

Article

Investigation of the Relationship Between the Anti-Oxidant Effect, Brand Trust, Healthiness, and Intention to Purchase Propolis Products: The Moderating Effect of Nutritional Disclosure

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Abstract: Propolis market is growing, and such growth suggests the importance of understanding consumer behavior. Hence, the aim of this research is to explore the relationship between the anti-oxidant effect, brand trust, healthiness, and consumers' intention to purchase propolis products. A secondary objective is to examine the moderating role of nutrition disclosure. Survey participants were recruited via the Clickworker platform, yielding 305 valid observations for statistical analysis. The Hayes Process Macro Model 7 was employed to test the research hypotheses. The results indicated that the anti-oxidant effect is positively associated with both healthiness and intention to purchase. Moreover, the findings showed that brand trust is positively related to healthiness and intention to purchase. Additionally, the results disclosed the significant moderating effect of nutrition disclosure on the impact of the anti-oxidant effect and brand trust on healthiness based on the heuristic effect as theoretical underpinning. This research sheds light on the literature by clarifying the relationship between five attributes in the domain of propolis products.

Keywords: propolis products; anti-oxidant effect; brand trust; healthiness; intention to purchase; nutrition disclosure



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1. Introduction

According to Polaris Market Research [1], the propolis product market has been experiencing significant growth, driven by an increasing consumer interest in healthier lifestyles, which has been fueled by improved living conditions. Specifically, the global sales volume of propolis products in 2024 is estimated to reach approximately 650.9 million USD, with projections indicating a rise to approximately 954.3 million USD by 2032. As a functional food offering natural health benefits, propolis has gained considerable popularity, particularly due to its plant-based origin compared to synthetic alternatives [2–4]. This suggests that the propolis market holds considerable promise, and understanding consumer behavior is crucial for ensuring the long-term sustainability of the industry.

This research selects intention to purchase as the outcome variable because it is directly related to the sales growth of vendors [5,6]. Also, many studies in the food market domain have adopted intention to purchase as the dependent variable to scrutinize behavioral characteristics [7–9]. Such abundance leads this work to choose intention to purchase as a dependent variable considering its worth as an attribute in the consumer behavior research domain. Another key focus of this study is healthiness, which refers to consumer perception

of the potential improvement in their health through the consumption of specific food products. Scholars have suggested that the primary motivation for propolis consumption is the enhancement of health, particularly through strengthening the immune system [2,10,11]. This indicates that the perception of health benefits could serve as a significant motivator for propolis consumption.

This study uses the perception of the anti-oxidant effect as an independent variable. In the packaging and advertising of propolis products, the anti-oxidant effect is often emphasized to attract consumers [12,13]. However, limited research has explored how the perception of anti-oxidants influences product evaluation. Given that such claims may be difficult for consumers to fully understand; it is important to assess whether these messages are effective in resonating with them. In addition, this study incorporates brand trust as another key explanatory variable. Brand serves as a crucial differentiator in the marketplace [14,15], especially as global propolis product manufacturers (e.g., Apis Flora (São Paulo, Brasil), Bee Health Limited (London, UK), and Manuka Health New Zealand Ltd. (Auckland, New Zealand)) enter the market to drive sales growth [16]. In this context, the role of brand trust becomes increasingly significant, as prior research has shown that brand trust is positively linked to consumers' decision making and purchase intentions [14,17,18].

Another objective of this study is to examine the moderating effect of nutrition disclosure. The primary purpose of nutrition disclosure is to provide consumers with clear and accurate information to facilitate better decision making [19,20]. However, individuals often do not engage in meticulous decision-making processes due to the time and effort required [21,22]. As a result, scholars have argued that heuristics—quick judgments made without thorough contemplation—are commonly employed in consumer behavior [21,23,24]. It is therefore reasonable to assume that consumers are likely to evaluate propolis products based on marketing messages and brand perceptions of their benefits. In other words, a more careful consideration of nutrition labeling, as a form of nutrition disclosure, is likely to influence consumer evaluations. This research, therefore, seeks to explore the moderating role of nutrition disclosure in the relationships between the anti-oxidant effect, brand trust, and healthiness, using the heuristic effect as the theoretical foundation.

