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ARTICLE

Visual attention and attribute choice for specialty coffee labels

Atenção visual e escolha de atributos em rótulos de cafés especiais

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Abstract: This study uses eye-tracking metrics to quantify the visual attention given to differentiation attributes in specialty coffees. Two Discrete Choice-type experiments were developed using the packaging as a stimulus to analyze visual attention and the probability of choice for each attribute. Experiment 1 (466 observations) included the evaluation of the attributes price, brand, coffee variety, organic label and origin. Experiment 2 (279 observations) tested price, score, altitude and roast. Experiments 1 and 2 revealed that the use of the Time Fixation Duration (TFD) and Visit Count (VC) metrics were efficient in evaluating the effect of visual attention on the choice of each attribute present in the packaging. In experiment 2, the Time to First Fixation (TFF) and the willingness-to-pay (WTP) metrics were also significant, the latter of which had a value higher than the highest price indicated by the retailer. The packaging label could be considered a first potential activation regarding the novelty that these attributes represent, and the findings of this study can direct the efforts of the coffee industry to educate its customers about the main quality attributes related to the consumption of specialty coffees that are still poorly understood, but which may generate future profitability.

Keywords: consumer behavior, food choice, coffee attributes, eye-tracking, binary logit model.

Resumo: Este estudo usa métricas de rastreamento ocular para quantificar a atenção visual dada aos atributos de diferenciação dos cafés especiais. Dois experimentos do tipo Discrete Choice foram desenvolvidos utilizando a embalagem como estímulo para analisar a atenção visual e a probabilidade de escolha de cada atributo. O experimento 1 (466 observações) incluiu a avaliação dos atributos preço, marca, variedade do café, selo orgânico e origem. O experimento 2 (279 observações) testou preço, pontuação, altitude e torra do grão. Os experimentos 1 e 2 revelaram que o uso das métricas Time Fixation Duration (TFD) e Visit Count (VC) foram eficientes na avaliação do efeito da atenção visual na escolha de cada atributo presente na embalagem. No experimento 2, o tempo para a primeira fixação (TFF) e as métricas de disposição a pagar (WTP) também foram significativas, sendo que este teve um valor superior ao preço mais alto indicado pelo varejista. O rótulo de uma embalagem pode ser considerado potencialmente uma primeira ativação em relação à novidade que esses atributos representam e, além disso, os achados deste estudo podem direcionar os esforços da indústria cafeeira para educar seus clientes sobre os principais atributos de qualidade relacionados ao consumo de cafés especiais que ainda são pouco conhecidos, mas que podem gerar lucratividade futura.

Palavras-chave: comportamento do consumidor, escolha alimentar, atributos do café, eye-tracking, modelo logit binário.

1. Introduction

The main objective of this study is to evaluate the visual attention and attribute choice of specialty coffee consumers using the eye-tracking technique. Visual attention represents one of the fundamental aspects of consumer psychology (Ramsøy, 2015). Through eye-tracking,

it is possible to determine the visual stimuli that had the longest fixation time in a given communication, as well as the path followed by the eye, the first fixation, the fixation duration, the number of fixations, and other metrics (Sousa, 2016). Eye-tracking allows the measurement of an individual's eye movements in relation to a stimulus that researchers want to capture, recording the path of visual exploration until the act of choosing a product or packaging (Kytö et al., 2018). Its application in consumer behavior research enables researchers to understand the information and visual aspects related to the direction, duration, and sequence of eye movements, as well as the pupil reactions of the respondents (Rodrigues et al., 2015).

The research gap contribution is based on Van Loo *et al*.'s study (2015), which utilizes the eye-tracking technique to examine the influence of attributes and visual attention on coffee consumers' choice. However, in our case, the focus is on applying this technique to the Brazilian context. Another noteworthy contribution to the field is the investigation of the relationship between visual attention and price during the decision-making and willingness-to-pay (WTP) process concerning specialty coffees.

According to Parent et al. (2011), WTP is a concept derived from and utilized in business strategy: it refers to the motivation of consumers to pay a price that exceeds the current market price for a good or service due to their perception of higher value associated with that good or service. In essence, it represents the maximum value that a consumer is willing to spend on a product or service. The literature explores WTP from various consumer behavior perspectives, ranging from studies on payments for public environmental goods (Liebe et al., 2011) to investigations on how brand experience can influence the willingness-to-pay a premium price (Dwivedi et al., 2018). In the context of coffee research, the primary focus is on understanding how much consumers are willing to pay for fair-trade products (Ruggeri et al., 2021; Yang et al., 2012) and for coffees with sustainability-related certifications (Gallenti et al., 2016; Van Loo et al., 2015).

Before we proceed, it is essential to provide context regarding the functioning of the international trade chain for coffee transactions and to explain the concept of 'specialty coffee'. Coffee is a perennial crop that is primarily grown in developing countries within the tropical and subtropical zones, and, with the exception of Brazil, the primary consumers of coffee are mainly found in developed countries characterized by higher per capita income (Nishijima et al., 2012; Vegro & Almeida, 2020). However, the Brazilian coffee market historically served as a convenient outlet for the production of lower-quality coffees that were not suitable for export; it is only recently that domestic consumers in Brazil have also become more demanding in terms of coffee quality (Pires et al., 2003).

In the late seventies, Erna Knutsen was the first to use the term 'specialty coffees' to classify coffees produced from Arabica coffee beans grown in *terroirs* that provide unique flavor profiles (Rhinehart, 2009). The market for premium coffees has been characterized by waves of consumption in the last decades: (i) in the first wave, the beverage was 'consumed rather than appreciated', being valued mostly for the stimulating effects of caffeine and not so much for its flavor or other intangible attributes (Roseberry, 1996; Borrella et al., 2015), and drinking coffee was considered an old-fashioned habit of old people (Teles & Behrens, 2020); (ii) the second coffee consumption wave, on the other hand, was characterized by the improvement in the quality of the commodity and by the opening of large coffeehouse chains, such as Starbucks (Daviron & Ponte, 2005; Teles & Behrens, 2020); and finally, (iii) the third wave of consumption is happening now (Manzo, 2010, 2015; Borrella et al., 2015; Fischer, 2017). The third wave does not seem to be associated with a drop in coffee consumption but rather with an increase in demand for differentiation (Teles & Behrens, 2020). This time around, the characteristics of the bean are being appreciated and the beverage is savored because of its aroma, flavor, sweetness,

acidity, body and aftertaste (Fischer, 2017). The coffees of this high-quality consumption wave are called specialty coffees: beans with controlled origin and strict quality standards regarding the processing of the raw coffee, roasting, packaging and preparation (Manzo, 2010, 2015; Borrella et al., 2015). Additionally, numerous individuals, ranging from producers to baristas, are dedicated to ensuring a high-quality product from the beginning to the end of coffee production and consumption, aiming to deliver a cup with minimal or no defects (Costa, 2020).

