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How Front-of-Package Labels, Perceived Food Quality, Brand Loyalty, and Consumer Consciousness of Nutritional Value Drive Consumer Satisfaction

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Abstract

Food labeling standards play a vital role in shaping our food choices. Many food-borne diseases can be effectively curtailed by adopting customer centered Front-of-Package (FOP) food labeling and nutritional standards. Past studies primarily cover consumer behavior towards food labels, yet there is a noticeable lack of literature underscoring factors affecting the consumer satisfaction towards FOP food labeling standards. To address this research gap, this study proposes an analytical framework to, first, analyze the impact of FOP food labeling standards on consumer satisfaction, second, examine the mediating role of perceived food quality and brand loyalty and third, test the moderating effect of consumer consciousness of nutritional value. A cross-section of 775 Pakistani consumers between the age of 18-65 years was drawn through purposive sampling technique and accessed through online survey to collect data. Data was analyzed using SmartPLS for structural equation modeling and confirmatory factor analysis to assess the effect size between variables. A significant positive association was found between FOP food labeling standards and consumer satisfaction, and perceived food quality and brand loyalty mediated this relationship. It was further established that consumer consciousness of nutritional value acts as a moderator in the association between FOP food labeling standards and perceived food quality and brand loyalty, respectively. In the light of these findings this study offers policy measures to enhance informed consumer choices and promote healthier eating habits. This paper fulfills an identified need to highlight inherent factors affecting consumer behavior towards FOP food labeling standards.

Keywords: Front-of-package food labels, brand loyalty, perceived food quality, nutritional awareness, consumer satisfaction.

1. Introduction

Human health is largely determined by the food they consume. Various food borne diseases ranging from as common as diarrhea to as lethal as cancers are caused by consuming contaminated food. Contamination of food occurs at any stage of the food supply chain such as production, delivery and consumption. Packaging plays a key role in protecting food from contamination from farm to fork. Moreover, it serves as an effective tool of information sharing regarding product handling and consumption. Front-of-package (FOP) food labels act as primary sources of information for the consumers about ingredients and nutritional value of the product, thus facilitating healthier food choices (Aguenaou et al., 2021; Gokani, 2024). Coderre, Sirieix, and Valette-Florence (2022) highlight various attributes of food labels including design, relevance, credibility, honesty, visibility, awareness, and clarity. Moreover, the translation of information into different languages and the use of regulator symbols on the package has a favorable impact on product positioning globally (Wagner & Charinsarn, 2021).

Attributes of product packaging have a strong correlation with consumer preferences and product acceptability. These attributes include color, design, shape, ergonomics, aesthetic appeal, and informational elements like instructions and labels. Numerous studies accentuate that packaging and labeling are the effective tools used by the food industry for sharing complementary product information with consumers (Bryła, 2020; Hafner & Pravst, 2024; Wu, Zhang, van Klinken, Schrobback, & Muller, 2021). As a result, the food industry is under immense pressure of compliance with regulatory requirements while offering safe, nutritious, and environmentally responsible food options for consumers. Processed foods occupy a major share in our daily food intake, highlighting the importance of customer-oriented consumer food labels aimed at facilitating healthy food choices. Amidst appealing packaging and pervasive marketing campaigns, consumer health does not receive the attention it deserves. However, health-conscious consumers use alternative sources of awareness about nutritional information for informed decision-making (Sigurdsson et al., 2024).

Nutrition labeling is a key tool for encouraging mindful eating and fostering a healthy lifestyle. Numerous studies have reported a significant relationship between FOP food labeling standards and consumer satisfaction (Batista, de Carvalho-Ferreira, Thimoteo da Cunha, & De Rosso, 2023; Clarke et al., 2021; Moreira, García-Díez, De Almeida, & Saraiva, 2019; Oswald, Adhikari, & Mohan, 2022; Sicilia, López, & Palazón, 2023; Smed, Edenbrandt, & Jansen, 2019; Yaseen, Mehdi, Somogyi, & Ahmad, 2016). However, there is a dearth of literature which examines the mediating role of perceived food quality (PFQ) (Andik & fitri Rachma, 2022; Shriedeh, Hanaysha, & Gulseven, 2024) and brand loyalty (Chuenban, Sornsaruht, & Pimdee, 2021; Liu, Tse, & He, 2022) and the moderating role of consumer consciousness of nutritional value (CCNV) (Aguenaou et al., 2021; Andik &

fitri Rachma, 2022; Liu et al., 2022). This research gap can be represented in the form of a research question, "What factors influence consumer satisfaction with the current food labeling standards?"

To bridge this research gap, this article proposes an analytical framework to measure the impact of FOP food labeling standards on consumer satisfaction, with the mediating role of PFQ and BL and the moderating role of CCNV. This study is particularly useful for consumers in sensitizing them for using nutritional information given on the FOP food labels for healthy food choices. Moreover, it serves as food for thought for concerned policy makers to adopt consumer-centric food labels This document is organized into eight sections; first, outlines background, purpose, and addresses the research gap; second, presents an extensive review of extant literature, discusses the variables involved, develops hypotheses, and proposes a conceptual framework; third, explains the methodology employed; fourth, presents the results of measurement and structural models of PLS-SEM, discusses the findings by comparing with extant literature; fifth, offers conclusions, theoretical contribution, highlights practical implications, identifies limitations of this research, and suggests directions for future investigations.

2. Literature Review

2.1 Food Packaging and Labeling Standards

Front-of-Package labeling promotes healthier dietary habits by offering appropriate product information (Song & Im, 2018). However, the importance of accurate information clearly describing product properties without misleading the user cannot be overstated (Bandara, De Silva, Maduwanthi, & Warunasinghe, 2016). FOP nutrition labeling programs, endorsed by the World Health Organization, aim to combat obesity (Gassler, Faesel, & Moeser, 2023) and focus on providing information about critical nutrients like sodium, trans and saturated fats, and total sugars (Batista et al., 2023; Smed et al., 2019). Equally important, consumer attitudes emphasize balanced lifestyles, food safety, and nutritional content with labels influencing purchasing decisions. Consumer label reading habits are influenced by factors like lifestyle and literacy (Moreira et al., 2019). Raising awareness among consumers about product nutritional value is crucial for labeling success.

Various nations embrace different labeling schemes, reflecting global efforts to enhance consumer awareness (Kanter, Reyes, Vandevijvere, Swinburn, & Corvalán, 2019). For instance, food producers in Australia and New Zealand are prompted to reformulate for better healthfulness through the Health Star Rating System (Mantilla Herrera et al., 2018). Directive systems, such as traffic-light schemes, promote accurate evaluation of product healthfulness (Arrúa et al., 2017). Clear and accessible information is crucial for informed decisions. The effectiveness of FOP labeling in fostering healthier choices relies on attention-capturing attributes, swift information processing, and cognitive ease (Ares et al., 2018). This study considers four specific food labels namely Multi-Traffic Light, Chile

Warning Label, Daily Intake Guide, and Health Star Rating System have been illustrated in Figure 1.

