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EFFECT OF VISUAL ELEMENTS IN BRAND PACKAGING OF GEOGRAPHICAL INDICATION AGRICULTURAL PRODUCTS ON EMOTIONAL COGNITION: THE MEDIATING ROLE OF CULTURAL SYMBOLS

O EFEITO DOS ELEMENTOS VISUAIS NA EMBALAGEM DE MARCA DE PRODUTOS AGRÍCOLAS COM INDICAÇÃO GEOGRÁFICA NA COGNICÃO EMOCIONAL: O PAPEL MEDIADOR DOS SÍMBOLOS CULTURAIS

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Abstract
Purpose – Aims to examines how visual elements in the packaging of geographical indication (GI) agricultural products impact of consumers' emotional cognition, with a particular focus on the mediating role of cultural symbols in this relationship. Design/methodology/approach – Drawing on semiotic theory, in this study, packaging visual elements (such as colors and patterns) constitute the reproducibility; the cultural significance referred to by these elements (such as tradition and regional identity) constitutes the object, and the emotional cognition generated in consumer interpretation correspond to the semiotic interpretant. The samples are from adults over 18 years old who have purchased agricultural products in Shandong Province, China. Data from 254 valid questionnaires were analyzed using descriptive statistics, reliability tests, correlation analysis, and PROCESS Model 4 mediation analysis with bootstrapping. Findings – All variables scored at moderately high levels (M = 5.52–5.68). Reliability was solid (Cronbach's α 0.8 for all scales), and correlation analysis showed significant positive relationships among the variables (r = 0.759–0.810, p < 0.01). The indirect effect of packaging visual system design on affective cognition through cultural symbols is significant (indirect effect = 0.2506, 95% bias-corrected CI [0.1415, 0.3604]), accounting for 30.8% of the total effect, indicating partial mediation. Originality/value – This study extends semiotic theory to GI product branding

Resumo
Objetivo – O objetivo é examinar como os elementos visuais na embalagem de produtos agrícolas com indicação geográfica (IG) influenciam a cognição emocional dos consumidores, com foco especial no papel mediador dos símbolos culturais nessa relação. Desenho/metodologia/abordagem – Com base na teoria semiótica, neste estudo, os elementos visuais da embalagem (como cores e padrões) constituem a reprodutibilidade; o significado cultural a que esses elementos se referem (como tradição e identidade regional) constitui o objeto, e a cognição emocional gerada na interpretação do consumidor corresponde ao interpretante semiótico. A amostra é composta por adultos com mais de 18 anos que adquiriram produtos agrícolas na província de Shandong, na China. Os dados de 254 questionários válidos foram analisados utilizando estatística descritiva, testes de confiabilidade, análise de correlação e análise de mediação do Modelo 4 do PROCESS com bootstrapping. Resultados – Todas as variáveis obtiveram pontuações em níveis moderadamente altos (M = 5,52–5,68). A confiabilidade foi sólida (α de Cronbach 0,8 para todas as escalas), e a análise de correlação mostrou relações positivas significativas entre as variáveis (r = 0,759–0,810, p < 0,01). O efeito indireto do design do sistema visual da embalagem sobre a cognição afetiva por meio de símbolos culturais é significativo (efeito indireto = 0,2506, IC de 95% corrigido para viés [0,1415, 0,3604]), representando 30,8% do

by empirically validating a semiotic mediation model. It shifts the focus from macro-level brand strategies to micro-level visual communication, offering practical guidance for using packaging design as a strategic tool to enhance brand competitiveness and support rural industrial development.

Keywords: Geographical Indication Agricultural Products. Packaging Visual System. Cultural Symbols. Emotional Cognition.

efeito total, indicando mediação parcial. Originalidade/valor – Este estudo amplia a teoria semiótica para a marca de produtos com Indicação Geográfica (IG), validando empiricamente um modelo de mediação semiótica. Ele muda o foco das estratégias de marca em nível macro para a comunicação visual em nível micro, oferecendo orientação prática para o uso do design de embalagem como ferramenta estratégica para aumentar a competitividade da marca e apoiar o desenvolvimento industrial rural.