In summary, the primary aim of this study is to investigate the relationships between the anti-oxidant effect, brand trust, healthiness, and the intention to purchase propolis products. A secondary objective is to examine the moderating role of nutrition disclosure in the effects of the anti-oxidant effect and brand trust on consumers' healthiness perceptions of propolis products. While the propolis product market has experienced steady growth [16], consumer behavior research in this domain remains limited, particularly in understanding consumer characteristics. To address this gap, this study explores consumer perceptions among individuals with experience using propolis products. By doing so, it contributes to the literature by clarifying the relationships between key variables in the context of propolis products. Moreover, this research offers valuable insights into the heuristic effects in propolis product consumption. Finally, this study provides managerial implications that can inform strategies for improving marketing efforts and enhancing consumer engagement.

2. Literature Review and Hypotheses Development

2.1. Healthiness

Scholars have defined food healthiness as the extent to which food consumption promotes health and well-being [25,26]. Healthiness is closely associated with the nutritional content and beneficial ingredients of food [27–29]. Given that food consumption directly influences an individual's health, there has been a growing market interest in healthy

foods [7]. As a result, researchers have increasingly explored consumer perceptions of food healthiness. For example, Provencher and Jacob [30] examined consumer food choice decisions with healthiness as a key attribute, while Foroni et al. [31] investigated differences in healthiness perceptions based on gender. Richetin et al. [32] used healthiness as a central variable to study consumer perceptions of organic foods. Sun and Moon [33] adopted food healthiness as a main variable to examine the user behavior of food delivery application system. Additionally, Taylor et al. [34] explored children's eating behaviors to identify key factors influencing their evaluation of food healthiness. Yarar et al. [35] highlighted that food healthiness is shaped by various factors, including packaging and ingredients. Consequently, it can be inferred that food healthiness has been widely studied in the food business sector, both as an explained and explanatory variable.

2.2. Intention to Purchase

Intention to purchase refers to a consumer's willingness to buy a specific product [5,36]. Scholars have argued that intention to purchase is directly linked to business revenue growth, highlighting its importance as a key indicator for measuring the effectiveness of marketing strategies [6,37]. Consequently, intention to purchase has been widely used as a dependent variable in food marketing research. For example, Witek and Kuźniar [6] examined factors influencing the intention to purchase green food, while Roseira et al. [38] explored consumer behavior related to organic food using intention to purchase as a key metric. Similarly, Quevedo-Silva and Pereira [39] focused on intention to purchase in their investigation of meat consumers, and Platta et al. [9] utilized intention to purchase as a key explanatory variable in the context of edible insect products. Based on this body of literature, it is evident that intention to purchase is commonly employed to assess consumer behavior in the food business sector. Regarding the consumer perception, Huang and Lu [28] found the healthiness elevates the intention to purchase food. Yoo et al. [7] also demonstrated that healthiness is positively associated with consumer decision making in the domain of grocerant where functions both supermarket and restaurants together. De Temmerman et al. [8] revealed the positive impact of perceived healthiness from the Nutri-score positively affects the intention to purchase food. Based on the literature review, this research proposes the research hypothesis as follows:

Hypothesis 1. *Healthiness positively affects the intention to purchase propolis products.*

2.3. The Anti-Oxidant Effect

Previous studies have highlighted that the anti-oxidant effect refers to the ability of certain compounds to neutralize or reduce the damage caused by oxidative stress, which is linked to conditions such as heart disease and cancer [40,41]. Propolis products have emerged as functional foods emphasizing their anti-oxidant properties. Functional foods are designed to offer health benefits beyond basic nutrition, promoting overall well-being [3,11]. With the growing interest in healthier lifestyles, consumers have become increasingly attracted to the anti-oxidant claims associated with propolis products [2,42]. Consequently, marketers of propolis products have focused on promoting the health benefits, particularly emphasizing the anti-oxidant effect [2,4]. It can be inferred that consumers are likely to associate the anti-oxidant effect with improved health. Existing literature suggests that the motivation for consuming functional foods is often driven by the belief and desire for better health, which is closely tied to healthiness perception [10,11]. However, despite the marketing strategies employed, limited research has investigated how the anti-oxidant effect influences healthiness perception focusing on consumer behavior. While previous studies have scientifically confirmed the anti-oxidant effects of propolis [43–45], this research focuses on the underexplored area of consumer behavior related to these

effects. To minimize such a research gap in the literature, this study proposes the following research hypotheses:

Hypothesis 2a. *The anti-oxidant effect positively affects healthiness of propolis products.*

Hypothesis 2b. *The anti-oxidant effect positively affects intention to purchase propolis products.*