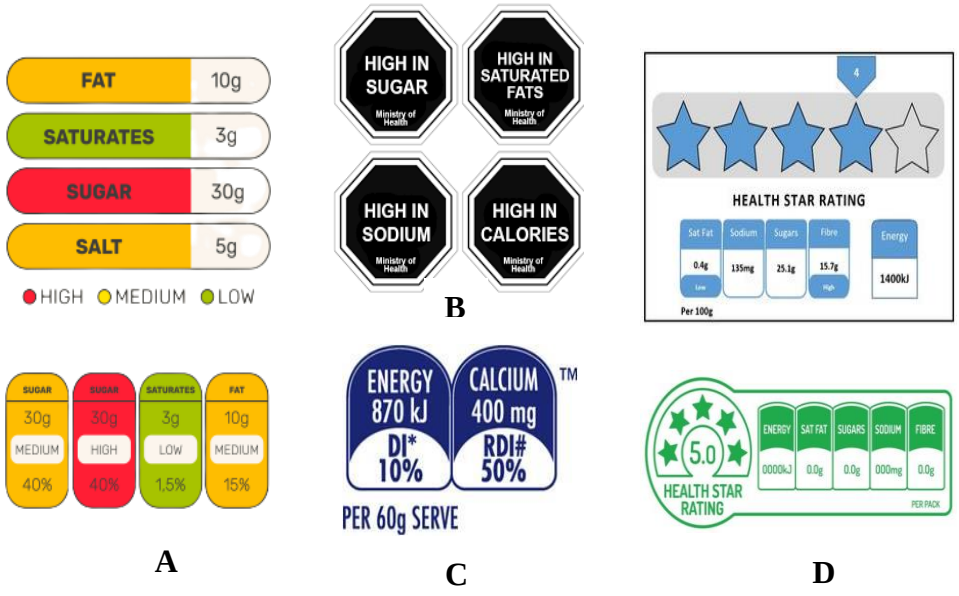

Figure 1: Four internationally used labeling standards: (A) Multi-traffic Light, (B) Chilean Warning Label, (C) Daily Intake Guide, and (D) Health Star Rating System

2.2 Food Labeling Standards and Consumer Satisfaction

FOP food labels serve as primary source of information for consumers about nutrition and health, aiding in healthier food choices (Miller & Cassady, 2015). The major focus of previous studies conducted on food labeling is on consumer perception about nutritional information, packaging design, and product layout (Feldmann & Hamm, 2015). FOP food labels generally provide details about ingredients used, nutritional value, processing methods, and storage considerations (Bandara et al., 2016). Food labeling is associated with improved dietary quality and health-conscious eating patterns, benefiting specific consumer groups (Moreira et al., 2019). In pursuit of their quest for healthier food products consumers explore various sources of information, including food labels. The literature underscores the pivotal role of food labeling in shaping consumer preferences, promoting healthier dietary habits, and guiding purchasing decisions (Khandpur et al., 2019; Sajdakowska, Gębski, Wardaszka, & Wieczorek, 2022). Sicilia et al. (2023) found that the effect of digital food influencers on purchase intention is mediated by the credibility of the FOP label. Drawing upon this discussion, we can hypothesize that:

- H1: FOP food labeling standards have a positive impact on consumer satisfaction.

2.3 Perceived Food Quality

A continuous debate revolves around the efficacy of food labels, specifically FOP nutrition labels, in addressing health risks. Previous studies emphasize that consumers' perception of a product's excellence is influenced by subjective impressions, encompassing both intrinsic and extrinsic attributes (Batista et al., 2023; Loebnitz & Grunert, 2022). There are two aspects of perceived food quality based on FOP food labels. First, that food labels provide nutritional information required by consumers to make healthier food choices. For this purpose, food labels aim to inform consumers about the nutritional content of packaged foods, promoting healthy dietary habits and preventing diet-related non-communicable diseases (Ikonen, Sotgiu, Aydinli, & Verlegh, 2020; Kanter, Vanderlee, & Vandevijvere, 2018). Second, consumers' consciousness of nutritional value plays a significant role in shaping the perceived food quality. To measure perceived understanding of consumers about FOP nutrition labels, Oswald et al. (2022) used eye-tracking technique. Considering the critical role of food labels in shaping consumers' perceptions of food quality, we can hypothesize as:

- H2: FOP Food labeling standards positively impact the perceived food quality.

Perceived product quality signifies the intangible and tangible perception of consumers towards a product and service (Nikhashemi, Valaei, & Tarofder, 2017). Several researchers have highlighted a strong correlation between perceived product quality and consumer's behavioral intentions and satisfaction towards products as well as services. For example, Nikhashemi et al. (2017) reported the positive impact of brand personality and perceived product quality on mobile phone consumers' switching behavior. Similarly, while studying online shopping behavior in UAE, Shriedeh et al. (2024) found a positive impact of website quality, customer reviews, and perceived service quality on customer satisfaction and word-of-mouth promotion. Various studies indicate that FOP food labels can influence consumers' purchase decisions, particularly in terms of choosing foods labeled as "healthy" or "unhealthy" (Clarke et al., 2021). Therefore, we can propose that perceived food quality, as influenced by FOP food labels, has a positive impact on consumer satisfaction.

- H3: Perceived food quality has a positive effect on consumer satisfaction.

2.4 Brand Loyalty

FOP food labeling may lead to brand loyalty by enhancing consumer's awareness towards nutritional value of the food products they consume. Brand symbolism influences how consumers perceive quality of nutritional labeling (Athaide & Klink, 2012; Dalal & Aljarah, 2021). Visual elements of food packaging, such as colors and design components shape consumer expectations by enhancing product acceptability (Van der Colff, Van der Merwe, Bosman, Erasmus, & Ellis, 2016). Various studies highlight the positive impact of food labels on the brand loyalty or customer repurchase intention (Abdul Latiff, Rezai, Mohamed, & Amizi Ayob, 2016; Andrews, Netemeyer, Burton, & Kees, 2021; Marette,

Nabec, & Durieux, 2019). While testing the effectiveness of Traffic Lights (TLs) in signaling the nutritional quality of food, Marette et al. (2019) found that TLs with red color leads to a reduction in consumer's willingness to pay (WTP) for products, whereas other products with the green or yellow color TLs witnessed an increase in WTP. Abdul Latiff et al. (2016). The relationship between food labels and brand quality and reputation is evident from the literature, therefore we can hypothesize that:

- H4: FOP Food labeling standards positively impact brand loyalty.

Brand loyalty is critical for long term success of any business venture, as it drives consumers' purchasing decisions. The relationship between brand loyalty and customer satisfaction has been well-established, however both have been studied in literature having bidirectional impact on each other. Some studies regress brand loyalty as predictor of customer satisfaction (Kataria & Saini, 2020), while some others report this relationship other way round i.e. customer satisfaction as predictor of brand loyalty (Liu et al., 2022; Popp & Woratschek, 2017). According to Fenko, Kersten, and Bialkova (2016) food labels and packaging significantly play a role in shaping the product experience, influencing consumer judgments, and affecting purchase intentions. A strong brand reputation influences consumer decision, even though studies vary on the correlation between brand loyalty, purchase intention and customer satisfaction (Koen, Wentzel-Viljoen, & Blaauw, 2018; Usunier, Van Herk, & Lee, 2017). Therefore, we can hypothesize as:

- H5: Brand Loyalty positively influences consumer satisfaction.

2.5 Perceived Food Quality and Brand Loyalty

Perceived food quality affects consumer's repurchase intention towards certain products, thus developing brand loyalty. Consumer evaluations and decision-making are shaped by various product attributes, significantly impacting perceptions of quality value, purchase decisions (Abdul Latiff et al., 2016). These attributes significantly affect how consumers perceive the quality and overall worth of a product, influencing their purchase decisions, happiness, intention to buy, and preference (Dörnyei, Krystallis, & Chrysochou, 2017). Perceived quality holds a pivotal role in consumer brand engagement, influencing assessments of reliability and trustworthiness, and playing a key part in shaping brand loyalty (Nikhashemi et al., 2017). Andik and fitri Rachma (2022) reported that perceived quality, brand awareness, brand association positively impact brand loyalty. Loebnitz and Grunert (2022) found similar positive results while studying the impact of perceived brand authenticity and advertising image on consumers' purchase intentions of food brands. As evident from the contemporary research, we can hypothesize that:

- H6: Perceived food quality positively influences brand loyalty.

