

A Conjoint Analysis of Preferred Chocolate Product Attributes for Local Chocolatiers Among Gen Z College Students in the First District of Davao City

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ABSTRACT

This study aims to provide empirical data by identifying the preferred chocolate product combinations for local chocolatiers and the relative importance of various attributes in shaping choices among Gen Z college students in the first district of Davao City. Anchored in the Multi-Attribute Utility Theory and Sensory Marketing Theory, the study employed Conjoint Analysis using 1000minds via the Potentially All Pairwise Rankings of all Possible Alternatives (PAPRIKA) method. Four sensory attributes were investigated: Type of Chocolate, Format, Texture, and Outer Packaging Material. Data from 389 verified respondents obtained through purposive sampling with a Poisson distribution revealed that Type of Chocolate (27.1%) and Format (27.1%) were the most preferred attributes, followed by Texture (23.3%) and Packaging (22.5%). The ideal simulated combination was a milk chocolate bar with a crunchy texture in paper-based packaging.

INTRODUCTION

The global chocolate market was worth USD 130.72 billion in 2024 and is projected to experience a sustained global demand as consumers continue to prioritize premium and quality experiences (MarkNTel Advisors, 2024; Smolokoff, 2021). Countries leading global cocoa production often struggle to capture their fair share of the global market value (Chen, 2024; Oliverio, 2024; Villacis et al., 2022). For the Philippines, an ideal location, climate, and fertile soil offer a strong competitive advantage in cacao production (Department of Agriculture, 2022; DOST, 2024; Quadra-Balibay, 2023). Yet, despite Davao Region's consistent status as a major producer, a significant trade deficit remains due to an over-reliance on imported products (Observatory of Economic Complexity, 2025; Padillo, 2022; Parrocha, 2021).

Foreign brands heavily control the local landscape (MarkNTel Advisor, 2025). However, the domestic market is highly promising with a rising demand for premium and artisanal chocolates (MarkNTel Advisors, 2025). Since the designation of Davao City as the Chocolate Capital of the Philippines under Republic Act No. 11547 (2021), regional industry leaders have actively sought to increase local patronage (Cudis, 2022). Understanding the evolving consumer nuances of the Generation Z market—individuals born from 1997 to 2012 (Selpian & Furman, 2024)—presents a golden opportunity for domestic manufacturers to build long-term market sustainability (Nielsen, 2025; Waworuntu et al., 2022; Wedel, 2024). Gen Z consumers tend to be hedonically motivated, prioritizing enjoyment, unique food experiences, and visual authenticity over cost-effectiveness alone (Chen et al., 2024; Intzesiloglou & Giannopoulos, 2024).

Conjoint analysis is a robust research technique used worldwide to reveal consumer priorities by forcing trade-offs between hypothetical alternatives (Stobierski, 2020). Prior local research has explored digital marketing effectiveness, direct engagement, and pricing preferences for artisanal chocolates within the country (Bidania, 2020; Lirag & Ramirez, 2024; Lirag et al., 2023). However, there is a distinct empirical gap regarding localized, sensory-based product attribute trade-offs for the Davao market. This paper utilizes the Potentially All Pairwise Rankings of all Possible Alternatives (PAPRIKA) method to identify specific attribute-level combinations that resonate with young consumers (Ombler, 2020). By evaluating the values assigned to intrinsic and extrinsic sensory features, this study seeks to provide data-driven insights to help local chocolatiers compete effectively against international brands. The objective of this research is to evaluate the specific relative importance and simulated market share of chocolate attributes among Gen Z college students in the first district of Davao City.

THEORETICAL REVIEW

Multi-Attribute Utility Theory (MAUT)

The Multi-Attribute Utility Theory authored by Keeney and Raiffa (1976) provides a systematic approach to understanding how consumers decide by evaluating multiple criteria simultaneously (Gabato et al., 2025). Individuals

assign utilities and importance to distinct attributes of a product, defining the exact trade-offs they are willing to sacrifice to achieve overall satisfaction (Sumatra, 2025). Conjoint analysis estimates the precise utility values that MAUT assumes, while MAUT offers the structural frame to calculate and predict decisions across conflicting product options (Appinio Research, 2022; Green & Srinivasan, 1990).

Sensory Marketing Theory

The Sensory Marketing Theory introduced by Aradhna Krishna (2010) proposes that engaging multiple human senses has a direct impact on consumers' perceptions, judgments, and behaviors. Because chocolate is generally perceived as a hedonic food, its selection relies heavily on deep sensory attraction (Bae et al., 2024; Macdiarmid & Hetherington, 1995; Rozin et al., 1991). Indulgence transcends mere flavor; it is an intricate multisensory journey where packaging engages vision, format triggers sight and touch, and type or texture activates taste, smell, and sound (Barry Callebaut, 2023).

