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The effect of background music on sensory evaluation of craft beer

O efeito da música ambiente na avaliação sensorial de cerveja artesanal

El efecto de la música ambiental en la evaluación sensorial de la cerveza artesanal

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Abstract
The present study sought to evaluate the influence of different musical genres on the temporal description of sensations and the global acceptability of IPA New England style craft beer. The dominant sensations were determined using the temporal dominance of sensations (TDS) method with 50 participants submitted to five sound conditions: absence of music and four musical genres (classic rock, sertanejo, pop and soft rock). The sensorial acceptability of craft beer was assessed using the 9-point hedonic scale, with 140 consumers, in the same consumption contexts. The TDS curves indicated significant diferences ($p < 0.05$) in sensory perception of the beverage in the different consumption environments. The bitterness sensation was present in all sound conditions. However, for each musical genre a different sensation was present, reported as fruity flavor for classic rock, refreshing for pop, lightness for soft rock and astringency for sertanejo. Craft beer showed greater acceptance when consumed to the sound of classic rock. Thus, some musical genres can be effectively used to influence the experience of tasting and consuming food and beverages, such as craft beer, making it possible to modify or intensify the dominant sensation and acceptability of the beverage. In addition, ambient music can be used by producers and traders as a tool to differentiate and expand the attractions for the target audience of this product.
Keywords: Beer; Musical genre; Sensory perception; TDS; Acceptability.

Resumo
O presente estudo objetivou avaliar a influência de diferentes gêneros musicais na descrição temporal das sensações e na aceitabilidade global da cerveja artesanal estilo IPA New England. As sensações dominantes foram determinadas pelo método de Dominância Temporal das Sensações (TDS) com 50 participantes submetidos a cinco condições sonoras: ausência de música e quatro gêneros musicais (rock clássico, sertanejo, pop e soft rock). A aceitabilidade sensorial da cerveja artesanal foi avaliada por meio da escala hedônica de 9 pontos, com 140 consumidores, nos mesmos contextos de consumo. As curvas TDS indicaram diferenças significativas ($p < 0,05$) na percepção sensorial da bebida nos diferentes ambientes de consumo. A sensação de amargor esteve presente em todas as condições sonoras. No entanto, para cada gênero musical estava presente uma sensação diferente, relatada como sabor frutado para o rock clássico, refrescante para o pop, leveza para o soft rock e adstringência para o sertanejo. A cerveja artesanal apresentou maior aceitação quando consumida ao som do rock clássico. Assim, alguns gêneros musicais podem ser efetivamente utilizados para influenciar a experiência de degustação e consumo de alimentos e bebidas, como a cerveja artesanal, possibilitando modificar ou intensificar a sensação dominante e a aceitabilidade da bebida.

Além disso, a música ambiente pode ser utilizada por produtores e comerciantes como ferramenta para diferenciar e ampliar as atrações para o público-alvo desse produto.
Palavras-chave: Cerveja; Gênero musical; Percepção sensorial; TDS; Aceitabilidade.

Resumen
El presente estudio buscó evaluar la influencia de diferentes géneros musicales en la descripción temporal de las sensaciones y la aceptabilidad global de la cerveza artesanal estilo IPA New England. Las sensaciones dominantes se determinaron mediante el método de dominancia temporal de las sensaciones (TDS) con 50 participantes sometidos a cinco condiciones sonoras: ausencia de música y cuatro géneros musicales (rock clásico, sertanejo, pop y rock suave). La aceptabilidad sensorial de la cerveza artesanal se evaluó mediante la escala hedónica de 9 puntos, con 140 consumidores, en los mismos contextos de consumo. Las curvas TDS indicaron diferencias significativas ($p < 0,05$) en la percepción sensorial de la bebida en los diferentes ambientes de consumo. La sensación de amargor estuvo presente en todas las condiciones de sonido. Sin embargo, para cada género musical se presentó una sensación diferente, reportada como sabor afrutado para el rock clásico, refrescante para el pop, ligereza para el rock suave y astringencia para el sertanejo. La cerveza artesanal mostró mayor aceptación cuando se consumía al son de rock clásico. Así, algunos géneros musicales pueden ser efectivamente utilizados para influir en la experiencia de degustación y consumo de alimentos y bebidas, como la cerveza artesanal, posibilitando modificar o intensificar la sensación dominante y la aceptabilidad de la bebida. Además, la música ambiental puede ser utilizada por productores y comercializadores como herramienta para diferenciar y ampliar los atractivos para el público objetivo de este producto.
Palabras clave: Cerveza; Género musical; Percepción sensorial; TDS; Aceptabilidad.