Vineyards focusing on the production of fine wines have been operating for many years with these concepts, and the comparison between coffee and wine is therefore increasingly common and encouraged by the productive chain of specialty coffees (Folmer, 2014). This is because wines are distinguished from each other and are more valued depending on the grape variety, producing region and processing particularities. This is exactly what roasting industries and producers want for the specialty coffees market: show the consumers that coffee can be much more than what is commonly known, offering specific sensory characteristics based on such aspects as the origin of the bean, which in these cases can lead to record prices paid to so-called "Special Reserve Coffees" (Teuber & Herrmann, 2012). This is the so-called "wineification of coffee", a logic that seeks to transpose the recognition afforded to wine over the centuries to coffee (Teuber & Herrmann, 2012; Folmer, 2014).

From this perspective, coffee is traded more like a brand than a traditional commodity. Consequently, specialty coffee prices do not solely conform to the typical patterns observed in commodity markets. This characteristic of specialty coffee pricing presents an uncommon perspective within agricultural product research, further justifying the relevance of this study.

2. Theoretical foundation

According to Ellsworth & Scherer (2003), the first evaluation is about the new, the novelty - something in the environment (physical, social or mental) that changes and attracts attention. For the authors, it does not matter what draws attention, it cannot be dismissed as irrelevant to one's well-being and more in-depth evaluations will be necessary. Similarly, attitudes play a role in our daily judgments and decisions, enabling us to navigate life more efficiently without needing to invest significant time and cognitive resources in re-evaluating every decision when faced with similar situations (Kwon & Nayakankuppam, 2015).

The study of attitudes holds a central position in social psychology and consumer behavior research, as positive attitudes are expected to lead to corresponding behavioral changes (Bagozzi, 1981; Fazio et al., 1989; Cohen & Reed II, 2006). Rodrigues (1975) defines social attitudes as an organization of beliefs and cognitions, loaded with affective components, that predispose individuals to take actions consistent with their cognitions and emotions toward a particular object. Attitudes encompass cognitive, affective, and behavioral elements that influence our perception of reality, motives, and learning processes. This perspective aligns with the constructionist theory of emotions, which is part of the circumplex model. According to this theory, emotional categories are socially constructed and culturally relative, indicating that emotions are influenced by social reality (Hoemann et al., 2019). Since attitudes are constructed, they actively shape and interpret the information we receive from the world, making them susceptible to the attention we allocate to each situation.

For Orquin & Loose (2013), one of the ways in which attention influences perception is by directing the visual attention of a specific visual stimulus to the fovea (central focus point of the retina), which has a greater density of sensory neurons and therefore improves the visual processing of stimuli. With respect to decision-making, if a stimulus receives no fixation and

is outside the perceptual range of the fixation, then it may not be identified. Furthermore, the attention paid by consumers to the stimuli of a given product is selective, thus being both top-down (given by the stimulus) and bottom-up. Once the information is processed, the perceptual process can begin.

Economic and marketing studies have demonstrated that price exerts both attractive and aversive effects on consumer demand (Gaur & Fisher, 2005; Rao, 2005; Rao & Monroe, 1988). Price is recognized as a factor that influences consumer choice, functioning both as a budgetary constraint and as an indicator of product quality (Sigurdsson et al., 2010; Zeithaml, 1988). The literature indicates that price can have a negative impact on perceived value and WTP (Dodds et al., 1991). However, it is also acknowledged that prices can enhance the perceived and actual effectiveness of products (Shiv et al., 2005).

According to Aaker (2009), a brand adds tangible or intangible value to a product, and this is primarily achieved through elements such as brand loyalty, brand awareness, brand associations, and perceived quality, among other brand assets. Keller (2009) expands on this concept and identifies additional factors that contribute to brand value, including lower vulnerability to market crises and competitor actions, higher profit margins, a more elastic consumer response to price decreases, a more inelastic response to price increases, and improved communication effectiveness. Furthermore, Lassar et al. (1995) propose that a familiar brand carries favorable, unique, and positive associations in the minds of consumers. As a result, consumers may make inferences about unfamiliar products from a known brand based on the quality, value, or usefulness associated with other products from the same brand. Therefore, when a product lacks a brand, it is essentially perceived as a commodity.

As discussed, the market for high-quality coffees aims to differentiate these beverages from agricultural commodities (Alvarez et al., 2010; Nunes et al., 2013). The quality and reputation of specialty coffees are conveyed through attributes such as score, roast, variety, organic certification label, region of origin, and altitude.

The roast plays a crucial role in fully developing the coffee bean (Raposeiras, 2014). Roasting is a precise process as under-roasting will result in an incomplete expression of the bean's sensory characteristics, while over-roasting will lead to burnt flavors. Generally, there are three main types of roasts: light, medium, and dark. Light and medium roasts aim to extract and highlight the unique qualities of each coffee bean (Manzo, 2014). Lighter roasts generally preserve the natural acidity of the coffee and accentuate delicate flavors such as fruity and floral notes. In contrast, darker roasts tend to express caramel and chocolate notes and can have a more pronounced bitterness (Raposeiras, 2014). Furthermore, it is advisable to grind the coffee as close to the time of consumption as possible, as the longer the interval between grinding and brewing, the more the coffee loses its flavor and aroma due to oxidation.