By synthesizing the Multi-Attribute Utility Theory and the Sensory Marketing Theory, this study establishes a comprehensive analytical approach where cognitive decision-making is directly informed by multisensory stimuli. While sensory marketing explains how specific chocolate properties activate the consumer's senses to shape initial perceptions, the structural equations of MAUT systematically calculate how these sensory inputs are weighted when making final trade-offs. This theoretical convergence provides the foundation for the study's structural design, mapping the journey from sensory sensation to aggregated preference selection. To visualize the sequential relationship and operational workflow between these two integrated frameworks, see Figure 1.

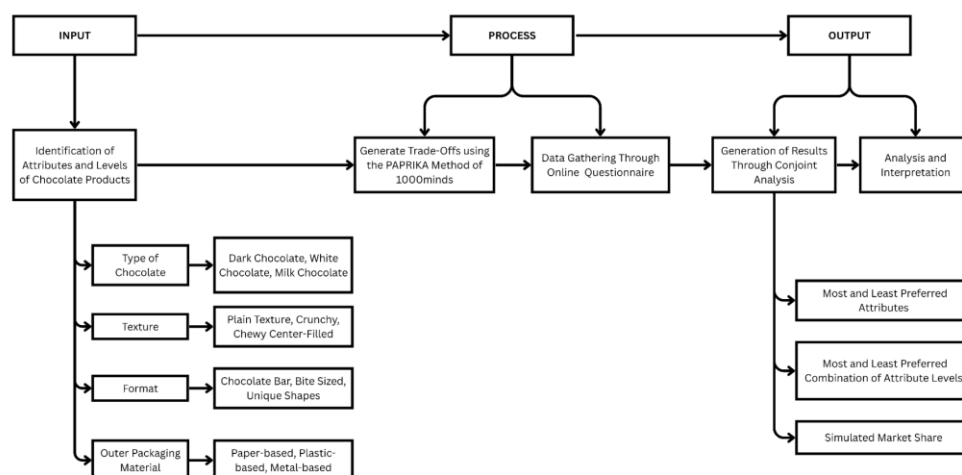


Figure 1. Conceptual Framework

METHODOLOGY

This study employed a descriptive quantitative research approach. Conjoint analysis served as the primary methodology, utilizing the web-based 1000minds software (Kulshreshtha et al., 2021; Patwardhan et al., 2025). The research design

concentrated on four key sensory attributes with three levels each, yielding a total of 81 unique profile alternatives and 54 possible pairwise trade-off combinations.

The targeted population comprised enrolled Gen Z college students aged 18–28 in Higher Educational Institutions (HEIs) within District 1 of Davao City. To determine a sample size capable of supporting statistical applications when the exact population is unknown, Cochran's formula was employed (Ajireloja, 2023).

Using a 90% confidence level ($Z=1.645$), a maximum data variability ($p=0.50$), and a 5% margin of error ($e=0.05$), the initial baseline size calculated to 271 respondents. To guarantee higher statistical validity and protect against unverified inputs, the final target was increased, securing a total of 389 verified respondents after rigorous data cleaning.

A multi-stage sampling plan combined purposive sampling with a Poisson distribution to establish data gathering intervals across 22 verified HEIs paired by geographic proximity. Actual data collection occurred on weekdays over a 24-day period from August 26, 2025 to September 26, 2025. Researchers intercepted respondents at institutional gates, verified eligibility via school IDs or email configurations, and provided digital access links or mobile devices to input choices.

The 1000minds survey instrument utilized real-time automated trade-offs where participants chose between two alternatives differing in only two attributes at a time (Hansen & Ombler, 2008). A strict exclusion matrix discarded invalid records based on: a median answering time below two seconds, a total question response time below one second, excessive neutral choices ("they are equal"), continuous left/right selections, or a failure to verify digital participation. Nonparametric statistical validation was conducted via Kendall's Coefficient of Concordance (W) and Spearman's Rank Correlation Coefficient (ρ) to measure preference agreement across the sample (Indeed Editorial Team, 2025).

RESULTS

Profile of the Respondents

The younger segment of Gen Z dominated the sample; 20-year-olds constituted the largest single cohort at 20.6%, followed immediately by 18 and 19-year-olds at 20.1% each. In terms of sex assigned at birth, female consumers represented 56.0%, male consumers accounted for 43.4%, and 0.5% identified as intersex. Geographically, 43.2% resided permanently within District 1, while 34.2% and 22.6% resided in Districts 2 and 3, respectively.

