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Multi-Attribute Preference Formation in Geographically Differentiated Agri-Food Products: Evidence from Chilean Pisco

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Abstract

Chilean pisco, a geographically differentiated agro-industrial product protected by a Denomination of Origin (DO), faces a changing consumption environment characterized by greater emphasis on perceived quality, authenticity, and product differentiation. Understanding how consumers evaluate product attributes is relevant for examining preference formation in agri-food products with territorial identity. This study analyzes consumer preferences for Chilean pisco by identifying the relative importance of product attributes using conjoint analysis (CA). A survey was applied to 402 consumers in Chile using an orthogonal fractional factorial design comprising nine product profiles defined by price, alcohol content, color, and brand recognition. The model estimated part-worth utilities and relative attribute importance under trade-off conditions. Results show that price had the highest relative importance (RI = 36.5%), followed by alcohol content (26.2%), and color (21.6%), while brand recognition showed the lowest (15.7%). The preferred profile combines medium price (β = 0.809), well-known brand (β = 0.448), high alcohol content (45% vol.) (β = 0.333), and clear color (β = 0.098). Consumer preference formation follows a hierarchical structure in which attributes contribute differently to overall preference. It is concluded that, within the evaluated product category, competitiveness strategies should prioritize coherent price positioning and sensory consistency alongside brand differentiation. These findings contribute to understanding consumer behavior in agro-industrial products with territorial identity and provide empirical evidence relevant to the differentiation of geographically protected products.

Keywords: conjoint analysis, consumer preferences, consumer behavior, designation of origin, agroindustry

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Formación de preferencias multiatributo en productos agroalimentarios diferenciados geográficamente: Evidencia del pisco chileno

Resumen

El pisco chileno, un producto agroindustrial diferenciado geográficamente y protegido por una denominación de origen (DO), enfrenta un entorno de consumo cambiante caracterizado por un mayor énfasis en la calidad percibida, la autenticidad y la diferenciación del producto. Comprender cómo los consumidores evalúan los atributos de los productos es relevante para examinar la formación de preferencias por productos agroalimentarios con identidad territorial. Este estudio analiza las preferencias de los consumidores de pisco chileno mediante el análisis conjunto (AC) para identificar la importancia relativa de sus atributos. Se aplicó una encuesta a 402 consumidores en Chile mediante un diseño factorial fraccionado ortogonal compuesto por nueve perfiles de producto definidos por precio, contenido alcohólico, color y reconocimiento de marca. El modelo estimó las utilidades parciales y la importancia relativa de los atributos bajo condiciones de intercambio. Los resultados muestran que el precio presentó la mayor importancia relativa (RI = 36,5%), seguido del contenido alcohólico (26,2%) y del color (21,6%), mientras que el reconocimiento de marca presentó la menor (15,7%). El perfil preferido combina precio medio (β = 0,809), marca reconocida (β = 0,448), alto contenido alcohólico (45% vol.) (β = 0,333) y color claro (β = 0,098). La formación de preferencias de los consumidores sigue una estructura jerárquica en la que los atributos contribuyen de manera diferenciada a la preferencia global. Se concluye que, dentro de la categoría de producto evaluada, las estrategias de competitividad deben priorizar una estructuración coherente del precio y la consistencia sensorial junto con la diferenciación de marca. Estos resultados contribuyen a la comprensión del comportamiento del consumidor en productos agroindustriales con identidad territorial y aportan evidencia empírica relevante para la diferenciación de productos protegidos geográficamente.

Palabras clave: análisis conjunto, preferencias del consumidor, comportamiento del consumidor, denominación de origen, agroindustria

Formação de preferências multiatributos em produtos agroalimentares diferenciados geograficamente: Evidências do pisco chileno

Resumo

O pisco chileno, um produto agroindustrial geograficamente diferenciado, protegido por Denominação de Origem (DO), enfrenta um ambiente de consumo em transformação, caracterizado por maior valorização da qualidade percebida, da autenticidade e da diferenciação do produto. Compreender como os consumidores avaliam os atributos dos produtos é relevante para examinar a formação de preferências por produtos agroalimentares com identidade territorial. Este estudo analisa as preferências dos consumidores de pisco chileno, identificando a importância relativa dos atributos por meio da Análise Conjunta (AC). Foi realizada uma pesquisa com 402 consumidores no Chile, utilizando um delineamento fatorial fracionado ortogonal composto por 9 perfis de produto definidos por preço, teor alcoólico, cor e reconhecimento de marca. O modelo estimou as utilidades parciais e a importância relativa dos atributos sob condições de troca. Os resultados mostram que o preço apresentou a maior importância relativa (RI = 36,5%), seguido do teor alcoólico (26,2%) e da cor (21,6%), enquanto o reconhecimento de marca apresentou a menor importância relativa (15,7%). O perfil preferido combina preço médio (β = 0,809), marca reconhecida (β = 0,448), alto teor alcoólico (45% vol.) (β = 0,333) e cor clara (β = 0,098). A formação de preferências dos consumidores segue uma estrutura hierárquica, na qual os atributos contribuem de forma diferenciada para a preferência geral. Conclui-se que, na categoria de produto avaliada, as estratégias de competitividade devem priorizar um posicionamento de preço coerente, a consistência sensorial e a diferenciação de marca. Esses resultados contribuem para a compreensão do comportamento do consumidor em relação a produtos agroindustriais com identidade territorial e fornecem evidências empíricas relevantes para a diferenciação de produtos protegidos geograficamente.