Contradicting the aforementioned recommendations that suggest less intense roasts are more suitable for consumption, a sensory study conducted by Monteiro et al. (2010) indicated that the dark roast was actually more widely accepted in terms of color, aroma, flavor, and overall impression among a larger group of consumers. Conversely, the light roast sample received lower appreciation from a significant portion of consumers across all evaluated attributes.

The term 'score' in relation to specialty coffee follows the widely used classification established by the Specialty Coffee Association (SCA). According to this classification, a coffee needs to achieve a minimum of 80 points on a scale that goes up to 100 in order to be considered a specialty product (Costa, 2020). The assessment process involves evaluating several aspects of the tested coffee, including fragrance/aroma (evaluated both with dry ground beans and after immersion in water), flavor, aftertaste (the flavor that lingers in the mouth after swallowing),

acidity, body (the sensation of weight, filling of the mouth), balance, uniformity, clean cup (the ability to distinguish all the characteristics), sweetness, and overall concept.

Coffee varietals refer to coffees that are produced using a single bean variety without blending it with other varieties. Most experts recommend this approach for specialty coffees as it allows the unique aromatic and flavor characteristics of the chosen variety and the terroir of the producing farm to be perceived (Raposeiras, 2014). According to Donnet et al. (2008), the coffee variety represents a reputation attribute that influences the price of specialty coffees.

The organic coffee certification aims to promote biodiversity and reduce the use of fertilizers and pesticides in coffee production (Ponte, 2004). The coffee industry has been a pioneer in implementing sustainability certification programs, setting a benchmark for other commodities (Pierrot et al., 2010; Reinecke et al., 2012). For instance, fair trade certification strives to establish a minimum price for small-scale producers (Basu & Hicks, 2008; Reinecke et al., 2012). On the other hand, coffee forest certifications focus on the conservation of forests by promoting traditional production methods integrated with nature.

The country of origin of coffee is considered as one of the reputation attributes that influence the price of specialty coffees (Donnet et al., 2008; Teuber, 2010; Teuber & Herrmann, 2012). Donnet et al. (2008) found significant effects of the country of origin, even after controlling for the objective quality differences that contribute to a sensory quality score. Similar results were reported by Teuber (2010) concerning the effects of the country and region of origin.

Altitude can serve as an indicator of the production of coffee beans that are more resilient, flavorful, and aromatic in higher regions. Specialty coffees are predominantly cultivated in high-elevation locations. This observation can be attributed to the higher concentration of specific minerals in the beans that develop in mild and humid climates at higher altitudes. These components significantly influence the properties evaluated in the gastronomical analysis of a cup of coffee, such as flavor, aroma, and acidity (Raposeiras, 2014).

3. Methodology

Since the intention was to evaluate the largest number of specialty coffee attributes, eight different attributes were used to structure the experiment. Because of the constraints of bounded rationality, however, we divided the set of attributes in two experiments (only the price was part of both experiments) to avoid confusion in the participants' visual attention and to have a feasible number of attributes to be selected by the consumer in each hypothetical product.

The evaluated attributes were displayed on the coffee packaging as it plays a crucial role in attracting consumers' attention (Bialkova et al., 2013; Clement et al., 2013; Varela et al., 2014) in coffee shops and various other coffee retailers. Furthermore, the attributes featured on the packaging play a significant role in sales promotion and conveying product information at the point of sale, especially with the rise of self-service channels and evolving consumption habits (Kuvykaite et al., 2009). It is important to note that the perception of quality can be influenced by both the content and presentation of the packaging. The coffee packages were specifically created for the experiment.

The experiments were conducted at a specialty coffee shop to provide respondents with a realistic consumption experience and to recruit as much coffee consumers who could distinguish and appreciate the evaluated attributes as possible, or coffee 'connoisseurs': these individuals possess a level of knowledge and expertise in coffee consumption that sets them apart from their peers, enabling them to understand, evaluate, and appreciate coffee products (Quintão & Brito, 2016). The conditions for participating in the experiment

were as follows: whether the respondent consumed coffee regularly; and whether he/she agreed with and signed the Informed Consent Form. The data collection was carried out with a random selection of participants: total sample of 28 individuals. It should be highlighted that this same sample of 28 individuals participated in two distinct experiments (experiment 1 and experiment 2).

Previous experiments applying eye-tracking used the following number of participants: 22 in Van der Laan et al. (2015), 32 in Visschers et al. (2010), 40 in Balcombe et al. (2015), 50 in Varela et al. (2014), 51 in Vidal et al. (2013), and 53 in Ares et al. (2013), for example. As such, the sample collected here falls within the sample size range used in other studies.

Before starting the data collection with the eye-tracker, the respondents were asked if they consumed (specialty or common) coffee regularly. This was the control variable and a condition for participation. If the participants drank coffee, but did not know anything about specialty coffees, they received an informative text explaining those attributes a lay consumer would probably not know about the subject, like describing briefly what a specialty coffee is, for example. Consequently, not all participants were specialty coffee connoisseurs. Out of the total of 28 participants, 15 were considered specialty coffee enthusiasts, while 13 were simply curious about specialty coffees. The experiment was not designed to explicitly differentiate between connoisseurs and amateurs, as was done in the study conducted by Carvalho & Spence (2018).

After reading and signing the Informed Consent Form, each participant was positioned in front of the equipment. The eye-tracker model used was the Tobii T120 with integrated 17" monitor (refresh rate: 60 Hz, response time: 4 ms). This eye-tracker captures eye movements at 120 Hz (or every 8.3 ms) and operates at a distance of 50–80 cm from the eyes and can follow the movements of the head within a 30 × 22 cm window (at 70 cm of the screen). This non-intrusive eye-tracking device is connected to a computer and managed by a software. The equipment records the user's eye movement during the decision-making process and records the visual attention flow that occurred during the experiment.

The respondents viewed 16 photos (slides) on the computer screen with packaging combinations presented two by two; the combinations were defined by means of an orthogonal matrix. As such, each packaging could or could not contain all of the evaluated attributes. Each combination was shown during 10 seconds. At the end of each viewing, the participant would have to inform the researcher if his/her choice would be the picture on the right, left or none of them.