2.4. Brand Trust

Previous studies have defined brand trust as the degree of credibility consumers place in a particular brand [18,46]. A brand carries implicit meanings, including its image, consistency, differentiation, and value [14,15]. Consumers who trust a brand tend to have more favorable appraisals of its products. Furthermore, brand trust increases the likelihood of purchase, as consumers are influenced by the vendor's market reputation [17,18]. Thus, brand trust is likely to enhance both individual evaluations and decision making. To be specific, Wu et al. [46] argued that consumers consider brand trust when evaluating food products. Sekhar et al. [15] also suggested that brand trust is highly valued in the evaluation of organic products. Liu and Wang [14] found that brand trust played a significant role in fostering positive appraisals of agricultural products. Previous studies documented that health perception influences brand trust in the case of the food itself [47,48]. However, in the context of health-related products, the exploration of heuristics, such as the tendency to assume a product is good for health simply because of trust in the brand, has been somewhat underexplored. Additionally, Tan et al. [18] studied green product consumers and found that brand trust positively influences purchase intention. Similarly, Husain et al. [17] revealed a positive association between brand trust and purchase intention in the luxury goods market. Aureliano-Silva et al. [49] examined food delivery application users and documented the positive effect of brand trust on purchase intention. Based on this body of literature, the following hypotheses are proposed:

Hypothesis 3a. *Brand trust positively affects the healthiness of propolis products.*

Hypothesis 3b. *Brand trust positively affects the intention to purchase propolis products.*

2.5. The Moderating Effect of Nutrition Disclosure and the Heuristic Effect

Nutrition disclosure is defined as the provision of information to consumers regarding the nutritional content of a product, with food labeling being the most common method of dissemination [19,20]. Scholars further define nutrition disclosure as a practice that offers clear nutritional information to help consumers make more informed decisions [50–52]. Richetin et al. [32] argued that nutrition disclosure on labeling plays a crucial role in minimizing consumer biases when choosing organic food. Previous research has shown that nutrition disclosure helps reduce the risks associated with purchasing by mitigating the effects of marketing illusions and providing transparency that prevents adverse selection [50,51,53].

Heuristic, as defined by Etco et al. [21] and Santa and Drews [54], refers to the process of evaluating products based on rough judgments or estimates. Previous studies suggest that consumers often rely on heuristics in their consumption decisions and product evaluations, as deep reflection can be mentally taxing [23,54]. The literature indicates that sellers often capitalize on heuristics, emphasizing specific messages or appealing to consumers based on the vendor's reputation [21,22]. As a result, consumers may evaluate products with insufficient information, relying on these simplified decision-making shortcuts. To reduce the biases introduced by heuristics, providing more comprehensive product information becomes essential. In the food industry, nutrition disclosure is a key strategy

for mitigating heuristic biases. Cohen and Babey [23] highlighted the heuristic effects in the marketing of dietary food products, while Monaco et al. [55] used heuristics as a theoretical framework to explore consumer behavior toward novel foods. Additionally, Vega-Zamora et al. [24] demonstrated the role of heuristics in consumer decision making for organic foods. By providing clear and detailed information, nutrition disclosure can help consumers refine their product evaluations in the context of food decision making. This rationale can be extended to consumer behavior regarding propolis products. Based on these insights, the following research hypotheses are proposed:

Hypothesis 4a. *Nutrition disclosure significantly moderates the relationship between the anti-oxidant effect and healthiness.*

Hypothesis 4b. *Nutrition disclosure significantly moderates the relationship between brand trust and healthiness.*

3. Method

3.1. The Research Model

Figure 1 is the research model. The anti-oxidant effect exerts a positive effect on both healthiness and intention to purchase. Healthiness is positively associated with intention to purchase. Nutrition disclosure moderates the impact of anti-oxidant effects on healthiness.

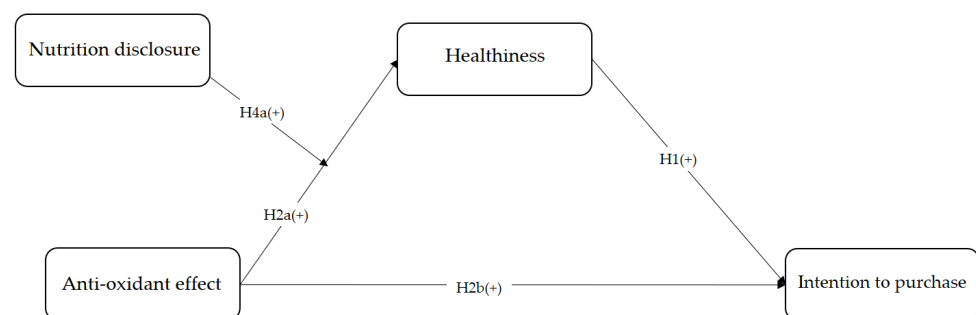


Figure 1. The research model based on the anti-oxidant effect.