Palavras-chave: *Produtos Agrícolas com Indicação Geográfica. Sistema Visual de Embalagem. Símbolos Culturais. Cognição Emocional.*

1 INTRODUCTION

Geographical indication agricultural products carry the unique natural and cultural heritage of specific regions. They represent strong local character and cultural meaning, and play a key role in driving rural economies and industrial upgrading (Dagne, 2010). In an increasingly competitive market, turning the intrinsic quality advantages of GI products into perceived brand value has become a hot topic for both researchers and practitioners. While studies on GI products are growing, covering brand value formation, brand management, consumer perception, and brand protection (Baishakhy *et al*., 2026; Chayapong, 2025).

Packaging serves as the first point of contact between the product and the consumer, acting as a visual representation of brand identity, regional culture, and product value. These days, packaging is seen as a mix of science, art and technology (Saha, 2022). The visual elements in packaging design work as an intuitive way to communicate brand identity, local cultural heritage and product value, helping to boost consumer recognition and emotional connection (Odewole *et al*., 2025). Consumers no longer just look for functionalitythey want emotional resonance and cultural identity (Cui, 2024). Cultural symbols on packaging can serve as a powerful bridge linking products to people‘s feelings (Cui, 2024).

However, several gaps exist in the current literature. First, previous studies on GI agricultural products have focused on macro-level brand strategies, with limited attention to the visual elements of packaging. Second, while cultural symbols have been recognized as important in marketing, their mediating role in the relationship between packaging design and consumer' emotion cognition has not been thoroughly examined, particularly in the context of GI products rooted in local culture.

To address these gaps, this study using semiotic theory, suggests that cultural symbols in GI product packaging influence emotional cognition by shaping how visual elements are interpreted. Addresses three research questions: (1) Do packaging visuals significantly affect emotional cognition? (2) Do cultural symbols mediate this relationship? (3) If so, To what extent does it mediate this relationship? Answering these questions should help advance both academic understanding and practical strategies for making GI products more competitive through better packaging.

What's new here is using semiotic theory to explain how packaging design creates meaning and emotional value. Earlier studies often rely on the Stimulus-Organism-Response (SOR) framework (Rehman and Elahi, 2024). According to Peirce's semiotics, all symbol is composed of a representamen, an object, and an interpretant. In this study, the visual elements of packaging (such as color and pattern) constitute the representamen; The cultural significance that these elements refer to (such as tradition and regional identity) constitute the object; and the emotional experience and value judgment generated in consumer interpretation correspond to the semiotic interpretant. Therefore, in this framework, cultural symbols are not external to the visual elements; rather, they are the meaning converter between the visual elements and emotional cognition. This provides us with a clearer perspective for analyzing the interaction between consumers and packaging with cultural connotations.

2 LITERATURE REVIEW AND HYPOTHESIS FORMULATION

2.1 Agricultural products with geographical indications

Research on GI products abroad has long focused on protection mechanisms and global operational systems (Tripathi, 2024). The EU(European Union) has strict

certification and quality control through PDO (Protected Designation of Origin) and PGI (Protected Geographical Indication) systems, with most studies centered on how GI labels boost international trade (Crespo-Moncada *et al*., 2025). In the process of building agricultural origin brands, Japan builds regional brands by linking products to local nature, traditions and culture, while also expanding the agricultural value chain horizontally (Reyes *et al*., 2020). South Korea pays special attention to the cultural fit of packaging design—one comparative study found significant differences between China and Korea in how designers rank the importance of packaging elements (Liu *et al*., 2024). Methodologically, most studies predominantly employ quantitative approaches, using consumer behavior experiments to measure market responses.