The sample size of experiment 1 included 466 observations. This calculation was obtained by multiplying 28 individuals by 16 photos, generating 448 observations to be used in the discrete choice measurement models. For those occasions when the interviewees made no choice (neither the right or left option of the slide), the data was doubled, because this represented the occurrence of "non-choice" in both product sides. The sample of experiment 1, therefore, had 448 observations + 18 duplicate "non-choice" observations, totaling 466.

The attributes highlighted as areas of interest in the eye-tracker were:

- Price: R$ 13.75; R$ 15.00; and R$17.50 (Brazilian currency) – provided by one of the partners of the coffeehouse considered in the study, as a reference to the sale price of a 250g package of roasted and ground specialty coffee if they would sell packaged coffee.
- Brand: during the data collection, the coffeehouse was in the process of changing its visual identity. The study therefore considered the old brand (Brand A) and the new brand (Brand N).
- Variety: the varieties Catuaí, Novo Mundo and Bourbon were considered.
- Organic Coffee: organic coffee label. When this label did not appear, the corresponding space on the label was left blank.

- Origin: Cerrado Mineiro, Alta Mogiana and Mantiqueira de Minas.

The metrics used are the gaze fixation duration within the area of interest and the number of gaze points. Time to First Fixation (TFF) corresponds to the time (seconds) of the respondent's attention during the first look at an attribute. Time Fixation Duration (TFD) corresponds to the time (seconds) of the respondent's attention regarding the total fixation time on an attribute. In addition to these metrics, the gaze path was also considered. Visit Count (VC) corresponds to the gaze points - number of visits to a particular area of interest - in this case, the packaging attributes presented two by two in a slide.

In the experiment 2 the respondents viewed 09 photos (slides) on the computer screen with packaging combinations presented two by two; the combinations were defined by means of an orthogonal matrix. As such, each packaging could or could not contain all of the evaluated attributes. Each combination was shown during 10 seconds. At the end of each viewing, the participant would have to inform the researcher if his/her choice would be the picture on the right, left or none of them.

The sample size of experiment 2 included 279 observations. This calculation was obtained by multiplying the 28 individuals by 9 photos, generating 252 observations. Considering also the duplication of "no choice" observations, as already explained in experiment 1, we considered 252 data points + 27 duplicate data points, totaling 279 for the discrete choice measurement model.

The same levels of the attribute price from experiment 1 were repeated for experiment 2 (R$ 13.75; R$ 15.00; and R$ 17.50). In addition, other attributes regarding the choice were gathered as areas of interest in the eye-tracker:

- Score: 80, 85 or 90 points according to the most frequently used standardization in the market from the Specialty Coffee Association (SCA).
- Altitude: 800 meters, 1000 meters and 1200 meters.
- Roast: light, medium and dark.

Both experiment 1 and 2 uses the measure concerning the attention (metrics used are the time to first fixation, total fixation duration and the number of saccades within the area of interest). As such, Figure 1 summarizes how the data collected in each experiment (1 and 2) were used as explanatory variables of a to-be-estimated binary logit model.

For example, for experiment 1, the variable TFF_BRAND_A corresponds to the fixation time of the first gaze (in seconds) on the packaging area referring to the brand attribute "old brand"; the variable TFD_O_MANTIQUEIRA corresponds to the total fixation time of the gaze (in seconds) on the packaging area referring to the origin attribute "Mantiqueira de Minas"; VC_BRAND_N corresponds to the visit count (whole numbers) on the packaging area referring to the brand attribute "new brand". An analogous analysis can be done for the other variables of both experiments.

In both experiments, the dependent variable was a dummy that assumed the value of "1" when the experiment participant chose one of the products of the slide (photo) or the value of "0" when no choice was made. For those occasions when the interviewees made no choice (neither the right or left option of the slide), the assigned value was "0" and the data was doubled, because this represented the "non-choice" of both product sides.