Palavras-chave: análise conjunta, preferências do consumidor, comportamento do consumidor, denominação de origem, agroindústria

1. Introduction

Pisco is a spirit obtained through the distillation of genuine wines produced from *Vitis vinifera* grapes, predominantly from the Muscat group, whose distinctive aromatic profile is associated with the presence of characteristic terpenoid compounds (Bordeu et al., 2012; Peña y Lillo et al., 2005). The cultivation of these varieties requires agroclimatic conditions characterized by high solar radiation, elevated heat accumulation, and marked thermal amplitude, factors that directly influence the oenological quality of the grapes and the sensory expression of the distillate (Verdugo-Vásquez et al., 2025).

In the South American context, both Chile and Peru recognize pisco as an emblematic product of cultural and economic significance (Saldaña et al., 2025). In Chile, this protection is reflected in the oldest Denomination of Origin (DO) scheme in Latin America, established through Decree Law No. 181 of 1931 (Lacoste et al., 2014; Ministerio de Agricultura, 1931). This regulation restricts its production to the Atacama and Coquimbo regions, where agroclimatic and production conditions contribute to product differentiation (Pszczólkowski & Lacoste, 2016; Verdugo-Vásquez et al., 2025).

The relevance of this activity is reflected in a consolidated productive base that is strongly concentrated territorially. According to the Servicio Agrícola y Ganadero (Agricultural and Livestock Service; SAG, 2024), the Chilean authority responsible for protecting the country's animal and plant health and overseeing the safety of agricultural and livestock products, the area planted with pisco grapevines reached 9,122.3 ha in 2022, showing an upward trend since 2015. Of this area, 94% is concentrated in the Coquimbo Region, while production is distributed across 2,343 properties, predominantly small- and medium-scale operations (Figure 1). This fragmented production structure shapes both the organization of the value chain and the process of value creation, in a context where geographical indications reinforce territorial differentiation and authenticity in competitive markets (Hamrick et al., 2024).

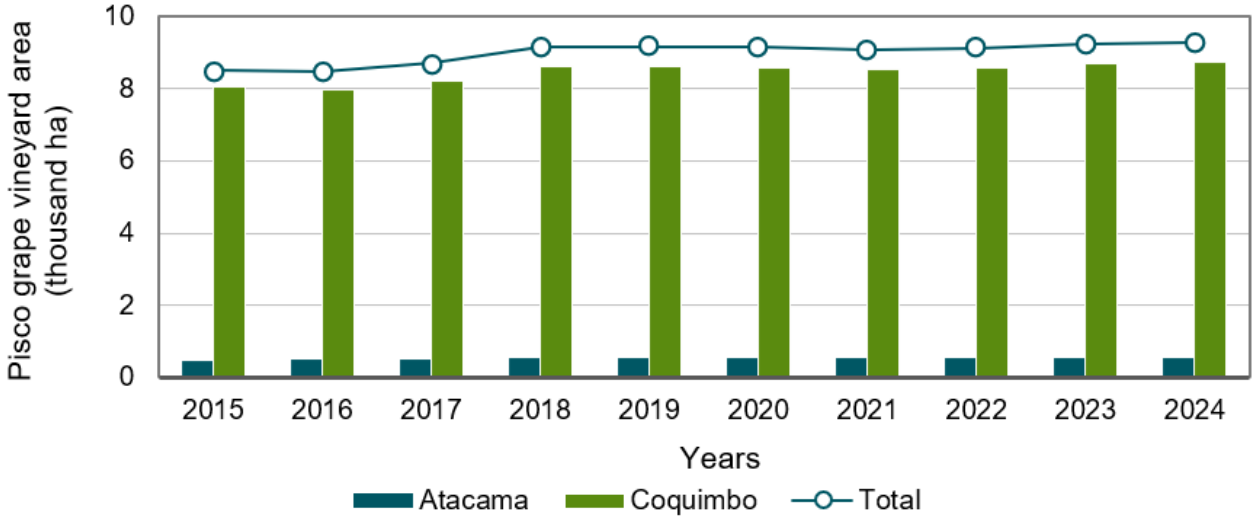

Figure 1. National evolution of the area planted with pisco grapevines (2015-2024)

Source. SAG (2024)

Despite its productive relevance and dominant position in the domestic market, with an annual production exceeding 44 million liters (Valenzuela, 2024), Pisco faces growing challenges in a changing consumption environment. Recent developments in the spirits market reflect a greater valuation of attributes such as perceived quality, authenticity, and differentiation, in contrast to approaches focused primarily on volume (Cockx et al., 2021). In this context, products with geographical indications depend not only on distinctive attributes but also on consumers' ability to interpret these signals (Crespo-Moncada et al., 2025).

