

Facereader as a Tool to Evaluate Music Preferences of Slovak Consumers

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Abstract: The sales environment is a space that needs the interplay of several elements to create a pleasant atmosphere. The space must create a shopping experience, only then will customers remember it better. One of the components of a good sales environment is music. It can positively influence consumers' mood, memory, attitude towards brands and purchase intentions. To properly approach the creation of a quality music backdrop, in this study we will focus on the analysis of Slovak consumers' music preferences using the FaceReader tool. The latter allows measuring and analysing emotional reactions to specific music stimuli. The aim is to investigate the impact of selected audio stimuli on consumers' emotional responses, recording and analysing expressions such as facial expressions and changes in emotional state. This implicit data is then compared with explicit feedback provided by consumers through Computer Assisted Web Interviewing (CAWI) questionnaire. The research results correlate the implicit feedback with stated preferences, offering a more comprehensive view of music perceptions and preferences in the Slovak context.

Keywords: Store atmosphere, Music preferences, FaceReader, Consumer emotions

JEL Classification: M30, M31, M37

1 Introduction

Environmental factors such as music and sound, lighting, colour and smell help to create sensory impressions that are essential to creating a shopping experience. Therefore, finding a unique synergy of factors can mean a competitive advantage for retailers and better customer retention (Pine & Joseph, 1998). Music is defined as one of the fundamental factors that significantly contributes to the creation of a shopping atmosphere. Music is a powerful sound that can influence consumers' conscious and unconscious decisions. Pleasant music played in the store significantly influences consumer's purchase intentions (Hussain & Ali, 2015). Zhou and Wong (2004) write that store atmosphere represents a conscious effort to create a retail environment that elicits specific emotional effects on consumers and increases the likelihood of purchase, suggesting that retailers may actively manipulate these stimuli (Vieira, 2013). Oakes (2000) adds that the emotional reactions triggered by the store environment influence the time and money spent by the consumer in the store. Background music can positively contribute to improving the shopper's mood at the point of purchase, which also has an impact on behavioural change. Music has a strong influence on causing psychological reactions in shoppers (Jain & Bagdare, 2011). Milliman (1986) found in his research that slower music was associated with slower purchase rates and higher sales. In another study he tested the effect of fast and slow music in an "upscale" restaurant. The results of the study showed that the guests consumed their meals faster when fast music was playing. However, in the evening when slow music was played, customers spent significantly more time in the restaurant and spent more money on alcoholic beverages. Oakes and North (2008) found that music variables (genre, tempo, loudness and pleasantness) can be used to achieve desired effects in terms of service environment ratings, perceptions of waiting time, length of stay, speed of movement, etc. According to the findings of Milliman (1986), loud music, if it is the preferred genre, will contribute positively to the emotional states of the shoppers in the target group of this study, young fashion shoppers. Customer behaviour and emotions influenced by stimuli like a music can be analysed also by neuromarketing tools. Neuromarketing or neuroscience focuses on the subconscious responses of customers because according to previous studies, consumer behaviour and their cognitive responses of consumers are inconsistent (Renvoise & Morin, 2016).

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Mansor & Isa (2020) are classifying neuromarketing research methods as physiological tools that include face-reading technology. Human emotions provide a wealth of knowledge that can be discerned through facial expression measurements. Based on Wahab et al. (2021), Ekman and Friesen categorized six universal facial expressions: happiness, fear, surprise, disgust, sadness, and anger. Areni (2003) compared academic theories with industry-based observations and found that atmospheric music plays a crucial role in shaping customer experiences. It helps create a suitable brand image, encourages customers to stay longer, attracts or repels them, manages their perception of time, influences social behaviour, and masks unwanted background noise.

2 Methods

The initial experiment on music preferences has been proceeded in the beginning of September 2024 via online questionnaire while using a Computer-Assisted Web Interview (CAWI) survey on N=200 participants. CAWI is a quantitative method with a programmed questionnaire that is distributed online through email, mobile applications, online advertisement and SMS (Elliot, 2021). Our survey link has been distributed via university email to university colleagues, students, and friends. This study gave us better understanding of music preferences and perception such as genres, type of music and others specification related to audio stimulation in retail. The research sample consisted of 97 females and 103 males represented by generations – Boomers (1946-1965) 34, Generation X (1965-1980) 39, Millennials (1981-1996) 55, Generation Z (1997-2012) 69 and Generation Alpha (after 2012) only 3 participants, which were kids of university employees. Quantitative research sample was not representative based on the age of participants, as large number of participants were university employees and students.