1. Introduction

The sensory quality of a food or beverage is generally measured based on taste, olfactory and visual systems. It was believed that the other sensory senses, especially hearing, had little or no influence on the sensory perception and affective response of a food product (Ramírez et al., 2010). However, studies in the field of sensory science have found that the sense of hearing can also contribute to the sensory evaluation of a food, having na integrated action with other sensory responses (Paula et al., 2021; Pantoja & Borges, 2021; Jeong and Lee, 2021; Kantono et al., 2016; Knöferle & Spence, 2012; Spence & Shankar, 2010; Stroebele & De Castro, 2004).

The simultaneous activation of sensory senses can increase or reduce the perception of certain attributes intrinsic to food, in addition to modifying the degree of acceptability by consumers (Motoki et al., 2022). The interactions between modalities related to the senses of sight, smell and taste are extensively reported in the literature (Lawless and Heymann, 2010). However, little is known about the effect of hearing on the sensory perception of food and beverages. Therefore, it is necessary to study the influence of the acoustic environment on the sensory quality of a product.

Among the important ambient aspects in the process of obtaining sensory quality, the sound and noise present in places where we commonly comsume our meals and taste products can strongly influence the perception of food sensory characteristics (Galmarini et al., 2021; Peng-Li et al., 2020; Spence, 2012; Stafford et al., 2012). Therefore, studies have turned to try to understand how this influence occurs and how it can be used to modulate the experience of consuming certain foods (Carvalho et al., 2016; Spence et al., 2014).

Research assessing the influence that sound has was preparing or ingesting food has revealed that it can add significant value to people's experience with food and beverages (Knöferle & Spence, 2012; Spence & Shankar, 2010). Differences in consumer behavioral when influenced by music range from subtle predispositions to consumption to more drastic changes, such as increased consumption and/or spending on products (Techawachirakul et al., 2022; Biswas et al., 2019; Seo & Hummel, 2011; North et al., 2000).

Some foods are consumed frequently and culturally with music being played in the background, among which beverages are highlighted. Of the beverages most consumed nationally and internationally, craft beer has shown continuous and consistent market growth (Paula et al., 2021; Carvalho et al., 2018).

In this context, it is relevant to assess the sensorial quality of craft beer under different acoustic conditions. An important temporal methodology that proves to be effective in capturing possible differences regarding the description of the same product (same craft beer) is the Temporal Dominance of Sensations (TDS). It allows for a quick test performed with consumers in order to obtain the time profile of the product and the dominant sensations after ingestion (Pineau & Schlich, 2015; Kantono et al., 2016).

Thus, the present study seeks to evaluate the influence of different musical genres, using existing songs and characteristics of each genre, on the temporal description of sensations and the global hedonic perception of New England style IPA craft beer.

2. Methodology

The present study was approved by the Human Research Ethics Committee of the Federal University of Viçosa (UFV), Brazil, registered under number 2.413,736. The effect of background music on the perception and sensory quality of craft beer was assessed using the Temporal Dominance of Sensations (TDS) method and the acceptance test. Evaluations were carried out in the Sensory Analysis Laboratory of the UFV, in individual booths and under white light.