2.6 Consumer Consciousness of Nutritional Value

Consumer consciousness of the nutritional value is influenced by many factors including the education level, emotional motivation towards healthy eating, state of health or disease (Yoo, Han, Chung, & Park, 2019). Subjective influences often outweigh evidence-based

factors in consumer perceptions and behaviors (Nardi, Teixeira, Ladeira, & de Oliveira Santini, 2020). In risk perception and consumer behavior, contextual, demographic, and attitudinal factors shape decisions, especially during crises (Kitz, Walker, Charlebois, & Music, 2022). Effective food labeling can combat obesity by encouraging healthier choices (Gassler et al., 2023). Among other factors, limited literacy and numeracy skills pose a health barrier, emphasizing the need for easily comprehensible labeling systems (Ares et al., 2018). Front-of-Pack labels enhance consumer comprehension of nutritional value. This context of consumer awareness of nutritional value being significantly impacted by food labeling is critical in the light of the following hypothesis:

- H7: Consumer consciousness of nutritional value moderates the relationship between Front-of-Package food labeling standards and Perceived Food Quality.

Numerous studies present evidence of elevated self-reported awareness and utilization of nutrition Labeling among individuals prioritizing healthier eating habits (Andrews, Lin, Levy, & Lo, 2014; Hawley et al., 2013). Relying on nutrition labels as a trusted source of information is common among individuals who consider these labels highly credible (Campos, Doxey, & Hammond, 2011). Andrews et al. (2021) examined the interplay between objective nutrition knowledge about FOP nutrition symbols such as Stop Sign labels and Traffic-Light labels, nutrient perceptions, nutrition use accuracy, disease risk, brand attitudes, and purchase intentions and found supportive results. Trust is crucial in shaping consumer choices, signifying the confidence that a brand will consistently fulfill the needs and expectations of consumers (Liu et al., 2022). Trust is integral to determining whether consumers will remain loyal to a particular product or service, closely intertwined with a brand's reputation as an indicator of product quality. Based on these discoveries, the subsequent hypothesis is suggested:

- H8: Consumer consciousness of nutrient value moderates the relationship between Front-of-Package food labeling standards and Brand Loyalty.

2.7 Proposed Analytical Framework

Consumer preferences in food packaging have shifted towards a focus on nutrition, health-conscious practices, and overall food quality, highlighting the crucial role of food labels in informed purchasing decisions. Despite substantial research, a gap persists regarding disparities between international FOP Labeling standards and those in Pakistan. This research fills the gap by examining the alignment of Pakistani standards with consumer satisfaction requirements and their impact on purchasing behavior. We propose an analytical framework (as illustrated in Figure 2) to examine the interplay between FOP food labeling standards, perceived food quality, brand loyalty, consumer awareness of nutrition values, and their collective impact on consumer satisfaction. The proposed framework offers a comprehensive understanding of the subject matter as well as novel contribution to the body of knowledge:

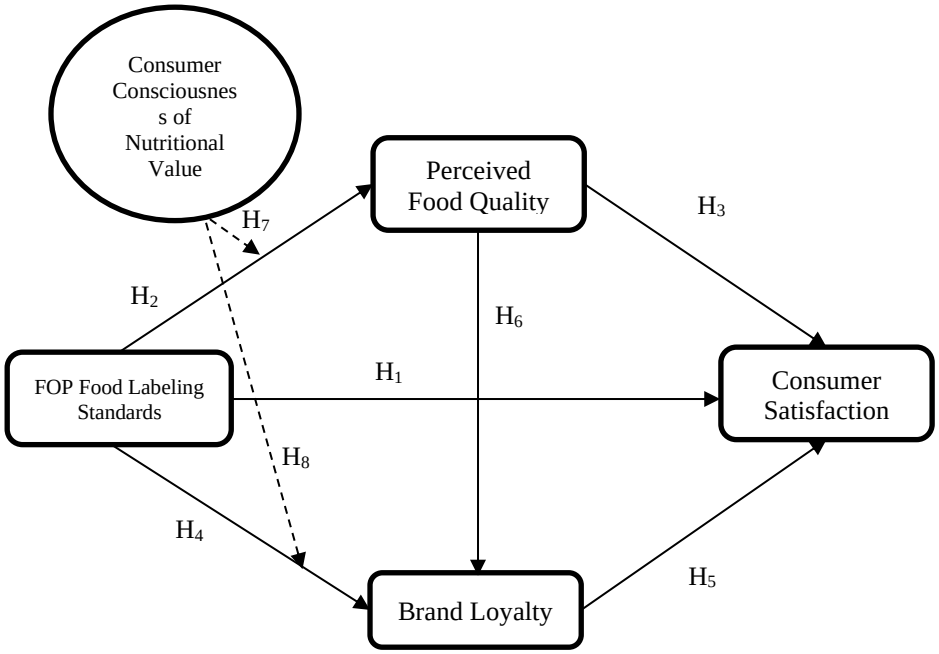

Figure 2: Proposed Analytical Framework

3. Methodology

This is a quantitative study which employs positivism philosophy and survey strategy to test hypotheses using cross-sectional data (Mabe & Bwalya, 2022). With individuals as sampling unit (Bruinsma, 2021), this study employs a purposively drawn sample of 775 individuals above the age of 18 years. Purposive sampling technique is used for targeted acquisition of data from specific population subsets, particularly, in situations where the precise calculation of selection probabilities is infeasible, or when certain population units inherently lack the possibility of being selected (Campbell et al., 2020). Moreover, purposive sampling allows researchers to exercise control over participant selection based on various factors, such as expertise in the subject matter or willingness to participate (Oliver, 2016). Additionally, this method facilitates the exploration of diverse perspectives within the population, which is crucial for understanding the multifaceted nature of the phenomena being studied (Berndt, 2020). The choice of "Maximum Variation Sampling" allows for the inclusion of varied viewpoints, enhancing the richness of the data while still adhering to practical constraints, such as time and resources (Stratton, 2021). Purposive sampling is justified in this study for several reasons. First, it allows for the selection of participants who possess specific characteristics or expertise relevant to the research objectives, ensuring that the data collected will directly address the research questions.

Purposive sampling, also referred to as judgmental, selective, or subjective sampling, relies on the researcher's discretion in selecting the study's units, whether they are participants, cases, organizations, events, or data points. This method serves to streamline the selection of potential participants in the research (Aschbrenner et al., 2024). It is commonly employed in market research, organizational research, and brand research to gain insights into potential customers, address issues, evaluate forthcoming product launches, assess brand image, and measure customer satisfaction, among other objectives.

Data was collected using an online questionnaire survey administered to individuals aged 18 years and older. The survey encompasses a well-structured set of questions designed to assess and quantify various components central to the study. Prior to the main survey, a pilot study was conducted to assess the efficiency of the survey instrument and gain a deeper understanding of the study's core principles. Based on feedback received from the pilot study, adjustments were made to enhance the clarity and comprehensibility of the questionnaire for respondents participating in the main survey. Participants were asked to rate survey questions using a 5-point Likert scale, where 1 denoted as "Strongly Disagree" and 5 denoted as "Strongly Agree." This systematic approach allowed participants to express their level of agreement or disagreement with the survey questions uniformly.

