HOW CONSUMER INVOLVEMENT INFLUENCES BEER FLAVOUR PREFERENCES

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ABSTRACT

Purpose: Much of the innovation in the beer sector has focused on flavour, resulting in a proliferation of flavoured beers. In this context, the understanding of consumers' flavour preferences is a relevant question for the beer industry; however, little is known whether consumer involvement influences beer flavour preferences, and the present study is directed to shed light on this area yet under-investigated.

Methodology: Research was conducted in Spain, where a total amount of 565 beer consumers were classified based on their level of involvement with beer. The data were analysed by ANOVA, Tukey test, principal component analysis (PCA), and multidimensional scaling

(MDS), to examine consumers' preferences for different beer flavours using a consumer hedonic approach based on like and dislike evaluation.

Findings: Our findings support the existence of a homogeneous pattern in beer-flavour preferences, regardless of consumer involvement, showing a greater liking for conventional flavours. Further, highly involved consumers show a higher preference for unconventional or flamboyant beer flavours, than low or medium involved consumers.

Value: Derived from our findings it can be stated that consumers do not accept all kinds of flavours, and that their level of product involvement affects their flavour preferences.

Keywords: Consumer, Involvement, Flavour, Beer, Preferences.

1. INTRODUCTION

Food product flavours are constantly evolving, partially due to food product innovations, and food companies need to understand the influencing factors in food preference and choice. Consistent with Aquilani et al. (2015) flavour represents one of the primary critical factors for a beverage like beer and beverage developers seek ways for their beverage innovations to stand out in retail outlets; thus gaining further differentiation in the increasingly competitive marketplace. One example of introducing novel beer flavours is the Spanish brewery company Estrella Galicia that launched a barnacle-flavoured beer -which evokes the sea flavour- in the year 2018 achieving great success in the marketplace.

Despite beer requires four essential ingredients -grain, hops, yeast, and water- and was traditionally flavoured using available herbs, fruit, and spices (Kiefer, 2001), beer within the last decade vary significantly in style, ingredients, and flavour. In fact, beer culture has

changed dramatically in recent years, with the emergence of the craft beer movement (Elzinga et al., 2015). The increasing popularity of the brewing industry affects consumers' commercial beer preferences and consumption trends, which seem to be connected to the discovery of new flavours (Aquilani et al., 2015). So, in the past years there was an increasing demand for craft beers offering new and novel flavours (Cardello et al., 2016) and some authors even point out that among the brewing industry craft beer is the driver of a "*flavour revolution*" (Kleban and Nickerson, 2012). Thus, breweries have come out with the problem of offering beer flavours that are new and different (Jaeger et al., 2017) making this situation akin to a hamster wheel where once you get on, it is hard to get off (Frost, 2018).

Beer was selected as the beverage product category under research because beer is the most widely consumed beverage around the world and is a very popular beverage product in Europe (Gomez-Corona et al., 2014) being particularly suitable for analysing consumers' product liking and preference. In addition, prior research indicates for a beverage product like beer, flavour is a relevant factor in consumers' evaluation of the product (Daems and Delvaux, 1997) and beer choice (Aquilani et al., 2015).

Previous studies on beer consumption have focused on different product characteristics (Sester et al., 2013; Cardello et al., 2016; Gómez-Corona et al., 2016), but little is known about which factors contribute to the consumers' acceptance and preference for novel and unconventional flavours. Further, to the best of our knowledge, no studies have yet been developed on consumer flavour preferences considering the level of consumer involvement. In this context, this research aims to examine whether consumers' preferences for beer flavours are influenced by their level of involvement with this beverage, and being consistent

with Zaichkowsky's (1985) we assume consumers' involvement with beer as "*an individual's perceived relevance of the beer, based on inherent needs, values, and interests*". For this purpose, this study focuses on the stated flavour preferences, which can be evaluated based on consumers' experience without the exposure of a real stimulus (Saba et al., 1998).

The central proposition of this study is that conventional and unconventional/flamboyant beer-flavour preferences depend on the level of consumer involvement towards this beverage. In particular, this work aims to answer the following research question: *How consumer involvement with beer influences preferences for beer flavours*?. We endeavour to answer this question through our study. More specifically, the emphasis was directed to providing beer flavours, as well as investigating how different consumer involvement influences flavour preferences.

2. LITERATURE REVIEW

2.1. Flavour, taste and food liking

The sensory characteristics of food products and beverages are among the most important determinants of consumers' preferences, being taste a crucial factor in consumers' food choices (Roininen et al., 1999; Moskowitz et al., 2005; Garcia-Bailo et al., 2008). Some consumers use the terms "taste'" and "flavour" interchangeably when referring to the sensory qualities of foods (Prescott, 1999). According to Moskowitz and Krieger (1995) and Andersen et al. (2019) individuals use the term *liking of flavour* as a combination of aroma and taste. Likewise, flavour could be understood as a sense that is cognitively constructed from the integration of different physiologically sensory systems, such as olfaction and gustation (Prescott, 1999). What is more, Blake (2006) defines the term flavour as a

multisensory experience created by individuals' brain from all the sensory inputs received during eating and drinking; and thus, flavour could be considered as a psychological construct of the brain (Prescott, 1999).

Prior research reports that food preferences have two primary sources: flavour, -comprising taste, odour and texture- and food nutrients (Ackroff, 2008) and states that experiencing a food flavour, followed by a positive internal state results in an increased preference and acceptance for that flavour through an associative process. Moreover, flavours are added to basic foodstuffs in order to satisfy the human desire for variety (Rozin, 1973). One of the most common ways to determine consumer preference and acceptance of foods and beverages is through the measure of overall liking, which measures the individuals' overall hedonic response to food through the evaluation of the sensory attributes of product such as flavour, smell, texture and appearance (Lawless and Heymann, 2010; Andersen et al., 2019). Further, prior studies have demonstrated the positive influence of flavour enhancement on food liking (Cardello and Maller, 1982). In this vein, previous research on consumer behaviour has considered the expected liking judgements about food products which are made in the absence of the sensorial experience with food; and in turn, these liking judgements are based on non-experiential information such as self-knowledge, emotional memories or intuition (Robinson and Clore, 2001).