2.1 Craft beer processing

In the UFV Technological and Sensory Properties laboratory, New England style IPA craft beer was produced, where the quantities of the ingredients were calculated according to the characteristics of the style using the software BeerSmith™ to aid in development of the formulation.

Craft beer was produced with two batches (approximately 17.5 L in each repetition), and at the end of the process these batches were mixed to obtain a single craft beer sample, with an alcohol content of 5.6%.

In each batch 3.9 kg of Pale Base malt (Maris Otter), 700 g of rolled oats, 400 g of Carapils malt, 400 g of Cristal malt and 250 g of wheat malt were used.

2.1.1 Brewing

In the first processing stage, the malt was ground with the aid of a grain grinder and added to the mash tank to expose sugars and proteins to enzymatic action in an infusion process. The raw materials (malts and adjuncts) were mixed in 17 L of heated water (approximately 60 ºC). Oats were there first cereal to be added and the base malt was added last. This mixture was maintained at 60 ºC for 20 min in order to gelatinize the starch.

In the mashing stage, the wort temperature was increased to 66.7 °C and maintained for 60 min to promote the conversion of starch into fermentable sugars. The wort temperature was then raised to 75.6 °C and maintained for 10 min to inactivate the malt enzymes. At the end of the mashing process, the resulting liquid, the must, was transferred to the clarification tank where it was filtered using the malt husk as a filter material.

The filtered wort, plus hops, was boiled in the boiling tank at approximately 100 ºC for 60 min, allowing for the formation of aromas and flavors characteristic of craft beer, and the commercial sterilization of the wort.

After boiling, the wort remained at rest for 20 min for sedimentation of the coagulated proteins in the boiling tank and the vegetative part of the hops. Subsequently, the hop wort was cooled to a temperature of 20 ºC, so that it could be inoculated with the culture medium.

2.1.2 Fermentation

250 ml of acidified distilled water (pH 5.3) was prepared for mashing and cooled to a temperature of 20 ºC. The yeast *Saccharomyces cerevisiae* was inoculated directly into the must previously prepared and stored in a BOD incubator, at temperature around 20 ºC.

2.1.3 Maturation

Once fermentation was complete, the beer was gradually cooled until it reached 10 ºC. Most of the yeast was separated by decantation (sedimentation) and maturation was initiated.

During the maturation process, craft beer was separated from the yeast and stored in a barrel at a temperature close to 2 ºC. This initiated the Dry Hopping process, which consisted of adding 80 g of Citra hops, present in a container suitable for this process, in contact with craft beer for eleven days. At the end of this phase, which lasted approximately fifteen days, the beer was practically finished, with a distinct final aroma and flavor.

After maturation, the craft beer was bottled in 600 mL glass containers and stored at 4 °C. When bottling, the carbonation technique called "Primming" was used, which consisted of adding 210 g of crystal sugar to the 35 L of craft beer obtained, to generate a slight fermentation in the bottle.

2.2 Protocol for presentation of the craft beer

For sensory evaluations, craft beer was served in piazza acrylic cups of approximately 40 mL. The shape of the cup favored the concentration of substances that impart the characteristic aromas of the drink, permitting the observation of color, brightness and foaming of the beer.

Craft beer was served at the usual drinking temperature (approximately 4 ºC). The protocol of actions when tasting craft beer, both in the acceptance test and in the TDS descriptive methodology, followed the steps adapted from Brejas (2017), including: put the beer (~ 25 mL) in the mouth (the first and only sip), inhale the air three times, move the beer around the mouth three times and swallow. This standardization reduced the variability among consumers. In all analyses, the cups containing craft beer were coded with random three-digit numbers.

In each booth, a computer containing the *SensoMaker* software was available for the panellists to record the TDS descriptive assessment, along with a headset for listening to the musical genres.

The analysis time for each musical context was 2.5 min. After accommodation of the consumers in the individual booths the music started playing and was played for 1.5 minutes (for the acceptance test) or after 1 min of the music being played (for the TDS test), beer was served for evaluation by the panellists. All computers were tuned to play the music at an approximate volume of 70 db to ensure that it was not excessively loud.

