INTERNATIONAL JOURNAL OF BUSINESS, 29(4), 2024 ISSN: 1083-4346

Understanding the Effectiveness of Food Product Labeling – A Model Considering Consumer Purchase Styles

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ABSTRACT

Food product labels provide information on nutrition, expiration dates, regulatory compliance, and positioning. This study examines how consumers' attention to and use of nutritional labels impact their purchase decisions. An online survey collects data on purchase styles, label usage, and the likelihood of brand-switching due to missing information on labels. This research considers an integrated variable of "purchase styles" in its model to understand the effectiveness of product labeling on consumers' decision-making. The study identifies four consumer segments based on purchase styles: impulse shoppers, cautious shoppers, brand loyal shoppers, and analytical shoppers. Using Structural Equation Modeling (EQS), the study finds a significant link between purchase styles and brand switching based on label information. Analytical shoppers are the most influenced by product labels, while impulse shoppers are the least. These findings have important managerial implications for targeting specific consumer segments and enhancing consumer confidence in the quality of food products.

JEL Classifications: M

Keywords: food marketing, food product labeling, nutritional information, consumer behavior, consumer decision-making, purchase styles, segmentation

https://doi.org/10.55802/IJB.029(4).005

I. INTRODUCTION

The importance of food labeling in assisting consumers in making informed choices about their food cannot be overstated, as it contributes to public health and individual decision-making. Nutrition labels inform consumers; well-designed front-of-package nutrition information has been shown to encourage healthier choices. Research consistently demonstrates that using nutrition labels is associated with healthier diets, but the degree of influence varies depending on customer characteristics, purchasing context, and label design (Cowburn and Stockley, 2005; Drichoutis et al., 2005; Campos et al., 2011; Bleich et al., 2017; Christoph et al., 2018; Nohlen et al., 2022). However, the effectiveness of using food product labels as shopping aids to support consumer decision-making is a subject of ongoing debate, and empirical research in this area has yielded conflicting results (Cawley et al., 2015; Hobin et al., 2017; Zhen and Zheng, 2017). Some researchers suggest that demographic variables, such as lower levels of education that may lead to poor numeracy skills, could explain the inconsistent findings (Rothman et al., 2006; Peters et al., 2007). Gassler et al. (2023) built on an attitude-based segmentation analysis to understand the effect of Nutri-Score nutrition labeling on healthier food choices among German consumers.

Extensive empirical research has been carried out to understand the factors influencing consumers' use of nutritional labels. The primary focus of these studies has been to identify the characteristics of individuals who utilize nutritional information on food labels. To examine this, researchers have adopted a cost-benefit approach, initially proposed by Stigler in 1961. According to this approach, consumers are more likely to seek nutrition-related information if the benefits of making healthier food choices outweigh the costs, such as the time spent reading labels. While some studies have specifically explored the use of nutrient information and differentiated between ingredient lists and nutrition panels, the majority have concentrated on the determinants of nutritional label usage in general. For instance, Bender and Derby (1992) investigated the overall determinants, while other researchers, such as Drichoutis et al. (2005) and Nayga (1996), focused on specific nutrient information. Nayga (1999) also examined the determinants of consumers' perceptions and beliefs regarding label usage.

This study aims to systematically comprehend the contradictory findings in the literature by proposing a conceptual model that integrates theories from psychology, behavioral economics, communication, and marketing, and introduces segmentation by purchase styles to better understand how food labels influence consumers. Drawing on the work of Nayga (1999) and Drichoutis et al. (2005), we propose a conceptual framework that categorizes the factors influencing the use of on-pack nutrition information into four distinct purchase style segments. These factors include individual characteristics, situational factors, attitudinal and behavioral factors, product class involvement, knowledge, and motivation factors. We argue that the segmentation of purchase styles, which includes impulse, cautious, brand loyal, and analytical shoppers, is not solely determined by individual factors but rather by integrating multiple factors that shape consumers' decision-making processes. Our approach recognizes that the combined effect of these factors, rather than individual factors in isolation, ultimately influences consumers' decision-making when it comes to utilizing nutritional information on food labels.

https://doi.org/10.55802/IJB.029(4).005

II. RESEARCH BACKGROUND

Extensive research on food product labeling has not established a consensus on its effectiveness for consumers during shopping, leaving uncertainty regarding the communication of necessary information and its impact on dietary habits (Seiders and Petty, 2004; Garde, 2008). Behavioral change is difficult to measure due to the complex nature of consumer behavior, which is influenced by various internal and external factors, and some consumers intentionally ignore the provided information (Rotfeld, 2008a, 2008b; Rotfeld, 2010). Previous systematic reviews have been conducted (Baltas, 2001; Drichoutis et al., 2006), but they lack a comprehensive framework encompassing all relevant nutrition labeling and consumer behavior aspects.

Drichoutis et al.'s (2006) review provides an updated and promising conceptual framework for examining factors that affect the use of on-package nutrition information. However, the study has a narrow focus on label use precursors and does not include broader aspects such as antecedents, consequences, and relationship moderators related to nutrition label usage. Grunert et al. (2010) noted that most studies examining factors influencing the utilization of nutrition information have primarily focused on demographic variables as determinants. Given the fragmented nature of the research in this area, a structured and systematic framework is needed to provide new insights for policymakers and managers. While Drichoutis et al.'s (2006) review is an important step toward analyzing empirical findings, it falls short of comprehensively covering all aspects relevant to understanding the complexity of nutrition labeling, consumer use, and understanding of such labels.

Previous research has primarily focused on the presentation and information provided on food products (Seiders and Petty, 2004). Our research focuses on the effectiveness of food and nutrition labeling in communicating nutritional content and dietary value to the consumer, specifically examining how consumer characteristics such as knowledge and motivation moderate the effects of nutrition labeling on behavior.

We take a segmentation approach to our analysis because while many consumers report frequent use of nutrition labeling, certain segments appear to place a greater emphasis on labels than others. Past empirical studies have examined demographic characteristics that encourage consumers to use nutritional labels when grocery shopping, with results indicating that females, older individuals, and those living in suburban and rural areas are more likely to use nutritional labeling. Additionally, larger households have been found to be less likely to use nutritional labeling.

The rationale for conducting this research stems from the need to explore the determinants of nutritional label use, as previous studies have yielded inconsistent findings in this area. While factors such as age, income, and working status have not consistently been associated with label use, education and gender (specifically, being female) have shown a positive correlation with label use. Moreover, individuals with more available time for grocery shopping tend to be classified as label users. Additionally, consumers who prioritize nutrition and health concerns, including those on special diets, organic buyers, and those aware of the diet-disease relationship, are more likely to use nutritional labels. Conversely, studies indicate that consumers prioritizing price tend to use labels less frequently, while those emphasizing nutrition are more inclined to seek out nutritional information. Furthermore, a substantial body of research has demonstrated that greater nutrition knowledge significantly increases the likelihood

https://doi.org/10.55802/IJB.029(4).005

of using nutritional labels.

While previous studies have predominantly relied on Stigler's (1961) cost-benefit approach to examine nutritional label use, some researchers have proposed alternative theoretical frameworks, such as those proposed by Zarkin and Anderson (1992) and Drichoutis et al. (2006). The purpose of this research is to expand beyond the existing literature, which heavily concentrates on food labels as direct aids in point-of-purchase shopping. While recognizing the limitations imposed by consumers' limited information processing abilities and time, this research argues for the consideration of purchase styles in assessing the effectiveness of product label information.

Purchase styles prioritize time and shopping situations in decision-making and acknowledge the influence of labels on consumer confidence in food quality and education regarding diet and health. Consequently, a broader conceptual framework is needed to analyze food labeling comprehensively. To achieve this, this study will explore the limitations of labels as direct shopping aids and highlight the significance of purchase styles in segmentation. These purchase styles have notable impacts on the food marketing system, even if consumers do not extensively rely on labels when making product selections. While a small but active consumer segment may actively use labels (Padberg, 1999), other impacts can occur irrespective of consumers' use of labels as shopping aids.

In conclusion, this research aims to broaden the scope by examining the role of labeling in consumer goods markets and the justifications for segmentation and targeting via consumers' purchase styles. This helps better understand the limitations of food labels as point-of-purchase shopping aids.

The limits of labels as direct shopping aids and the need to introduce purchase styles in segmenting the markets have been recognized in the realm of food labeling. While food labels are valuable sources of information for consumers, their utilization is hindered by consumers' limited time and cognitive abilities during shopping. Research conducted by Park et al. (1989) on grocery shopping behavior reveals that consumers make a significant portion of their purchase decisions in-store, with time constraints and decision-making pressure affecting the quality of their choices. Additionally, many consumers dislike grocery shopping, further limiting their reliance on food labels as shopping aids.