2.2. Preference and acceptance of food flavours

Each individual has a very personal opinion regarding which flavours to choose and to prefer; and therefore, some individuals may find some flavours delicious, while finding some other flavours as unpleasant and unacceptable (Blake, 2006). Previous research supports that the

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acceptance of foods is determined by factors related to both products and consumers. Some studies indicate that the culture of the individual (Rozin and Schiller, 1980; Rozin, 1996) and the local ingredients (Møller, 2013), family norms and childhood experiences (Fowler, 1997) influence individuals' food preferences and choices. Other studies indicate that early exposure to flavours (Blake, 2006), the actual food exposure (Zellner et al., 1999), and tasting experiences are the most relevant factors (Giacalone et al., 2014). Moreover, other authors report that product familiarity (Birch, 1999), the individual personality traits (Cardello et al., 2019) or even emotions (Pelegrín-Borondo et al., 2019) influence flavour and food preferences.

Previous research highlights familiarity as a relevant factor for understanding and predicting acceptance and preference for food products (Giacalone et al., 2014). The term familiarity refers to whether a stimulus has been encountered before by an individual; and in turn, familiarity measures how well a sensory stimulus from a novel product category fits previously encountered products in this category (Giacalone et al., 2014). Likewise, familiarity is often related to typicality (Giacalone et al., 2014), meaning the degree to which a product is regarded to be representative of a category (Blijlevens et al., 2012). Consequently, liking ratings are higher for consumers who are highly familiar with the food product (Borgogno et al., 2015) and familiar products and flavours are preferred because of the recall of prior knowledge about past consumption behaviour (Giacalone and Jaeger, 2016).

However, in the food products and beverages context, consumers have an ambivalent approach towards unfamiliar foods, which is based on the "omnivore's dilemma" (Rozin, 1976), which is the characteristic of humans to have curiosity towards unfamiliar and novel

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food, while having an innate fear of them. So, according to this dilemma, flavour preferences are driven by both a need for consistency -meaning a preference for familiar foods-, and a need for stimulation, meaning a preference for novel food products to generate curiosity and interest (Giacalone et al., 2014).

Regarding beer, prior studies support that flavour preferences and liking are developed through experience and acquired through familiarity (Birch, 1999; Donadini et al., 2014), and consequently, consumers who are exposed to more beer flavours are aware that beer flavours can go far beyond the conventional flavours that have dominated the marketplace (Donadini and Fumi, 2010). Similarly, consumers with a more varied choice of consumed beers appreciate a more extensive range of beer flavours, than did consumers exposed to only a few beer styles (Donadini et al., 2014). Interestingly, some authors report that consumers expect to find determined flavours in a beer, and that a beer could be rejected if this expectation is not confirmed (Sester et al., 2013). However, other authors indicate that today consumers are demanding more original or unique flavours (Gómez-Corona et al., 2016) and that beer preferences seem to be associated with the discovery of new flavours (Aquilani et al., 2015). Finally, some personality traits seem to underlie individuals' propensity to accept and choose novel food products (Cardello et al., 2019), such as *food neophobia*. The term *food neophobia* defines the individual's propensity to seek or to avoid novel foods (Giacalone et al., 2014), influencing the individual's hedonic assessment of food products and flavours (Tuorila et al., 2001).

2.3. Product involvement

The concept of involvement has received considerable attention in consumer behaviour research, since involvement has a significant influence on consumers' perceptions and

preferences (Schiffman et al., 2008). Zaichowsky (1985) conceptualised involvement in her seminal work as the perceived personal relevance of one product to the individual's needs, values and goals; and in turn, consumer involvement does not exist independently of an "object", referring to a product, a situation, or a task (Zaichowsky, 1985). Similarly, according to Verbeke and Vackier (2004) involvement could be defined as the level of perceived personal importance, interest or relevance evoked by a stimulus linked to enduring situation-specific goals. Therefore, involvement could be considered as a personal interest in a particular product category. So, a product that is deemed to be a "*low-involvement*" product is one for which the individual does not consider the choice decision to be significant enough to make an extensive effort in the decision-making process (Bell & Marshall, 2003). Conversely, a "*high-involvement*" product is one for which the consumer invests substantial time and effort to make a choice decision.

The personal relevance and the motivational state activated by a stimulus or situation (Zaichowsky, 1985) are central to the concept of involvement considered as an individual trait (Mittal and Lee, 1989). For this reason, involvement has been defined traditionally as being a characteristic of either a product or of an individual. Accordingly, the level of consumer involvement with a specific product is a crucial variable influencing the consumption behaviour, the time investment in a choice decision, information searching, product variety-seeking or attribute evaluation (Zaichkowsky, 1985) and the level of concern about the product (Borgogno et al., 2015). Therefore, consumers with a *low* level of involvement display little interest in the product and product alternatives, being satisfied with a minimum level of performance; while highly involved consumers show great motivation

to search for product information, are concerned about the quality performance of the product and are also willing to compare alternatives (Zaichkowsky, 1985).

So, in this context individuals' food involvement could be understood as the construct identifying individuals who are highly motivated and interested in foods, food preparation and other food-related activities (Cardello et al., 2019). Likewise, level of involvement with food will vary from one individual to another and could be conceived as lying on a continuum, along which the individual's level of involvement with food can be measured (Bell and Marshall, 2003). In this vein, previous research reports that the sensation and pleasure associated with the eating experience may have more importance for an individual who is highly food involved than for one who is not (Bell and Marshall, 2003). Likewise, highly food-involved individuals are likely to be more sensation seeking (Zuckerman, 1979) and may be more inclined towards new food experiences and with a greater desire to experience new food flavours (Pliner and Hobden, 1993).