To ensure the robustness of the sample, the survey link was disseminated through multiple channels, including personalized and corporate emails, as well as prominent social media platforms such as Facebook, Instagram, and LinkedIn. The questionnaire comprises a total of 55 items, organized into nine sections, meticulously designed to comprehensively investigate various facets of front-of-package (FOP) food labeling requirements and customer preferences. Each section utilizes Likert scale questions to gauge respondents' opinions and perceptions regarding different aspects of the study variables. Drawing from established literature, these sections explored factors such as perceived food quality, consumer awareness of nutritional value, brand loyalty, and satisfaction with FOP Labeling practices. To overcome common method bias, this study utilized a two-pronged strategy. First, it adopted preventive (ex-ante) measures such as large sample size, survey strategy, pilot testing of the questionnaire, project brief, informed consent, and protecting the privacy and confidentiality of the information shared by respondents. Second, it applied ex-post measures to test the suitability of data for formal analysis. These tests include normality, reliability, validity and variance inflation factor (VIF). Confirmatory factor analysis, a preliminary technique to test the suitability of data for PLS-SEM tests common method bias as a necessary assumption of the structural model.

The last section of the survey encompassed additional demographic inquiries pertaining to education, occupation, household composition, BMI range, exercise habits, and pertinent medical considerations. This comprehensive approach aligns with prior research methodologies and enhances the depth of understanding regarding consumer behavior towards FOP food labeling (Yoo et al., 2019). The cross-sectional data analysis was

analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to investigate complex structural relationships among the selected variables (Hallak & Assaker, 2016). PLS-SEM was chosen over Covariance-Based SEM (CB-SEM) for several reasons. PLS-SEM is particularly suitable for exploratory research and small sample sizes, allowing for the analysis of non-normally distributed data and complex models with multiple constructs (Guenther, Guenther, Ringle, Zaefarian, & Cartwright, 2023). In contrast, CB-SEM requires larger samples and assumes multivariate normality, which may not hold true in this study's context. Additionally, PLS-SEM focuses on maximizing the variance explained in the dependent variables, making it more appropriate for the research goals. It is a common practice to apply structural equation modeling to datasets obtained through purposive sampling (Doustmohammadian et al., 2022; Van der Merwe, Bosman, Ellis, & Jerling, 2016; Wang et al., 2020). PLS-SEM enables the simultaneous modeling and estimation of various relationships among multiple dependent and independent variables, comprising both measurement and structural models (Becker, Cheah, Gholamzade, Ringle, & Sarstedt, 2023).

4. Results and Discussion

4.1 Socio-demographic Characteristics

Demographic characteristics of respondents affect the quality of data collected for the research study. A total of 807 responses were collected through an online survey. An essential prerequisite for participation was that respondents must be 18 years of age or older and possess the ability to comprehend English. Out of the accumulated responses, 32 samples, equivalent to 4%, did not satisfy these criteria and were consequently excluded from the analysis. The remaining 775 responses, constituting 96% of the total, were retained for further examination. The study encompassed participants aged 18 to 65, with a gender distribution of 53.3% female and 46.7% male. The survey covered demographic information such as age, gender, education, socio-economic status, occupation, household composition, exercise routines, health conditions, and grocery shopping responsibility. The study's respondents predominantly fall within the 18-24 age group, comprising 63.4% of the total participants. A significant portion, 50.8%, have attained an undergraduate education, highlighting the educational background of the sample.

In addition to age and education, the socio-demographic profile includes a diverse mix of respondents. The gender distribution shows that 53.3% are female and 46.7% are male. Regarding occupation, the largest group consists of students (34.6%), followed by professionals in various fields such as engineering, teaching, and design. Family income levels vary, with 32.1% earning between PKR 50,000 and 100,000 per month, while 17.3% report monthly incomes exceeding PKR 300,000. The health status of participants, measured by body mass index (BMI), indicates that 65.8% fall within the normal range, while 15.1% are classified as overweight and 12.5% as obese. Regarding physical activity, 25.4% engage in workouts 4-5 times per week, while a notable 33% do not participate in any physical exercise. In terms of food safety awareness, 11.1% reported having

experienced foodborne diseases. Overall, these characteristics provide important context for the study and highlight the diverse backgrounds of the respondents.

4.2 Descriptive Indicators

During data collection, respondents expressed their preference from four global nutritional Labeling systems based on their prior knowledge. Among a total of 775 respondents, 22% favored the Reference Intakes (DIG), while an equivalent 22% showed a preference for the Chilean Warning Label System (WRN). The Health Star Rating Method (HSR) was chosen by 23% of respondents, whereas the Multiple Traffic Light Label method (MTL) garnered the highest preference, with 33% of respondents selecting it as their preferred nutritional Labeling method as shown in the Table 1. These findings suggest that the MTL Label method received the highest level of preference among the respondents.

Table 1: Nutritional Label Preferences of Respondents

Food Labels	Number of responses	Percentage
Daily intake guide	168	21.7
Health star rating	180	23.2
Multi-traffic lights	259	33.4
Chilean warning label	168	21.7

4.3 Data Preparation

A basic assumption of statistical inference is that the data should follow a normal distribution. Normality of data is determined by testing the skewness and kurtosis. The acceptable range of skewness values is -3 to +3 and kurtosis values is -10 to +10 (Mishra, Pandey et al. 2019). Table 2 shows that skewness and kurtosis values for all five constructs namely BL, CCNV, CS, FOP, and PFQ fall in the acceptable range. These findings suggest that the data aligns reasonably closely with a normal distribution.

Table 2: Analysis of Normality of Constructs

Indicators	Skewness	Kurtosis
BL	-0.175	0.314
CCNV	-2.01	0.32
CS	-0.139	-0.211
FOP	-0.93	0.49
PFQ	0.192	-0.25

Collinearity, also referred to as multicollinearity, describes the scenario in which two or more independent variables within a statistical model exhibit a linear relationship (Kyriazos & Poga, 2023). In statistical analysis, collinearity is a critical consideration, as

it can significantly influence the dependability and interpretive clarity of the data (Alem, 2020).

VIF values were calculated for each indicator in the analysis to assess the extent of collinearity within the dataset. A VIF value equal to 1 indicates the absence of collinearity, while values between 3 and 5 suggest the presence of moderate multicollinearity, and VIF values exceeding 5 indicate high multicollinearity. The VIF serves as a metric to gauge the extent to which collinearity inflates the variance of estimated regression coefficient (Mansour, Al Zobi, Al-Naimi, & Daoud, 2023). This assessment is crucial in determining the impact of collinearity on the results and conclusions drawn from the statistical analysis. Table 3 summarizes the variance inflation factor (VIF) values confirming no substantial evidence of high correlations among indicators. This underscores the robustness of the statistical analysis and the independence of variables.

Consequently, the obtained VIF values enhance the reliability of the results and facilitate a clearer understanding of the individual contributions of each indicator to the model. These VIF values collectively indicate that there is no substantial evidence of high correlations among the analyzed indicators. This finding underscores the robustness of the statistical analysis and the independence of the included variables.