It is important to understand that food labels are just one aspect of the broader range of product information available to consumers. Consumers acquire knowledge from various sources, such as the medical profession, government, and health and consumer advocacy groups, which may sometimes present conflicting information. Therefore, viewing food labels solely as direct consumer information is insufficient. However, this does not diminish the significance of food labels to consumers with allergies, specific dietary needs, or a focus on health. Nor does it imply a loss of consumer choice. In response to the complexity of consumer products, consumers often develop distinct purchasing styles to navigate information overload.

While relying solely on consumers' direct use of labels as shopping aids may have limitations, research suggests that influence can still occur even in the absence of widespread label use. Population segments or consumer advocates who engage with labels and publicize their findings can drive changes in consumption patterns. Moreover, not all consumers interact with nutrition label information similarly. Different purchase styles emerge at the point of purchase, where consumers may value comprehensive labeling separately from its use as a direct shopping aid.

https://doi.org/10.55802/IJB.029(4).005

Early studies by Lenahan et al. (1973) on consumer reactions to proposed nutritional labeling formats found that many consumers appreciated the existence of labels, even if they did not actively use them. This indicates that food labels have option and existence values beyond their direct use value. The option value refers to the availability of labels for those who choose to use them, while the existence value can be seen as a sense of consumer assurance that food products are being monitored. The Nutri-Score has been shown to promote healthier food choices and improve the overall nutritional quality of consumers' shopping carts (Ducrot et al., 2016; Julia and Hercberg, 2017; Egnell et al., 2019; Crosetto et al., 2020; Sarda et al., 2020; Dubois et al., 2021).

III. MODEL DEVELOPMENT AND RESEARCH HYPOTHESIS

A. Conceptual Models

Front-of-package nutrition labels impact consumer behavior through various pathways. Initially, the label must attract the consumer's attention to have an effect on their decision-making process (Wogalter et al., 2002; Bialkova et al., 2014). Understanding how nutritional labels use influences brand-switching behavior is crucial for business practitioners, with the likelihood of switching brands due to label information being a key variable. Previous research indicates that consumers alter their purchasing behavior based on nutritional labels, primarily to avoid negative nutrients (Derby and Levy, 2001; Hawkes, 2004). Additionally, studies suggest that nutritional information can impact brand choice (Baltas, 2001), and labeling and educational campaigns can significantly influence consumer behavior (Teisl et al., 1997; Teisl et al., 2001).

Rogers' Diffusion of Innovation Model (1995) and McGuire's Information Processing Model (1976) are influential frameworks for understanding the adoption of innovations and consumer information processing. Rogers' model consists of five stages: knowledge, persuasion, decision, implementation, and confirmation, while McGuire's model originally had eight stages but was later reduced to five: exposure, attention, comprehension, acceptance, and retention. In McGuire's model, consumers attend to messages they perceive as relevant to their lives. Attention is followed by comprehension, where the message is analyzed for meaning and stored in memory. Acceptance refers to the persuasive impact of the information, and retention involves transferring the information to long-term memory. Overall, both models highlight the process of knowledge acquisition, persuasion, decision-making, behavior change, and the importance of relevance and comprehension in consumer information processing. This study proposes a model (see Figure 1) with a conceptual basis on the consumer-oriented adoption model called "EACI," consisting of four stages: Exposure, Attention, Comprehension, and Implementation. Knowledge and attention to labels are key in utilizing them for purchasing decisions (Cronin et al., 1993). Nutritional food labels attract consumer attention, and comprehension of label terms is generally high due to consistent formatting and terminology. The implementation stage is linked to accepting label information as credible. Consumers primarily read labels to avoid negative nutritional attributes, which have a stronger impact on purchase decisions than positive attributes (Byrd-Bredbenner, 1994).

The EACI (Exposure, Attention, Comprehension, Intention) model focuses on Individual-Level Processes. Exposure ensures that the individual has come into contact

https://doi.org/10.55802/IJB.029(4).005

with the label. Attention assesses whether the label captures the individual's attention, and comprehension measures whether the individual understands the information on the label. Intention evaluates if the label influences the individual's intention to purchase or use the product. The EACI model explicitly breaks down the cognitive processes involved when a consumer interacts with a product label, making it highly specific to the shopping context of product labeling. In comparison, Rogers' Diffusion of Innovation Model is more applicable to strategic decisions about introducing innovations rather than tactical adjustments to product labels. McGuire's Information Processing Model offers a framework for understanding communication effectiveness but is less prescriptive for specific elements of product labeling. It focuses on general communication strategies rather than the specific stages of product labeling effectiveness.

The EACI model's specificity, granularity, and focus on individual cognitive processes make it a superior framework for understanding and improving the effectiveness of product labeling. It allows for targeted interventions at each stage of consumer interaction, leading to more actionable insights and practical improvements. In contrast, while valuable in their own right, Rogers' Diffusion of Innovation model and McGuire's Information Processing Model do not offer the same level of detailed applicability to the shopping context of product labeling.

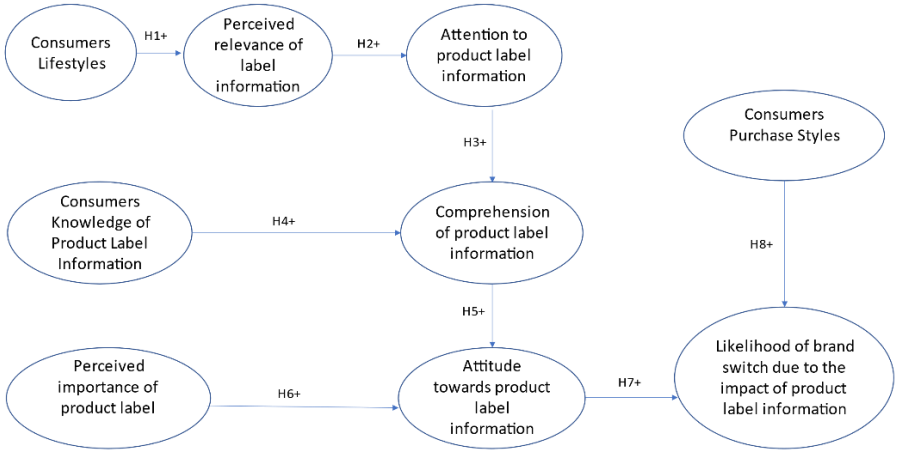
Moorman (1990) found that enduring motivation influenced information processing and decision quality, with a stronger relationship observed in the post-NLEA period (Moorman, 1996). Label use in various studies (Wang et al., 1995a, 1995b; Nayga, 2000; Kim et al., 2001a; Drichoutis et al., 2005) was measured using similar questions assessing motivation as Moorman (1990, 1996) and Keller et al. (1997).

The impact of food attributes on nutritional label use has been extensively discussed (Rotfeld, 1994; Thayer, 1997). Consumers prioritizing price are generally less likely to use nutritional labels, including specific nutrients like fat and cholesterol (Drichoutis et al., 2005). This may be due to time constraints or a desire to avoid information overload. Conversely, those valuing nutrition are more inclined to use labels (Nayga et al., 1998; Nayga, 2000) and seek nutrient-specific information (Lin and Lee, 2003; Drichoutis et al., 2005). The relationship between the importance of taste and label use remains unclear, with conflicting findings (Nayga, 1996, 1999, 2000; Nayga et al., 1998; Drichoutis et al., 2005).

Figure 1 demonstrates an exploratory model of consumers' responses to food product labels with a segmentation by purchase styles.

https://doi.org/10.55802/IJB.029(4).005

Figure 1
An Exploratory Model on Consumers' Responses to Food Product Labels Segmentation by Purchase Styles



B. Research Hypotheses

Derby and Levy (2001) found that health claims on food packaging can influence consumer purchasing decisions despite a low level of belief in the claims. Such claims can also lead to truncated information searches and more favorable judgments about the product (Levy and Fein, 1998; Roe et al., 1999). The presence of health claims on perceived healthier products significantly increases purchase intentions (Steinhauser and Hamm, 2018; De Temmerman et al., 2021). However, including health claims does not always affect product evaluations or purchase intentions, and there is only a weak effect on disease risk perceptions (Roe et al., 1999; Garretson and Burton, 2000). Consumers face many choices regarding food and often prioritize taste over nutrition, indicating a self-control problem (Smith, 2004). However, consumers who are diet-conscious or perceive diet as important to their lifestyle are more likely to use on-pack nutrition information and health claims (Nayga, 2000; Kim et al., 2001a; Drichoutis et al., 2005). Therefore, consumer lifestyles may predict the perceived relevance of label information. This hypothesis is represented by H1.