3. METHODOLOGY

3.1. Sampling and fieldwork

An online survey was conducted in Spain from January to March 2019, and the questionnaire was created using Qualtrics®. Invitations to fill out the online questionnaire were previously sent via e-mail. The study involved random sampling; and therefore, the obtained sample was not representative of the national population. In addition, respondents had to be legally admitted to drinking beer, hence at least 18 years old, and only people with regular consumption of beer were eligible. Consequently, two pre-screening questions were included in the questionnaire to ensure that the participants consume beer and have the legal age for

drinking alcohol. A total amount of 892 surveys were posted and 565 valid questionnaires were obtained, yielding a sampling error of 3.97% at a confidence level of 95%.

The focus of the research reported here is on the liking and disliking arising from evoked beer flavours, i.e. "*how much do you like this beer flavour*". Therefore, participants evaluated beer flavours and their ratings were based on the flavour description through a consumer hedonic approach on like and dislike evaluation. More precisely, the beer flavour names were used as the research stimuli, since food names can evoke more powerful affective, emotional and cognitive responses than real tasted foods and can evoke salient memories and associations with food products (Cardello and Maller, 1982).

The preference of flavours was elicited using flavours 20 items proposed by Arellano-Cobarrubias et al. (2019) and five additional items –*barnacles, chilli peppers, pumpkin, fried chicken* and *smoked bacon*- were included given that they are commercially available. Then, the liking of each flavour was elicited ranging on a 7-point hedonic scale (1="*dislike extremely*" to 7="*like extremely*"). Additional questions regarding consumption and purchase behaviour and socio-demographic characteristics were also included.

The level of consumers' involvement with beer was measured by revisiting Mittal and Lee's (1989) 3-item scale of involvement. The items "*Beer is important to me*", "*I have a strong interest in beer*", and "*Beer matters for me*" were measured using a 7-point Likert type scale, being 1="*strongly disagree" and* 7="*strongly agree*", and the 3-item scale was internally reliable. For each participant the involvement level score was calculated adding the scores obtained for the three items, and then calculating the mean value. Next, tertile split of the sample was generated considering the involvement level score and using the triadic split

procedure (Quester and Smart, 1998). Consequently, participants scoring in the lower tertile formed the low involvement group (n=186; mean=1.75; SD=0.794), while participants scoring in the upper tertile constituted the highly involved group (n=223; mean=6.40; SD=0.715). Individuals between the lower and the upper tertile groups formed the medium involved group (n=156; mean=3.85; SD=0.928). Then, the ANOVA test was conducted validating the difference between groups on the involvement dimension (F-value=460.638; p-value<0.001).

3.2. Data analysis

The principal factors underlying beer flavours were analyzed through Principal Components method (PCA) through Varimax rotation. Then, multidimensional scaling (MDS) through Euclidean distance method was conducted to gain further insight into the underlying dimensions of beer flavours. The differences between consumer groups regarding their flavour preferences were examined using the analysis of variance (ANOVA) and Tuckey post hoc test. Data analysis was performed using SPSS (version 18.0) software.

4. RESULTS

4.1. Beer flavour dimensions

Principal components factor analysis through Varimax rotation procedure was developed on flavour items in order to examine whether they could be grouped under general characteristics. Eigenvalue criterion being higher than 1 was applied, and items with rotated factor loadings of 0.50 or higher were retained (Hair et al., 1998). A high Kaiser-Meyer-Olkin value (KMO=0.960) and a highly significant results of Barlett's test of sphericity (x^2=12997.635; df=300; p<0.001) indicated that the data for the 25 beer flavours were

suitable for PCA (Verbeke and Viaene, 1999). The PCA resulted in a factorial construct with four principal components (PCs) that jointly account for the 74.07% of the variance. The reliability of the four PCs was relatively high, since all the Cronbach's α scores exceed the commonly accepted threshold of 0.70 (Hair et al., 1998).

A four-factor solution was identified (Table 1). The obtained PCs were labelled as "*usual food and spices*", "*floral and citrus flavours*", "*cereals and yeast*" and "*unconventional/flamboyant*" according to the loading obtained for each item. The first factor is labelled as "*usual foods and spices*" flavours, since items loading high on this factor are flavours such as ginger, vanilla or common foods such as stone fruits, almond or butter. The second factor –labelled as "*floral and citrus flavours*"- reflects that these beer flavours are closely related. Similarly, the "*cereals and yeast*" factor indicates that flavours such as hop, cereals and yeast are closely related. Finally, the fourth factor -labelled as "*unconventional/ flamboyant*" flavours includes non-conventional flavours related to the beer product, such as barnacle, fried chicken of chile flavours.

Table 1. Results of the PCA of the factorial structure of the dimensions of beer flavour

VARIABLES	INDICATORS	Factor 1	Factor 2	Factor 3	Factor 4
Usual foods and spices (α=0.950)	FLAV17: Ginger	0.808			
	FLAV16: Vanilla	0.782			
	FLAV11: Hibiscus	0.755			
	FLAV15: Cinnamon	0.754			
	FLAV10: Stone fruits (peach, cherry, plum…)	0.727			
	FLAV14: Berries (cranberry, raspberry, berry, blackberry…)	0.717			
	FLAV9: Almond	0.691			
	FLAV8: Coconut	0.670			
	FLAV7: Butter	0.659			
		0.611			
Floral and citrus (α=0.920)	FLAV5: Apple		0.670		
	FLAV4: Honey		0.661		
	FLAV6: Pineapple		0.651		
			0.645		

| Group	Items				
	FLAV3: Citrus/acidic fruits (lemon, orange, grapefruit…) FLAV2: Floral		0.643		
Cereals and Yeast (α=0.817)	FLAV12: Hop FLAV1: Cereals (oats, wheat, …) FLAV13: Yeast			0.828 0.796 0.738	
Unconventional /Flamboyant (α=0.928)	FLAV21: Chilli peppers FLAV20: Barnacles FLAV23: Chile FLAV24: Fried chicken FLAV19: Chocolate FLAV25: Smoked bacon FLAV22: Pumpkin FLAV18: Cheese				0.791 0.762 0.729 0.657 0.647 0.613 0.617 0.608

4.2. Relationships between beer flavours

Beer flavours were examined through multidimensional scaling performing Euclidean distance method to gain further insight into their underlying factor structure. The two dimensional MDS perceptual spaces of the beer flavours (RSQ=0.988; Kruskal's stress coefficient= 0.618%) are shown in Figure 1.