Figure 2 is another research model. Brand trust positively affects both healthiness and intention to purchase. Healthiness is positively associated with intention to purchase. Nutrition disclosure moderates the effect of brand trust on healthiness.

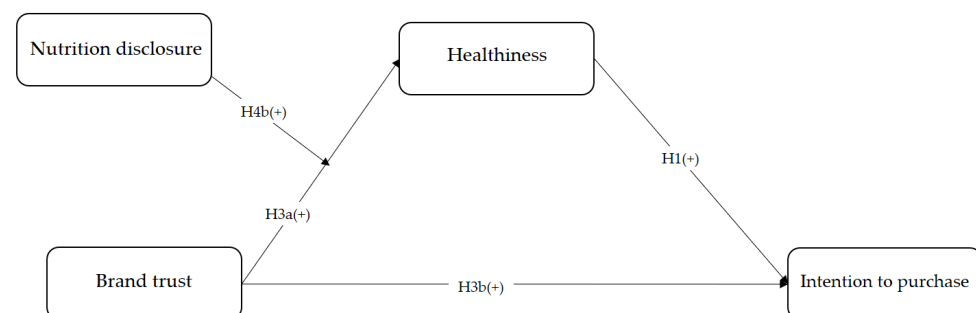


Figure 2. The research model based on brand trust.

3.2. Illustration of Measurement Items

This work used a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) to measure the variables. This study referenced prior studies for the measurements of four attributes: brand trust [17,18], healthiness [7,33], nutrition disclosure [32,53], and intention to purchase [6,37]. This work consulted with three experts in the consumer behavior

research domain to develop the measurement items of the anti-oxidant effect. Table 1 is the description.

Table 1. Depiction of measurement.

Construct	Code	Item
Anti-oxidant effect	A1	Propolis product has an anti-oxidant effect.
	A2	Propolis products are useful to get an anti-oxidant impact.
	A3	Propolis product provides me with anti-oxidant outcomes.
	A4	Propolis product improves the anti-oxidant effect of mine.
Brand trust	B1	I trust the brand of propolis product.
	B2	Propolis product brand is trustworthy.
	B3	Propolis product brand is reliable.
	B4	Propolis product brand never disappoints me.
Healthiness	H1	Propolis product promotes my health condition.
	H2	Propolis product is useful for my better health condition.
	H3	Propolis product improves my health condition.
	H4	Propolis product is effective for enhancing my health condition.
Nutrition disclosure	N1	Propolis product offers nutrition information well.
	N2	Propolis product nutrition information is easy to attain.
	N3	Propolis product nutrition information is easy to ensure.
	N4	Propolis products discloses nutrition information well.
Intention to purchase	I1	I intend to use propolis product.
	I2	I will purchase propolis product.
	I3	I am willing to buy propolis product.
	I4	I have an intention to purchase propolis product.

Considering the operational definitions, the anti-oxidant effect refers to consumer perception of the ability of propolis products to reduce oxidative damage. Brand trust is defined as the degree to which consumers rely on the brand of propolis products. Healthiness refers to how consumers evaluate the potential of propolis products to promote overall health. Nutrition disclosure pertains to how clearly and effectively the nutritional information of propolis products is presented from the consumer's perspective. Finally, intention to purchase is defined as the likelihood that consumers will adopt propolis products in the future.

3.3. Recruitment of Survey Participants and Data Analysis

The Clickworker platform (<https://www.clickworker.com/>, accessed on 23 June 2024) was utilized to recruit survey participants. Previous studies have established that Clickworker provides reliable data for statistical inferences [56,57]. Considering that numerous previous studies have used data collected through the Clickworker platform as a basis for statistical analysis quality, this research chose the Clickworker platform for data collection. The survey targeted native English speakers, and data collection occurred between 23 June and 2 August 2024. This study also attempted to reflect consumer perceptions more realistically by collecting a random sample because the propolis products market is open to everybody. Participants were first asked whether they had experience using propolis products, resulting in an initial pool of 650 responses. Those without experience (345 respondents) were excluded from the dataset, as this study was to focus on individuals with direct, firsthand experience with propolis products. By excluding participants without experience, this research attempted to reach results based on more vivid experiences. As a result, 305 valid observations remained for analysis.