In China, regional agricultural brands have been adopted by many places as a key way to raise prices and sales, serving as an important lever for rural revitalization (Ouyang *et al*., 2025; Tang *et al*., 2024). Mao and Gorg (2025) discussed the issues of geographical indications of agricultural products in China and the quality of enterprises' exports, and proposed that strict quality supervision should be carried out for geographical indication agricultural products during export.

Recent domestic research has looked at brand value formation, management models for regional public brands, and how different stakeholders collaborate under government leadership, plus the effect of packaging design on buying decisions (Liu *et al*., 2024; Gioia, 2024). Methodologically, Chinese scholars tend to prefer case studies and qualitative work, such as in-depth analyses of typical brands like Wuchang Rice and Yangtze River Delta Region(Qian *et al*., 2025; Qie *et al*., 2025). Which offer solid evidence for understanding the public nature of GI brands in China.

Still, an analysis of the literature reveals certain shortcomings in current research. For one thing, they still don‘t fully understand how visual symbol systems specifically drive emotional identification. Second, there is insufficient research on the mediating role of cultural symbols in the relationship between visual elements and consumers’ emotional cognition. These gaps leave room for theoretical innovation in this study, especially in exploring how cultural symbols mediate that relationship, which holds significant research value.

2.2 Visual packaging elements and consumer emotional cognition

Visual packaging elements include color, typography, imagery, layout, work together to shape how consumers see and feel about a product (Gioia, 2024; Wang, 2025). People often make snap judgments based on what they see (Rehman and Elahi, 2024). Past research shows that good-looking packaging can trigger positive feelings, improve product evaluations and boost purchase intentions (Orth and Malkewitz, 2008; Kui *et al*., 2024; Muthusamy *et al*., 2024). The packaging of agricultural products with geographical indications not only serves as a protective container but also acts as a medium for conveying the product's authenticity, quality, and regional characteristics (Tripathi, 2024). A well-designed visual system can spark positive emotions and build a stronger bond between consumers and the brand.

2.3 The mediating role of cultural symbols

Cultural symbols are visual representations that carry shared meanings, traditions and collective identities within a specific cultural setting (Xiong, 2024). From a semiotic standpoint, these symbols have both a signifier (like a pattern, color or icon) and a signified (the cultural idea or meaning they evoke). In packaging, they act as carriers of cultural meaning, mediating between the product and how consumers interpret it.

According to semiotic theory, meaning isn't fixed in objects—it's generated through how people interpret signs within a cultural context (Cobley, 2020). When consumers see packaging with cultural symbols, they start decoding: they interpret visuals as signs of authenticity, tradition or regional identity. This process triggers symbolic associations, which then shape emotional responses. For GI products tied closely to specific places and cultural heritage, using cultural symbols well on packaging can communicate deeper cultural value and strengthen emotional ties (Li and Wen, 2025).

Earlier work backs this up. Studies show that when consumers see a product as culturally authentic and symbolically rich, they're more likely to have positive attitudes toward it (Dong and Li, 2025). So cultural symbols aren't just decoration—they're the key mechanism through which visual design gets translated into emotional cognition.

That means packaging visuals influence emotions by inviting culturally meaningful interpretations.

2.4 Research hypotheses

In study, cultural symbols are not external moderators that exist independently of packaging visuals; They are embedded in these visual elements effects. Consumers will not directly perceive the cultural symbols carried if they do not first perceive the visual elements. Thus, the effect of visual elements on emotion necessarily passes through the recognition and interpretation of symbols. So, in this study ,We therefore posit a mediation model, where visual elements shape emotional cognition by activating culturally meaningful interpretations.

Based on the findings of the literature review, which identified existing research gaps, and the research questions formulated accordingly, this study proposes the following hypotheses regarding visual elements, cultural symbols, and consumer emotional cognition within the visual design system of GI agricultural products.