From the perspective of information economics, this phenomenon is related to the nature of pisco as an experience good, whose quality cannot be fully evaluated before consumption. This condition generates information asymmetries that consumers address using quality signals or cues (Bravo et al., 2024; Thøgersen, 2023). In the case of pisco, its sensory complexity –associated with aromatic compounds perceived through orthonasal and retronasal olfactory pathways– hampers objective *ex ante* evaluation, thereby reinforcing the importance of observable attributes in preference formation (Peña y Lillo et al., 2005).

Within this framework, consumers have been shown to integrate intrinsic and extrinsic cues to infer quality under conditions of uncertainty (Zeithaml, 1988). Extrinsic cues –such as price or brand– become particularly relevant when available information is limited (Javeed et al., 2022; Symmank, 2018), whereas intrinsic product attributes provide information about the product's physical and sensory characteristics. In products with territorial identity, attributes such as origin and production process may influence willingness to pay, reinforcing their economic value (Pablo-Cano et al., 2024). However, their relative importance may vary across evaluation contexts, without necessarily exhibiting a stable hierarchy (Teas & Agarwal, 2000).

Additionally, the effectiveness of origin-related cues depends on the informational context. Although the DO may serve as a quality indicator, its differentiating capacity may be diminished in environments with multiple certifications and extrinsic attributes, where information overload hinders interpretation (Livat et al., 2019; Thøgersen, 2023).

Information processing theory provides a complementary framework for understanding how consumers integrate multiple attributes using decision rules to form preferences (Bettman, 1979). In this sense, examining the contribution of individual attributes is particularly relevant in products with strong territorial anchoring, where technical, economic, and symbolic dimensions coexist. In the case of Chilean pisco, evidence suggests that brand-related cues constitute a relevant component. However, their relative importance may depend on the conditions under which consumers evaluate the product (Araya-Pizarro, 2022).

Despite these advances, empirical evidence regarding the hierarchy of attributes in geographically protected spirits remains limited and fragmented. In this regard, multi-attribute utility models constitute an appropriate approach for decomposing consumer preferences into observable components and analyzing decisions under conditions of uncertainty. Within this framework, traditional conjoint analysis assumes that the total utility of a product profile equals the sum of the utilities associated with its individual attribute levels, thereby enabling estimation of the relative contribution of each attribute to overall preference (Eggers & Sattler, 2011). This compensatory model is appropriate when the objective is to estimate the main effects of product attributes on consumer preferences rather than to model interaction effects. However, its systematic application to examine the structure of preferences in geographically protected spirit products remains scarce. Consequently, this study aims to analyze the influence of intrinsic and extrinsic attributes on pisco choice, considering four critical dimensions: price, alcohol content, color, and brand recognition.

This study contributes to the literature on consumer preference formation for geographically differentiated agri-food products by providing empirical evidence on how intrinsic and extrinsic attributes shape consumer choice within a Denomination of Origin spirit category. While the empirical setting focuses on Chilean pisco, the analytical approach contributes to understanding how consumers evaluate quality cues and form preferences under conditions of information asymmetry. Consequently, these findings provide insights relevant not only to geographically protected spirits but also to other geographically differentiated agri-food products, in which consumers rely on origin, authenticity, and multiple quality cues to evaluate product quality.

2. Materials and Methods

2.1 Research Design

The study was conducted using a quantitative, non-experimental, cross-sectional research design, grounded in stated-preference theory and utility-based approaches. Conjoint analysis (CA) was selected as the central methodological approach due to its proven effectiveness in decomposing the utility structure of complex and multidimensional agro-industrial goods (Hair et al., 2019).

Unlike direct ranking methods, CA captures the relative importance of product attributes by simulating trade-offs within a controlled choice environment, thereby providing greater ecological validity for the analysis of experience goods (Eggers et al., 2022). This approach is consistent with contemporary standards for studying distilled spirits and other multi-attribute consumer goods, offering a rigorous and reproducible framework for modeling consumer preferences (Navarasam et al., 2021; Yandug et al., 2023).

The theoretical foundation of CA lies in utility-based preference models, which assume that consumers evaluate alternatives according to the utility derived from the combination of attribute levels defining each product profile (Green & Srinivasan, 1978; Louviere et al., 2000). Consumer evaluations reveal trade-offs among competing characteristics, allowing the contribution of each attribute level to overall utility to be estimated. The resulting part-worth utilities represent the implicit value assigned to specific product characteristics and provide an empirical representation of the underlying preference structure under controlled conditions (Eggers & Sattler, 2011). This is particularly relevant for experience goods, such as distilled spirits, whose quality cannot be fully assessed before consumption, leading consumers to rely on observable cues when forming purchase preferences.