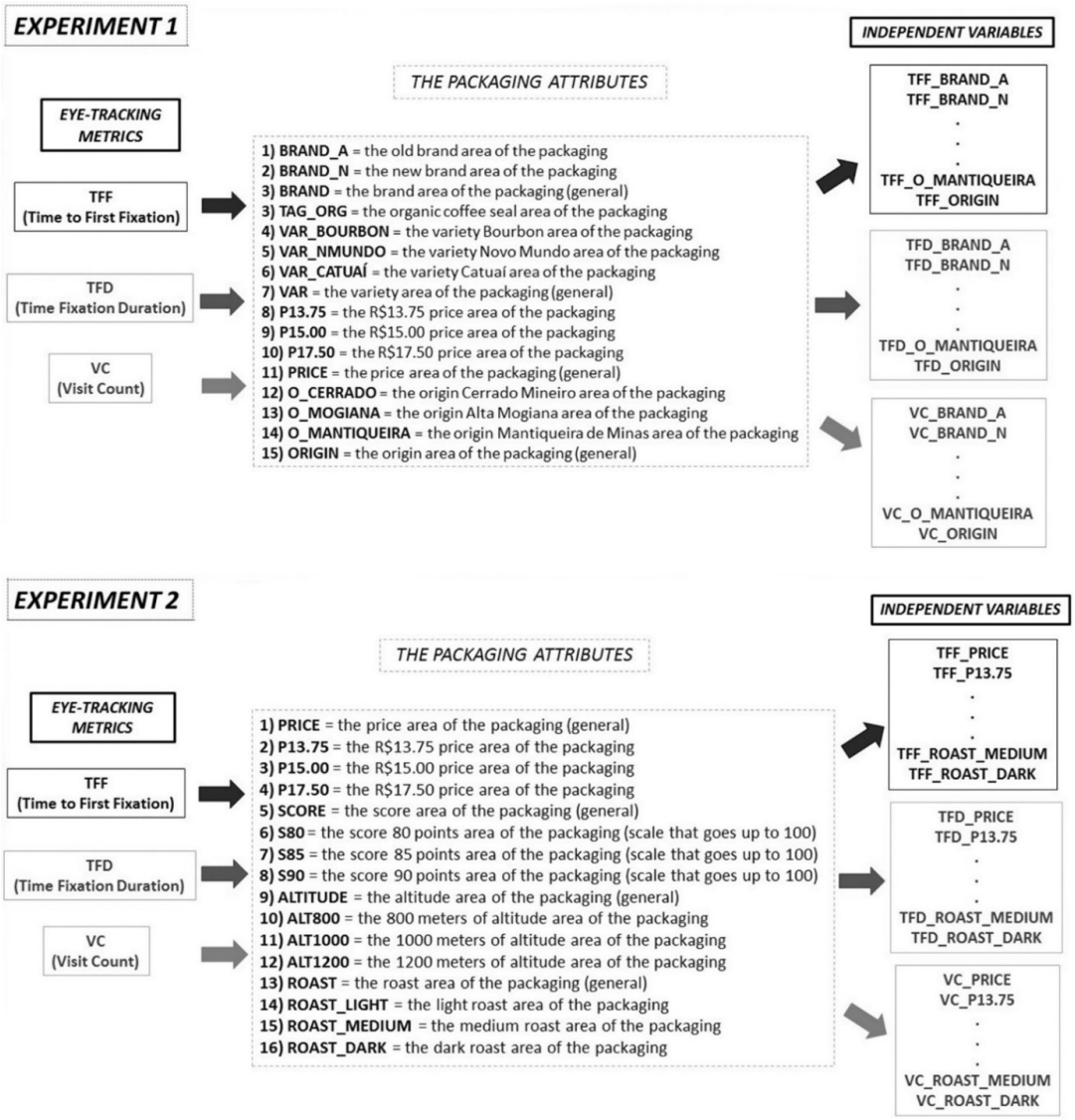

Figure 1. Independent variables obtained in both experiments, initially considered in the binary logit model.
Source: research data.

The discrete choice modeling (DCM) method was used for the data analysis. DCM is an econometric analysis technique, which may be recommended to evaluate consumer behavior by applying conditional logit analysis on the choice of the alternative that maximizes utility (McFadden, 1973; Hensher & Johnson, 1981). According to random utility theory (McFadden, 1973), DCMs are applied based on the assumption that the utility of individual *i* in choosing alternatives *j* for choice situation *t* can be represented as:

$$U_{ijt} = \beta'_i x_{ijt} + \varepsilon_{ijt} \quad (1)$$

Where:
xijt: is a vector of observed variables related to the individual alternative *j* and *i*;
β'_i: is a vector of structural parameters that characterize choices;

ε_{ijt}: is the not-observed error term, which is assumed to be independent of β and *x*.

Different random utility models can be derived by making different assumptions about the composition and distribution of the not-observed factors $f(\varepsilon_{ijt})$. In this study, data collected from the choice experiments were analyzed with the *Binary Logit Model* and not with the *Error Component Random Parameter Logit* (RPL-EC). For RPL-EC to be applied, more than two choices of the individual are required (and not just two: choice and non-choice, as is the case under study in this manuscript).

All experiment participants made the choice (one alternative) between different specialty coffee packages or chose the option "do not buy" (second alternative). The not-buying option was added to approximate a real purchase experience (Van Loo et al., 2015). Two empirical models were therefore estimated for the experiments and the econometric analysis was performed with the binary logit model to estimate the probability of an individual choosing the product according to the perceptions given by the explanatory variables, used in the final adjusted model.

In the binary logit model, the answer given by the individuals is a dichotomous and discontinuous variable. For example, if the individual answers "Yes" to the question "do you choose any product from this slide?", the dependent variable takes value "1"; if he/she answers "No", this variable takes a value of "0". This model is based on the cumulative logistical distribution function, given by:

$$P_i = \frac{1}{1 + e^{-X_i\beta}} \tag{2}$$

Where:
Pi: represents the probability of the product choice event occurring;
Xi: is a vector of explanatory variables;
β: is a vector of unknown parameters to be estimated.

According to Torres-Reyna (2014), the estimation of the parameters $\beta_0, \beta_1 \ldots \beta_n$ is done based on data defined through the maximum likelihood method, which is a combination of coefficients that maximizes the probability of the sample being observed. After the estimation of the logit model, the marginal effects of each attribute are calculated, finding the respective percentage in the choice probability variation of the individual.

In nonlinear models, the estimated coefficient is not equivalent to the marginal effect (MgE) of the dependent variable regarding the probability of the consumer making a choice, i.e., $\partial P(Y=1) \big/ \partial X$ will not be immediately β as in the linear regression. According to Maddala (1983), therefore, the marginal effect is given by:

$$\partial P(Y=1) \big/ \partial X = \beta \frac{e^{-X_i\beta}}{\left(1 + e^{-X_i\beta}\right)^2} \tag{3}$$

That is, it is given by multiplying the estimated coefficient β of each explanatory variable with the density function of the logistic distribution. The R software was used for the adjustment of the model (R Core Team, 2018).

Coffee studies applying the DCM method have investigated whether ethical consumption and charity are substitutes or not in the context of fair trade and organic coffee labeling (Langen, 2011); They evaluated the impacts of coffee sustainability labels on consumer preferences, willingness-to-pay (WTP) and the visual attention to attributes (Van Loo et al., 2015); They

compared two analytical approaches - joint rating-based and choice-based experiments - which revealed the consumer preferences between different iced coffees in Norway (Asioli et al., 2016).

In this context, this study seeks to use the DCM methodology to examine the attention of consumers of specialty coffees, but here no multinomial and mixed logit models are used, but instead the binary logit model through the perception of choice and non-choice. Specifically, the focus is on consumer attention based on various WTP attributes for specialty coffees and the application of discrete choice modeling to estimate the probabilities of product choice in relation to the attributes and metrics of visual attention to price during the decision making process.

It should be highlighted that other models (besides model 1 and 2) were estimated considering the presence of all variables or different combinations. The most robust model presented here was defined through the stepwise method and with the aid of the lowest value to the Akaike Information Criterion (AIC).