Based on insight from quantitative research we have set up qualitative research on emotional perception of the same audio stimuli reproduced in instrumental and vocal. Research has been conducted on the beginning of October 2024 in The Laboratory of Consumer Studies at the Faculty of Economics and Management of the Slovak University of Agriculture in Nitra. The study was carried out in accordance with the Code of Ethics of the „Laboratory of Consumer Studies,. The qualitative research sample was N=50, where most of the participants were students and employees of the Faculty of Economics and Management.

The main objective of this study was to investigate how different versions of the same genre of selected audio stimuli affect consumers' emotionality. The same music sample was played to 50 respondents in instrumental and vocal version. During stimuli playback, we monitored facial biometrics to obtain information about participants micro-emotions. For a more detailed view of emotion, we have chosen two micro emotions. Valence and arousal. However, some of the authors might not consider valence and arousal as an emotion. Russell (1980) specifies that valence and arousal are fundamental dimensions used to describe and measure emotions in psychology and neuroscience. These concepts are often included in emotional response models, such as the circumplex model of affect. Further Russell specifies Valence as a dimension, that refers to the positivity or negativity of an emotional experience. It indicates whether an emotion is pleasant or unpleasant, but it does not represent a specific emotion. Following Russell's explanation of arousal, it refers to the level of activation or energy in an emotional response. It can range from calm to excited states, but it is a dimension rather than a specific emotion.

Music sample that has been played to participants we have chosen based on inputs from qualitative part of this study. To choose the audio stimuli we have used Artificial Intelligence (AI). Our music parameters given to AI were: up-to-date song, modern, dynamic dance music, covering genres such as pop, disco and house. According to these preference parameters, the AI suggested a few current contemporary pop songs. From the selection of options we have chosen a song called: „The Sound of Silence,, by the original composer Disturbed - while the selected song was an edited remix version performed by DJ CYRIL. The music was reproduced to participants through headphones JBL Tune 720BT wireless headphones, at 65 dB loudness and the tempo of the songs was 126 BPM.

Link to vocal music sample: <https://www.youtube.com/watch?v=Y-e7ij7aW8c>

Link to instrumental music sample: <https://www.youtube.com/watch?v=UNviwyVczw0>

We have used software from Noldus' FaceReader 7 to analyse respondents' micro emotions while listening to the same stimulus for 30 seconds. The emotionality analysis represents the average valence and arousal values for all respondents during the first 30 seconds of the music sample. The method of playing the demos was in the form of an A/B test. The order of the music samples varied from test to test like A/B, B/A, etc.

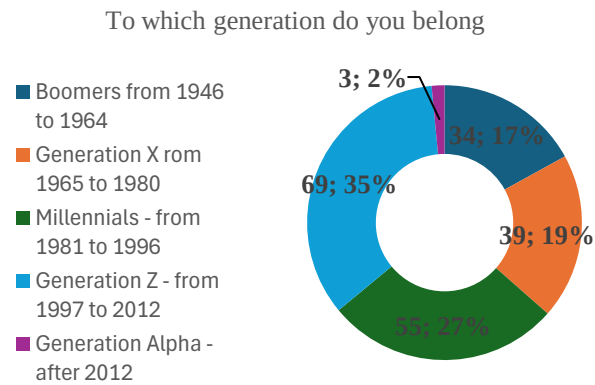
3 Research results

Through the results of the quantitative data collection that preceded the testing of the music preference evaluation, we obtained insights needed to conduct the qualitative study. The characteristics of the research sample that formed the basis for making decisions about music genre choice comprised a total of 200 respondents, with a mixture of 103 males and 97 females in diverse sample of each age category (Fig. 1). The obtained data on music preferences (Fig.2) shows that most of the respondents up to 73% (146) prefer pop music in a retail environment. Other popular music genres include Hip-hop with a 6% preference of 12 respondents, followed by disco 5% (10) and electronic music 5% (9). The preferences of other music genres are represented by less than 5% of the research sample. Least preferred genres such, classical or country music no one from the research sample preferred.

Another question from qualitative survey regarding preferred type of the music (Fig. 3) has shown that 110 respondents (55%) would like to listen to instrumental music while shopping. Vocal music has chosen 45 participants (45%).

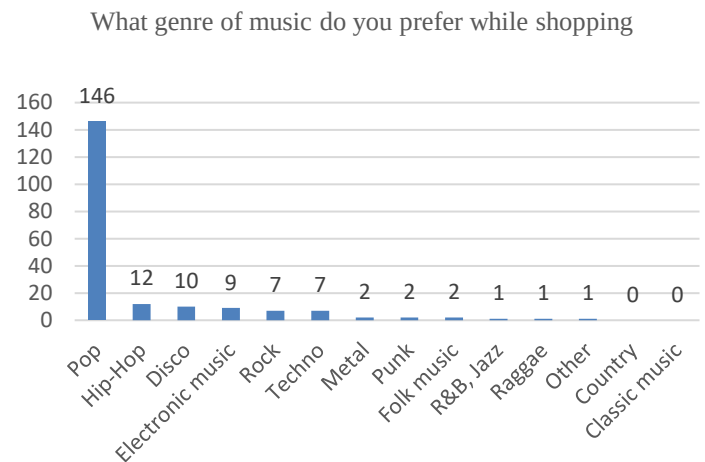
Age groups that participated in qualitative research of tested audio-stimuli in Laboratory of consumer studies can be seen in (Fig. 4). Research sample was made of 18 people (36%) belonging to Generation Z, 15 which is (30%) were Millennials, 10 were from Generation X (20%), and the least represented age groups where Boomers 4 (8%), and Gen Alfa 3 (6%).