2.3 Musical genres

A previous assessment was carried out with music professionals and craft beer consumers to choose the four genres that were used in the research, as well as the songs used to represent each musical genre. Five contexts were used containing four musical genres and one without music.

The four sound conditions with the following genres and the songs that represented them were: Pop (Just Can't Get Enough by Nouvelle Vague), Sertanejo (Evidências by Chitãozinho & Xororó), Soft Rock (If You Leave Me Now by Chicago) and Classic Rock (Another Brick In The Wall by Pink Floyd).

Because each song selected for the analysis had a different playing time, it was determined that all should be adjusted to equal time intervals, containing 2.5 min of the song (time pre-established as sufficient to analyze both methodologies), in

addition to the most important parts of the song (such as chorus, change of tones or increased frequency of reproduction). The online application Audio Cutter was used to edit the music excerpts.

2.4 TDS procedure

The TDS methodology was applied in order to obtain the descriptive assessment of craft beer in five different consumption contexts (four musical styles and absence of music). The evaluation was carried out by a team of 50 participants, 25 female and 25 male, with ages ranging from 18 to 47 (mean age 22.82 ± 4.65 years).

Initially, the TDS methodology procedure was presented to the participants, with an emphasis on the concept of dominant attribute (striking sensory perception or the new sensation that appears at a given moment). The definitions and descriptions of the sensory attributes were assigned previously from a descriptive research of beers, using a previous list adapted from Araújo, Silva and Minim (2003) (Table 1). Then, the evaluators were introduced to the layout/interface of the data collection software, SensoMaker, proposed by Nunes and Pinheiro, 2012, and instructed on its use during the evaluations. The order of positioning the sensory attributes, including the option "without sensation", in the software layout was randomized following the balanced block design (BBD), as recommended by Pineau et al. (2012).

Table 1. Definitions and descriptions of the sensory attributes.

Sensory attributes	*Definitions*
Bitterness	Characteristic bitter taste, promoted by hops.
Fruity flavor	Characteristic fruit flavor.
Alcoholic flavor	Characteristic flavor of etanol.
Refreshment	Sensation of freshness
Lightness	Sensation of lightness when tasting products embedded in air bubbles.
Astringency	Sensation of dryness of the oral mucosa.

Source: Authors (2022).

Each participant evaluated the craft beer in five TDS sessions, referring to each type of consumption context. In each session, panelists were presented with a sample of craft beer at approximately 4 °C, encoded with a random three-digit number. The panelists were instructed to taste the beer and select and/or deselect in the software, during the analysis time (45 seconds after the first and only sip), the dominant attribute that best reflected their judgments. The evaluation ended after the end of the analysis time present in the software (2.5 min) or when the participant did not identify any more attributes as dominant, selecting the analysis stop button (stop). The first context of craft beer consumption evaluated was the absence of background music (referring to the 1st session). Regarding the other acoustic conditions in the environment (music styles), the presentation order of the different musical genres was randomized among the panelists. Headphones were used to transmit the different musical styles present in the individual booths.

Data analysis was performed using the software SensoMaker (Nunes & Pinheiro, 2012) and R, version 3.5.3 (free software). The SensoMaker software was also used for data collection, for plotting of the TDS curves.

2.5 Acceptability of craft beer

The influence of different consumption contexts (four musical styles and absence of music) on the sensorial acceptability of craft beer was assessed using the acceptance test. The assessment was carried out by a team of 140 regular craft beer consumers, 58 of whom were female and 82 male, with ages ranging from 18 to 57 (mean age 25.70 ± 8.20 years).