Table 3: Summary of VIF Values

Items	VIF	Items	VIF	Items	VIF	Items	VIF	Items	VIF
BL1	2.292	CCNV1	1.539	CS1	1.968	FOP1	2.059	PFQ1	1.485
BL2	2.402	CCNV2	1.792	CS2	2.396	FOP2	2.569	PFQ2	1.309
BL3	1.665	CCNV3	2.4	CS3	1.895	FOP3	2.029	PFQ3	1.564
BL4	1.783	CCNV4	2.69	CS4	2.602	FOP4	1.959	PFQ4	2.748
BL5	1.752	CCNV5	2.504	CS5	2.568	FOP5	-	PFQ5	2.69
BL6	2.041	CCNV6	2.407			FOP6	2.032	PFQ6	1.437
BL7	1.756	CCNV7	2.074			FOP7	1.698		
BL8	1.756	CCNV8	1.982			FOP8	1.466		
BL9	-	CCNV9	2.169			FOP9	1.404		
BL10	1.7	CCNV10	2.225			FOP10	-		
						FOP11	1.722		

Many authors have used Pearson's correlations to assess the correlations/strength between variables (Chuenban et al., 2021; Jacob et al., 2020). Table 4 represents the correlation matrix, showing significant positive correlations among all the variables, with p-values < 0.05, indicating statistical significance at the 95% confidence level and validating the linearity assumption. The results show that BL (Brand loyalty) has moderate positive

correlations with all other variables: CS (r = 0.404), FOP (r = 0.459), PFQ (r = 0.500), and CCNV (r = 0.559). This suggests that increases in BL are associated with moderate increases in customer satisfaction (CS), Front-of-Package (FOP), perceived food quality (PFQ), and consumer consciousness of nutritional value (CCNV). Customer satisfaction (CS) exhibits strong correlations with FOP (r = 0.803) and PFQ (r = 0.809), indicating that higher customer satisfaction is strongly associated with FOP and perceived food quality. CS's moderate correlation with CCNV (r = 0.503) also indicates that customer satisfaction moderately aligns with consumers consciousness of nutritional value. FOP shows a strong positive correlation with perceived food quality (PFQ) (r = 0.612), implying that front of package is closely associated with perceived quality among customers. CCNV has moderate to strong positive correlations with all other variables, notably PFQ (r = 0.558), indicating that maintaining CCNV is associated with perceived high quality. These correlations validate the assumption of linearity among the variables, showing that improving one factor may positively impact the others.

Table 4: Pearson Correlation Test

		BL	CS	FOP	PFQ	CCNV
BL	Pearson Correlation	1	.404**	.459**	.500**	.559**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
CS	Pearson Correlation	.404**	1	.803**	.809**	.503**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
FOP	Pearson Correlation	.459**	.803**	1	.612**	.528**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000
PFQ	Pearson Correlation	.500**	.809**	.612**	1	.558**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000
CCNV	Pearson Correlation	.559**	.503**	.528**	.558**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	

**. Correlation is significant at the 0.01 level (2-tailed).

4.4 Measurement Model

Structural equation modeling (SEM) requires the establishment of a measurement model to link the measurement items with their respective latent variables (Munim & Noor, 2020). This section outlines the application of the partial least squares (PLS) technique to generate outcomes for the measurement model through confirmatory factor analysis (CFA). CFA is a statistical method used to confirm the underlying factor structure of a set of observed

variables. With CFA, researchers can explore the hypothesis that a relationship exists between the observed variables and the latent constructs that underlie them (Suhr, 2006). CFA verifies the factor structure of observed variables, assessing the connection between observed variables and latent constructs (Dash & Paul, 2021). In addition to assessing the quality and reliability of the measurement instruments used in the study, the measurement model is essential for validating the relationships between latent variables and their observable indicators (Cheung, Cooper-Thomas, Lau, & Wang, 2024).

The findings, discussed in the subsequent CFA-PLS analysis section, deepen the understanding of observed and latent variable relationships, reinforcing the study's validity. Average variance extracted is a measure used to assess convergent validity and discriminant validity in structural equation modeling (SEM) and confirmatory factor analysis (CFA). By using Smart PLS, Cronbach's alpha and Average variance extracted (AVE) values were computed, assessing the measurement instrument quality and reliability. In the field of psychometrics and structural equation modeling (SEM), the AVE concept is considered a statistical term commonly applied in the context of Confirmatory Factor Analysis (CFA) and latent variable modeling (Vargas-Chanes, González-Núñez, & Ruiz-Fuentes, 2024). These values are crucial for the PLS-SEM reliability evaluation, with higher values indicating greater reliability (Sarstedt et al., 2022).

AVE values exceeding 0.50 are considered ideal for demonstrating convergent validity in SEM (Ab Hamid, Sami, & Sidek, 2017). Table 5 summarizes Cronbach's alpha and AVE values of the constructs.

Table 5: Results of Cronbach's Alpha and Average Variance Extracted

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
BL	0.879	0.903	0.508
CCNV	0.917	0.931	0.574
CS	0.833	0.882	0.6
FOP	0.879	0.903	0.513
PFQ	0.798	0.858	0.509

The values of CCNV and CS indicate strong internal consistency and reliability, supported by high Composite Reliability and Cronbach's alpha values, with reasonably high AVE values. The study assesses the internal consistency of constructs using Cronbach's alpha values, with a threshold of 0.7 indicating reliability (Amirrudin, Nasution, & Supahar, 2021). Table 5 shows exceptional internal consistency for all constructs. PFQ indicator demonstrates good reliability and moderate AVE, maintaining acceptable consistency. BL and FOP indicators show considerable consistency and reliability, though AVE values were relatively lower. Initial values for FOP5, FOP10, and BL9 fell below the threshold, impacting Average Variance Extracted (AVE). Removing these indicators improved AVE

for FOP (from 0.442 to 0.508) and BL (from 0.467 to 0.513), ensuring robust convergent validity as AVE validates indicators in latent constructs; values above 0.5 in Table 5 indicate strong reliability and convergent validity (Shrestha, 2021). A calibrated measurement model in structural equation modeling establishes relationships between latent and observed constructs.

4.5 Structural Model Results

Following the establishment of the measurement model in the preceding phase, the analysis proceeds with the utilization of Smart-PLS for Structural Equation Modeling (SEM) to explore the relationships between latent variables, as illustrated in Figure 3. The PLS-SEM research model integrates structural and measurement models. The outer model outlines the connection between a latent variable and its observed variables, whereas the inner model defines the associations among unobserved or latent variables. In the structural model, the statistical significance of path coefficients is evaluated for both independent and dependent variables (Hair, Ringle, & Sarstedt, 2011).

PLS-SEM enables the evaluation of how effectively the model accounts for the target construct of interest and computes the strength of the correlations among latent variables. By employing path coefficients and t-values, the PLS-SEM technique, in conjunction with bootstrapping, is employed to assess the importance of structural correlations (Hair et al., 2011). This analysis enhances understanding of relationships and their significance within the research model.