The first dimension –dimension 1- yields a large perceptive difference between two groups of beer flavours. One group consists of flavours with greater liking (i.e. "*cereals*", "*hop*", "*yeast*", "*citrus*", "*floral*", "*apple*", and "*honey*"), opposed to flavours with high disliking (e.g. "*fried chicken*", "*smoked bacon*", "*chile*"). Thus, the primary perception by which consumers separate beer flavours is on "like/dislike" evaluation. The second dimension – dimension 2- splits the items into two groups, which can be described in conventional (i.e. "*stone fruits*", "*citrus*", "*berries*") and unconventional beer flavours (i.e. "*chilli peppers*", "*barnacles*", "*chile*"). Hence, consumers split beer flavours in a "conventional/unconventional" evaluation.

Figure 1. Two-dimensional MDS solution for beer flavour
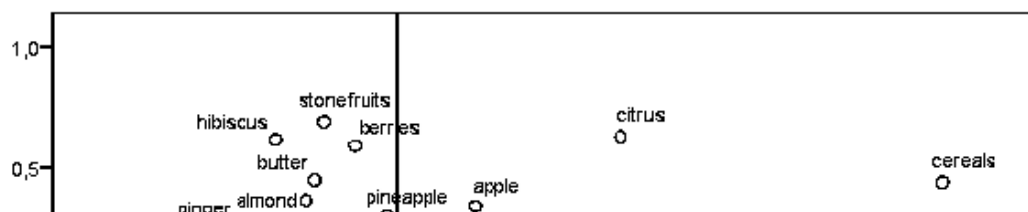
Based on the configuration resulting from this two-dimension positioning of stimuli, we split the beer flavours into two main categories. On one side, the "*unconventional/flamboyant*" flavour category, which includes flavours with low scores on the two dimensions. On the other side, the "*conventional flavours*" that score high on dimension 1 and dimension 2. Accordingly, flavours included in component 1 "*usual food and spices*", component 2 "*floral and citrus*" and component 3 "*cereals and yeast*" are all considered as "conventional flavours"; whereas flavours grouped in component 4 are considered as "*unconventional/flamboyant*" flavours.

4.3. Different levels of product involvement and flavour preferences

4.3.1. Conventional beer flavours

Table 2 shows the consumer preferences for conventional beer flavours. The average flavour rating of highly involved consumers (4.30) was slightly higher than for medium involved (3.11) and low involved consumers (2.12). The conventional beer flavour more strongly preferred is FLAV1 "*cereals*"; while the conventional flavours least preferred are FLAV8 "*coconut*" and FLAV17 "*ginger*". The low preference for "ginger" flavour could be attributed to cultural influence, since this spice is not popular and not commonly used in traditional Spanish cooking.

Some differences were found between consumers with different levels of beer involvement. For low involved consumers FLAV8 "*coconut*" ($Mean_{low}$=1.46) and FLAV7 "*butter*" ($Mean_{low}$=1.50) were the least preferred flavours. However, both for medium and highly involved consumers FLAV17 "*ginger*" ($Mean_{medium}$=2.49; $Mean_{high}$=3.08) and FLAV16 "*vanilla*" ($Mean_{medium}$=2.50; $Mean_{medium}$=3.31) is the stepwise order in their least preferred flavours. These findings show the low preference for spices flavour in beer among medium

and highly involved consumers, who are the consumers with more significant concern about the product. Further, the relatively large standard deviation in the overall preference scores for both medium and highly involved consumers implies a greater divergence in the preferences for beer flavours among subjects.

Findings indicate that consumer flavour preferences tend to be positively associated with cereals, hop and yeast flavours, as well as with citrus or acidic fruit flavours for all consumer types, regardless their level of product involvement. Besides, floral beer flavour is strongly preferred by medium as well as by highly beer involved consumers. The obtained findings are coherent with retail outlets that mostly commercialize beer flavours that are highly conventional, since most of the mainstream retailers commercialize lemon and hop-flavoured beer.

Table 2. Clusters, descriptive statistic and test for group differences for conventional beer flavours

ITEMS	Clusters			Post-Hoc Statistical Significance (Tukey HSD)	
	Low involved consumers (l) (n=186)	Medium involved consumers (m) (n=156)	Highly involved consumers (h) (n=223)	F-Value	Significance (p < 0.05)
FLAV1: Cereals (oats, wheat,)	4.17 (1.88)	5.18 (1.28)	6.21 (1.03)	103.405	0.000 [lm;mh;lh]
FLAV2: Floral	2.15 (1.39)	3.60 (1.41)	5.22 (1.58)	219.434	0.000 [lm;mh;lh]
FLAV3: Citrus/acidic fruits (lemon, orange, grapefrut…)	2.61 (1.76)	3.60 (1.55)	5.15 (1.56)	127.380	0.000 [lm;mh;lh]
FLAV4: Honey	1.83 (1.11)	3.01 (1.46)	4.61 (1.78)	176.674	0.000 [lm;mh;lh]
FLAV5: Apple	2.04 (1.31)	3.10 (1.64)	4.65 (1.83)	133.908	0.000 [lm;mh;lh]
FLAV6: Pinneapple	1.77 (1.13)	2.69 (1.50)	4.19 (1.91)	123.245	0.000 [lm;mh;lh]
FLAV7: Butter	1.50 (0.87)	2.68 (1.69)	3.87 (2.00)	107.984	0.000 [lm;mh;lh]

