of Italian student, which may limit the generalizability of the findings. Future research should aim to test this effect across diverse cultural and demographic contexts to enhance the universality of the results.

Managerial implications. The prevalence of misleading health information on food packaging can prevent consumers from capturing accurate food information and may lead them to unknowingly purchase less healthy options. While FOPLs have been acknowledged by policymakers and the scientific community as an effective tool for providing consumers with reliable indicators of a food's healthiness, their sole presence has proven to be partly ineffective in limiting unhealthy choices.

This research proposes a potential solution, highlighting that the intentional disclosure -by policymakers and public health advocates, for example- of the manipulative intent behind misleading health information could be included as part

of their communication. Specifically, our results show that informing consumers about the persuasion knowledge (i.e., persuasive intent of misleading information), as compared to healthiness knowledge (i.e., sheer healthiness knowledge about food packages displaying misleading information), leads consumers to spread more negative word-of-mouth about the company, and that the process is mediated by consumer anger and counterargue intention toward the company.

Originality of the paper. In the food communication context, psychological reactance theory has explained how consumers respond with reactance towards the persuasive messages about healthier food because people feel compelled by the healthy food and want to restore their freedom of unhealthy food choices. However, the potential consumer reactance towards unhealthy food is overlooked in the literature. Anchored in persuasion knowledge model, we confirm, for the first time in the literature, that persuasion intent, specifically lying intention from unhealthy food companies, can activate consumer reactance, including anger and counterargue intention, to restore their freedom of choice and spread more negative word of mouth about the company that has the lying intention.

Key words: misleading information; front-of-pack nutritional labels; persuasion knowledge model; psychological reactance; health communication.

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