Model 1 - Experiment 1

$$Y_1 = \alpha + \beta_1 TFD\_BRAND\_A + \beta_2 TFD\_BRAND\_N + \beta_3 TFD\_TAG\_ORG + \beta_4 TFD\_VAR\_NMUNDO + \beta_5 TFD\_VAR\_CATUAI + \beta_6 TFD\_VAR\_BOURBON + \beta_7 VC\_BRAND\_N + \beta_8 VC\_PRICE + \beta_9 VC\_VAR + \varepsilon \quad (4)$$

Where:

Y_1: has value 1 when the individual from experiment 1 decides by choosing one of the products of the slide (photo); has value zero when no choice is made.

$\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ e β_9: are the estimated parameters of the proposed model;

Independent variables: described in the Figure 1.

ε: corresponds to the random error term.

Model 2 - Experiment 2

$$Y_2 = \alpha + \beta_1 PRICE + \beta_2 TFF\_PRICE + \beta_3 TFD\_ALT800 + \beta_4 TFD\_ALT1000 + \beta_5 TFD\_PRICE + \beta_6 TFD\_ROAST + \beta_7 TFD\_ROAST\_LIGHT + \beta_8 TFD\_ROAST\_MEDIUM + \beta_9 VC\_PRICE + \beta_{10} VC\_TAG\_ORG + \varepsilon \quad (5)$$

Where:

Y_2: has value 1 when the individual from experiment 2 decides by choosing one of the products of the slide (photo); has value zero when no choice is made.

$\alpha, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ e β_{10}: are the estimated parameters of the proposed model;

Independent variables: described in the Figure 1.

ε: corresponds to the random error term.

4. Results and discussion

Several models were adjusted for the two experiments considering all independent variables initially exposed in Figure 1. According to these selected models, Table 1 presents the descriptions of the explanatory variables considered and their respective descriptive statistics observed for the purposes of adjusting the logit model (experiments 1 and 2). The models with the independent variables exposed in Tables 2 and 3 (for experiment 1 and 2, respectively) were some of those with the best parsimony in their estimates.

Table 1. Description of the independent variables and respective descriptive statistics (Experiments 1 and 2)

Variables	*Experiment 1*				*Experiment 2*			
	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation
PRICE	-	-	-	-	13.7500	17.5000	15.2400	1.4632
Time to First Fixation (TFF)								
TFF_PRICE	-	-	-	-	0.0000	9.9000	3.5900	2.8400
Time Fixation Duration (TFD)								
TFD_BRAND_A	0.000	3.4600	0.1072	0.3519	-	-	-	-
TFD_BRAND_N	0.000	3.7100	0.1215	0.3892	-	-	-	-
TFD_TAG_ORG	0.000	4.4700	0.6029	0.7421	-	-	-	-
TFD_VAR_BOURBON	0.000	4.4300	0.3473	0.8046	-	-	-	-
TFD_VAR_NMUNDO	0.000	4.6100	0.2637	0.7079	-	-	-	-
TFD_VAR_CATUAI	0.000	4.9300	0.5739	0.9699	-	-	-	-
TFD_ALT800	-	-	-	-	0.000	3.4600	0.1072	0.3519
TFD_ALT1000	-	-	-	-	0.000	3.7100	0.1215	0.3892
TFD_PRICE	-	-	-	-	0.000	4.4700	0.6029	0.7421
TFD_ROAST	-	-	-	-	0.000	4.4300	0.3473	0.8046
TFD_ROAST_LIGHT	-	-	-	-	0.000	4.6100	0.2637	0.7079
TFD_ROAST_MEDIUM	-	-	-	-	0.000	4.9300	0.5739	0.9699
Visit Count (VC)								
VC_BRAND_N	0.000	5.0000	0.3798	0.9108	-	-	-	-
VC_PRICE	0.000	8.0000	1.4180	1.5051	0.0000	8.0000	1.9610	1.7593
VC_VAR	0.000	12.0000	3.0450	2.3399	-	-	-	-
VC_TAG_ORG	-	-	-	-	0.0000	11.0000	2.7240	1.8050

Source: research data.

The Akaike Information Criterion (AIC) is an information criterion that takes both the model's degree of fit and parsimony into account, and it is an indicator used in the comparison of models (Fávero et al., 2009). It is the criterion used for the selection of the final models of both experiments.

The results obtained from the adjustment of the Logit model for experiment 1 are presented in Table 2. It should be highlighted that other models were estimated considering the presence of other variables. The most robust model presented here was defined with the stepwise method and with the aid of the lowest value to the Akaike Information Criterion (AIC).

Table 2. Estimates of the Logit model coefficients and the respective values of the marginal effects.

Variables	Coefficients	z value	Standard Deviation (coef)	*p* value	MgE#
Intercept	2.1539***	6.637	0.3245	0.0000	-
Time Fixation Duration (TFD)					
TFD_BRAND_A	6.9838^{NS}	1.317	5.3042	0.1879	0.183
TFD_BRAND_N	-2.3163***	-2.623	0.8832	0.0087	-0.061
TFD_TAG_ORG	1.1173***	2.747	0.4067	0.0060	0.029
TFD_VAR_BOURBON	-0.1023^{NS}	-0.268	0.3811	0.7883	-0.003
TFD_VAR_NMUNDO	-0.9999***	-3.753	0.2664	0.0001	-0.026
TFD_VAR_CATUAI	-0.6355***	-2.581	0.2462	0.0098	-0.017
Visit Count (VC)					
VC_BRAND_N	1.1531**	2.001	0.5762	0.0453	0.030
VC_PRICE	-0.2211*	-1.775	0.1246	0.0758	-0.006
VC_VAR	0.2736 *	1.949	0.1403	0.0512	0.007
N					466
AIC					227.41

Notes: (1) ***,**, * indicates a significance level of 1%, 5% and 10%, respectively; (2) *NS* not significant (significance level above 10%); (3) # Marginal Effect (MgE).

The premise was adopted of only performing an interpretation for the marginal effects of the coefficients with a significance below 10%. The individual's probability of choice reduces 6.1% for every 1 second of total gaze time at the new brand. In addition, the individual's probability of choice increases 2.9% for every 1 second of total gaze time at the organic label. Another finding was that the participant's probability of choice reduces 2.6% and 1.7% for every 1 second of total gaze time at the Novo Mundo variety and the Catuaí variety, respectively.