FLAV8: Coconut	1.46 (0.87)	2.59 (1.60)	3.73 (1.90)	101.861	0.000 lm;mh;lh
FLAV9: Almond	1.54 (0.98)	2.60 (1.52)	3.71 (1.97)	96.457	0.000 lm;mh;lh
FLAV10: Stone fruits (peach, cherry, plum…)	1.86 (1.41)	2.87 (1.74)	3.59 (1.90)	51.594	0.000 lm;mh;lh
FLAV11: Hibiscus	1.58 (1.08)	2.62 (1.64)	3.44 (1.97)	65.536	0.000 lm;mh;lh
FLAV12: Hop	3.50 (1.86)	4.29 (1.65)	5.52 (1.64)	71.553	0.000 lm;mh;lh
FLAV13: Yeast	3.04 (1.73)	3.68 (1.62)	5.60 (1.49)	139.967	0.000 lm;mh;lh
FLAV14: Berries (cranberry, raspberry, berry, blackberry…)	1.91 (1.48)	2.74 (1.71)	3.86 (1.84)	68.141	0.000 lm;mh;lh
FLAV15: Cinnamon	1.66 (1.12)	2.55 (1.59)	3.43 (1.75)	68.392	0.000 lm;mh;lh
FLAV16: Vanilla	1.76 (1.30)	2.50 (1.59)	3.31 (1.81)	47.803	0.000 lm;mh;lh
FLAV17: Ginger	1.69 (1.31)	2.49 (1.71)	3.08 (1.88)	35.345	0.000 lm;mh;lh
Average values	**2.12 (1.33)**	**3.11 (1.58)**	**4.30 (1.75)**		

NOTE: l,m,h letters indicate significant differences (p≤0.05) between groups (low, medium and high involved consumers) according to Tuckey post-hoc test

4.3.2. Unconventional/flamboyant beer flavours

The flamboyant beer flavour more strongly preferred is FLAV19 "*chocolate*" ($Mean_{low}$=1.64; $Mean_{medium}$=2.67; $Mean_{high}$=4.36) for all types of consumers, as shown in Table 3. Conversely, FLAV24 "*fried chicken*" and FLAV25 "*smoked bacon*" was the stepwise disliking order for all types of consumers, regardless their level of product involvement.

Further, differences between consumer groups were found in their standard deviations, given that standard deviations are higher for highly involved consumers (SD_{high}=1.983), than for medium (SD_{medium}=1.580) and low involved consumers (SD_{low}=0.966). This finding implies that preferences for flamboyant beer flavours varied more widely between subjects who are highly involved consumers. Finally, when comparing the preferences for the different flavour categories, findings indicate that flamboyant beer flavours were less preferred

(Mean$_{low}$=1.44; Mean$_{medium}$=2.38; Mean$_{high}$=3.56), than conventional beer flavours (Mean$_{low}$=2.12; Mean$_{medium}$=3.11; Mean$_{high}$=4.30) for all type of consumers, as it could be expected. Additionally, the highly involved consumers express higher scores for all the unconventional flavours; while flavour preference scores are quite low both for low (Mean$_{low}$=1.44) and medium involved consumers (Mean$_{medium}$=2.38).

Table 3. Clusters, descriptive statistic and test for group differences for flamboyant beer flavours

ITEMS	Clusters			Post-Hoc Statistical Significance (Tukey HSD)	
	Low involved consumers (l) (n=186)	Medium involved consumers (m) (n=156)	Highly involved consumers (h) (n=223)	F-Value	Significance (p < 0.05)
FLAV18: Cheese	1.49 (1.02)	2.29 (1.55)	3.09 (1.95)	50.907	0.000 [lm;mh;lh]
FLAV19: Chocolate	1.64 (1.18)	2.67 (1.71)	4.36 (1.91)	130.832	0.000 [lm;mh;lh]
FLAV20: Barnacles	1.54 (1.22)	2.54 (1.66)	4.23 (2.07)	121.969	0.000 [lm;mh;lh]
FLAV21: Chilli peppers	1.51 (1.13)	2.73 (1.66)	4.34 (2.19)	133.295	0.000 [lm;mh;lh]
FLAV22: Pumpkin	1.36 (0.92)	2.32 (1.55)	3.22 (1.85)	75.669	0.000 [lm;mh;lh]
FLAV23: Chile	1.37 (0.81)	2.43 (1.77)	3.61 (2.16)	86.976	0.000 [lm;mh;lh]
FLAV24: Fried chicken	1.29 (0.73)	2.03 (1.30)	2.87 (1.86)	63.569	0.000 [lm;mh;lh]
FLAV25: Smoked bacon	1.29 (0.72)	2.05 (1.45)	2.74 (1.89)	49.774	0.000 [lm;mh;lh]
Average values	**1.44 (0.97)**	**2.38 (1.58)**	**3.56 (1.98)**	50.907	0.000 [lm;mh;lh]

*NOTE: l,m,h letters indicate significant differences (p≤0.05) between groups (low, medium and high involved consumers) according to Tuckey post-hoc test.*

4.3.3. Product involvement and flavour preferences

The projection of flavour preference scores onto the spider plot shows relatively homogeneity in consumers' preference for beer flavours (Figure 2). More precisely, our findings reveal

that all consumers prefer "*cereals and yeast*" flavours, more than "*usual food and spices*" flavours or than *"unconventional"* beer flavours, regardless of their level of involvement. Therefore, the order of flavour preferences is the following: "*cereals and yeast*", "*floral and citrus*", "*usual foods and spices*" and "*unconventional/flamboyant flavours*". Interestingly, "*cereals"*, "*hop*" and "*yeast*" flavours are the most preferred flavours for all the levels of consumer involvement. Conversely, "*fried chicken*" and "*smoked bacon*" flavours are the least preferred for all the consumers, regardless of their level of beer involvement. However, findings indicate that the flavour preference profile differed between consumers according to their level of beer involvement. More precisely, highly involved consumers show the highest preference for both "*unconventional/flamboyant*" and "*conventional*" flavours; while low involved consumers report the smallest preference for all types of flavours. Likewise, the higher standard deviation values obtained for highly involved consumers indicate their greater diversity of preferences and judgments about beer flavours. Therefore, considering these descriptive results, the relationship between the level of consumer involvement with the beverage product and flavour preferences has emerged.