Table 2 presents the demographic profiles of the survey participants based on frequency analysis. Among the respondents, 58.7% were female. In terms of age, individuals in their 30 s and 40 s accounted for approximately 63.3% of the sample. Regarding monthly household income, 36.4% of participants reported earning between USD 2500 and USD 4999. Table 2 also provides details on the frequency of propolis product usage, with 118 participants reporting less than once per week, 121 using it 1–2 times per week, 44 using it 3–6 times per week, and 22 using it more than seven times per week.

Table 2. Profiles of survey participants (N = 305).

Item	Frequency	Percentage
Male	126	41.3
Female	179	58.7
20 s	47	24.3
30 s	101	33.1
40 s	92	30.2
50 s	33	10.8
Older than 60	5	1.6
Monthly household income		
Less than USD 2500	86	28.2
USD 2500–USD 4999	111	36.4
USD 5000–USD 7499	48	15.7
USD 7500–USD 9999	13	4.3
More than USD 10,000	47	15.4
Weekly use frequency		
Less than 1 time	118	38.7
1–2 times	121	39.7
3–6 times	44	14.4
More than 7 times	22	7.2

The convergent validity of the measurement items was assessed using multiple indices, as outlined in the existing literature [58,59]. The criteria for convergent validity included factor loadings greater than 0.5, average variance extracted (AVE) greater than 0.5, and construct reliability (CR) exceeding 0.7. The goodness of fit of the measurement model was evaluated using several indices, including the chi-square statistic (χ^2/df) less than 3, the goodness-of-fit index (GFI), the normed fit index (NFI), the relative fit index (RFI), and the comparative fit index (CFI) all exceeding 0.8, as well as the root mean square error of approximation (RMSEA) less than 0.1 [59,60]. Next, the means and standard deviations (SDs) for the attributes were calculated. To examine the relationships between attributes and ensure discriminant validity, a correlation matrix was employed. According to prior research, discriminant validity is considered acceptable when the square root of the AVE for each construct exceeds the correlation coefficients between constructs [58–60]. This study also employed Hayes' Process Macro Model 7, which utilizes ordinary least squares regression for path analysis with 5000 bootstrap iterations. According to Hayes [61], the Process Macro Model is less affected by sample distortions, allowing for more robust estimates. Additionally, we applied the simple slope method to examine the moderating effects of nutrition disclosure. This method enables a graphical representation of the interaction effect by comparing the slopes at three levels of the moderating variable: low, medium, and high [60].

4. Empirical Results

4.1. Confirmatory Factor Analysis

Table 3 presents the results of the confirmatory factor analysis (CFA). The goodness-of-fit indices indicate that the model fits the data adequately ($\chi^2 = 347.847$, $df = 160$, $\chi^2/df = 2.174$, GFI = 0.895, NFI = 0.937, RFI = 0.925, CFI = 0.965, RMSEA = 0.062). All factor loadings, AVE, and CR values exceeded the established thresholds, confirming that the convergent validity of the measurement items is satisfactory. Thus, the convergent validity could appear as acceptable manners. The mean value of the anti-oxidant effect and brand trust are 3.77, and 3.80, respectively. Also, Table 3 illustrates the mean value of healthiness (mean = 3.84), nutrition disclosure (mean = 3.77), and intention to purchase (mean = 3.84).

Table 3. Confirmatory factor analysis results.

Construct	Code	Loading	Mean (SD)	AVE	CR
Anti-oxidant effect	A1	0.806	3.77 (0.80)	0.730	0.915
	A2	0.880			
	A3	0.893			
	A4	0.838			
Brand trust	B1	0.707	3.80 (0.78)	0.674	0.891
	B2	0.862			
	B3	0.824			
	B4	0.881			
Healthiness	H1	0.823	3.84 (0.86)	0.742	0.920
	H2	0.858			
	H3	0.872			
	H4	0.892			
Nutrition disclosure	N1	0.790	3.77 (0.80)	0.647	0.880
	N2	0.797			
	N3	0.839			
	N4	0.791			
Intention to purchase	I1	0.921	3.84 (1.01)	0.836	0.953
	I2	0.937			
	I3	0.897			
	I4	0.902			

Note: SD, standard deviation, goodness-of-fit indices: $\chi^2 = 347.847$, $df = 160$, $\chi^2/df = 2.174$, RMR = 0.031, GFI = 0.895; NFI = 0.937; RFI = 0.925; CFI = 0.965; RMSEA = 0.062; CR, construct reliability; AVE, average variance extracted.