H1: Perceived relevance of label information is positively related to consumers' healthy lifestyles.

When detailed nutritional indices and recommended daily values are illustrated on a product's packaging, consumers tend to pay more attention to the nutritional information and its importance for their diet. According to the EACI model, attention is a crucial stage in using nutritional information to influence consumers' food product choices.

https://doi.org/10.55802/IJB.029(4).005

H2: Attention to product label information is positively related to the perceived relevance of product label information.

Research suggests that consumers prefer simplified and easy-to-use labels and nutrition facts panels, as indicated by Burton and Andrews (1996). This preference is consistent with other empirical studies that show subjects prefer a larger amount of information. However, too much information can lead to poor comprehension and difficulty making food choices. Excessive nutritional information may even discourage individuals from using it to make food-related decisions (Block and Peracchio, 2006).

H3: Comprehension of product label information is positively related to attention to product label information.

Consumers' decision-making process is influenced by past experiences, needs, and wants. Effective labels assist consumers in making choices among similar products. Nayga (1999) investigated factors that shape consumers' perceptions and beliefs about label usage. Knowledge plays a critical role in the consumption process and can impact future behavior (Moorthy et al., 1997). Erdem and Keane (1996) proposed two models for consumer decision-making when faced with uncertainty about brand attributes, aiming to maximize utility in the short term and expected utility over time.

Consumers' level of nutrition knowledge can influence label use and subsequent purchasing decisions (Bender and Derby, 1992). Nutrition knowledge increases the perceived benefits of label use and decreases its cost, enhancing efficiency. Moorman and Matulich (1993) found a positive relationship between health knowledge and information acquisition, including nutrition label reading. However, Nayga et al. (1998) and Nayga (2000) did not establish a similar relationship. Moorman et al. (2004) discovered that subjective knowledge significantly influences information search locations, with consumers more likely to seek information consistent with their beliefs. Adesina et al. (2022) highlighted that the reading and comprehension of information on nutritional labels among consumers is not uniform and that food labels also have an impact on most people’s purchasing decisions.

H4: Consumers' comprehension of product label information is positively related to their knowledge of product label information.

The personal factors that influence consumer comprehension of nutrition information, such as ability, motivation, and knowledge levels, are considered important in assessing enduring motivation (involvement) and enduring ability (nutrition knowledge) to process such information. These factors also play a role in shaping consumers' attitudes toward product label information.

Moorman's (1990) study examined the impact of both stimulus and consumer characteristics on the use of nutrition information, highlighting that negative consequence information displayed on products increased consumer motivation and ability to process such information. This suggests that consumers with a positive attitude towards product label information are more likely to engage in comprehensive processing of the information. Furthermore, previous research has indicated that changes in nutrition label format can enhance consumers' ability to comprehend nutrition data, leading to improved

https://doi.org/10.55802/IJB.029(4).005

evaluation of disease risk perceptions and purchase decisions (Kemp et al., 2007). This finding suggests that consumers with a positive attitude towards product label information are more inclined to invest effort in understanding the information provided.

Additionally, Wang et al. (1995a) found that the enduring importance of nutrition, encompassing both motivation and ability, positively predicted consumer search and use of nutrition information. This implies that consumers with a positive attitude towards product label information are more likely to have higher levels of comprehension, as they are motivated to seek out and process the information.

Taken together, these findings support the notion that consumers' attitude toward product label information is positively related to their comprehension of the information. Consumers with a positive attitude are more likely to engage in thorough processing of the information, leading to a better understanding of the nutritional content and its implications for their decision-making.

H5: Consumers' attitude towards product label information is positively related to their comprehension of the information.

When consumers encounter food labels, they can be influenced through various channels, including cognitive effects, emotional reactions, and social influences. Cognitive effects play a significant role in shaping consumers' attitudes. Food labels that provide novel health information, challenging existing beliefs and attitudes, tend to have a greater impact. According to the expectancy disconfirmation theory, when consumers are presented with new and unexpected information, their attitudes toward a product can shift (Oliver, 1980). Labels also serve as reminders of long-term health goals, reinforcing the importance of making healthy choices. Even if consumers are already aware that certain foods are unhealthy, seeing the label can remind them to prioritize their health and make better choices.

Emotional reactions can also be triggered by food labels, which can prompt discussions among friends and family, influencing decision-making and potentially leading to broader changes in social norms (Hammond, 2011; Li et al., 2020). This indicates that labels have social influences that can shape attitudes and behaviors.

Food labels influence consumer behavior through cognitive effects, emotional reactions, and social influences. Novel health information challenges existing beliefs and attitudes, shifting consumer attitudes. Labels serve as reminders of long-term health goals and can induce emotional reactions. They also prompt discussions and influence social norms. These factors interact with individual attributes and environmental factors to shape attitudes and behaviors. Hence, the attitude towards product label information is positively related to its perceived importance.

H6: The attitude towards product label information is positively related to the perceived importance of such information.

Whether the use of nutritional information leads to brand switches and dietary changes is subject to consumers' attitudes and beliefs. Teisl et al. (2001) argued that providing health-related information does not always result in consumers switching away from "unhealthy" products. Therefore, educating consumers about the beneficial impact of making healthy food choices may be necessary first (Mayer et al., 1993). However,

https://doi.org/10.55802/IJB.029(4).005

most empirical research indicates that providing and using nutritional information can significantly alter dietary patterns. Variyam et al. (1995, 1997) studied the effect of information, expressed as knowledge, on dietary intake.

Furthermore, consumers tend to value products that make claims about their nutritional content more highly than products with no such claims. These claims also induce consumers to pay more attention to the nutrition panel (Teratanavat et al., 2004).

H7: Brand switches due to the impact of product label information is positively related to the attitude towards such information.

1. A Segmentation Approach – Purchase Styles

The use of nutrition labels can be influenced by a combination of sociodemographic variables, including age, gender, family size, living situation, education, income, and occupation, which in turn can generate the four segments of shoppers: impulse shoppers, brand loyal shoppers, cautious shoppers, and analytical shoppers. The influence of age on nutrition information use has yielded mixed results (Cole and Gaeth, 1990; Moorman, 1990; Cole and Balasubramanian, 1993; Wang et al., 1995b; Nayga, 2000; Bryla, 2020; Sarda et al., 2020). Older individuals perceive labels as less comprehensible and tend to read only the ingredient list, while younger people read nutritional labels (Bender and Derby, 1992). The relationship between age and label use is mixed, but the likelihood of using fat, cholesterol, and health-related information increases as age increases (Nayga, 1996; Lin and Lee, 2003). One important sociodemographic factor is household size. Research suggests that larger households, particularly those with small children, are more likely to use food labels (Wang et al., 1995a, 1995b). This may be because households with more members have a greater need to consider the nutritional content of the products that they purchase to meet the diverse dietary needs of their family members.

Education level is another influential factor. Studies consistently show that consumers with higher levels of education are more likely to use nutrition information labels (Wang et al., 1995a, 1995b; Nayga et al., 1998; Viswanathan et al., 2009). Higher education levels are associated with increased information search, with better-educated individuals considering both nutritional labels and ingredient lists (Bender and Derby, 1992). Despite lower perceptions of label usefulness, highly educated individuals are more likely to utilize nutritional labels, including specific nutrient information (Wang et al., 1995a, 1995b; Nayga et al., 1998; Kim et al., 2001a; McLean-Meyinsse, 2001; Drichoutis et al., 2005). This may be due to their greater awareness of the importance of healthy eating habits and their ability to understand and interpret the information provided on the labels.

Income can also shape consumer behavior toward nutrition labels (Wang et al., 1995a, 1995b; Nayga et al., 1998; Sarda et al., 2020). The relationship between income and nutritional label use is inconclusive. While the impact of income on label use is less clear, some studies suggest that consumers with higher incomes are more likely to use and compare nutrition information labels. Higher-income consumers tend to value nutritional information and rely on labels, but the impact on specific nutrients like cholesterol is mixed (Nayga, 1996; Drichoutis et al., 2005). This could be attributed to their increased purchasing power and willingness to invest in healthier food choices.

Gender, on the other hand, has yielded conflicting results (Nayga et al., 1998;

https://doi.org/10.55802/IJB.029(4).005

Nayga, 2000). Some studies have found no differences between male and female shoppers in their likelihood of using nutrition labels. However, economic studies analyzing scanner data often show significant coefficients for female shoppers and label use. Females use nutritional labels more frequently than males, paying attention to calorie, vitamin, and mineral information (Bender and Derby, 1992; Kim et al., 2001a, 2001b; McLean-Meyinsse, 2001). Males tend to focus on ingredient lists (Bender and Derby, 1992). Various cultural and contextual factors may influence these differences, and further research is needed to understand the gender dynamics in relation to label use.