Figure 2. Spider plot for beer flavour preferences for high, medium and low involved consumers
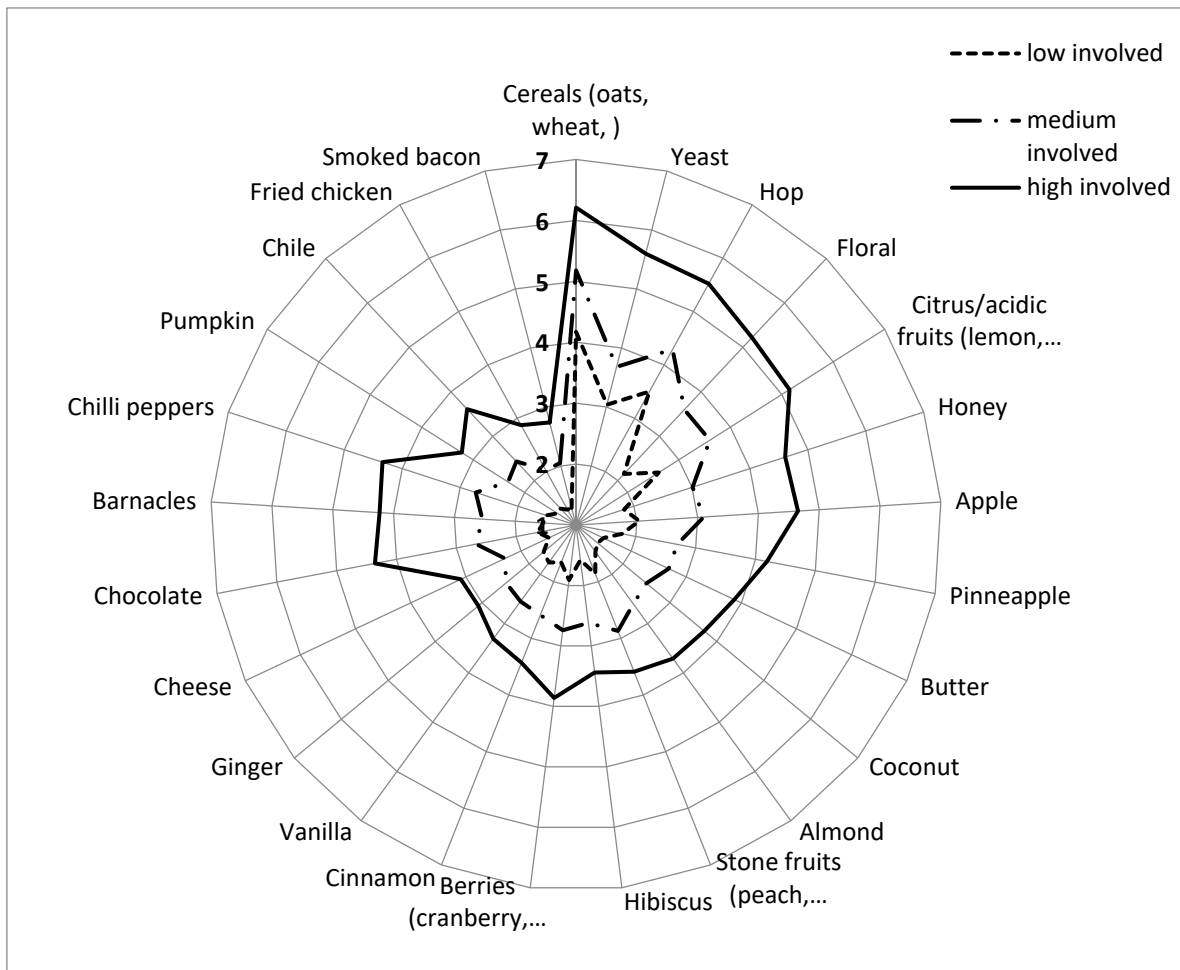
4.4. ANOVA analysis

4.4.1. Conventional beer flavours

The ANOVA test reveals significant differences in beer flavour preferences according to the level of consumer involvement with the beverage product (Table 4). The multivariate test using Pillai's Trace and Wilks' Lambda were conducted obtaining values of Pillai's Trace=0.947, F(17, 579.351), $p<0.001$; and Wilks' Lambda=0.053, F(17, 579.351), $p<0.001$, respectively. Then, a post hoc analysis was developed using the Tuckey test, indicating significant differences between consumers with different levels of involvement. Research

findings indicate significant differences between the groups of consumers for all the flavours considered. More precisely, and considering the mean scores obtained for "*conventional*" flavours it can be stated that consumers highly involved with beer show significantly higher preferences, followed by medium and low involved consumers. Similarly, results indicate that some "conventional" flavours are more discriminating than others, as determined by F-values, such as "*floral*" (F=219.434) and "*honey*" (F=176.674).