Behavioral patterns indicated that chocolate consumption is an active weekly routine, with 30.1% consuming products 2–3 times a week and 29.6% consuming them once a week. The top consumption occasions were desserts or sweet treats (64.0%) and convenient snacks (55.5%). Buyer-consumers represented the majority role at 53.5%, compared to consumers-only (34.2%) and buyers-only (12.3%). While 90.8% expressed an explicit willingness to consider local products, actual brand preference strongly favored international options at 67.6%, leaving local options at 32.4%. Top local brand awareness concentrated on Cacao de Davao (30.8%) and Malagos Chocolates (30.3%), though a large

awareness gap remained, with 30.6% completely unfamiliar with any local brands.

Relative Importance of Attributes and Part-Worth Utilities

Conjoint analysis established that Gen Z college students evaluate product choices primarily through intrinsic product nature and presentation. As shown in Table 1, Type of Chocolate and Format emerged tied with the highest relative attribute importance weights at 27.1% (Massaglia et al., 2023). Sensory texture followed closely at 23.3%, while Outer Packaging Material was determined to be the least influential driver at 22.5% (Rustagi, 2020; Wang et al., 2023).

The computed part-worth utilities reveal a distinct hierarchical preference structure for each attribute level. Milk chocolate obtained the peak utility for chocolate type, while white chocolate fell to 0% (Sözeri Atik et al., 2020). For product presentation, the traditional chocolate bar outperformed bite-sized and unique shapes (Research and Markets, 2024). Auditory-gustatory crunchy elements represented the top choice for texture, while plain mouthfeel scored the lowest (Kohyama, 2020). For packaging, sustainable paper-based structures held the maximum value over plastic options (Arfelli et al., 2024).

Table 1. Attribute Part-Worth Utilities and Relative Importance Weights

Attribute	Level	Part-Worth Utility	Relative Importance Weight
Format	Chocolate Bar	27.10%	27.10%
	Bite-Sized	14.40%	
	Unique Shapes	0.00%	
Type of Chocolate	Milk Chocolate	27.10%	27.10%
	Dark Chocolate	16.30%	
	White Chocolate	0.00%	
Texture	Crunchy	23.30%	23.30%
	Chewy Center Filled	10.60%	
	Plain	0.00%	
Outer Packaging	Paper-based	22.50%	22.50%
	Metal-based	10.10%	
	Plastic-based	0.00%	

Simulated Market Share Analysis

The 1000minds predictive software modeled choice allocations for potential chocolate configurations across the 389 verified participants. When all

81 variations are potentially active, Chocolate 1 captures an absolute 100.0% primary market preference.

To simulate real-world market constraints as shown in Table 2, secondary and tertiary choice options were computed for scenarios where the primary ideal alternative is absent. If Chocolate 1 is excluded from available inventory, consumer preference redistributes dynamically: Chocolate 4 takes the lead with a 39.7% market share, showing a willingness to substitute milk chocolate for healthy dark chocolate variants, followed by Chocolate 5 (31.3%) and Chocolate 3 (17.9%). Under the tertiary choice simulation, Chocolate 2 assumes the highest volume at 23.7%, indicating that if secondary packaging preferences are compromised, premium metal-based options retain substantial market value.

Table 2. Simulated Market Share of Alternative Chocolate Product Profiles

Product Profile	Texture Level	Type Level	Format Level	Packaging Level	1st Choice	2nd Choice	3rd Choice
Chocolate 1	Crunchy	Milk Chocolate	Chocolate Bar	Paper-based	100.0%	0.0%	0.0%
Chocolate 4	Crunchy	Dark Chocolate	Chocolate Bar	Paper-based	0.0%	39.7%	16.6%
Chocolate 5	Chewy Center	Milk Chocolate	Chocolate Bar	Paper-based	0.0%	31.3%	16.2%
Chocolate 3	Crunchy	Milk Chocolate	Bite Sized	Paper-based	0.0%	17.9%	19.7%
Chocolate 2	Crunchy	Milk Chocolate	Chocolate Bar	Metal-based	0.0%	11.1%	23.7%
Chocolate 9	Plain	Milk Chocolate	Chocolate Bar	Paper-based	0.0%	0.0%	13.0%
Chocolate 8	Crunchy	White Chocolate	Chocolate Bar	Paper-based	0.0%	0.0%	4.5%
Chocolate 6	Crunchy	Milk Chocolate	Chocolate Bar	Plastic-based	0.0%	0.0%	3.3%
Chocolate 7	Crunchy	Milk Chocolate	Unique Shapes	Paper-based	0.0%	0.0%	3.0%

DISCUSSION

The empirical findings confirm that Gen Z college students are highly systematic, structured decision-makers who evaluate chocolate products through a dual framework of cognitive utility and affective sensory cues. Nonparametric validation revealed a Kendall's W of 0.784 (Moslem et al., 2019) and a Spearman's ρ of 0.781 (Yan et al., 2019), indicating a strong positive correlation and high level of preference agreement across the sample.