The connection between employment status and label use is also uncertain. Some studies suggest that unemployed or retired individuals use labels more, while others indicate that working individuals are more likely to utilize nutrient information (Nayga et al., 1998; Nayga, 2000; Drichoutis et al., 2005). However, the use of different types of nutritional information varies among working individuals, with ingredients and vitamin/mineral information being more commonly utilized than cholesterol information (Nayga, 1996; Drichoutis et al., 2005). Additionally, employment has a negative relationship with the use of sodium information (Nayga, 1996).

Household characteristics influence label usage. Households with preschool children and married consumers tend to search for nutrition information more often (Feick et al., 1986; McLean-Meyinsse, 2001). Larger household sizes are negatively correlated with label use, although some studies find that larger households use labels more often, particularly for vitamins/minerals and sugar content information (Wang et al., 1995a, 1995b; Nayga, 1996; Drichoutis et al., 2005). Major grocery shoppers are more likely to use labels, while meal planners prioritize taste over calorie and cholesterol information (Kim et al., 2001a; Drichoutis et al., 2007). Geographical location also plays a role, with non-city or rural areas associated with higher label usage, especially regarding fat content information (Wang et al., 1995a, 1995b; Lin and Lee, 2003).

Time pressure influences individuals' search for nutrition information. Those with more time available during grocery shopping are more likely to use nutritional labels (Nayga et al., 1998). The effects of time pressure on label use are specific. Low levels of time pressure are associated with higher use of cholesterol information but lower use of vitamins/minerals information (Drichoutis et al., 2005). Agreeing that "reading labels take more time than I can spend" reduces the likelihood of using nutritional labels and fat content information (Kim et al., 2001a; Lin & Lee, 2003). Chen et al. (2024) explain how contextual and individual factors, such as time pressure, influence the process.

Overall, the interaction of sociodemographic variables such as household size, education, income, and gender contributes to the formation of different shopper segments. Impulse shoppers may be less influenced by specific sociodemographic factors and are more likely to make purchase decisions based on immediate visual appeal. On the other hand, brand-loyal shoppers may exhibit consistent preferences and trust in their favorite brands, regardless of sociodemographic factors. Cautious shoppers consider a few factors, such as price and nutrition, in their purchasing decisions, while analytical shoppers consider multiple factors, including price, nutrition, and other product attributes, before making a purchase. Understanding these segments can provide insights into how different sociodemographic variables shape consumer behavior and influence their attention to product label information.

The impact of demographic and socioeconomic factors on consumer purchase styles has led to the hypothesis that these styles may influence their attention to nutrition

https://doi.org/10.55802/IJB.029(4).005

labels. Specifically, it is believed that consumers' purchase styles will predict their brand-switching behavior and their level of attention to product label information.

H8: Consumer purchase styles will be predictive of their brand switches due to the impact of product label information.

IV. DATA ANALYSES AND RESULTS

A. Data Collection and Sample

An online survey was conducted using convenience sampling. All study participants were solicited using online media (announcements, social media, email invitations). The total reach of potential respondents is unknown. Since there is no sampling frame, there is no way of calculating the response rate. Because the persons contacted could elect not to participate in the study, the data analyzed in the study, in essence, were drawn from a non-probabilistic sample. Therefore, the degree to which the data represents the general population is unknown. Participants who opted to click the survey link can answer the questions. A total of 923 persons responded to started the survey link, and 477 completed it (51.7% completion rate). The 477 respondents answered a series of questions associated with the attention to, interaction with, and knowledge of product label information and general purchase styles, lifestyles, and demographic information.

About 80.15% of the respondents were female. This may be because many males were excluded from the study after answering the screening question, which identified the participant as the primary food shopper for his/her household. About 67% of the respondents had no children, but of those who had, 21% had between 2 and 4. The largest sector of participants in the age range was 21-30. Many were also between the ages of 51-60. The majority of the respondents had an income level of 75,000 or more. Most had either some college experience (48.32%) or had completed an undergraduate degree (40.52%).

B. Descriptive Results

Regarding consumers' attention to nutritional labels, 29.09% of respondents frequently look at them when making food purchases, while 24.94% look at them occasionally. Regarding the amount of information read, 29.7% of respondents read almost all of the information, and 27.8% read about half. Overall, 72.7% of those surveyed read half or more of the information. Generally, consumers have at least some understanding of what they are reading on product labels, with 32.7% saying they understand a lot and 27.7% saying they understand some of what they read. Only 15.1% of the sample reported understanding little to nothing of what they read. Snack foods are the type of product that respondents most frequently check for nutritional information, followed by desserts and then entrees**.**

The way nutritional content is displayed can influence a consumer's decision to purchase a product. According to the survey, while a large number of respondents remained neutral on whether they would purchase a product with nutritional information displayed more conveniently, 44% either strongly agreed, agreed or somewhat agreed that it would influence their decision. Similarly, a majority of 54.54% either strongly

https://doi.org/10.55802/IJB.029(4).005

agreed, agreed, or somewhat agreed that they would purchase a product with the most nutritional content, regardless of how it was displayed.

The survey also revealed which attributes of nutritional labeling information consumers considered important. Most respondents found Expiration Date (78.8%), Calories (59.95%), Calories from Fat (57.3%), Fat (58.6%), and Saturated Fat (52.9%) to be somewhat relevant, relevant, or very relevant when viewing a nutritional label.

Other factors like Health Claims (45.9% of respondents), Protein (41.2% of respondents), Unsaturated Fat (43% of respondents), Serving Size (44.7% of respondents), and Sugar (44.6% of respondents) also proved to be important to consumers, though not the majority. The way nutritional information is presented can also influence a consumer's decision to purchase a product. While most respondents were neutral when asked if they would purchase a product with easy-to-read nutritional information, 53.2% of them either strongly agreed, agreed, or somewhat agreed that label readability is an important factor. Similarly, when asked if they would consistently purchase a brand with easy-to-read labels, most respondents (55.7%) either strongly agreed, agreed, or somewhat agreed, indicating that a consistent brand image with easy-to-read labeling may foster brand loyalty.

Regarding taglines containing nutritional information, such as Low Fat, No Fat, Reduced Fat, Low Sodium, Low Sugar, and Made in the US, the average respondent was somewhat likely to purchase the product. Food manufacturers may consider incorporating these taglines, especially for snacks, desserts, and entrees. Bold colors and fonts also impact purchasing decisions, with 33.1% of respondents stating that they would likely buy a product with bold colors and 37.6% stating the same for bold font. Respondents were mostly neutral regarding visually appealing colors, larger fonts, and relevant nutritional information on the side or back of the product. However, even in these cases, the majority of respondents answered somewhat likely, likely, or very likely to purchase the product.

When considering gender differences, Barletta (2003) notes that "Men are buyers, women are shoppers." Men's purchasing processes are straightforward and linear, aiming for a "good solution." In contrast, women's purchasing processes are more complex, striving for the "perfect solution" (Barletta, 2003). Table 1 highlights the significance of these gender differences in the context of product label reading

We performed a cross-tabulation analysis between "gender" and "how much do you read the product labels." The results are presented in Table 1. The chi-square value of 40.671 ($df = 4$, $p < .001$) indicates a significant association between gender and the frequency of product label reading. The analysis reveals that 80.8% of female respondents read half or more of the information on labels, compared to only 57.7% of male respondents. In addition, 11.5% of male respondents read none of the information on labels, while only 1.9% of females totally ignore information on labels. This suggests that nutritional labeling is more pertinent to females, highlighting the potential benefit of incorporating female-friendly or visually appealing designs and color schemes on product labels.

https://doi.org/10.55802/IJB.029(4).005

Table 1
Gender and How Much Reading Information on Labels – Crosstabulation Results

			How much reading information on labels					Total
			All of the information	Almost	About half of the information on the label	Only a little	None	
Gender	Male	Count	27	30	33	48	18	156
		% within gender	17.3%	19.2%	21.2%	30.8%	11.5%	100.0%
	Female	Count	45	111	96	54	6	312
		% within gender	14.4%	35.6%	30.8%	17.3%	1.9%	100.0%
Total		Count	72	141	129	102	24	468
		% within gender	15.4%	30.1%	27.6%	21.8%	5.1%	100.0%

C. Hypotheses Testing Results

The full model (see Figure 1) was tested using SEM analysis to verify the significance of the inter-relationships between constructs. The SEM approach affords advantages regarding the scope of hypotheses that can be investigated. Specifically, it allows the researcher to study multiple relationships comprehensively and simultaneously. It facilitates a more complete modeling of theoretical relations and explicitly addresses measurement error, whereas traditional analyses (e.g., MANOVA and ANOVA) limit their focus to associations among measures and rely on raw composite scores that fail to address measurement error adequately. This study meets all the conditions (suggested by Bagozzi and Yi, 1989) under which the use of the structural equation model is appropriate. SEM was considered appropriate for this study since the sample size (total of 477) was large enough for convergence and estimation.