Table 4 is the results of correlation matrix. Because the diagonal values are greater than off-diagonal values, the discriminant validity of measurement items appeared as acceptable level. Intention to purchase positively correlates with the anti-oxidant effect ($r = 0.601$, $p < 0.05$), brand trust ($r = 0.660$, $p < 0.05$), healthiness ($r = 0.684$, $p < 0.05$), and nutrition disclosure ($r = 0.533$, $p < 0.05$). Healthiness positively correlates with the anti-oxidant effect ($r = 0.667$, $p < 0.05$), brand trust ($r = 0.618$, $p < 0.05$), and nutrition disclosure ($r = 0.596$, $p < 0.05$).

Table 4. Correlation matrix and discriminant validity.

	1	2	3	4	5
1. Anti-oxidant effect	0.828				
2. Brand trust	0.601 *	0.820			
3. Healthiness	0.667 *	0.618 *	0.861		
4. Nutrition disclosure	0.533 *	0.661 *	0.596 *	0.914	
5. Intention to purchase	0.560 *	0.660 *	0.684 *	0.533 *	0.914

Note: * $p < 0.05$, Diagonal is the square root of average variance extracted, and SD stands for standard deviation.

4.2. Results of Hypotheses Testing

Table 5 is the results of hypotheses testing using the anti-oxidant effect as an independent variable. Based on F-values, both models are statistically significant ($p < 0.05$). The anti-oxidant effect positively affected both healthiness ($\beta = 1.216$, $p < 0.05$) and intention to purchase ($\beta = 0.236$, $p < 0.05$). Additionally, intention to purchase is positively influenced by healthiness ($\beta = 0.661$, $p < 0.05$). Anti-oxidant effect $\times$ nutrition disclosure appeared significantly to account for healthiness ($\beta = -0.185$, $p < 0.05$). Thus, all the hypotheses are supported.

Table 5. Results of hypotheses testing focusing on the anti-oxidant effect.

	Model 1 Healthiness		Model 2 Intention to Purchase	
	β	t Value	β	t Value
Constant	−2.077	−2.83 *	0.408	1.90
Anti-oxidant effect	1.216	6.85 *	0.236	3.39 *
Nutrition disclosure	1.068	3.27 *		
Interaction	−0.185	−2.59 *		
Healthiness			0.661	10.10 *
F-value	122.04 *		143.45 *	
R ²	0.5488		0.4872	
Conditional effect of the focal predictor				
Nutrition disclosure				
3.00	0.659	10.69 *		
3.75	0.520	10.77 *		
4.75	0.334	4.74 *		
Index of mediated moderation				
	Index	LLCI	ULCI	
	−0.1228 *	−0.2131	−0.0519	

Note: * $p < 0.05$; interaction: anti-oxidant effect $\times$ nutrition disclosure (test of interaction: $F = 13.11$ *).

Figure 3 shows the slope of nutrition disclosure. The magnitude of the low-nutrition disclosure group is the strongest ($\beta = 0.659$, $p < 0.05$), while the magnitude of the high-nutrition disclosure group is the weakest ($\beta = 0.334$, $p < 0.05$) for the impact of the anti-oxidant effect on healthiness.

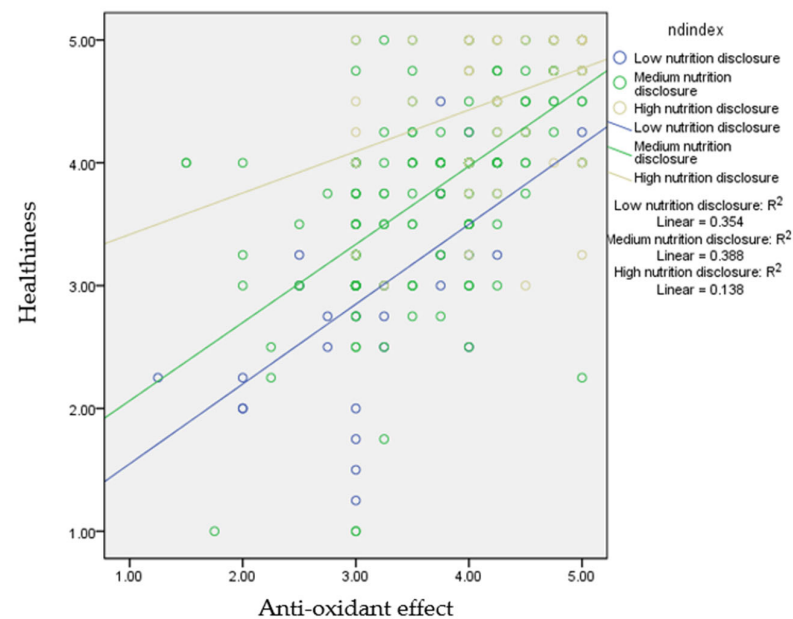


Figure 3. The moderating effect of healthiness on the association between the anti-oxidant effect and healthiness.