The identical top ranking of Type of Chocolate and Format (27.1% each) highlights that young consumers weigh the inherent flavor category and physical format equally. For local chocolatiers, this implies that neither attribute can be compromised during product development; a premium bean type cannot compensate for an inconvenient or unfamiliar presentation format. The preference for milk chocolate aligns with its sweet, creamy characteristics that evoke nostalgic, indulgent sensory experiences (MarketNtel Advisors, 2025; Mielmann et al., 2022). Concurrently, the strong preference for the classic chocolate bar format underscores how familiarity and convenience dominate over the novelty of

irregular shapes, which scored 0% utility (Balita, 2024). While unique shapes possess visual aesthetic value, they appear to compromise the practical usability and portion management that Gen Z expects during on-the-go snacking occasions (Christodoulou et al., 2025; Dumitrescu, 2022).

Texture represents a vital sensory differentiator (23.3%), with crunchy configurations leading heavily over chewy or plain options (Baingana, 2024; Joye & Sagis, 2020). Incorporating a crunch adds an experiential twist to traditional flavors, satisfying Gen Z's demand for multi-sensory stimulation (McCormick, 2022). Although Outer Packaging Material was ranked as the least critical feature weight (22.5%), its internal level scores reveal that sustainable paper-based and recyclable metal-based packaging are heavily favored over plastic (Dabija et al., 2020; Lianita et al., 2024). This underscores how environmental consciousness acts as a functional credence attribute for this cohort.

The preference contradiction between an open willingness to try local options (90.8%) and a behavior prioritizing international brands (67.6%) points to an established quality-availability gap. Gen Z's expectations are heavily anchored to international benchmarks, meaning they perceive imported confectionery as more reliable and consistent (Glass & Cheung, 2018; Kusawat & Teerakapibal, 2022; Palomo, 2021). Coupled with the finding that 30.6% of respondents are entirely unfamiliar with existing local providers, it is evident that a substantial brand awareness gap hinders domestic market penetration (Lasco, 2024). Local chocolatiers must bridge this gap by matching or exceeding international structural and sensory attributes while leveraging targeted social media visibility to transform abstract consumer interest into active purchasing habits (Syah et al., 2022; Waworuntu et al., 2022).

CONCLUSIONS AND RECOMMENDATIONS

This study quantified the attribute preferences of Gen Z chocolate consumers in the first district of Davao City, validating the structural integration of the Multi-Attribute Utility Theory and the Sensory Marketing Theory. The research shows that young consumers evaluate products via structured trade-offs. Their preference centers on a crunchy, milk chocolate bar in paper-based packaging, whereas unconventional shapes and plastic wrappers fail to generate meaningful utility. The prevailing challenge for Davao City's local industry is not an unwillingness from consumers to support homegrown products, but rather a persistent brand awareness and international quality gap.

To translate these insights into practice, stakeholders should implement the following targeted initiatives:

For Local Chocolate Manufacturers and Entrepreneurs: Prioritize core production infrastructure around milk and dark chocolate profiles using standard bar formats rather than investing in complex, irregular shapes. Integrate high-quality texture modifications, such as crushed local nuts, puffed rice, or local crisp elements, to satisfy multi-sensory demands. Transition commercial lines toward sustainable, paper-based outer boxes that utilize interactive elements like brand storytelling and origin disclosures via scrawled QR codes to directly address the awareness gap.

For Marketers and Sales Strategists: Focus digital visibility campaigns on the top-performing profile combinations (Chocolates 1, 4, and 5). Deploy structured influencer campaigns across visual social media platforms like TikTok and Instagram to drive immediate brand recall (Cadayday et al., 2024). Utilize temporary pop-up retail spaces, chocolate festivals, and experiential tasting booths near university hubs to minimize buying friction and capture spontaneous purchasing habits (Discover Davao, 2025; Rosenbaum et al., 2021).

For Policymakers and Trade Sectors: Formulate targeted collective branding initiatives, such as a standardized local quality or sustainable origin seal, to lower consumer hesitation and build trust. Provide structural incentives, like subsidies or tax relief, to encourage small and medium enterprises to adopt eco-friendly paper or metal packaging configurations (Mitchell & Topic, 2020).

FURTHER STUDY

Future research should expand the geographical focus beyond District 1 to evaluate macro-regional consumer differences across Davao City and surrounding provinces. Shifting focus to longitudinal testing would determine how changing economic conditions or lifecycle shifts alter these preference structures over time. Methodological extensions should incorporate missing non-sensory variables – specifically price elasticity, specific ethical certifications, and localized branding elements – to construct a comprehensive model of actual buying behavior within the Philippine confectionery market.

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