2.2 Population and Sample

The target population was defined as adult individuals residing in Chile who consume pisco. To determine the sample size, the general recommendations proposed by Orme (2010) for CA studies were followed, which suggest sample sizes typically ranging from 150 to 1,200 observations, depending on the complexity of the experimental design and the analytical objectives. In line with these criteria, sample sizes of approximately 300 observations or higher are generally considered sufficient to provide stable estimates in CA applications. The final sample consisted of 402 participants, exceeding the thresholds commonly recommended for this type of model.

Data collection employed a non-probability quota sampling approach based on the demographic distribution reported in the 2017 Census, prioritizing the regions that account for more than 80% of the national population (Antofagasta, Coquimbo, Valparaíso, Metropolitan, O'Higgins, Maule, Biobío, and La Araucanía). Quota controls by gender and age group were implemented to improve sample balance across key demographic characteristics. This procedure aimed to incorporate variability among consumer profiles relevant to pisco consumption.

Participants were recruited through an online survey administered via Google Forms. The survey link was distributed via email, personal contacts, and social media to reach potential participants across the target regions. Eligibility was restricted to individuals aged 18 years or older residing in Chile, regardless of nationality, who reported consuming pisco. During data collection, quota attainment by gender, age group, and region was continuously monitored, and recruitment within each category was closed once the predefined quota had been reached. Before analysis, the dataset was screened to identify and remove duplicate or inconsistent responses. Participation was anonymous, voluntary, and uncompensated.

2.3 Data Collection and Survey Instrument

The data collection process was conducted digitally via Google Forms in October 2021. The questionnaire underwent content validation through expert judgment and a technical pilot test (n = 15 respondents) to assess the

clarity of the instructions and the cognitive load associated with the experimental task. The instrument was structured into four sequential modules: (i) informed consent and inclusion criteria; (ii) sociodemographic and psychographic characterization using multiple-choice items and 5-point Likert-type scales; (iii) consumption habits and purchase frequency; and (iv) the conjoint analysis experimental task. The study was conducted in accordance with ethical standards for research involving human participants, and informed consent was obtained from all respondents before participation.

For the design of the stimuli, four key attributes were selected based on a review of the relevant literature and an analysis of the distilled spirits market segment: price, alcohol content, color, and brand recognition, comprising a total of 10 attribute levels (Table 1).

Table 1. Types, attributes, and levels for conjoint analysis

TYPE	ATTRIBUTE	LEVEL
Extrinsic	Price	Low (USD 7.05); Medium (USD 12.93); High (USD 23.52)
Intrinsic	Alcohol content	35%; 40%; 45%
Intrinsic	Color	Clear; Amber
Extrinsic	Brand recognition	Well-known; Unknown

Note. Reference exchange rate: 1 USD = CLP 850.

To address the complexity of the full factorial structure, a fractional orthogonal array comprising nine product profiles was generated using the CONJOINT/ORTHOPLAN procedure in SPSS, a standard algorithm for main-effects estimation in CA (Green & Rao, 1971; Hair et al., 2019; Orme, 2010). This approach allows the estimation of the main effects associated with each attribute level while keeping the evaluation task manageable for respondents, consistent with established practice in the field (Hair et al., 2019; Orme, 2010) (Figure 2).

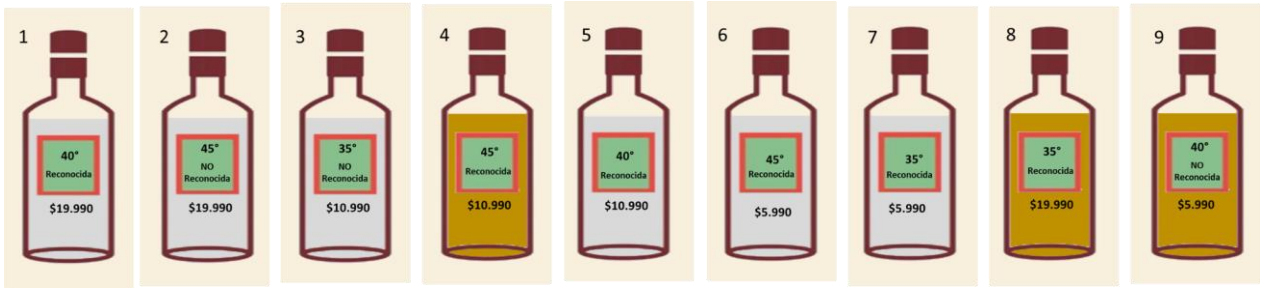

Figure 2. Experimental stimuli used in the conjoint analysis (original survey design administered in Spanish)

2.4 Statistical Modeling and Data Analysis

The estimation of preference structures was performed using an additive conjoint utility model based on part-worth utilities, which assumes that an individual's total utility for a product profile equals the sum of the part-worth utilities associated with its attribute levels. Mathematically, the estimated total utility for stimulus j (Uj) is expressed as:

$$U_j = \sum_{i=1}^{k} \sum_{l=1}^{m_i} \beta_{il} * x_{ijl} \quad (1)$$

where k represents the total number of attributes; m_i, the number of levels within attribute i; β_{i1}, the part-worth utility coefficient associated with level l of attribute i; and x_{ij1}, a dummy variable indicating the presence of that level in the profile.