H^1. Visual elements in GI product packaging have a significant positive impact on consumers' emotional cognition.

H^2. Cultural symbols strengthen the relationship between packaging visual elements and emotional cognition. Specifically, packaging visuals enhance emotional cognition by reinforcing the symbolic meanings carried by cultural symbols.

3 THEORETICAL FRAMEWORK

This study is grounded in semiotic theory. Coming out of the work of Ferdinand de Saussure and Charles Sanders Peirce, semiotics gives us a systematic way to understand how meaning is conveyed and interpreted through signs and their construction (Yakin and Totu, 2014). It offers a strong framework for examining how packaging visuals function as carriers of cultural meaning and shape consumer thinking. Peirce's classic triadic model includes the sign (or representamen), the object and the interpretant (Kralemann and Lattmann, 2013). The sign is the external form you can perceive; the

object is what the sign refers to; and the interpretant is the meaning formed in the receiver's mind.

Peirce emphasized that signs do not possess fixed meanings in and of themselves; rather, meaning arises from the receiver's interpretive process and is profoundly influenced y their cultural background and prior knowledge. This theoretical logic provides a crucial foundation for understanding the mechanisms by which consumers respond to packaging design. Semiotic analysis of packaging has examined that the visual design of packaging influences consumers' perception of brand quality and loyalty (Rehman & Elahi, 2024).

Table 1.

Peirce's trinity theory factor and variables' mapping relation

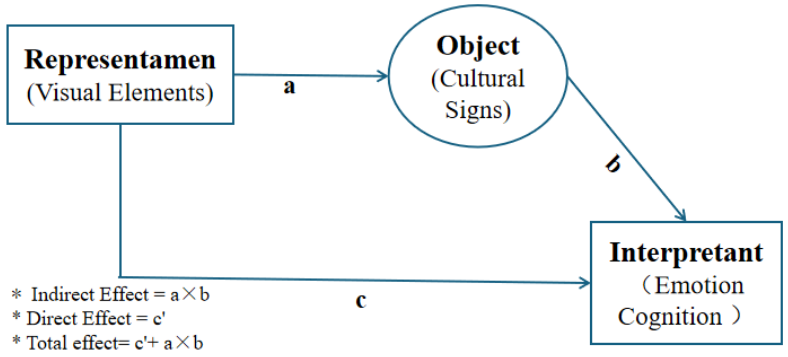
Peirce's trinity theory factor	Variables	Dcipher
Representamen	Visual Elements（VE)	Visual elements serve as the "carriers" of symbols, such as color, graphics, layout, etc
Object	Cultural Symbols（CS）	The actual cultural origins referred to by visual elements, such as regional culture, traditional patterns, and folk imagery
Interpretant	Emotion Cognition（EC）	The emotional cognition that consumers acquire after decoding symbols

Here's how it works. First, packaging visuals like color, typography, imagery and layout together make up the sign—the perceivable form that can carry meaning. These elements are usually chosen and arranged carefully to stir specific associations. Second, the cultural symbols on packaging—like traditional patterns, local motifs or historical images—serve as the object, pointing to cultural concepts. When consumers see these symbols, they start decoding them as signs of authenticity, tradition, regional identity or cultural heritage. This decoding process has a clear cultural flavor: the same symbol might be interpreted differently across cultures, but within one cultural context, these symbols work well to convey shared meaning. Finally, consumers' emotional cognition can be seen as the interpretant, the emotion cognition that come out of the decoding process. In Peirce's terms, symbols (cultural symbols) trigger corresponding interpretants (emotional responses), which is the final outcome of the semiotic process.