The relationships among the constructs are tested using Structural Equation Modeling with EQS. First, the overall fit of the observed data to the model is tested. The obtained value of the Chi-Square Statistic is 627.56 ($p = 0.000$, d.f. = 72), indicating an appropriate model fit. Our measured CFI (Comparative Fit Index) value of 0.933 exceeds the required value of .90, which can be considered as an indicator of a great model fit. The NFI and NNFI (Non-Normed Fit Index) with a value of 0.925 and .903, respectively, indicate that our model reaches a value above the cut-off criteria of .90.

The research findings support all the hypotheses proposed in our model regarding the relationship between different constructs and consumers' likelihood of brand switching due to the impact of product label information. Consumers' lifestyles show a significant and positive relationship with the perceived relevance of product label information, supporting Hypothesis 1. This suggests that consumers who align their lifestyles with health-conscious choices are more likely to perceive product label information as relevant. In addition, consumers' lifestyles are found to be positively related to the perceived importance of label information in the post hoc analyses.

https://doi.org/10.55802/IJB.029(4).005

Table 2
Hypotheses Testing Results - Impact of Product Labelling on Brand Switch

Constructs	Standardized Coefficients	Hypotheses
Consumers Lifestyles → Perceived relevance of product label information	0.995 *	H1 supported
Perceived relevance of product label information → Attention of product label information	0.944*	H2 supported
Attention to product label information → Comprehension of product label information	0.169*	H3 supported
Consumers' Knowledge of Product Label Information→ Comprehension of product label information	0.975*	H4 supported
Comprehension of product label information → Attitude towards product label information	0.441*	H5 supported
Perceived importance of product labels in decision making → Attitude towards product label information	0.681*	H6 supported
Attitude towards product label information→ Likelihood of brand switch due to the impact of product label information.	0.927*	H7 supported
Consumers Purchase Styles→ Likelihood of brand switch due to the impact of product label information.	0.262*	H8 supported
Perceived importance and consumer lifestyles are post hoc correlated positively and significantly.	1.049*(significantly and positively correlated)	

*Note: *: significant at 0.05 level.*

The perceived relevance of product label information is significantly and positively related to consumers' attention to such information, providing support for H2. This implies that consumers who consider product labels to be important are more attentive to the details presented on those labels. Furthermore, the attention given to product label information is significantly and positively related to comprehension of the information, confirming H3. This indicates that consumers who pay more attention to product labels are better able to understand the information presented to them.

Additionally, consumers' knowledge of product label information demonstrates a significant and positive relationship with their comprehension of the information, supporting H4. This suggests that consumers who possess greater knowledge about product labels are more likely to comprehend the information provided to them.

Moreover, comprehension of product label information is significantly and positively related to consumers' attitude towards the information, indicating support for H5. This implies that consumers who understand product label information have a more positive attitude toward it. Furthermore, the perceived importance of product labels in decision-making exhibits a significant and positive relationship with consumers' attitude towards product label information, confirming H6. This suggests that consumers who consider product labels to be important when making decisions have a more favorable attitude towards the information presented to them. Additionally, consumers' attitude towards product label information is significantly and positively related to their

https://doi.org/10.55802/IJB.029(4).005

likelihood of brand switching due to the impact of the information, supporting H7. This indicates that consumers with a positive attitude towards product label information are more inclined to switch brands based on the information presented on labels.

Lastly, consumers' purchase styles show a significant relationship with their likelihood of brand switching due to the impact of product label information, providing support for H8. This suggests that different types of shoppers, such as impulse shoppers, brand loyal shoppers, cautious shoppers, and analytical shoppers, may exhibit varying tendencies to switch brands based on the information provided on product labels.

In summary, the study findings support the hypotheses and demonstrate the interplay between consumers' lifestyles, perceived relevance, attention, comprehension, knowledge, attitude, purchase styles, and the likelihood of brand switching due to the impact of product label information.

D. Additional Analyses

Consumers' purchasing behavior is influenced by their use of nutritional labels, primarily to avoid negative nutrients in food products. Additional regression analysis is conducted to find the direct impact on the brand switch of perceived relevance of certain information on a product label. Items are studied from a comprehensive list, including Health claims, Expiration date, Preparation directions, Calories, Calories from Fat, Fat Content, Carbohydrates, Protein, Trans Fat, Saturated Fat, Unsaturated Fat, Serving Size, Sodium, Dietary Fiber, Cholesterol, Vitamins, Sugar, List of Ingredients, and Percent daily values. Only health claims, calories, calories from fat, trans fat, and a list of ingredients are found to be significantly and positively related to the likelihood of brand switching due to the impact of the product label.

E. Further Analyses via Segmentation by Purchase Styles

Further analysis via segmentation by Purchase Styles (including Impulse Shoppers, Brand Loyal Shoppers, Cautious Shoppers, and Analytical Shoppers) yields results on the Impact of Product Labeling on Brand Switch (Table 3), Product Label Content, and Design Factors (Table 4) as well as the Beliefs in Product Label Information (Table 5). First, as shown in Table 3, Impulse Shoppers and Brand Loyal Shoppers are less likely to switch brands than Analytical Shoppers, who are more likely to switch due to certain information not being included on the product label. Cautious Shoppers fall in the middle in their responses to product label information. Regarding the importance of product labeling in purchase decision-making, Analytical Shoppers consider it the most important factor, while Impulse Shoppers and Brand Loyal Shoppers deem it less important.

Table 3
Descriptive Statistics

Variables	Mean	Standard Deviation	Skewness	Kurtosis	Jarque-Bera Test
ECO	58.12	21.21	2.83	13.44	9956.98*** (0.00)
WTI	55.73	17.74	0.99	4.75	490.77*** (0.00)

*Notes: *** indicates 1% level of significance. p-values are given in parentheses*

https://doi.org/10.55802/IJB.029(4).005

As shown in Table 4, Analytical Shoppers also have specific preferences for product label content and design, preferring information on the back or side of the packaging, in a readable font, and with visually appealing colors. They also favored taglines indicating "No sugar" or "Low sugar." Analytical Shoppers tended to believe that reading product labels helps them make better personal dietary choices, and they felt fully capable of comprehending the information provided. They also indicated a willingness to buy products with more nutritional information, even if the display was inconvenient. Finally, the Lifestyle of Analytical Shoppers was characterized by a tendency to read product labels and a willingness to try new things.

Table 4

ANOVA Testing Results on Product Label Content and Design Factors– Segmentation by Factor of Purchase Styles (Impulse Shoppers, Brand Loyal Shoppers, Cautious Shoppers, and Analytical Shoppers)

Dependent Variable	ANOVA (significance p-value)	Duncan test on the difference of four groups
On the front	.131	The means of all four groups are equal.
On the back	.012*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups.
On the side	.021*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups.
In larger font	.076	The means of all four groups are equal.
In readable font	.028*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups.
In bold colors	.106	The means of all four groups are equal.
In visually appealing colors	.024*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups.
Tagline with Low fat	.356	The means of all four groups are equal.
No fat	.282	The means of all four groups are equal.
Reduced fat	.651	The means of all four groups are equal.
Low sodium	.185	The means of all four groups are equal.
No sodium	.195	The means of all four groups are equal.
Low sugar	.046*	The mean of Analytical Shoppers and the mean of Cautious Shoppers are significantly higher than that of all the other two groups.
No sugar	.050*	The mean of Analytical Shoppers is significantly higher than that of all

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		the other three groups.
Made with Splenda	.420	The means of all four groups are equal.
Made in the US	.768	The means of all four groups are equal.
Dependent Variable	ANOVA (significance p-value)	Duncan test on the difference of four groups

*Note: *: significant at 0.05 level*

Table 5 shows that analytical shoppers are more influenced in all categories in response to product labeling information. The Analytical Shoppers Segment believes that reading labels can help personal diet; they receive a lot of info, help choose the best product, fully comprehend info, buy with more nutritional info conveniently displayed, and buy with more nutritional info no matter the display. Compared to other purchase style segments, Analytical shoppers like at greater extent to read the information on the back, on the side, in a larger and readable font, and visually appealing colors.