To facilitate the interpretation of preference structures, the relative importance (RI) measure was calculated from the range of estimated part-worth utilities. This indicator expresses the proportional contribution of each attribute to the overall preference configuration, with larger utility ranges indicating a greater influence on consumer evaluations.

$$RI_i = \frac{\max(\beta_{il}) - \min(\beta_{il})}{\sum_{i=1}^{k}[\max(\beta_{il}) - \min(\beta_{il})]} \times 100 \quad (2)$$

where RI_i denotes the relative importance of attribute i, calculated as the ratio between the utility range of that attribute and the sum of the utility ranges across all attributes.

The predictive validity of the conjoint model was assessed using Pearson's R and Kendall's Tau coefficients to examine the agreement between estimated and observed preference structures, computed using SPSS v.26 software. High values of these coefficients indicate satisfactory predictive accuracy of the estimated utility model (Hair et al., 2019; Orme, 2010).

3. Results

3.1 Socioeconomic and Behavioral Characterization of Consumers

The descriptive analysis of the sample (n = 402) shows a relatively balanced gender distribution, with a slight predominance of males (53.2% men; 45.8% women). A marked concentration is observed among younger and single consumer segments, with 56.7% under 30 years of age and 78.4% single.

In terms of education, the sample exhibits a high level of education, with 80.6% having completed undergraduate or postgraduate studies. From a socioeconomic perspective, the middle-income segment predominates, with 50.7% of participants reporting household incomes between USD 825 and USD 2,060 per month. Likewise, the geographic concentration in the country's central zone (61.4%) is consistent with the national population distribution (Table 2).

From a psychographic perspective, the observed traits suggest a profile oriented toward responsibility (88.3%) and optimism (73.1%). These attributes, together with a tendency toward extroversion among nearly half of the sample (46.5%), are consistent with the notion that pisco consumption in the Chilean market is closely linked to socialization processes and the pursuit of rewarding experiences in collective settings (Figure 3).

Table 2. Sociodemographic profile of pisco consumers in Chile (n = 402)

VARIABLE	SEGMENT	%
Gender	Male	53.2
	Female	45.8
Age	<30 years	56.7
	30-60 years	41
	>60 years	2.2
Marital status	Single	78.4
	Married	15.9
	Other	5.7
Region of residence	North	13.4
	Central	61.4
	South	25.1
Education	Primary/Secondary	19.4
	Undergraduate	65.9
	Postgraduate	14.7
Occupation	Employed	57.5
	Student	31.8
	Unemployed	4.2
	Other	6.5
Household income	Up to USD 824	21.9
	USD 825-1,235	24.6
	USD 1,236-2,060	26.1
	USD 2,061-2,824	16.2
	More than USD 2,824	11.2

Note. Reference exchange rate: 1 USD = CLP 850.

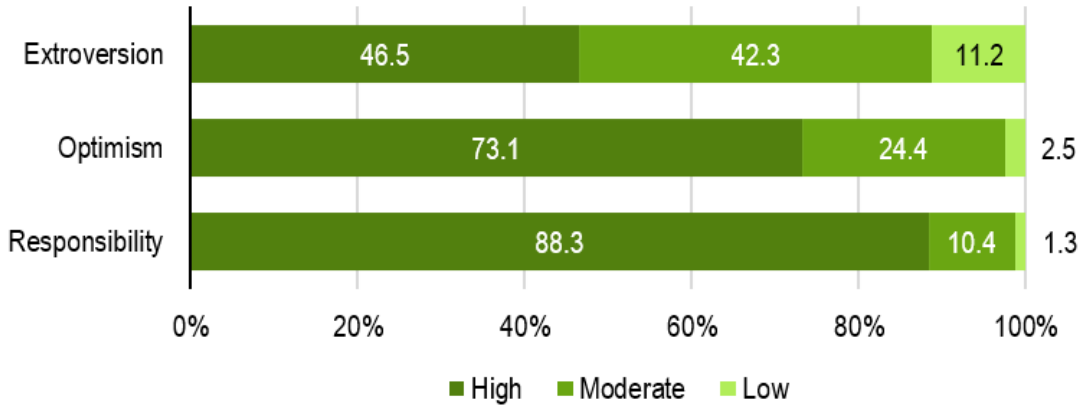

Figure 3. Psychographic profile of pisco consumers in Chile (%) (n = 402)

Consumption and purchasing patterns indicate that Chilean pisco consumers exhibit a predominantly occasional consumption profile embedded in social contexts (Table 3). Consumption is mainly associated with interpersonal contexts, particularly with friends (65.9%), while private settings such as friends' homes (44.8%) and respondents' own homes (39.3%) represent the most frequent locations. Regarding purchasing behavior, supermarkets (51.7%) and liquor stores (39.8%) are the main retail channels, while social media is the dominant information source (78.4%). These findings highlight the relevance of informal consumption contexts and digital channels in consumers' access, purchasing decisions, and information search regarding pisco.