Table 4. Multivariate test for group differences for conventional flavours

ITEMS	Mean difference			Confidence interval (Lower bound; Upper bound)			Significance
	(l-m)	(m-h)	(l-h)	(l-m)	(m-h)	(l-h)	
FLAV1: Cereals (oats, wheat, …)	-1.01	-1.03	-2.04	-1.37; -0.64	-1.38;- 0.68	-2.37;-1.70	0.000 [lm;mh;lh]
FLAV2: Floral	-1.44	-1.62	-3.06	-1.82; -1.07	-1.98; -1.26	-3.41; -2.72	0.000 [lm;mh;lh]
FLAV3: Citrus/acidic fruits (lemon, orange, grapefrut…)	-.99	-1.56	-2.55	-1.41; -0.58	-1.96; -1.16	-2.93; -2.17	0.000 [lm;mh;lh]
FLAV4: Honey	-1.18	-1.60	-2.78	-1.56; -0.80	-1.96; -1.23	-3.13; -2.43	0.000 [lm;mh;lh]
FLAV5: Apple	-1.05	-1.56	-2.61	-1.47; -0.64	-1.96; -1.16	-2.99; -2.23	0.000 [lm;mh;lh]
FLAV6: Pinneapple	-.92	-1.50	-2.42	-1.32; -0.52	-1.89; -1.12	-2.79; -2.05	0.000 [lm;mh;lh]
FLAV7: Butter	-1.18	-1.19	-2.36	-1.59; -0.76	-1.58; -0.79	-2.74; -1.98	0.000 [lm;mh;lh]
FLAV8: Coconut	-1.04	-1.23	-2.27	-1.45; -0.63	-1.62; -0.83	-2.64; -1.89	0.000 [lm;mh;lh]
FLAV9: Almond	-1.06	-1.11	-2.17	-1.46; -0.66	-1.50; -0.72	-2.54; -1.80	0.000 [lm;mh;lh]
FLAV10: Stone fruits (peach, cherry, plum…)	-1.00	-.73	-1.73	-1.44; -0.56	-1.15; -0.31	-2.13; -1.33	0.000 [lm;mh;lh]
FLAV11: Hibiscus	-1.04	-.82	-1.86	-1.45; -0.62	-1.22; -0.42	-2.24; -1.47	0.000 [lm;mh;lh]
FLAV12: Hop	-.79	-1.23	-2.01	-1.22; -0.35	-1.65; -0.81	-2.41; -1.61	0.000 [lm;mh;lh]
FLAV13: Yeast	-.64	-1.92	-2.55	-1.05; -0.23	-2.31; -1.52	-2.93; -2.18	0.000 [lm;mh;lh]
FLAV14: Berries (cranberry, raspberry, berry, blackberry…)	-.84	-1.11	-1.95	-1.27; -0.40	-1.53; -0.70	-2.34; -1.55	0.000 [lm;mh;lh]

FLAV15: Cinnamon	-.93	-.85	-1.78	-1.32; -0.54	-1.22; -0.47	-2.13; -1.42	0.000 [lm;mh;lh]
FLAV16: Vanilla	-.79	-.76	-1.55	-1.20; -0.39	-1.15; -.037	-1.93; -1.18	0.000 [lm;mh;lh]
FLAV17: Ginger	-.80	-.59	-1.39	-1.22; -0.37	-1.00; -0.19	-1.78; -1.00	0.000 [lm;mh;lh]

NOTE: l, m ,h letters indicate significant differences (p≤0.05) between groups (low, medium and high involved consumers) according to Tuckey post-hoc test.

4.4.2. Unconventional/flamboyant flavours

Similarly, the ANOVA measures were generated to compare "*unconventional/flamboyant*" flavour preference scores between consumers with different levels of product involvement (Table 5). Accordingly, the multivariate test using Pillai's Trace and Wilks' Lambda was developed, obtaining adequate values of Pillai's Trace=0.803, $F_{(8, 281.710)}$, $p < 0.001$; and Wilks' Lambda=0.179, $F_{(8, 281.710)}$, $p < 0.001$, respectively. The ANOVA analysis revealed significant differences in flavours' liking between consumers, according to their level of involvement. Results show that highly involved consumers report the highest preference for "unconventional/flamboyant" beer flavours, followed by medium and low involved consumers. Interestingly, some flavours seem to be more discriminating than others, as judged by F-values such as "*chilli peppers*" (F=133.295) and "*chocolate*" (F=130.832) flavours.

Table 5. Multivariate test for group differences for flamboyant flavours

ITEMS	Mean difference			Confidence interval (Lower bound; Upper bound)			Significance
	(l-m)	(m-h)	(l-h)	(l-m)	(m-h)	(l-h)	
FLAV18: Cheese	-0.81	-0.78	-1.59	-1.21; -0.40	-1.17; -0.39	-1.96; -1.22	0.000 [lm;mh;lh]
FLAV19: Chocolate	-1.04	-1.69	-2.72	-1.47; -0.60	-2.11; -1.26	-3.12; -2.32	0.000 [lm;mh;lh]
FLAV20: Barnacles	-1.00	-1.69	-2.69	-1.45; -0.55	-2.12; -1.26	-3.10; -2.28	0.000 [lm;mh;lh]

FLAV21: Chilli peppers	-1.22	-1.61	-2.82	-1.66; -0.77	-2.04; -1.18	-3.23; -2.41	0.000 [lm;mh;lh]
FLAV22: Pumpkin	-0.96	-0.89	-1.85	-1.35; -0.57	-1.27; -0.52	-2.21; -1.50	0.000 [lm;mh;lh]
FLAV23: Chile	-1.06	-1.18	-2.24	-1.50; -0.62	-1.60; -0.76	-2.64; -1.84	0.000 [lm;mh;lh]
FLAV24: Fried chicken	-0.75	-0.84	-1.58	-1.11; -0.38	-1.19; -0.49	-1.91; -1.25	0.000 [lm;mh;lh]
FLAV25: Smoked bacon	-0.76	-0.69	-1.46	-1.14; -0.39	-1.05; -0.33	-1.80; -1.11	0.000 [lm;mh;lh]

NOTE: l, m, h letters indicate significant differences (p≤0.05) between groups (low, medium and high involved consumers) according to Tuckey post-hoc test

5. DISCUSSION

The objectives of this study are twofold. First, this research aims to analyse beer flavours, providing a beer flavour categorisation. In this context, two flavour categories have been identified, namely "*conventional*" and "*unconventional/flamboyant*" flavours. Secondly, we aim to examine whether the consumers' preferences of beer flavours are related to their involvement with the product.