Based on the theoretical framework of semiotics and the hypotheses proposed in this study, Figure 1 presents the conceptual model of this research. This model indicates that the visual elements on the packaging influence consumers' psychological cognition through the mediating role of cultural symbols. The first indirect effect segment (a) corresponds to “Representamen → Object”, that is, the visual elements evoke cultural symbols. The second indirect effect segment (b) corresponds to “Object → Interpretant", the cultural symbols are decoded by consumers, thereby affecting their emotional cognition. The indirect path (a×b) represents the mediating role through cultural symbols. The direct path (c') reflects the effect of the visual elements on emotional cognition directly without the mediation of symbols, and the overall effect (c'+ a × b) corresponds to the three-way interaction of Peirce's symbol process. The symbol form is mediated by the object and ultimately generates meaning in the interpretant.

Figure 1

A Semiotic Mediation Model based on Pierce's ternary symbol theory



4 METHODOLOGY

4.1 Measurement instruments and questionnaire design

This study employed a questionnaire survey method to collect data. All items were adapted from previously established and well-validated scales to ensure the reliability and validity of the measurement instruments. A 7-point Likert scale was used (1 = “Strongly Disagree”, 7 = “Strongly Agree”). Packaging visual elements were measured using 13 items adapted from Rahimi *et al*. (2025) and Wang *et al*. (2023), It consists of 13 items

covering dimensions such as color, graphics, and information, and assesses the perceived effects of these visual elements. The measurement of cultural symbols drew upon scales from Zong *et al*. (2023), looking at how consumers perceive and identify with cultural symbols on packaging. Emotional cognition was measured with 4 items from Rehman and Elahi (2024), these items measure consumers' emotional resonance and sense of identification with the product.

To make sure the wording was clear and the items fit the context of Chinese GI products, this study conducted a pretest and a small-scale preliminary survey prior to the formal distribution of the questionnaire. Based on these findings, the questionnaire was optimized and adjusted, and the version refined through pretest feedback was used for formal distribution and data collection.

4.2 Sample and data collection

Data came from a survey of GI product consumers. The target population was adults aged 18 and above. The study used random sampling and distributed the questionnaire online. Participation was voluntary, people could withdraw anytime and all responses were kept confidential. After data cleaning, a total of 254 valid questionnaires from participants who had consumed GI agricultural products were retained. The data cleaning process included: (1) removing cases with missing purchase history data; (2) tossing out invalid responses with obvious straight-lining; (3) spotting and removing outliers using boxplot analysis, plus deleting individual outliers. Additionally, a Z-score analysis was conducted to confirm the absence of extreme outliers (all $|Z| < 3$).

5 RESULTS

Analyzed the data using SPSS 26.0. Descriptive statistics summarized sample characteristics. Reliability was checked with Cronbach's alpha. Pearson correlation looked at bivariate relationships. Mediation was tested using PROCESS Model 4 (Hayes, 2022) with bias-corrected bootstrapping (5,000 samples).

5.1 Descriptive statistics

Table 2 shows the descriptive stats for the three core variables. Mean scores ranged from 5.52 to 5.68, all in the upper-moderate range, meaning consumers rated these variables fairly positively. Standard deviations ran from 0.94 to 1.04, indicating acceptable spread. Note that cultural symbols had the highest standard deviation (SD = 1.04), suggesting relatively greater variation in consumers' emotion cognition of these symbols.

Table 2

Descriptive Statistics

Variable	Mean	SD	Min	Max
Visual Elements（VE)	5.5624	0.938	2.46	7.00
Cultural Symbols（CS）	5.5249	1.037	2.00	7.00
Emotion Cognition（EC）	5.6575	0.941	2.00	7.00

5.2 Reliability analysis

As Table 3 shows, Cronbach's α for all scales is above 0.8, indicating strong internal consistency and reliable measurement.

Table 3

Reliability Analysis

Item	Corrected Item-Total Correlation
Visual Elements（VE)	0.943
Cultural Symbols（CS）	0.811
Emotion Cognition（EC）	0.888

5.3 Correlation analysis

Pearson correlation (Table 4) shows significant positive correlation among all three variables ($p < 0.01$). The strongest correlation was between packaging visuals and emotional cognition ($r = 0.810$), providing preliminary support for H1.