Table 5

ANOVA testing results on belief in product label information – segmentation by factor of Purchase Styles (Impulse Shoppers, Brand Loyal Shoppers, Cautious Shoppers, and Analytical Shoppers)

Dependent Variable	ANOVA (significance p-value)	Duncan test on the difference of four groups
Reading label	.002*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups.
Help personal diet	.000*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups.
Received a lot of info	.000*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups. The mean of Impulse Shoppers is significantly lower than that of all the other three groups.
Help choose the best product	.000*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups. The mean of Impulse Shoppers is significantly lower than that of all the other three groups.
Fully comprehend info	.015*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups. The mean of Impulse Shoppers is significantly lower than that of all the other three groups.
Trust info	.169	The means of all four groups are equal.
Green and nutritional	.487	The means of all four groups are

https://doi.org/10.55802/IJB.029(4).005

		equal.
Buy with more nutritional info conveniently displayed	.050*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups. The mean of Impulse Shoppers is significantly lower than that of all the other three groups.
Buy with more nutritional info no matter display	.000*	The mean of Analytical Shoppers is significantly higher than that of all the other three groups. The mean of Impulse Shoppers is significantly lower than that of all the other three groups.
Buy more with easier to read nutritional info	.203	The means of all four groups are equal.
Buy same brand if same easy to read info	.372	The means of all four groups are equal.

Note: * *significant at 0.05 level.*

V. CONCLUSION AND MANAGERIAL IMPLICATIONS

This exploratory study examines various factors that influence consumers' likelihood of brand switching due to the impact of product label information. The results reveal that consumers' attention to, knowledge, and comprehension of product label information are significant factors in shaping their attitude towards the product label information and ultimately have an impact on their intention to brand switch. Importantly, consumers' purchase styles play a significant and direct role in brand switches due to label information. Additionally, consumers' lifestyle of maintaining a balanced diet emerges as an important factor.

This study emphasizes the importance of considering consumers' purchase style, as it is found to be the most influential factor driving their shopping behavior in response to product label information. Analytical shoppers are the most responsive to product label information, while impulse shoppers are the least responsive. From a managerial perspective, these findings have important implications for targeting specific consumer segments and building consumer confidence in the quality of food products. When evaluating alternative labeling regulations, it is crucial to consider the benefit-to-cost framework employed by each consumer's purchase style, taking into account the impact of label information on different segments by unique purchase styles. To effectively target different purchase styles, front-of-package nutrition labels should be prominently displayed and straightforward, especially for impulse buyers. An ideal labeling system would incorporate symbols and colors to create automatic associations that help consumers quickly and accurately interpret nutritional data. The system should also strike a balance between providing information and evoking emotional responses.

In terms of nutrition labeling, certain elements such as expiration date, calories, fat, saturated fat, and serving size are commonly considered relevant by most consumers. Health claims, protein, unsaturated fat, and sugar also hold importance but to a lesser extent. The nutritional content and label readability influence consumers' purchasing decisions, along with a consistent brand image and easy-to-read labeling. Taglines containing nutritional information such as "low fat," "no fat," "reduced fat," "low

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sodium," "low sugar," and "made in the US" have some influence on consumers' purchase decisions.

The findings of this study support the positive relationship between knowledge of product label information, comprehension, attitude, and, ultimately, brand switching. While previous research has shown mixed results (Nayga, 2000; Kim et al., 2001b; Drichoutis et al., 2005), this study confirms the indirect role of knowledge in shaping consumers' responses to label information. Also, label use itself may enhance nutrition knowledge as consumers engage with nutritional labels, leading to a more informed decision-making process.

Combining labeling with an information campaign can further impact consumer behavior by educating them. The availability of nutritional information influences consumers' valuations and perceptions of products. Certain information on a product label, such as health claims, calories, calories from fat, trans fat, and the list of ingredients, is significantly and positively related to the likelihood of brand switching. Health claims on the front of packaging can create positive judgments about a product's healthfulness, increasing the likelihood of purchase.

Based on these findings, several actionable recommendations are provided for policymakers and marketers to better target consumer segments via their purchase styles and enhance the effectiveness of product labeling. For Analytical Shoppers, who are particularly responsive to detailed product information, marketers should ensure that nutritional labels are comprehensive and include detailed information on ingredients, nutritional content, and health benefits. Data-driven marketing strategies should highlight the transparency and reliability of product information. In contrast, companies can simplify product labels using clear, concise, and visually appealing formats to target Impulse Shoppers and Brand Loyal Shoppers. Symbols, colors, and icons that quickly convey key nutritional information can aid fast decision-making.

For Cautious Shoppers, labels should inform and evoke positive emotional responses. Using phrases like “heart-healthy,” “energy-boosting,” or “immune support” can create positive associations with the product. Ensuring that labels are designed with readability in mind, using large fonts, high-contrast colors, and intuitive layouts can enhance label readability and consistency. Prominently displaying critical nutritional information such as expiration dates, calories, fat content, saturated fat, and serving sizes is crucial as these elements are most relevant to consumers. Highlighting health claims and specific nutritional benefits such as “low fat,” “no fat,” “reduced fat,” “low sodium,” “low sugar,” “high in protein,” and “contains unsaturated fats” can influence purchase decisions.

Companies can combine product labeling with educational campaigns to improve consumers’ nutritional knowledge, using multiple channels such as social media, in-store promotions, and public health partnerships. Developing interactive tools like mobile apps or online platforms where consumers can scan product labels to get detailed nutritional information, health tips, and personalized dietary recommendations can further enhance consumer engagement.

Clear regulatory standards for nutritional labeling are a necessity. Policymakers should mandate the inclusion of essential information while ensuring labels are not overly complex. Ongoing consumer research is also crucial to keep abreast of changing consumer preferences and behaviors related to nutritional labeling, allowing for periodic updates to labeling regulations. Collaborations between government agencies, health

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organizations, and food manufacturers can create standardized labeling systems that are both informative and consumer-friendly.

From a marketing perspective, marketers can use market segmentation to tailor marketing messages and promotions based on consumer purchase styles and lifestyle factors. For instance, promoting balanced diet products to health-conscious consumers using targeted digital ads and leveraging taglines that include nutritional benefits and health claims can attract consumers. Phrases such as "made in the USA," "organic," and "non-GMO" can also resonate well with certain consumer segments.

By implementing these recommendations, policymakers and marketers can enhance consumer understanding and engagement with product labels, ultimately driving informed purchasing decisions and fostering brand loyalty. This strategic approach benefits consumers by promoting healthier choices and supports businesses in differentiating their products in a competitive market.

REFERENCES

Adesina, E., Ajayi, B., Amoo, E.O., Adeyeye, B., Ajayi, M.P., Olawande, T., and Udume, M.E., 2022, "Consumers' Knowledge And Use Of Nutritional Labelling Information In Lagos, Nigeria", *Sustainability*, 14, 578.

Bagozzi, R.P., and Yi, Y., 1989, "On The Use Of Structural Equation Models In Experimental Designs", *Journal of Marketing Research*, 26, 271–284.

Baltas, G., 2001, "Nutrition Labeling: Issues And Policies", *European Journal of Marketing*, 35, 708–721.

Barletta, M., 2003, "Marketing To Women: How To Understand, Reach, And Increase Your Share Of The World's Largest Market Segment", *Dearborn Trade Publishing*, Chicago.

Bender, M.M., and Derby, B.M., 1992, "Prevalence of Reading Nutrition and Ingredient Information on Food Labels Among Adult Americans: 1982–1988", *Journal of Nutrition Education*, 24, 292–297.

Bialkova, S., Grunert, K.G., Juhl, H.J., Wasowicz-Kirylo, G., Stysko-Kunkowska, M., and Van Trijp, H.C.M., 2014, "Attention Mediates The Effect Of Nutrition Label Information On Consumers' Choice: Evidence From A Choice Experiment Involving Eye-Tracking", *Appetite*, 76, 66–75.

Bleich, S.N., Economos, C.D., Spiker, M.L., Vercammen, K.A., VanEpps, E.M., Block, J. P., … and Roberto, C. A., 2017, "A Systematic Review of Calorie Labeling and Modified Calorie Labeling Interventions: Impact on Consumer and Restaurant Behavior", *Obesity*, 25, 2018–2044.

Block, L.G., and Peracchio, L.A., 2006, "The Calcium Quandary: How Consumers Use Nutrition Labels", *Journal of Public Policy & Marketing*, 25, 188–196.

Bryła, P., 2020, "Who Reads Food Labels? Selected Predictors of Consumer Interest in Front-Of-Package and Back-Of-Package Labels During And After The Purchase", *Nutrients*, 12, 2605 - 2624.