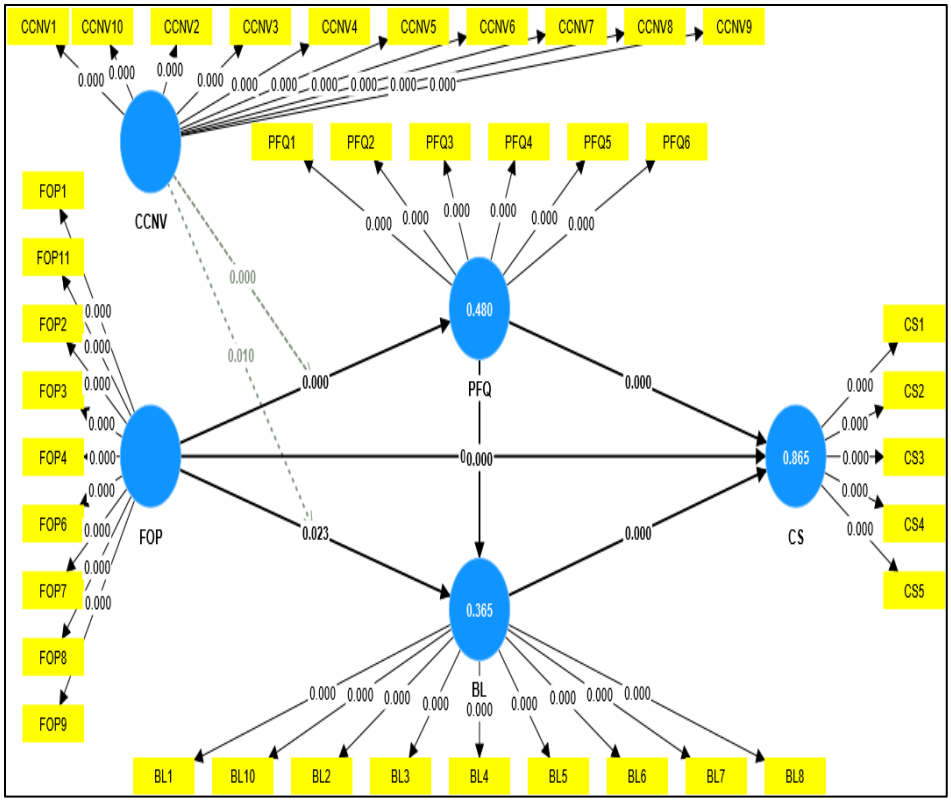

Figure 3: Structural Model Path Diagram

4.5.1 Direct Effect Analysis

In the Structural Equation Model (SEM), table 6 provides a comprehensive overview of the correlations between various variables, categorized under "Direct Path Coefficients." These coefficients represent the direct influence of one variable on another, quantifying the size and significance of these effects. The path from FOP food labeling to Consumer Satisfaction (FOP->CS) shows a highly significant positive impact, with a path coefficient of 0.581 and an exceptionally high t-statistic of 29.769. This suggests a noteworthy positive effect of FOP labeling on consumer satisfaction. Similarly, the path from FOP to Perceived Food Quality (FOP->PFQ) indicates a significant positive impact (t-statistic = 12.982) with a path coefficient of 0.459. The path from PFQ to CS also demonstrates a strong and significant impact, indicating a positive influence between these variables, with a path coefficient of 0.496.

The path from FOP to Brand Loyalty (BL) is somewhat weaker but still significant, indicating a positive effect, although less influential. Unexpectedly, the path from Brand

Loyalty (BL) to Consumer Satisfaction (CS) reveals a negative mean value, suggesting a predominance of negative values in this relationship. However, the path from the combination of CCNV and FOP to Brand Loyalty (CCNV x FOP -> BL) exhibits a significant positive impact (t-statistic = 2.565) with a p-value of 0.01, indicating that the brand loyalty is positively and statistically significantly influenced by CCNV and FOP. The path from the combination of CCNV and FOP to Perceived Food Quality (CCNV x FOP -> PFQ) also indicates a significant positive impact (t-statistic = 3.918) with a p-value of 0. These values reveal that the paths related to the interactions between CCNV and FOP have positive and statistically significant effects on both Brand Loyalty (BL) and Perceived Food Quality (PFQ). These findings expand complete understanding of the intricate relationships within the SEM, as depicted in Table 6.

Table 6: Direct Path Coefficients

Paths	Sample Mean (M)	Standard Deviation (STDEV)	t-statistics (|O/STDEV|)	P-values
FOP -> CS	0.581	0.019	29.769	0.000
FOP -> PFQ	0.459	0.035	12.982	0.000
PFQ -> CS	0.496	0.02	24.685	0.000
FOP -> BL	0.102	0.045	2.266	0.023
BL -> CS	-0.089	0.016	5.478	0.000
PFQ -> BL	0.178	0.047	3.815	0.000
CCNV x FOP -> BL	0.081	0.031	2.565	0.010
CCNV x FOP -> PFQ	0.094	0.024	3.918	0.000

4.5.2 Indirect Effect Analysis

Table 7 labeled "Indirect Path Coefficients" functions as a valuable reference for comprehending the intricate relationships among variables in the structural equation model (SEM). These coefficients shed light on the nuanced mechanisms through which intermediate variables influence outcomes. The initial path, marked by a negative coefficient, suggests that FOP indirectly affects CS through BL, with statistical significance at the 0.05 level. The second path reveals a substantial negative impact of CCNV on CS, partially mediated by BL, and this relationship is highly significant. The third path signifies a strong positive indirect effect of CCNV on CS through PFQ, also highly significant. The fourth path, while statistically significant, indicates a relatively weak negative influence of the interaction between CCNV and FOP on CS, passing through PFQ and BL. The fifth path indicates that FOP positively affects BL through PFQ, with significance, highlighting PFQ's mediating role. The sixth path suggests that the interaction

between CCNV and FOP positively impacts BL through PFQ. The seventh path unveils that PFQ negatively affects CS through BL, with BL's influence being significant. The subsequent path demonstrates that FOP negatively affects CS through the entire chain: FOP -> PFQ -> BL, with statistical significance, signifying the mediating roles of PFQ and BL. Another indirect path of CCNV through PFQ and BL on CS shows a negative effect of CCNV on CS through the complete chain, with PFQ and BL's influence being statistically significant. The indirect path of CCNV on CS through FOP and PFQ suggests that the interaction between CCNV and FOP positively impacts CS through PFQ, a highly significant effect. Lastly, a path implies that CCNV has a positive effect on BL through PFQ, representing a meaningful relationship, although not extremely strong.

Table 7: Indirect Path Coefficients

Paths	Sample Mean (M)	Standard Deviation	t-statistics	P-values
FOP -> BL -> CS	-0.009	0.005	1.998	0.046
CCNV -> BL -> CS	-0.036	0.007	4.792	0.000
CCNV -> PFQ -> CS	0.161	0.02	8.017	0.000
FOP -> PFQ -> BL	0.082	0.022	3.736	0.000
PFQ -> BL -> CS	-0.016	0.005	3.112	0.002
CCNV -> PFQ -> BL	0.058	0.018	3.297	0.001
FOP -> PFQ -> CS	0.228	0.019	11.759	0.000

4.5.3 Moderation Effect Analysis

Table 8 summarizes that consumer consciousness of nutritional value (CCNV) moderates the relationships between FOP and PFQ, and between FOP and BL according to hypothesis H7 and H8. The interaction term FOP x CCNV (0.1197) is significant ($p < .0001$), indicating that the relationship between FOP and PFQ is moderated by CCNV.

Table 8: Moderation Analysis Results

Paths	B	St.Dev	t-statistic	p-value	Findings
CCNV x FOP -> PFQ	0.1197	0.269	4.4456	0.0001	Partial moderation
CCNV x FOP -> BL	0.1197	0.298	4.0138	0.0001	Partial moderation

The proportion of variance in PFQ explained by the model is 46.53%, indicating a moderate-to-strong fit of the model to the data. The F-value (223.6363) is highly significant ($p < .0001$), indicating that the model is a good fit for predicting PFQ. Figure 5 illustrates the conditional effect of FOP food labeling standards on PFQ at different levels of CCNV as a moderator. It shows that at lower as well as higher levels of CCNV, the association between FOP and PFQ remains positive.