Table 4

Correlation Statistics

Variables	1	2	3
Visual Elements（VE)	1		
Cultural Symbols（CS）	0.788**	1	
Emotion Cognition（EC）	0.810**	0.759**	1

Note: $p < 0.01$

5.4 Testing for mediating effects

To test whether cultural symbols mediate the link between packaging visuals and emotional cognition, used PROCESS Model 4 (Hayes, 2022). Tested the indirect effect using bias-corrected bootstrapping with 5,000 resamples (Preacher and Hayes, 2008).

5.4.1 Path coefficient tests

First, the study examined the effect of packaging visuals on cultural symbols (path a). Visual elements significantly predicted cultural symbols ($B = 0.8719$, $SE = 0.0429$, $t = 20.3225$, $p < 0.001$, 95% CI [0.7874, 0.9564]), explaining 62.11% of the variance ($R^2 = 0.6211$).

Next, the study tested the joint effect of packaging visual system design and cultural symbols on emotional cognition (paths b and c′). With both as predictors, the overall model was significant ($F(2,251) = 285.6078$, $p < 0.001$), with adjusted $R^2 = 0.6947$—meaning the two predictors explain about 69.47% of the variance in emotional cognition. The results show that, after controlling for visuals, cultural symbols still had a

significant positive effect on emotional cognition (B = 0.2875, SE = 0.0514, t = 5.5943, p < 0.001, 95% CI [0.1863, 0.3887]), so path b is significant. Meanwhile, the direct effect of visuals on emotional cognition (path c′) was 0.5625 (SE = 0.0568, t = 9.8952, p < 0.001, 95% CI [0.4506, 0.6745]), which stayed significant.

5.4.2 Testing for indirect effects (bootstrap method)

The bias-corrected Bootstrap test (with 5,000 samples) showed (Table 5) that the indirect effect of visual elements on emotional cognition (mediated by cultural symbols) is 0.2506 (BootSE = 0.0558), with a 95% bias-corrected confidence interval of [0.1415, 0.3604]. Since this interval doesn't include zero, the indirect effect is significant. The total effect was 0.8131 (c = c′ + ab), with a direct effect of 0.5625; the indirect effect made up about 30.8% of the total.

Cultural symbols play a significant partial mediating role between packaging visual design and consumers' emotional cognition (indirect effect 95% CI [0.1415, 0.3604], mediation proportion = 30.8%).

Table 5

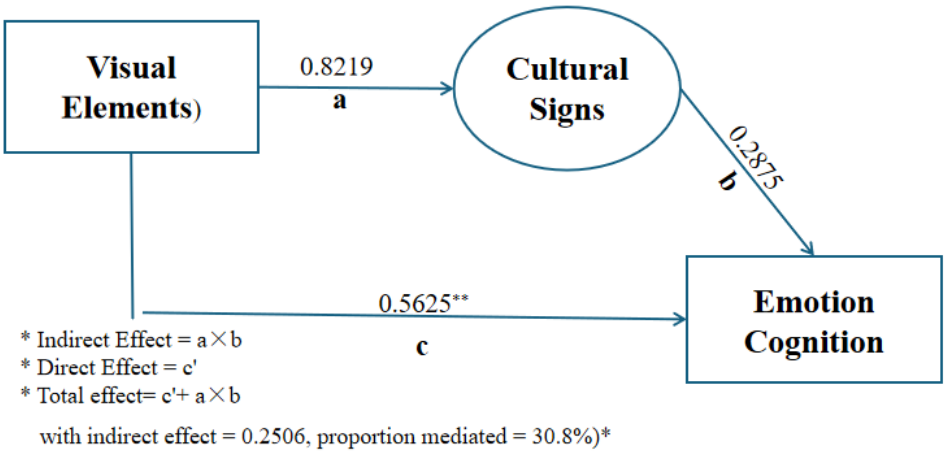
Testing for Indirect Effects (Bootstrap Method)