Table 3. Pisco consumption and purchasing habits in Chile (n = 402)

VARIABLE	SEGMENT	PERCENTAGE
Purchase frequency	Daily	0.8
	Weekly	18.7
	Biweekly	21.1
	Monthly	17.7
	Occasionally (more than one month)	41.8
Place of purchase	Liquor stores	39.8
	Supermarkets	51.7
	Other	8.5
Expenditure	Up to USD 58	70.4
	USD 59-USD 118	23.6
	More than USD 118	6.0
Information source	Social media	78.4
	Television	8.5
	Other	13.2
Consumption frequency	Daily	7.2
	Weekly	23.4
	Biweekly	21.9
	Monthly	14.4
	Occasionally (more than one month)	33.1
Consumption place	Friends' home	44.8
	Own home	39.3
	Pub or restaurant	11.0
	Other	5.0
With whom consumption occurs	Alone	1.0
	Partner	9.7
	Family	14.4
	Friends	65.9
	Other	9.0

Note. Reference exchange rate: 1 USD = CLP 850.

3.2 Hierarchy of Intrinsic and Extrinsic Product Attributes

The evaluation of attributes using a direct ranking approach (as a complementary descriptive analysis) shows that flavor (the primary sensory attribute) constitutes the dominant intrinsic dimension when assessed in isolation, being ranked first by 50.0% of respondents. This result is consistent with the sensory-driven nature of spirit consumption, in which organoleptic cues remain central to initial product assessment.

Within the extrinsic dimension, price shows the most favorable ranking distribution among isolated evaluations, based on average ranking position across respondents. This pattern is consistent with the possibility that price may function not only as a cost parameter but also as a heuristic for perceived quality under conditions of information asymmetry.

Table 4 presents the distribution of rankings across intrinsic and extrinsic attributes, reflecting heterogeneous preference structures across evaluative dimensions.

Table 4. Rank-based distribution of intrinsic and extrinsic attribute preferences (%) (n = 402)

Attribute	1st	2nd	3rd	4th	5th	6th
Flavor	50.0	19.7	8.0	7.0	3.0	12.4
Alcohol content	6.2	21.4	36.1	20.2	14.4	1.7
Color	20.2	21.6	22.9	19.7	9.2	6.5
Price	8.2	18.2	19.4	30.1	13.2	11.0
Place of purchase	6.2	9.2	7.0	11.2	32.6	33.8
Packaging design	9.2	10.0	6.7	11.9	27.6	34.6

Notably, differences between direct ranking and conjoint estimates indicate that attribute salience varies depending on whether attributes are evaluated in isolation or under trade-off conditions.

3.3 Preference Modeling and Attribute Importance

The conjoint analysis (CA) model showed a high degree of agreement between the estimated and observed preference structures, with a Pearson's R coefficient of 0.987 and a Kendall's Tau of 0.944 ($p < 0.001$). According to relative importance (RI), price emerges as the most influential attribute in the preference structure (36.51%), followed by alcohol content (26.22%) and color (21.58%), while brand recognition plays a secondary role (15.69%).

The estimated part-worth utilities for price revealed a non-linear preference pattern across the evaluated levels. The intermediate price (USD 12.93) generated the highest utility (β = 0.809), whereas both lower and higher prices received negative utilities, particularly the lowest price (β = −0.596).

Regarding intrinsic attributes, higher alcohol content (45%) generated the highest positive utility (β = 0.333), whereas the lowest alcohol content (35%) was negatively valued (β = −0.444). Likewise, the clear color profile was preferred over the amber alternative, although the magnitude of this difference was comparatively modest. Within the extrinsic dimension, well-known brands generated positive utility (β = 0.448), whereas unknown brands generated negative utility (β = −0.448) (Figure 4).