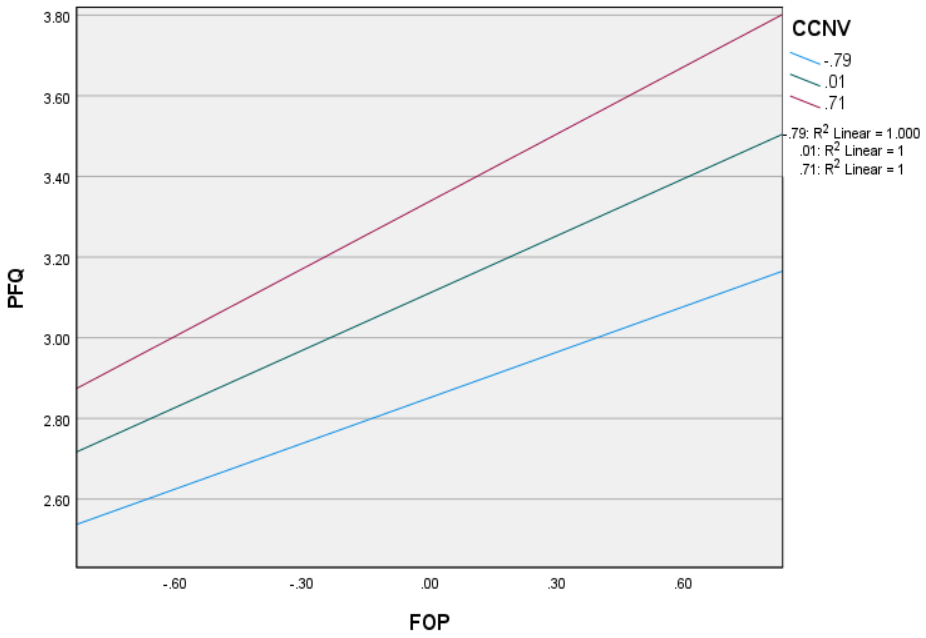

Figure 4: Conditional effect of FOP on PFQ across different levels of CCNV

The main effect of FOP on BL is significant (p-value < .0001), indicating that FOP independently influences BL. The effect of CCNV on BL is also significant (p-value < .0001), suggesting that CCNV alone has an impact on BL. The interaction between FOP x CCNV significantly affects BL (p-value = .0001), meaning that the relationship between FOP and BL varies depending on different levels of CCNV. The conditional effects show that as CCNV increases, the effect of FOP on BL becomes stronger. The proportion of variance in the outcome variable (BL) is explained by the model. Here, R-squared = 0.3424 (34.24%), indicating that about 34.24% of the variance in BL is accounted for by the predictors and moderator. Figure 5 illustrates the conditional effect of FOP food labeling standards on BL at different levels of CCNV as a moderator. It shows that at lower as well as higher levels of CCNV, the association between FOP and BL remains positive.

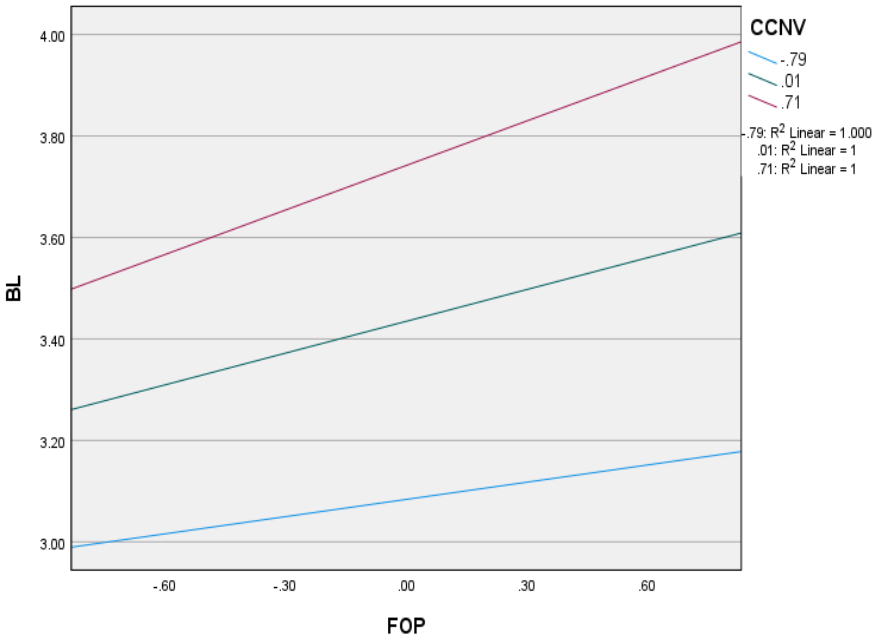

Figure 5: Conditional effect of FOP on BL across different levels of CCNV

5.6 Discussion

A comprehensive explanation of the statistical analysis conducted using Smart PLS software is provided. The online survey generated a total of 807 responses, of which 32 responses (4%) were excluded due to non-conformance with the sample criteria. Therefore, 775 responses (96%) were retained for further analysis, ensuring a complete dataset without missing values. The online survey data generated a total of 807 responses, but 32 responses (4%) were excluded due to non-conformance with the sample criteria. As a result, 775 responses (96%) were retained for further analysis, ensuring a complete dataset without missing values. A thorough examination of the measurement model was then conducted, assessing both validity and reliability. The internal consistency and reliability of the measurement instruments are supported by the reported Cronbach's alpha values, which are presented in Table 5. These values, ranging from 0.798 to 0.917, all exceed the recommended threshold, confirming strong internal consistency across all constructs. To further validate the measurement model, Average Variance Extracted (AVE) values are provided for each construct in Table 5. Most of these values fall within an acceptable range, demonstrating sufficient convergent validity.

The preferences of respondents regarding four international nutritional labeling systems were summarized in Section 4.2. The Multiple Traffic Light labeling was preferred by

majority (33%) of the respondents and supported by previous studies (Marette et al., 2019; Maubach, Hoek, & Mather, 2014). This data forms the basis for this research, providing insights into the participants' preferences regarding nutritional labeling standards. This study employs Structural Equation Modeling (SEM) to test the interrelationship between Front-of-Package (FOP) food labeling standards, consumer satisfaction (CS), perceived food quality (PFQ), and brand loyalty (BL). The analysis of path coefficients and p-values less than 0.05 confirm that FOP food labeling standards significantly affect PFQ and CS, supporting hypotheses H1 and H2 (Feldmann & Hamm, 2015; Kanter et al., 2018; Miller & Cassady, 2015; Willett et al., 2019).

An important finding from this study is that consumer satisfaction is not significantly influenced by brand loyalty, which contrasts with earlier works by (Kataria & Saini, 2020; Popp & Woratschek, 2017) that reported a positive correlation. This divergence may be due to several factors, including cultural influences and the pricing strategies of fast-moving consumer goods (FMCG), as explored by Kaur (2024). These studies suggest that in low-involvement product categories like FMCG, price sensitivity often overrides brand loyalty, which aligns with our observation of a weak or slightly negative relationship between consumer satisfaction and brand loyalty. In comparison to high-involvement products, where brand loyalty is typically stronger (Anees-ur-Rehman, Wong, Sultan, & Merrilees, 2018), the FMCG sector often sees more transient consumer loyalty due to the frequent and routine nature of purchases. The lack of strong brand loyalty observed in this study is consistent with research in the retail sector, as noted by (Walia, Kumar, & Negi, 2020) who highlighted the price sensitivity of consumers in the FMCG market. According to Umashankar, Bhagwat, and Kumar (2017) price sensitivity can have an impact on customer loyalty, especially if customers believe they are not receiving a fair return on their investment. Cultural norms and values can also have an impact on consumer satisfaction. Some cultures have specific expectations about how items should function, and they value excellent customer service and a well-known brand. Customers may become less satisfied with a brand if it fails to meet certain cultural norms or acts contrary to their values. Due to these reasons consumers may not consistently display a strong sense of brand loyalty and are more inclined to quickly move to alternatives when their favorite brand isn't accessible. Moreover, there is a risk of dissatisfaction by customers when firms fail to adapt their marketing methods to meet the cultural environment. All these studies indicate a potential adverse connection between brand loyalty and consumer satisfaction.