Path	Coefficient	SE	t	p	95% CI
Path a (VE→ CS)	0.8719	0.0429	20.3225	<0.001	[0.7874, 0.9564]
Path b (CS → EC, controlling VE)	0.2875	0.0514	5.5943	<0.001	[0.1863, 0.3887]
Direct effect (c′)	0.5625	0.0568	9.8952	<0.001	[0.4506, 0.6745]
Indirect effect (a×b)	0.2506	0.0558	—	—	[0.1415, 0.3604]
Total effect (c)	0.8131	—	—	—	—

Note: Bootstrap samples = 5000; CI = bias-corrected confidence interval.

Figure 2

Conceptual Model with Path Coefficients



6 DISCUSSION

6.1 Key findings

This study examined how visual elements in GI product packaging influence emotional cognition from a semiotic angle, focusing on the mediating role of cultural symbols. The study yielded three key findings.

First, packaging visuals have a significant direct positive effect on emotional cognition, supporting H1. For GI products, good visual design can communicate quality and emotional value just through how consumers see the packaging, which in turn increases their preference for GI products.

Second, cultural symbols partially mediate the link between visuals and emotional cognition, supporting H2. This means packaging design works not just through direct cognition but also through building symbolic meaning. When consumers pick up on culturally meaningful symbols in packaging visuals, their emotional investment in the product deepens—suggesting cultural resonance matters a lot in consumer psychology.

Third, the mediation accounted for about 30.8% of the total effect. That tells us that using cultural symbols in GI packaging plays a real role in turning visual elements into emotional cognition. It underscores how important it is to weave cultural narratives into packaging visual systems.

6.2 Theoretical contributions

This study makes a few theoretical contributions. First, this study reveals the essence of the "meaning transformation" process in semiotics by demonstrating that "cultural symbols are not derived from visual elements, but rather serve as a meaning converter between visual elements and emotional cognition". It does not merely uncover the statistical relationship of "A influencing C through B". Second, this study empirically validated a semiotic mediation model, showing that cultural symbols act as key mediators between visual stimuli and emotional responses. That helps us better understand how cultural resources turn into brand assets through consumer cognition. Third, the study fills an under-explored gap in the GI literature by shifting focus from broad brand strategies down to micro-level visual communication. The findings enrich the understanding of how packaging design serves as a vehicle for cultural expression and emotional connection.

6.3 Practical implications

These findings also offer practical takeaways for GI agricultural product businesses and policymakers. For enterprises producing GI agricultural products, investing in professional packaging design is not just about looks—it's a strategic move. Packaging should be seen as a critical touch-point for brand communication. When designing packaging, including culturally symbolic elements with local flavor—like traditional patterns, local landmarks or historical stories—can significantly strengthen the emotional bond between product and consumer. Put this strategy into practice, and GI products with packaging visuals that carry cultural symbols can stand out in crowded markets, build brand loyalty and ultimately support rural economic development by turning symbolic value into market strength.

7 CONCLUSION

This study provides robust empirical evidence demonstrating that visual elements in packaging significantly influence consumers' emotional cognition of GI products, with cultural symbols acting as a meaningful mediator. The findings point to two pathways—

direct visual appeal and indirect symbolic resonance—through which packaging design influences consumer emotions. By strategically combining visual aesthetics and cultural symbols, GI agricultural product brands can boost consumer engagement, stand out in the market and contribute to broader rural revitalization goals.

However, the study also has some limits. For one thing, a large chunk of our sample came from Shandong Province in China, which may limit how broadly we can generalize the results. Future research should aim for more geographically diverse samples to improve external validity. Also, this study only examined cultural symbols as a mediator. Future work could explore other mediators or moderators—like "trust", to build a fuller model of how consumers respond to GI agricultural product brands.

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