Burton, S., and Andrews, J.C., 1996, "Age, Product Nutrition, and Label Format Effects on Consumer Perceptions and Product Evaluations", *Journal of Consumer Affairs*, 30, 68–89.

Byrd-Bredbenner, C., 1994, "Designing A Consumer-Friendly Nutrition Label", *Journal of Nutrition Education*, 26, 180–190.

https://doi.org/10.55802/IJB.029(4).005

Campos, S., Doxey, J., and Hammond, D., 2011, "Nutrition Labels on Pre-Packaged Foods: A Systematic Review", *Public Health Nutrition*, 14, 1496–1506.

Cawley, J., Sweeney, M.J., Sobal, J., Just, D.R., Kaiser, H.M., et al., 2015, "The Impact of A Supermarket Nutrition Rating System on Purchases of Nutritious and Less Nutritious Foods, *Public Health Nutrition*, 18, 8–14.

Chen, J., Fan, Y., Zhang, M., Wu, S., and Li, H., 2024, "The Neural Model of Front-of-Package Label Processing", *Nutrition Reviews*, 82, 374–388.

Christoph, M.J., Larson, N., Laska, M.N., and Neumark-Sztainer, D., 2018, "Nutrition Facts Panels: Who Uses Them, What Do They Use, and How Does Use Relate to Dietary Intake?", *Journal of the Academy of Nutrition and Dietetics*, 118, 217–228.

Cole, C.A., and Balasubramanian, S.K., 1993, "Age Differences In Consumers' Search For Information: Public Policy Implications", *Journal of Consumer Research*, 20, 157–169.

Cole, C.A., and Gaeth, G.J., 1990, "Cognitive and Age-Related Differences in The Ability to Use Nutritional Information in A Complex Environment", *Journal of Marketing Research*, 27, 175–184.

Cowburn, G., and Stockley, L., 2005, "Consumer Understanding And Use Of Nutrition Labeling: A Systematic Review", *Public Health Nutrition*, 8, 21–28.

Cronin, R.J., Achterberg, C., and Sims, L.S., 1993, "Translating Nutrition Facts Into Action: Helping Consumers Use The New Food Label, *Nutrition Today*, 28, 31–36.

Crosetto, P., Lacroix, A., Muller, L., and Ruffieux, B., 2020, "Nutritional And Economic Impact of Five Alternative Front-of-Pack Nutritional Labels: Experimental Evidence", *European Review of Agricultural Economics*, 47, 785–818.

Derby, B.M., and Levy, A.S., 2001, "Do Food Labels Work?", *Handbook Of Marketing And Society*, Sage, Thousand Oaks, 372–398.

Drichoutis, A.C., Lazaridis, P., and Nayga, R.M., Jr., 2005, "Nutrition Knowledge and Consumer Use of Nutritional Food Labels", *European Review of Agricultural Economics*, 32, 93–118.

Drichoutis, A.C., Lazaridis, P., and Nayga, R.M., Jr., 2006, "Consumers' Use of Nutritional Labels: A Review of Research Studies and Issues", *Academy of Marketing Science Review*, 9, 1–22.

Drichoutis, A.C., Lazaridis, P., and Nayga, R.M., Jr., 2007, "An Assessment of Product Class Involvement in Food Purchasing Behavior", *European Journal of Marketing*, 40, 000–000.

Dubois, P., Albuquerque, P., Allais, O., Bonnet, C., Bertail, P., Combris, P., Lahlou, S., Rigal, N., Ruffieux, B., and Chandon, P., 2021, "Effects of Front-of-Pack Labels on the Nutritional Quality of Supermarket Food Purchases: Evidence from a Large-Scale Randomized Controlled Trial", *Journal of the Academy of Marketing Science*, 49, 119–138.

Ducrot, P., Julia, C., Méjean, C., Kesse-Guyot, E., Touvier, M., Fezeu, L.K., Hercberg, S., and Péneau, S., 2016, "Impact of Different Front-of-Pack Nutrition Labels on Consumer Purchasing Intentions: A Randomized Controlled Trial", *American Journal of Preventive Medicine*, 50, 627–636.

Egnell, M., Boutron, I., Péneau, S., Ducrot, P., Touvier, M., Galan, P., Buscail, C., Porcher, R., Ravaud, P., Hercberg, S., Kesse-Guyot, E., and Julia, C., 2019, "Front-of-Pack Labeling and The Nutritional Quality of Students' Food Purchases: A 3-Arm Randomized Controlled Trial", *American Journal of Public Health*, 109, 1122–

1129.
Erdem, T., and Keane, M.P., 1996, "Decision-Making Under Uncertainty: Capturing Dynamic Brand Choice Processes In Turbulent Consumer Goods Markets", *Marketing Science*, 15, 1–20.
Feick, L.F., Herrmann, R.O., and Warland, R.H., 1986, "Search for Nutrition Information: A Probit Analysis of The Use of Different Information Sources", *Journal of Consumer Affairs*, 20, 173–192.
Garde, A., 2008, "Food Advertising and Obesity Prevention: What Role for The European Union?", *Journal of Consumer Policy*, 31, 25–44.
Garretson, J.A., and Burton, S., 2000, "Effects of Nutrition Facts Panel Values, Nutrition Claims, and Health Claims on Consumer Attitudes, Perceptions Of Disease-Related Risks, and Trust", *Journal of Public Policy & Marketing*, 19, 213–227.
Gassler, B., Faesel, C.K., and Moeser, A., 2023, "Toward A Differentiated Understanding of The Effect of Nutri-Score Nutrition Labeling on Healthier Food Choices", *Agribusiness*, 39, 28–50.
Grunert, K.G., Fernandez-Celemín, L., Wills, J.M., Genannt Bonsmann, S.S., and Nureeva, L., 2010, "Use and Understanding of Nutrition Information on Food Labels in Six European Countries", *Journal of Public Health*. https://doi.org/10.1007/s10389-009-0307-0
Hammond, D., 2011, "Health Warning Messages On Tobacco Products: A Review", *Tobacco Control*, 20, 327–337.
Hawkes, C., 2004, "Nutrition Labels and Health Claims: The Global Regulatory Environment", World Health Organization, Geneva.
Hobin, E., Bollinger, B., Sacco, J., Liebman, E., Vanderlee, L., et al., 2017, "Consumers' Response to an On-Shelf Nutrition Labeling System in Supermarkets: Evidence to Inform Policy and Practice", *The Milbank Quarterly*, 95, 494–534.
Julia, C., and Hercberg, S., 2017, "Nutri-Score: Evidence of The Effectiveness of the French Front-Of-Pack Nutrition Label", *Ernährungs Umschau*, 64, 158–165.
Keller, S.B., Landry, M., Olson, J., Velliquette, A.M., Burton, S., and Andrews, C.J., 1997, "The Effects of Nutrition Package Claims, Nutrition Facts Panels, and Motivation to Process Nutrition Information on Consumer Product Evaluations", *Journal of Public Policy & Marketing*, 16, 256–269.
Kemp, E., Burton, S., Creyer, E.H., and Suter, T.A., 2007, "When Do Nutrient Content and Nutrient Content Claims Matter? Assessing Consumer Tradeoffs Between Carbohydrates and Fat", *Journal of Consumer Affairs*, 41, 47–73.
Kim, S.-Y., Nayga, R.M., Jr., and Capps, O., Jr., 2001a, "Food Label Use, Self-Selectivity, and Diet Quality", *The Journal of Consumer Affairs*, 35, 346–363.
Kim, S.-Y., Nayga, R.M., Jr., and Capps, O., Jr., 2001b, "Health Knowledge and Consumer Use of Nutritional Labels: The Issue Revisited", *Agricultural and Resource Economics Review*, 30, 10–19.
Lenahan, R.J., Thomas, J.A., Taylor, D.A., Call, D.L., and Padberg, D.I., 1973, "Consumer Reaction To Nutritional Labels on Food Products", *Journal of Consumer Affairs*, 7, 1–12.
Levy, A.S., and Fein, S.B., 1998, "Consumers' Ability to Perform Tasks Using Nutrition Labels", *Journal of Nutrition Education*, 30, 210–217.
Li, Y., Yang, B., Owusu, D., and Popova, L., 2020, "Higher Negative Emotions in Response to Cigarette Pictorial Warning Labels Predict Higher Quit Intentions