More precisely, and regarding beer flavour preferences, for "*conventional*" flavours the consumers' ratings could be translated into "*dislike very much*" and "*neither like nor dislike*", except for "*cereals and yeast*" that ranged from "*dislike slightly*" to "*like very much*". On the contrary, "*unconventional/flamboyant*" beer flavour preferences could be described as ranging from "*dislike extremely*" and "*dislike very much*" for low and medium involved consumers; and as "*dislike slightly"* and "*neither like nor dislike*" for highly involved consumers. Further, our findings indicate that consumer flavour preferences obtained the highest mean ratings for "*cereals and yeast*", –flavours closely related to beer-, followed by citrus or acidic fruit flavours for all consumer types, regardless of their level of beer involvement. These findings suggest that retail outlets mostly commercialise beer flavours which are the most preferred and that are highly conventional, since mainstream retailers

commercialise lemon and hop-flavoured beer, being some examples shandy beers or Yile Xiandi, Mahou and Estrella Galicia beer brands.

Secondly, this research aims to investigate how different levels of consumer involvement influence flavour preferences. Our findings indicate that consumers' beer flavour preferences follow a similar pattern, since consumers prefer "*conventional*" beer flavours and show low preferences for "*unconventional/flamboyant*" flavours, regardless of their level of involvement. The low preference for "*unconventional*" beer flavours for all types of consumers was expected, because these flavours are not widespread in the brewery industry; thus, these flavours are quite unusual and unpopular for beer consumers. One potential explanation for the weak preference for "*unconventional/flamboyant*" flavours could be the nature of the flavour-related products. These findings are in line with Giacalone et al. (2014) who reported that flavour preferences are driven by both the need for consistency -meaning a preference for familiar stimuli- and a need for stimulation, meaning a preference for novel stimuli. However, the increasing levels of novelty determine of a downward shift in the consumers' hedonic response. Therefore, being in line with Giacalone et al. (2014) it can be assumed that the type of food product category plays a crucial role in the consumers' hedonic evaluation; and in turn, since beer is a very familiar product, it would be complicated to create unconventional flavours, and for this reason beer flavours such as "*fried chicken*" or "*smoked bacon*" would mean a high level of novelty that might be determining their weak flavour preference.

Another major research finding is the highest preference of highly involved consumers for "*unconventional/flamboyant*" flavours, showing that highly involved consumers are much tolerant with unusual flavours. Therefore, besides individual differences in flavour

preferences, our findings show that the level of consumer involvement with the beverage product influences flavour preferences.

The highest preference of highly involved consumers for unconventional beer flavours could be expected, since according to Bell and Marshall (2003) unique and highly differentiated products would appeal to consumers who exhibit high involvement with the product category. One potential explanation is that consumers' preference for beer flavours could be influenced by product familiarity, since highly involved consumers show greater product familiarity (Verbeke and Vackier, 2004). Another possible explanation is that may be the cognitive and affective processing underlying the individual's preferences are slightly different for high, medium and low involved consumers. More precisely, for highly involved consumers flavour preference may be driven by a search in memory for past consumption experiences with beer; while for medium and low involved consumers, the flavour could be acting as a cue that should be evaluated.

Likewise, our findings are coherent with Jaeger et al. (2017) who reported that highly involved consumers have a more significant concern, experience and information about beer and may be leaving mass-produced beer driven by the desire for better tasting beer or different unconventional flavours. In addition, our findings are in line with research reported by Van Trijp and Steenkamp (1992) and with Donadini et al. (2014) who indicate that one segment of beer consumers could be characterized as "*flavour variety seekers*", since they appreciate intense flavours and show great interest in new experimental beers beyond the traditional ones. Highly involved consumers may be interested in tasting new beers with different flavours, rather than the usual well-known commercial beers, as reported by

Aquilani et al. (2015); and in turn, these consumers could be seeking for flavour specialties or craft beers spanning a vast range of flavours.

6. CONCLUSIONS, IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

The level of consumer involvement with the beverage product influences product flavour preferences. In general terms it can be stated that consumers primarily prefer traditional flavours to unconventional flavours, regardless of their level of product involvement, being the "*cereals*", "*yeast*" and "*hop*" flavours the most preferred ones. Similarly, highly involved consumers show a higher preference for unconventional or flamboyant flavours.

Our findings pinpoint the existence of similar patterns in flavour preferences, regardless the level of consumer involvement, showing a greater liking for conventional flavours and highlighting the most definite preference for beer-related flavours like "*yeast*" or "*hop*". In addition, our major research contribution is the empirical evidence of consumer level of involvement as a factor that determines preferences for beer flavours. More precisely, our research shows the difference in flavour preferences between high, medium and low involved consumers, suggesting that the higher level of involvement with the beverage product, the greater preference for unconventional flavours.

More in-depth knowledge of consumers' beer flavour preferences is of great importance for the brewery industry in order to increase its competitiveness; and in this context, our findings reveal that the level of consumer involvement should be considered. Therefore, the examination of the level of involvement with beer, allows the identification of different consumer groups, enabling breweries to develop specific marketing plans for these different

consumer groups. Breweries should consider that beer sensory properties are relevant for the consumers' purchasing decision; and therefore, product flavour represents a promising way to differentiate a product from competing ones. More precisely, brewers could adapt beer flavours to consumers' preferences as a successful strategy in order to increase beer consumption. Finally, the most important practical implications are related to product innovation in the food and beverage industry, traditionally suffering a very high rate of failure of new products. Our findings suggest that consumers' preferences are maximized in products that deliver scare flavour novelty for low and medium involved consumers; while moderate novel flavours could maximize highly involved consumer preferences.

The main research limitation is that our study focuses on stated flavour preferences, which are not necessarily valid and may differ from actual flavour preferences measured immediately after the product consumption. In addition, in order to generalise the results further research should focus on other types of products within the beverage category, as well as on other food categories. Finally, future studies could explore the relationship between individuals' flavour preferences and beverage consumption patterns.

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