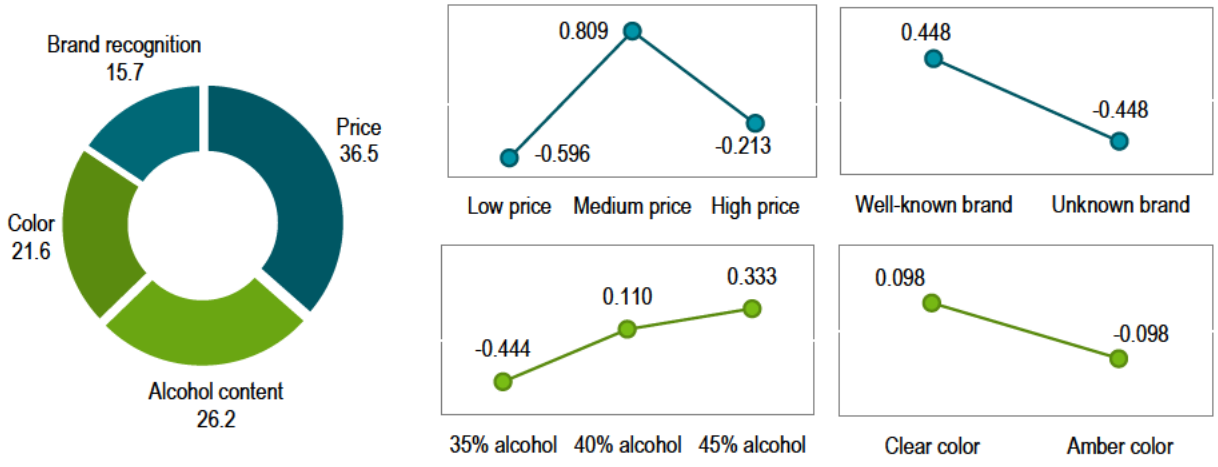

Figure 4. Relative attribute importance (%) and part-worth utility estimates

Table 5 reports the estimated relative importance and corresponding part-worth utilities for all evaluated attributes.

Table 5. Relative importance and part-worth utility estimates of attributes

Attribute	Relative Importance (%)	Level	Part-Worth Utility
Price	36.51	Low (USD 7.05)	−0.596
		Medium (USD 12.93)	0.809
		High (USD 23.52)	−0.213
Alcohol content	26.22	35%	−0.444
		40%	0.110
		45%	0.333
Color	21.58	Clear	0.098
		Amber	−0.098
Brand recognition	15.69	Well-known	0.448
		Unknown	−0.448

Note. Relative importance values represent the average of individually estimated importance scores across respondents. Model parameters: Pearson's R = 0.987; Kendall's Tau = 0.944 ($p < 0.001$). Reference exchange rate: 1 USD = CLP 850.

4. Discussion

The findings of this study indicate that Chilean pisco preferences are structured around multiple product attributes, consistent with the nature of territorially embedded products as experience goods. In line with information economics theory (Nelson, 1970), the impossibility of objectively evaluating product quality *ex ante* –partly due to the spirit's complex aromatic matrix (Peña y Lillo et al., 2005)– leads consumers to rely on observable signals to reduce uncertainty. The results suggest that these signals differ in their relative contribution to preference formation, with price receiving greater relative importance than the other attributes evaluated in the conjoint design. However, this pattern is context-dependent, as revealed by the contrast between direct ranking and conjoint-based evaluations, which point to the influence of the task used to elicit preferences.

The complementary descriptive ranking analysis provides additional evidence on attribute evaluation under non-choice conditions. When attributes are assessed in isolation, sensory dimensions –particularly flavor– are the most frequently prioritized (50.0%), indicating that sensory characteristics receive greater salience when attributes are considered individually. However, price ranks lower in the direct ranking than in the conjoint model, suggesting that its relative salience varies depending on whether attributes are considered individually or jointly under trade-offs. This divergence between direct ranking and conjoint-based importance is consistent with evidence that attribute salience may vary according to the decision task and the way information is presented (Bettman et al., 1998; Kahneman, 2011; Louviere et al., 2000). This contrast illustrates the complementary information provided by direct ranking and conjoint analysis when attributes are considered under different task conditions.

The predominance of price as the most important attribute (RI = 36.51%) is consistent with the literature highlighting its role as a key extrinsic signal under uncertainty (Javeed et al., 2022; Zeithaml, 1988). However, the critical finding is the negative utility associated with the lowest price ($\beta = -0.596$), suggesting that, for geographically protected products, price may extend beyond its role as a monetary consideration and function as a cue related to perceived quality and product positioning. The negative utility of the lowest-priced alternative is therefore compatible with quality-related inferences that disadvantage lower-priced options. This pattern is consistent with the broader evolution of the spirits market, characterized by increasing product differentiation and changing consumer preferences (Cockx et al., 2021). Likewise, this result aligns with the logic of geographically indicated products, in which authenticity and origin serve as mechanisms for capturing economic and symbolic value within the value chain (Hamrick et al., 2024).

Among intrinsic attributes, alcohol content (RI = 26.22%) and color (RI = 21.58%) also contributed substantially to the overall choice structure. The preference for higher alcohol content (β = 0.333) may reflect an association between alcohol strength and perceived product intensity or structural character. Previous research has documented the sensory and technological relevance of these characteristics in Chilean pisco (Bordeu et al., 2012). Similarly, the preference for clear over amber profiles indicates a differentiated response to color within the pisco profiles evaluated. In line with the literature on geographical indications, origin signals depend on their ability to convey recognizable, product-specific attributes to consumers (Crespo-Moncada et al., 2025). This distinctive identity is also linked to the historical and viticultural trajectory of Chilean pisco as a territorially differentiated distilled beverage (Pszczólkowski & Lacoste, 2016).