Among Smokers", *Tobacco Control*, 29, 496–501.
Lin, C.-T.J., and Lee, J.-Y., 2003, "Dietary Fat Intake and Search for Fat Information on Food Labels: New Evidence", *Consumer Interests Annual*, 49, 000–000.
Mayer, R.N., Scammon, D.L., and Golodner, L.F., 1993, "Healthy Confusion For Consumers", *Journal of Public Policy & Marketing*, 12, 130–132.
McGuire, W.J., 1976, "Some Internal Psychological Factors Influencing Consumer Choice", *Journal of Consumer Research*, 2, 302–319.
McLean-Meyinsse, P.E., 2001, "An Analysis of Nutritional Label Use In The Southern United States", *Journal of Food Distribution Research*, 32, 110–114.
Moorman, C., 1990, "The Effects of Stimulus and Consumer Characteristics on The Utilization of Nutrition Information", *Journal of Consumer Research*, 17, 362–374.
Moorman, C., 1996, "A Quasi-Experiment to Assess The Consumer and Informational Determinants of Nutrition Information Processing Activities: The Case of The Nutrition Labeling and Education Act", *Journal of Public Policy & Marketing*, 15, 28–44.
Moorman, C., 1998, "Market-Level Effects of Information: Competitive Responses and Consumer Dynamics", *Journal of Marketing Research*, 35, 82–98.
Moorman, C., and Matulich, E., 1993, "A Model of Consumers' Preventive Health Behaviors: The Role of Health Motivation and Health Ability", *Journal of Consumer Research*, 20, 208–228.
Moorman, C., Diehl, K., Brinberg, D., and Kidwell, B., 2004, "Subjective Knowledge, Search Locations, and Consumer Choice", *Journal of Consumer Research*, 31, 673–680.
Moorthy, S., Ratchford, B.T., and Talukdar, D., 1997, "Consumer Information Search Revisited: Theory and Empirical Analysis", *Journal of Consumer Research*, 23, 263–277.
Nayga, R.M., Jr., 1996, "Determinants of Consumers' Use of Nutritional Information on Food Packages", *Journal of Agricultural and Applied Economics*, 28, 303–312.
Nayga, R.M., Jr., Lipinski, D., and Savur, N., 1998, "Consumers' Use Of Nutritional Labels While Food Shopping and at Home", *The Journal of Consumer Affairs*, 32, 106–120.
Nayga, R.M., Jr., 1999, "Toward an Understanding of Consumers' Perceptions of Food Labels", *International Food and Agribusiness Management Review*, 2, 29–45.
Nayga, R.M., Jr., 2000, "Nutrition Knowledge, Gender, and Food Label Use", *Journal of Consumer Affairs*, 34, 97–112.
Nohlen, H.U., Bakogianni, I., Grammatikaki, E., Ciriolo, E., Pantazi, M., Dias, J., and Van Bavel, R., 2022, "Front-of-Pack Nutrition Labelling Schemes: An Update of The Evidence", *Publications Office of the European Union*, Luxembourg.
Oliver, R.L., 1980, "A Cognitive Model of The Antecedents and Consequences of Satisfaction Decisions", *Journal of Marketing Research*, 17, 460–469.
Padberg, D., 1999, "Nutritional Labeling for Food-Away-From-Home", in *New Economic Approaches To Consumer Welfare And Nutrition*, Alexandria, VA.
Park, W.C., Iyer, E.S., and Smith, D.C., 1989, "The Effects of Situational Factors on In-Store Grocery Shopping Behavior: The Role of Store Environment and Time Available for Shopping", *Journal of Consumer Research*, 15, 422–433.
Peters, E., Hibbard, J., Slovic, P., and Dieckmann, N., 2007, "Numeracy Skill and The Communication, Comprehension, and Use Of Risk-Benefit Information", *Health*

https://doi.org/10.55802/IJB.029(4).005

Affairs, 26, 741–748.
Roe, B., Levy, A.S., and Derby, B.M., 1999, "The Impact of Health Claims on Consumer Search and Product Evaluation Outcomes: Results from FDA Experimental Data", *Journal of Public Policy & Marketing*, 18, 89–105.
Rogers, E.M., 1995, "Diffusion of Innovations" (4th Ed.), *The Free Press*, New York.
Rose, D., 1994, "Attitudes and Behaviors Related to Weight Status", *Food Review*, 17, 30–35.
Rotfeld, H.J., 2008a, "Financial Aliteracy", *Journal of Consumer Affairs*, 42, 306–309.
Rotfeld, H.J., 2008b, "How Do You Know That?", *Journal of Consumer Affairs*, 42, 123–126.
Rotfeld, H.J., 2010, "A Pessimist's Simplistic Historical Perspective On The Fourth Wave Of Consumer Protection", *Journal of Consumer Affairs*, 44, 423–429.
Rothman, R.L., Housam, R., Weiss, H., Davis, D., Gregory, R., et al., 2006, "Patient Understanding of Food Labels: The Role of Literacy and Numeracy", *American Journal of Preventive Medicine*, 31, 391–398.
Sarda, B., Julia, C., Serry, A.-J., and Ducrot, P., 2020, "Appropriation of The Front-of-Pack Nutrition Label Nutri-Score Across The French Population: Evolution of Awareness, Support, and Purchasing Behaviors Between 2018 and 2019", *Nutrients*, 12, 2887.
Seiders, K., and Petty, R.D., 2004, "Obesity and The Role of Food Marketing: A Policy Analysis of Issues and Remedies", *Journal of Public Policy & Marketing*, 23, 153–169.
Smith, T.G., 2004, "The McDonald's Equilibrium: Advertising, Empty Calories, And The Endogenous Determination Of Dietary Preferences", *Social Choice and Welfare*, 23, 383–413.
Steinhauser, J., and Hamm, U., 2018, "Consumer and Product-Specific Characteristics Influencing the Effect of Nutrition, Health, and Risk Reduction Claims on Preferences and Purchase Behavior—A Systematic Review", *Appetite*, 127, 303–323.
Stigler, G., 1961, "The Economics of Information", *Journal of Political Economy*, 69, 213-225.
Teisl, M.F., Bockstael, N.E., and Levy, A.S., 1997, "Preferences for Food Labels: A Discrete Choice Approach", *Strategy and Policy In The Food System: Emerging Issues*, Washington, D.C., 171–194.
Teisl, M.F., Bockstael, N.E., and Levy, A.S., 2001, "Measuring The Welfare Effects of Nutrition Information", *American Journal of Agricultural Economics*, 83, 133–149.
De Temmerman, J., Heeremans, E., Slabbinck, H., and Vermeir, I., 2021, "The Impact of The Nutri-Score Nutrition Label on Perceived Healthiness and Purchase Intentions, *Appetite*, 157, 104995.
Teratanavat, R.P., Hooker, N.H., Haugtvedt, C.P., and Rucker, D.D., 2004, "Consumer Understanding and Use of Health Information on Product Labels: Marketing Implications for Functional Food", *AAEA Conference*, Denver, Colorado.
Thayer, W., 1997, "Retailers Select 10 Best New Products Of The Year, *Frozen Food* Age*"*, 46, 1–16.
Variyam, J. N., 1995, "Modeling Nutrient Intake: The Role of Dietary Information", 1842, US Department of Agriculture, Economic Research Service.
Variyam, J.N., Blaylock, J., and Smallwood, D., 1997, "Diet-Health Information And

https://doi.org/10.55802/IJB.029(4).005

Nutrition: The Intake Of Dietary Fats And Cholesterol", U.S. Department of Agriculture, Washington, D.C.

Viswanathan, M., Hastak, M., and Gau, R., 2009, "Understanding and Facilitating The Usage of Nutritional Labels By Low-Literate Consumers", *Journal of Public Policy & Marketing*, 28, 135–145.

Wang, G., Fletcher, S.M., and Carley, D.H., 1995a, "Consumer Factors Influencing The Use of Nutrition Information Sources", *Advances in Consumer Research*, 22, 573–581.

Wang, G., Fletcher, S.M., and Carley, D.H., 1995b, "Consumer Utilization of Food Labeling As A Source of Nutrition Information", *The Journal of Consumer Affairs*, 29, 368–380.

Wogalter, M.S., Conzola, V.C., and Smith-Jackson, T.L., 2002, "Research-Based Guidelines for Warning Design and Evaluation", *Applied Ergonomics*, 33, 219–230.

Zarkin, G.A., and Anderson, D.W., 1992, "Consumer and Producer Responses to Nutrition Label Changes", *American Journal of Agricultural Economics*, 74, 1202–1207.

Zhen, C., and Zheng, X., 2017, "The Impact of NuVal Shelf Nutrition Labels on Food Purchase", *Applied Economic Perspectives and Policy*, 42, 870–887.

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https://doi.org/10.55802/IJB.029(4).005