Table 6 presents the results of hypothesis testing with brand trust as the independent variable. Based on the F-values, both models are statistically significant ($p < 0.05$). Brand trust has a positive effect on both healthiness ($\beta = 1.216$, $p < 0.05$) and intention to purchase ($\beta = 0.236$, $p < 0.05$). Furthermore, intention to purchase is positively influenced by healthiness ($\beta = 0.528$, $p < 0.05$). The interaction term brand trust $\times$ nutrition disclosure also shows a significant impact on healthiness ($\beta = -0.130$, $p < 0.05$). Therefore, all hypotheses are supported.

Table 6. Results of hypotheses testing focusing on brand trust.

	Model 3 Healthiness		Model 4 Intention to Purchase	
	β	t Value	β	t Value
Constant	−0.948	−1.17	−0.080	−0.39
Brand trust	0.922	6.85 *	0.496	7.89 *
Nutrition disclosure	0.847	3.79 *		
Interaction	−0.130	−2.28 *		
Healthiness			0.528	9.17 *
F-value	83.43 *		191.15 *	
R ²	0.4540		0.4611	
Conditional effect of the focal predictor				
Nutrition disclosure				
3.00	0.532	7.08 *		
3.75	0.435	7.02 *		
4.75	0.305	3.62 *		
Index of mediated moderation				
	Index	LLCI	ULCI	
	−0.0687 *	−0.1346	−0.0067	

Note: * $p < 0.05$, interaction: brand trust $\times$ nutrition disclosure (test of interaction: $F = 5.20$ *).

Figure 4 illustrates the slope of nutrition disclosure. The impact of brand trust on healthiness is strongest in the low-nutrition disclosure group ($\beta = 0.532, p < 0.05$), while it is weakest in the high-nutrition disclosure group ($\beta = 0.305, p < 0.05$).

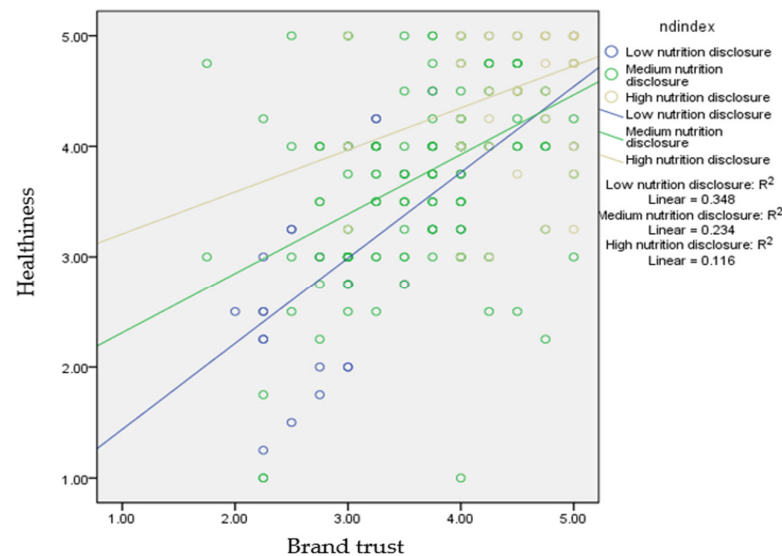


Figure 4. The moderating effect of healthiness on the association between brand trust and healthiness.

5. Discussion

5.1. Discussion of the Empirical Results

The objective of this study was to examine the relationship between anti-oxidant effects, brand trust, healthiness perception, and the intention to purchase propolis products. Moreover, the research investigated the moderating role of nutritional disclosure between anti-oxidant effects, brand trust, and healthiness perception. Participants were recruited through an online survey, and the hypotheses were tested using Hayes' Process Macro Model 7.