Regarding the additional extrinsic dimension, the lower relative importance of brand recognition (RI = 15.69%) suggests that, in strongly territorially embedded products, brand-related cues contribute to preference formation but are less influential than the other attributes considered in the model. This result is consistent with quality formation models in which multiple signals jointly shape product perception (Steenkamp, 1990). Furthermore, in contexts where multiple signals coexist, consumers tend to prioritize those that synthesize relevant information more efficiently (Thøgersen, 2023). However, the proliferation of concurrent attributes may lead to cognitive overload, reducing their effectiveness as quality indicators (Livat et al., 2019).

Finally, the integration of these attributes can be interpreted through information processing theory, which posits that consumers combine multiple signals using compensatory decision rules (Bettman, 1979). The conjoint results are consistent with this framework, as price, alcohol content, color, and brand recognition jointly contributed to preference formation, with their relative importance indicating the differential weight assigned to each cue. Prior evidence on Chilean pisco similarly indicates that brand-related information contributes to consumer evaluations (Araya-Pizarro, 2022).

Although the conjoint model is appropriate for the analysis, it is based on stated preferences, which may differ from actual purchasing behavior. The non-probabilistic quota sampling approach and the exclusive use of an online survey may influence participation patterns and limit the generalizability of the findings beyond the sample studied. In particular, the sample was relatively concentrated among younger and highly educated participants, which should be considered when interpreting the generalizability of the observed preference hierarchy. Furthermore, as with any main-effects conjoint analysis design, the orthogonal array employed does not allow the separate estimation of higher-order interaction effects; this is an inherent and well-documented characteristic of main-effects designs in traditional conjoint analysis (Green & Srinivasan, 1978; Orme, 2010), rather than a limitation specific to this study. Nevertheless, this study provides an empirical hierarchy of attributes that contributes to understanding value creation processes in geographically protected agri-food products.

Future research could examine the role of institutional cues, such as certifications and labeling systems, and assess whether sociodemographic and psychographic characteristics are associated with differences in preference structures, particularly in social consumption orientation and experience-seeking behavior. Other studies focusing specifically on modeling interaction effects between attributes, including whether brand recognition modifies responses to price, could complement this approach by adopting higher-resolution designs, such as Resolution V or full factorial arrays, or a discrete-choice experiment framework estimated using multinomial or mixed logit models (Louviere et al., 2000). While the empirical evidence derives from the Chilean pisco market, the patterns identified here contribute to a broader understanding of consumer preference formation in territorially differentiated agri-food products, where origin, authenticity, and multiple quality cues jointly shape consumer preferences and choices under conditions of information asymmetry.

5. Conclusions

The findings indicate that preference formation in agro-industrial markets with geographical protection involves a hierarchical and selective evaluation of product attributes. The Denomination of Origin (DO) provides an important contextual basis for product differentiation; however, the results indicate that specific intrinsic and extrinsic attributes contribute differently to preference formation under conditions of information asymmetry. This hierarchy is context-dependent, varying depending on whether attributes are evaluated in isolation or in trade-off contexts.

Price represents the most important attribute under trade-off conditions and shows a non-linear preference pattern across the evaluated levels. The penalization of the lowest price level suggests that consumers may consider monetary value not only as a cost attribute but also as a signal of perceived quality and market positioning. Consequently, price architecture represents an important dimension in the construction of value and differentiation within the category.

Regarding the sensory dimension, the preference for high alcohol content and a clear color profile indicates the relevance of product-specific attributes in consumer preference formation. These intrinsic attributes contribute to the value proposition of geographically protected products, with the preference for clear pisco over amber profiles highlighting a sensory characteristic that distinguishes the category from other global spirit categories.

Similarly, the study shows that, in products with strong geographical anchoring, the relative importance of brand recognition is lower than that of other evaluated attributes. Brand recognition contributes to preference formation alongside other quality-related dimensions. This finding highlights the relevance of territorial value within the overall preference structure and indicates that individual brand effects operate alongside collectively defined product attributes.

Finally, this study provides relevant evidence for agro-industrial value chain management, indicating that competitiveness strategies may benefit from safeguarding attributes associated with the product's territorial identity, ensuring coherent pricing architecture, and supporting brand-building efforts. These elements, together with a consistent sensory offering, may contribute to differentiation and value creation in these product categories as markets become increasingly sophisticated.

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Transparency of Data

Data not available: The dataset supporting the results of this study is not publicly available.

Author Contribution Statement

	S Araya-Pizarro
Conceptualization	
Formal analysis	
Investigation	
Methodology	
Validation	
Visualization	
Writing – original draft	
Writing – review and editing	

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