Each consumer evaluated craft beer in five sessions of the acceptance test, referring to each type of consumption context. In each session, consumers were presented with a craft beer sample at approximately 4 ° C, encoded with a random three-digit number. Consumers were instructed to taste the beer and assess sensory acceptability using the 9-point hedonic scale (ranging from 1 - “dislike extremely” to 9 - “like extremely”). The first context of craft beer consumption evaluated was the absence of background music (referring to the 1st session). In the other sound conditions (music styles), the order of presentation of the different music genres was randomized among consumers. The different musical styles were available in the headphones, present in the individual booths.

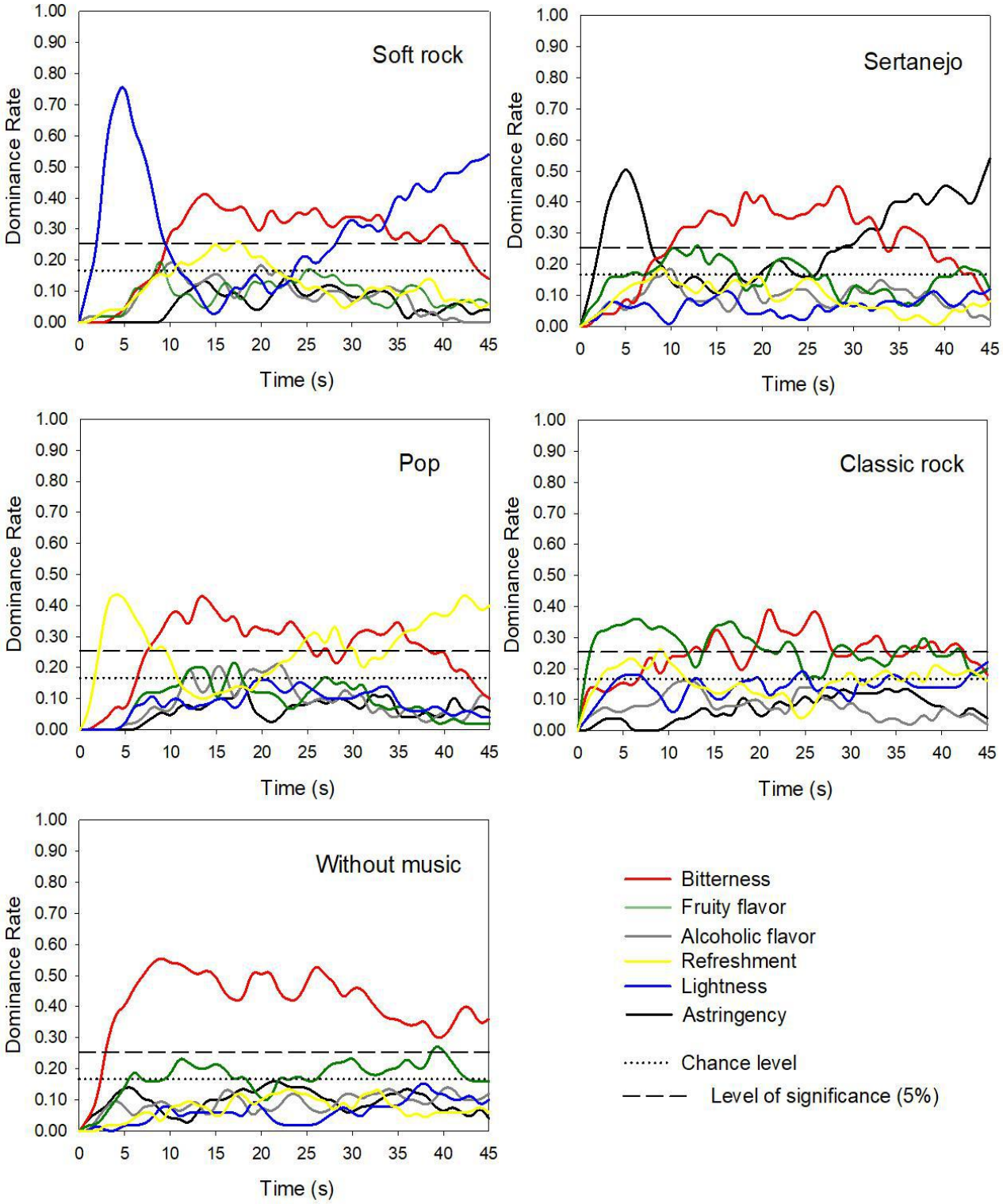
Results were evaluated according to the ANOVA and the means comparison test, using the Tukey test at 5% probability. Statistical analyses were performed using the free software R, version 3.5.3.