The analysis of the marginal effect VC indicates that the individual's probability of choice increases by 3% when the number of gaze points increase in the new brand area, while the participant's probability of choice reduces 0.6% for every 1 gaze point in the price area on the packaging. Finally, it should be noted that the individual's probability of choice increases 0.7% for every 1 gaze point in the variety area of the packaging.

It is worth mentioning that the model referring to experiment 2, specifically, contains an independent variable "Price" that is not associated with the visual attention metric. This variable is used for the calculation of the WTP and represents the price values of the packages chosen from each slide by the respondent. When no choice was made, the price value was computed twice for the same respondent in the database: a price value referring to the packaging on the right of the slide and another price value referring to the packaging on the left of the slide.

As such, the WTP was calculated only for model 2. The willingness-to-pay was therefore calculated based on (Van Loo et al., 2015), Hanemann (1984) and Belluzzo Junior (1999). According to the authors, WTP can be calculated by summing the intercept with the product of the estimated coefficients in the logit model and the median values of the variables. This sum is then divided by the estimated price coefficient.

In the model fitting process, the price variable only had a significant coefficient in experiment 2. Since its coefficient was not significant in experiment 1, its exclusion was chosen, resulting in an even more robust model (with a lower AIC value).

The results obtained from the adjustment of the Logit model for the second experiment are presented in Table 3. It should be highlighted that other models were also estimated considering the presence of other variables. The most robust model presented here was defined with the stepwise method and with the aid of the lowest AIC value. It should be highlighted that in this experiment, the variable "Price" proved significant in a final adjustment of the most robust model, with the WTP therefore only being calculated for this model.

Table 3. Estimates of the Logit model coefficients and the respective values of the marginal effects.

Variables	Coefficients	z value	Standard Deviation (coef)	*p* value	MgE#
Intercept	5.0961***	2.692	1.8934	0.0071	-
PRICE	-0.2294**	-1.974	0.1162	0.0483	-0.029
Time to First Fixation (TFF)					
TFF_PRICE	0.1562**	2.338	0.0668	0.0193	0.020
Time Fixation Duration (TFD)					
TFD_ALT800	-0.7619**	-2.497	0.3051	0.0125	-0.099
TFD_ALT1000	0.3807^{NS}	1.204	0.3162	0.2285	0.049
TFD_PRICE	1.2643**	2.363	0.5351	0.0181	0.164
TFD_ROAST	-1.6566***	-3.646	0.4543	0.0002	-0.215
TFD_ROAST_LIGHT	1.3881***	3.033	0.4576	0.0024	0.181
TFD_ROAST_MEDIUM	1.3698***	3.063	0.4472	0.0021	0.178
Visit Count (VC)					
VC_PRICE	-0,6564***	-3.529	0.1860	0.0004	-0.085
VC_TAG_ORG	0.2230**	2.076	0.1074	0.0378	0.029
WTP					**R$ 18.98**
N					279
AIC					252

Notes: (1) ***,** indicates a significance level of 1% and 5%, respectively; (2) NS not significant (significance level above 10%); (3) **#** Marginal Effect (MgE).

Just as in experiment 1, the premise was adopted in experiment 2 of only performing an interpretation for the marginal effects of the coefficients with a significance below 10%. One can see that for the attribute price, the individual's probability of choice decreases approximately 2.9% for each monetary unit of increase in the product's price. On the other hand, the individual's probability of choice increases about 2% for every 1 second of fixation time on the price.

In addition, it was found that the individual's probability of choice increases 16.44% for every 1 second of total gaze time at the price. It was also found that the individual's probability of choice reduces 9.9% for every 1 second of total gaze time at the label indicating an altitude of 800 meters. Table 3 shows that the individual's probability of choice reduces 21.54% for every 1 second of total gaze time for the sum of all types of roast; and the individual's probability of choice increases 18.05% and 17.81% for every 1 second of total gaze time on the light roast and medium roast attributes.

The VC reveals that the individual's probability of choice decreases 8.53% for every 1 gaze point on the price, and that it increases 2.9% for every gaze point on the organic label.

As mentioned above, the coefficient of the variable "Price" was significant only in model 2 (experiment 2). As such, the WTP was calculated only for model 2. The WTP was therefore calculated based on Van Loo et al., (2015). According to the authors, the WTP can be obtained through the sum of the intercept with the sum of the multiplication of the estimated coefficients in the logit model with the median values of the variables, and then being divided by the estimated price coefficient.

It should be noted that the median shows itself to be the most adequate alternative for the calculation of the WTP (Hanemann, 1984). According to Belluzzo Junior (1999), the main argument in favor of the median is its recognition as a more robust measure of the central tendency of a distribution; that is, it is not as sensitive as the mean to the inclusion of outliers. In addition, the median seems to be the most frequent alternative in many literature applications. A similar methodology was used by Hadker et al., (1997) and Belluzzo Junior (1999).

It should also be noted that in the WTP calculation, the price values of the series referring to the explanatory variable "Price" are not computed. As mentioned above, the median values of the other explanatory variables of the model (except for the "Price" variable) and the coefficient of the "Price" variable are used for this calculation.

Thus, R$ 18.98 is a proxy for the price that the individual would be willing to pay for specialty coffees, considering the median gaze metrics for the attributes related to the type of roast, organic label, altitude and price of the product (Table 3). The fact that the estimated WTP is higher than the highest price value observed in the packaging of the model may suggest that consumers could associate a higher price with a higher product quality.

Experiment 1 showed that the greater the TFD on the new brand, the lower the probability of choosing the product. The old brand had a positive signal, although it was not significant. One possible explanation is that the consumer is more familiar with the old brand. With the adoption and communication of the new identity, a new data collection could identify whether the gaze behavior and the probability of choice change. The more VC on the new brand, the higher the probability of the product being chosen. A possible explanation is that the image is not very familiar and that the respondent must return more often to make his/her choice - the novelty attracts attention (Ellsworth & Scherer, 2003).