The findings of this study also align with Expectancy-Disconfirmation Theory (Choi, Moon, & Kim, 2019), where consumer satisfaction is shaped by their expectations and the perceived performance of the product. In this study, the perceived food quality (PFQ) acts as an intermediary, significantly influencing consumer satisfaction. The significant indirect relationship between FOP and CS via PFQ supports Cognitive Theory (Soraghan, 2019), where consumers adjust their satisfaction based on the alignment between expectations and

the quality signals provided by FOP labels. The moderation analysis reveals that consistency in consumer needs and values (CCNV) partially moderates the relationships between FOP labeling and PFQ, as well as FOP and BL. This moderation effect suggests that consumer satisfaction can be further enhanced when FOP labeling aligns with the core values of the target market. The partial moderation observed in the FOP-PFQ relationship indicates that while FOP labeling significantly impacts perceived quality, this effect is amplified when consumer values align with the brand's messaging.

The results of direct path coefficients using SEM highlight that the connection between FOP labeling and consumer satisfaction (CS) is significant, with a path coefficient of 0.581 and a t-statistic of 29.769, as presented in Table 6. To gain comprehensive insights into the correlations between the variables, the values of t-statistics and path coefficients can be analyzed. Table 7 offers a significant understanding of the intricate relationships revealed by the indirect path coefficients within the SEM. A strong and positive indirect impact can be observed along the path from FOP labeling to PFQ to CS, emphasizing the role of perceived food quality as an intermediary variable. A minor but statistically significant negative influence is noticeable in the path from FOP labeling to BL to CS. The moderation test in this analysis demonstrates that CCNV significantly influences the relationship between FOP and PFQ, as indicated by the significant interaction term (FOP x CCNV). The conditional effects reveal that the effect of FOP on PFQ strengthens with higher levels of CCNV, suggesting a partial moderation effect where CCNV enhances the magnitude of the FOP-PFQ relationship without changing its direction. the impact of CCNV on the relationship between FOP and BL appears to be a partial moderation effect. While CCNV influences the magnitude of the relationship between FOP and BL, the direction of this relationship (positive) remains consistent across different levels of CCNV. Therefore, CCNV partially moderates the FOP-BL relationship by influencing the strength of the effect rather than completely altering its direction.

5. Conclusion

This study had the primary objective of examining the influence of Front of Package (FOP) food nutritional labeling on consumer satisfaction. It specifically focused on assessing disparities among four globally recognized FOP labeling standards and their implementation within the context of Pakistan. The overarching aim of this research was to determine the degree of satisfaction among consumers with existing food labeling standards, thus ascertaining whether these standards align with consumer expectations and impact purchasing behavior. To comprehensively address this objective, the study considered several crucial participant demographics, which served as important variables. These demographics encompassed age, gender, level of education, socioeconomic status, occupation, physical activity habits, health conditions, and roles in grocery shopping. Additionally, the study sought to evaluate consumer preferences in relation to the four distinct nutritional food labeling systems: the Chilean Warning Label, the Health Star Rating System, the Daily Intake Guide, and the Multi-Traffic Light. In essence, the primary

purpose of this study was to gain a deeper understanding of consumer preferences regarding Front of Package (FOP) food labeling.

Through a five-variable analysis, including Front of Package (FOP) food labeling standards, consumer satisfaction, perceived food quality (PFQ), brand loyalty (BL), and consumer consciousness of nutritional value (CCNV), this study has yielded valuable insights. The results have revealed that CCNV acts as a moderator, influencing the relationships between FOP and PFQ, as well as FOP and BL. Furthermore, the findings have illuminated the positive impact of FOP on both PFQ and BL. Notably, PFQ has been recognized as a significant factor influencing consumer satisfaction and displaying a robust positive correlation with brand loyalty. This study provides valuable insights regarding how consumers' perceptions of food quality, brand loyalty, and satisfaction are shaped by Front of Package (FOP) food labels. This research highlights the importance of aligning food labeling standards with the preferences and expectations of consumers in Pakistan. It sheds light on the intricate interactions and connections among these various elements. Ultimately, the results underscore the potential of FOP labeling to enhance consumer satisfaction with their choices.

5.1 Theoretical Contribution

This research enhances the understanding of consumers regarding the impact of Front-of-package (FOP) labels and how they think about brand loyalty, perceived food quality and overall satisfaction. This research also expands the existing literature by introducing the concept of Consumer Consciousness of Nutritional Value (CCNV) as a moderator and provide insights that are applicable beyond Pakistan. The findings of this research align with the theories put forth by (Andrews et al., 2021; Martini & Menozzi, 2021). They emphasize in their studies that consumer awareness and the accurate interpretation of nutritional information on FOP labels are crucial and underlines the importance of informed consumer behavior. The results suggest that consumers with higher nutritional knowledge (those with higher CCNV) are more likely tend to view FOP labels as trustworthy and meaningful, which positively influences their food choices positively. The findings of this study confirm that CCNV moderates the relationship between FOP labels and consumer perceptions, supporting the idea that personal attributes significantly influence how consumers perceive nutritional information. The insights from studies by (Aguenaou et al., 2021; Khandpur et al., 2019), highlight the importance of nutritional consciousness in shaping consumers responses to food information. This research also addresses a significant gap in the literature by examining g the differences between international FOP labeling standards and those used in Pakistan. This comparison highlights the challenges faced by Pakistani consumers and suggests that cultural and regional factors play an important role in how consumer respond to nutritional information.

5.2 Practical Implications

The food safety and quality in Pakistan is primarily governed by the Pakistan Standards and Quality Control Authority (PSQCA) at the federal level, along with provincial food authorities such as the Punjab Food Authority (PFA) and Sindh Food Authority (SFA) at the provincial level. Despite the ongoing efforts, challenges persist, including limited resources and gaps in regulatory oversight. Considering these challenges, policymakers and the food industry in Pakistan should pay close attention to the practical implications of this research to align food labeling requirements with consumer expectations. The results of this research can also benefit food producers and marketers. Gaining insights into the impact of Front of Package (FOP) labeling on perceptions of food quality and brand loyalty can contribute to the development of more effective marketing and branding strategies. They can adjust their labeling practices to better cater to consumer preferences, and policymakers can use this to make informed decisions regarding labeling regulations. By optimizing their labels to have a positive impact on these factors, companies can enhance consumer satisfaction.

Additionally, the study highlights the moderating role of consumer awareness of nutritional value (CCNV) in the relationship between consumer satisfaction and FOP food labeling. This suggests that consumer education and awareness campaigns hold the capacity to positively impact customer attitudes. Therefore, developing educational programs to enhance consumers' understanding of nutritional value and labeling can make a meaningful contribution. Lastly, the findings of this study can serve as guidance for food producers in creating products that align with consumer preferences. Understanding how FOP labeling influences consumer satisfaction can inform product development plans and assist organizations in creating products that better meet the expectations of their customers.

5.3 Limitations and Future Research

The study focused on individuals aged 18 and above in Pakistan, limiting generalizability. Future research could address this limitation by focusing on specific age groups, such as Generation Z and Millennials, or by recruiting respondents with different household income, education level, health issue such as diabetes, blood pressure, different BMI, and different individuals with specific dietary preferences. This tailored approach would provide a more comprehensive understanding of food preferences among various consumer groups. This cross-sectional study with 775 responses may limit reliability; long-term approaches and larger sample sizes are recommended. Future research may consider a long-term approach such as longitudinal study to capture changes in consumer preferences over time. Additionally, increasing the sample size could yield a more representative sample, resulting in more applicable and robust results. Furthermore, this study did not specifically focus on any brand or packaged item. Future studies could explore how FOP food labeling influences specific food groups or well-known brands, offering more specialized insights into consumer preferences and behaviors. Moreover, an experimental approach towards gauging consumer satisfaction towards FOP food labeling standards

would give statistically more representative results. By implementing these recommendations in future research, we can advance our understanding of how FOP food nutritional labeling affects consumer satisfaction and contribute to the development of more informed marketing and strategic approaches. Future studies may choose to explore the effects of FOP labeling on specific food groups or well-known brands for more specialized insights.

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