3. Results

3.1 Music and sensation dominance

The descriptive temporal analysis of craft beer under different ambient consumption conditions (different musical genres and absence of music) showed a significant difference ($p < 0.05$) regarding the behavior of the dominance rate of each sensory sensation perceived by the team of evaluators (Figure 1). Within each acoustic environment, the attributes below the chance level line, corresponding to a dominance rate of 0.17, indicated that they were not dominant. The significance level of 5%, corresponding to the dominance rate of 0.25, was calculated based on the total number of evaluators and the level of chance.

Figure 1. TDS curves of craft beer in different ambient sound conditions.



Source: Authors (2022).

The curves generated for the analysis of TDS indicate that there was variation in the sensory profile during the consumption of the drink. Craft beer, when tasted and evaluated without the presence of background music, presented bitterness and fruity flavor as the dominant descriptive attributes, while the bitter taste remained as the predominant sensory sensation throughout the analysis period.

The bitterness attribute, dominant in the time profile for the condition "without music", was also perceived as a dominant sensory sensation in other consumption contexts, regardless of the type of musical genre. However, it was interspersed with other dominant sensory sensations, which were characteristic for each consumption context. For the soft rock genre, the lightness sensation was the dominant sensory attribute in the first moments of the test (10 s), and returning to prevail at the end of the evaluation (35 to 45 s). The astringency attribute was dominant for the sertanejo genre, at the beginning (10 s) and at the end (33 to 45 s) of the craft beer tasting period. While refreshment was dominant for the pop genre. For the classic rock musical genre, there was a great alternation in the dominant sensory sensation between the fruity flavor and bitterness attributes.

3.2 Music and sensory acceptance

The different contexts of craft beer consumption (four musical genres and absence of music) resulted in a significant difference in the sensorial acceptability of the beverage by consumers ($p < 0.05$). Table 2 represent the average hedonic scores of craft beer evaluated under the various ambient conditions.

Table 2. Average hedonic scores of craft beer in different ambient sound conditions.

Musical genre	*Mean score*
Classic Rock	7,5 [a]
Pop	6,9 [b]
Soft Rock	6,9 [b]
Without music	6,3 [c]
Sertanejo	6,1 [c]

Means followed by the same letter do not differ significantly ($p > 0.05$), according to the 2 Tukey test. Source: Authors (2022).

Listening to the classic rock musical style during the tasting of craft beer by consumers provided a greatest intensity magnitude in sensory acceptance of the beverage (hedonic average 7.5) compared to other music types. This was followed by the pop and soft rock musical styles, both with an average acceptance rate of 6.9 on the 9-point hedonic scale. Consumption of the beverage to the sound of sertanejo music and in the absence of ambient music resulted in lower sensorial acceptability of craft beer (hedonic average 6.3 and 6.1, respectively).

4. Discussion

Each song played in the background provided a different temporal description of the dominant sensations when tasting craft beer. Related studies show that these changes are linked to connotative transfers of sensations, which can be applied to both music and food or can be intensified by the presence of certain elements characteristic of each musical genre (Galmarini et al., 2021; Kantono et al., 2016; Knöferle & Spence, 2012; Spence & Shankar, 2010).