The findings revealed that the anti-oxidant effect significantly influenced healthiness perception and the intention to purchase propolis products. Although the scientific efficacy of propolis's anti-oxidant effects has been widely noted by researchers [43–45], consumer perceptions related to this have been minimally explored. This research, therefore, focuses on demonstrating the impact of anti-oxidant effect perception on healthiness. Furthermore, brand trust was found to positively impact both healthiness perception and the intention to purchase propolis products. Generally, previous studies have highlighted the impact of health perception on brand trust [47,48]. However, this research demonstrates that, in the context of health-focused food products, an inverse relationship may be able to work. Next, the results indicated that healthiness perception was a key driver in increasing consumers' intention to purchase propolis products. The findings of this work is aligned with the findings from the previous works [7,8]. Also, this work is worthwhile by ensuring the positive effect of healthiness on the intention to purchase in the domain of functional food. Regarding the magnitude of the intention to purchase, healthiness exerted a stronger effect than the anti-oxidant effect and brand trust. It can be inferred that healthiness might become the strong motivation to purchase propolis.

This study further explored the moderating effect of nutritional disclosure on the relationship between anti-oxidant effects and healthiness perception. The results revealed a negative moderating effect, indicating that when consumers place more emphasis on nutrition information, the influence of anti-oxidant effects on their healthiness perception of propolis products is diminished. Additionally, this study uncovered a negative moderating

role of nutritional disclosure in the relationship between brand trust and healthiness perception. This implies that consumers' reliance on brand trust heuristics can be adjusted when they consider nutritional information, influencing their healthiness perception of propolis products. Overall, this research highlights that nutritional disclosure on propolis products may serve as a cue that reduces heuristic effects, thereby shaping consumers' healthiness evaluations.

5.2. Limitations and Directions for Future Research

This study has several limitations. First, data were collected exclusively through surveys. To gain a more comprehensive understanding of consumer behavior toward propolis products, future research could incorporate a wider range of data collection methods, such as experimental studies or qualitative research. Additionally, this study focused solely on nutrition disclosure as a moderating variable. Future research could explore other attributes as potential moderators to further enrich the findings.

6. Conclusions

6.1. Theoretical Implications

This study makes several important contributions to the literature. First, it provides valuable insights into the relationship between anti-oxidant effects, brand trust, healthiness perception, and the intention to purchase propolis products. While anti-oxidant effects and brand management are well-established marketing tools in the context of propolis products, there has been limited research examining consumer behavior concerning these specific attributes. Additionally, the findings of this study enhance external validity by reinforcing the significant relationship between healthiness perception and the intention to purchase, as demonstrated in previous research on food consumer behaviors (reference). Furthermore, this study contributes to the literature by highlighting the moderating effect of nutritional disclosure on the relationship between anti-oxidant effects, brand trust, and healthiness perception. Specifically, the results provide valuable insights into the heuristic effects in the context of propolis products, particularly regarding the influence of anti-oxidant effects and brand trust in functional foods. Furthermore, this study shed light on the literature by empirically demonstrating the possibility that nutrition disclosure can lead to more objective consumer evaluations of products.

6.2. Managerial Implications

This research offers several important managerial implications. First, managers of propolis products should consider minimizing discrepancies between ingredient claims and the stated anti-oxidant effects. If consumers focus on nutritional information, any misalignment or lack of reliable evidence for anti-oxidant claims could lead to skepticism, potentially resulting in a loss of market share. Namely, propolis producers should consider using the anti-oxidant effects as a marketing tool, emphasizing these messages in packaging and advertising. However, they also need to focus on producing products with an appropriate level of nutritional value concerning these claims. Additionally, propolis product managers may want to allocate resources effectively for brand marketing, as brand trust plays a crucial role in enhancing both healthiness perception and the likelihood of purchasing functional foods. Building and maintaining consumer trust in the brand can significantly impact purchasing decisions. In general, consumer trust is likely to be driven by motivation factors such as health promotion and immune system enhancement, which are key roles of functional foods. Therefore, producers should focus on offering products that contribute to health improvement. Plus, based on the fact that honest brands generally earn trust, it would be beneficial to use nutrition disclosure as a marketing tool. In detail,

improving the visibility of nutrition information and incorporating it into product packaging could serve as an effective brand management strategy, potentially gaining greater trust from consumers. Moreover, sellers of propolis products might be able to consider emphasizing the health benefits of their products in marketing efforts. Highlighting aspects such as the promotion of health conditions, presenting scientific research, and showcasing the organic nature of bee nurturing could help enhance healthiness perceptions. These strategies could contribute to increased market share and business growth in the functional food sector.

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