Another relevant aspect observed in experiment 1 was that the longer the TFD for each of the three varieties (Catuaí, Bourbon and Novo Mundo), the lower the probability of choice. One possible explanation is that the variety is not very well known by the consumer. In an alternative model, combining another set of variables and excluding the varieties Catuaí and Novo Mundo, the total fixation duration on the Bourbon variety increases the probability of

choosing the product. In addition, the likelihood of choice increases when all VC are summed for all the times the image of the variety appears, regardless of which variety it is. This result is similar to what happened with the new brand attribute. One possible explanation is that when the respondent is concerned with understanding these attributes that are apparently less well-known or familiar, the probability of choosing the product increases. In addition, the greater the TFD on the organic label, the greater the probability of choosing the product.

In turn, experiment 2 showed that the TFF for the sum of all locations where the attribute price was present, increased the likelihood of choice, regardless of the value. Since the relation is inversed, i.e., the shorter the time, the more it draws attention, the explanation is also inversed. The less the price draws attention at first glance, the higher the probability is of choosing the product. In addition, the greater the total fixation duration on all prices, the greater the probability of choosing the product. Although it may seem a contradiction, the price seems to signal an endorsement of the product's quality.

In addition, more VC on the coffee organic label increase the likelihood of choosing the coffee, as would be expected, and the greater the TFD on the light and medium roasts, the higher the probability of choosing the product. The greater the total fixation duration on the sum of all types of roast, the lower the probability of purchase was. A possible explanation is that the roast still seems to be a little-understood or not very important attribute in the consumer's decision. And the more VC on the medium roast indication, the lower the probability of choosing the product, strengthening the possible lack of consumer knowledge regarding this attribute. This is an example where the decision maker is not familiar with the visual scene, or as Ellsworth & Scherer (2003) put it, where he is faced with a novelty.

The fact that the price attribute is not significant may be related to the sampling characteristic of experiment 1.

The attribute label of origin also was not significant in the model, and the stepwise technique suggested the elimination of this attribute. It should be noted that the label of origin is an important variable based on literature studies, but for this experiment it was not relevant. This variable was considered in preliminary versions of models, but its inclusion was not conducive to a model with a better fit, nor did its coefficients show any significance.

The attribute altitude 1000 meters was the only unconfirmed variable in experiment 2. However, altitude 800 meters was significant and the hypothesis that the higher the altitude, the greater will be the intent of consuming specialty coffees (Raposeiras, 2014) was therefore not confirmed, indicating an inverse relationship to the one expected. This suggests that consumers may perceive the attribute of altitude as unfamiliar and therefore not make associations with the quality, value, or usefulness (Lassar, Mittal & Sharma, 1995) of this particular attribute. Consequently, they may still perceive certain characteristics of specialty coffee as commodities rather than appreciating the unique aspects associated with higher altitude coffee.

For the above reasons, the fact should be stressed that what is new and awakens interest cannot be dismissed as irrelevant and demands in-depth assessments (Ellsworth & Scherer, 2003). The TFD and VC measurements in the eye-tracking reveal the same, since that what draws attention is registered with longer fixation times and/or with a greater number of visits to a given area.

5. Conclusions

Experiments 1 and 2 enabled findings that contribute to filling the gap in the retail market regarding specialty coffees. The packaging label can be a first activation, but it needs to be part of an integrated communication campaign that develops the purchase attitude, either in retail or at other points of contact between the brand and its consumers. In experiment 1,

several variables did not yield significant results, potentially due to the characteristics of the sample. It is possible that a larger sample size and data collection from different regions, rather than being limited to a specific neighborhood in a particular city, could provide evidence for these variables. It is important to acknowledge that obtaining a 'non-result' is itself a result, underscoring the need for further studies to explore the findings presented here.

It was found that consumers are still not fully aware of some of the key quality reputation attributes related to the consumption of specialty coffees. Despite this being a market with extensive growth, there is therefore still space for expanding production and consumption, provided that the coffee production chain commits itself to treating specialty coffee not as an agricultural commodity, but as a brand.

The main contribution of this study to industries is to provide them with subsidies to highlight those attributes on the packaging of specialty coffees that consumers seek on the shelves of supermarkets when making their purchases. Industries can modify the packaging of specialty coffees they sell, increasing the area on the packaging dedicated to the attributes that consumers are most interested in, as well as intensifying communication at the point of sale, for example, through tastings to awaken people's curiosity about attributes that they do not know. Retailers can avail themselves of the results of this paper to draw up action plans to commercially exploit the attributes recognized by its costumers as differentials of specialty coffees compared to commodity coffee, such as visual communications with calls to action in its menus, social media, physical store and e-commerce channels. Additionally, retailers can educate their customers about attributes that are currently less understood but have the potential to generate future profitability. This can be achieved by organizing activations at the point of sale, offering face-to-face courses and classes, and ensuring the presence of trained baristas who can address any inquiries and provide clarification to customers.

The limitations of this study lie mainly in its niche character focusing on specialty coffees. As shown throughout this paper, this is a market in continuous growth, but which has yet to become popular. Finding participants who understand its attributes outside of specific environments, such as coffeehouses specializing in specialty coffees, is therefore a limiting factor. Consequently, we had to include some participants who were not fully familiar with the intricacies of specialty coffee, which may have limited the meaningful interpretation of certain variables even with some prior explanation. The sample size may be another limitation of the research, but it does not detract the obtained results because the focus is in the attributes. Then, N increases because the respondent is submitted to various combinations of these attributes in the Discret Choice methodology.

Future studies may be developed using experiments that contemplate "priming" to assess whether this will affect the consumer choice decision. The use of discrete choice models with more than two choices (multinomial logit) is also suggested, considering the choices on both sides of the photo (slide), for example, as well as the "no choice". The use of (conditional) multinomial logit allows one to consider the mix of product choice variables and the specific individual variables (such as income and gender) in the same model, with robust results. Furthermore, it would be valuable to conduct research involving non-Brazilian consumers to explore potential cross-cultural differences. Additionally, future studies could focus exclusively on specialty coffee enthusiasts.

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