Sensation variations occurred in the evaluation of New England IPA craft beer, even though the songs used for each genre were not intentionally composed to modulate basic tastes (as in similar studies) but as a potential activator of perceived sensations, such as bitterness, astringency, fruity flavor, lightness or freshness. Reinoso-Carvalho et al. (2016) sought to determine if the soundtracks that had previously been shown to correspond to different basic tastes would significantly modulate the perceived sweetness, bitterness, and acidity of beers, and reported that the different soundtracks evaluated influenced the sensorial classification of the beverage by the evaluators. This indicates the transfer of sensations as the potential mechanism underlying the cross modulations of taste in function of the sound heard.

In order to explain the possible causes for differentiation of the descriptive profiles, the results found for craft beer corroborate the conclusions of Eitan and Timmers (2010) which suggest that the higher sounds tend to be perceived as colder, drier and more difficult than sounds with a lower pitch. Spence, Velasco and Knöferle (2014) also considered that the fresh/fruity classifications of a study carried out with wines may have been influenced by the higher notes of songs considered "sweet".

Understanding how music is interpreted in the brain and how neural responses are given to these stimuli becomes an important factor in understanding why such differentiations are obtained with music and are not clearly evident with other noises, such as speech for example. Norman-Haignere, Kanwisher and Mcdermott (2015) demonstrated that circuits linked to music and speech are in different parts of the brain's auditory cortex, where all signals are interpreted, revealing that each area is basically deaf to the other's stimuli, although there is a match when the song is accompanied by a singer. Like all conditions of the analysis that involved music, they were reproduced using both the instrumental part and the singers' voices, but isolated from possible external noise with the use of headphones, so it can be considered that all neural responses were a result of the sound being played.

Still on the way the human body reacts to the ambient sound stimulus and more precisely to music, Iwanaga, Kobayashi and Kawasaki (2005) studied the effects of relaxing music (like most romantic songs) and exciting music (like that played in fitness centers) on the heart rate of volunteers. They found that their heart rate decreased when they were subjected to the conditions of relaxing music and increased when they were subjected to the conditions of exciting music, showing that music significantly influences the behavioral mode of those who listen to it.

The classic rock, soft rock and pop genres present musical characteristics such as accelerated time and a higher key, which can enhance the increase in excitement and mood changes of the participants (Thompson, Schellenberg and Husain, 2001). The results for these musical styles seem to reinforce the assumptions that the cognitive effect of music is promoted through excitement and mood swings (Paula et al., 2021; Jeong and Lee, 2021; Schellenberg and Hallam, 2005). Thus, the description of beer while hearing these genres resulted in alternating and more common characteristics about aspects related to beer, such as fruity flavor (classic rock), lightness (soft rock) and refreshment (pop).

The combination of accelerated time, key and the instruments used to compose the music play an important role in the differentiation observed. For the classic rock genre, the musical instruments used (mainly string instruments, such as the guitar, the electronic bass and the violin) and the higher tonality and the faster tempo, among the analyzed genres, had positive effects on the mood of the participants, indicating the alternation of sensations between the bitter taste (characteristic of this style of beer) and the fruity flavor of craft beer.

For the pop genre, the beat and sizzle of cymbals and percussion instruments correspond to the sound of bottles being opened, indirectly indicating the sensation of refreshment observed. The tone, the higher vocal frequency, the non-aggressive lyrics and the instruments used for the soft rock genre (piano and synthesizers, among others), made it possible to describe the sensation of lightness. North (2012) used the same music reported in this study for the pop genre in descriptive analysis of wines and obtained the highest scores of freshness for this product when it was played, indicating and corroborating the potential influence it had on the description of this sensation.

The sertanejo genre, on the other hand, is based on lyrics that traditionally and frequently report dilemmas, socio-cultural problems and personal aspects that are sung with the help of string instruments typical for the genre. The combination of these elements with a less accelerated beat than other genres and a lower pitch, resulted in the temporal description of craft beer as an astringent.

The different sound conditions of the environment, including the absence of music, also had a significant influence ($p < 0.05$) on the sensorial acceptability of craft beer. According to the differences found in this research, it is possible to infer

that the consumption of craft beer while listening to different musical genres caused different emotions at different intensities in consumers. Consumers may have found the sertanejo genre less pleasant than the others, causing negative emotions significantly greater than the other genres, which are indifferent or preferred by these consumers. On the other hand, listening to music genres that are generally among those preferred by this consumer profile, such as classic rock for example, may have significantly increased positive emotions, effects similar to those described in the Mozart effect (Galvarini et al., 2021; Tieppo et al., 2016). With the increase in positive emotions, there was also an increase in hedonic scores.

Another inference that can be made, according to the data of this research, is that the differentiation between musical genres indicates different emotional responses, which subsequently influence the acceptance ratings of craft beer. This differentiation was reported by Reinoso-Carvalho et al. (2019) when evaluating the role of emotion induced by listening to contrasting musical tracks, which refer to positive versus negative emotion, during beer tasting. The aforementioned authors found that distinct emotional reactions triggered by music influenced consumers' sensory perception and acceptability. Beer tasted to the sound of music associated with positive emotions was classified as sweeter, in addition to being more accepted by consumers. However, the same beer was classified as more bitter, with higher alcohol content and more body when consumers heard music associated with negative emotions.

The decrease in anxiety and the increase in well-being can be two mechanisms that were present during the beer evaluation, permitting the observed differentiation. Björkman et al. (2013), when analyzing the sedative effects of music (sensations of pain, relaxation and well-being), in addition to pain and anxiety behaviors during clinical exams, concluded that listening to sedative music caused a reduction in anxiety and an increase in well-being during exams.

Blood and Zatorre (2001), using brain imaging techniques, reported that listening to pleasant music provided listeners with some intense and pleasurable experiences described as "chills in the spine" or "chills". They found that as pleasurable sensations increased, cerebral blood flow increased in regions of the brain involved with reward and motivation. In contrast, the playing of unpleasant music showed increased activity in the paralymbic brain regions, which correlated with unpleasant emotions.

In summary, the results of the present work demonstrate that some musical genres can be effectively used to influence the participants' tasting experience of craft beer. It is possible to modify or intensify the dominant sensation and acceptance of craft beer through the selection of songs that are played in the background when consuming this product. The diverse and complex emotional aspects carried by consumers in their preferences for music and beer can be involved in these alterations, since this product is commonly consumed in social environments where music is commonly played in the background.

5. Conclusion

The different sound conditions heard when consuming New England IPA craft beer, specifically the different musical genres, had an influence on the sensorial acceptance of the beverage with regards to overall impression. This influence was positive for the genres pop, soft rock and classic rock, increasing the average of hedonic scores and differentiating these averages from each other. The musical styles that provided the highest and lowest sensorial acceptability of craft beer were classic rock and sertanejo, respectively. The absence of music during the tasting of the drink also conferred lower acceptability by consumers.

The temporal descriptive profile of craft beer differed when listening to different musical genres, indicating that there was a transfer of attributes assigned from music to beer, which may also be directly linked to the differentiation of sensory acceptance of the beverage.

The results of this study contribute to literature on music and its influences on sensory evaluation by highlighting the alternation in the results obtained for a given product when analyzed under different acoustic contexts. It also calls attention to the exploration of possible ways of presenting a food in different environments and locations for analysis or consumption.

This research is also important for the producer and seller since the brewing activity is booming, enabling greater controls of the attractions for consumers in this market, in addition to greater singularities of these environments.

Considering that the olfactory system also influences the sensory quality of products, further research is needed to assess whether different musical genres can influence consumers' purchase intention, as well as the selling price that consumers would be willing to pay for the product. In addition, future studies that allow to correlate the sensory characteristics of foods and acceptability, with the emotional attributes of consumers during the tasting of food and drinks to the sound of different musical genres, are necessary for a better understanding of the effect of background music on sensory evaluation of food and beverages.

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