Figure 1 Graph presents mix of generations in the quantitative research sample N=200



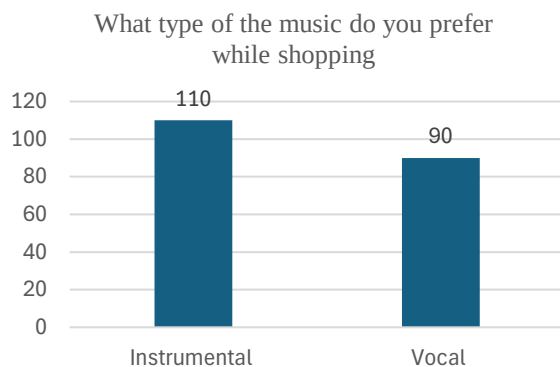
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Figure 2 Preference of music genres



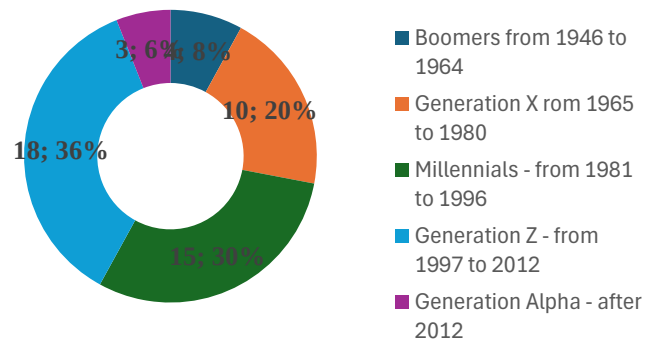
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Figure 3 Preferences in music type N=200



Source: Own data processing

Figure 4 Age categories of qualitative study N=50

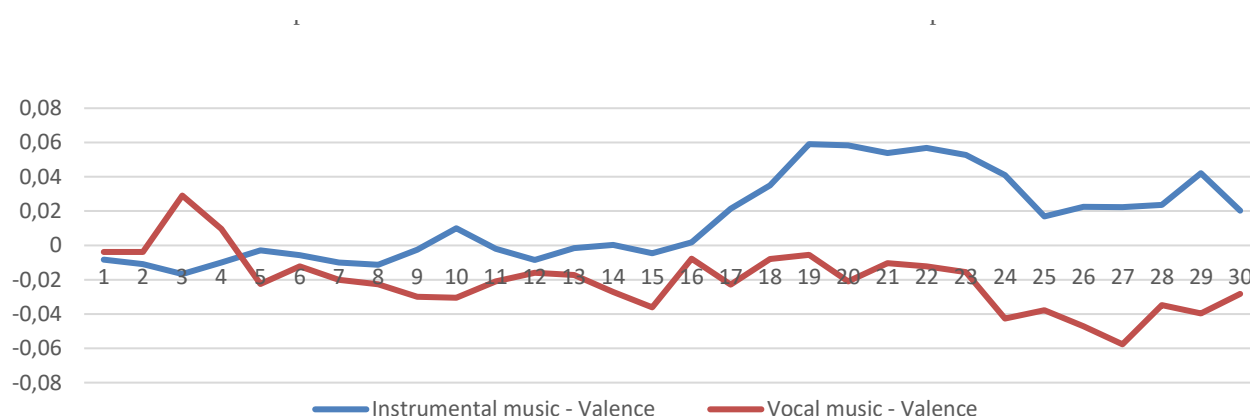


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3.1 Analysis of emotionality - valence when listening to musical stimuli

Based on the analysis of the respondents' facial micro-emotions (valence and arousal) while listening to the selected music samples, we found that higher average valence values were achieved for the instrumental version of the music sample. The average value of instrumental music reaches 0.014 whereas for the vocal it is - 0.020. The difference in emotional perception - valence is 0.035 between the perception of vocal and instrumental samples. In the graph (Fig. 5), we can see that the vocal sample starts with a higher average but only to about 4th second of the song. After that, we can observe a reverse in data analysis, when the valence of vocal music starts decreasing. We have also recorded a similar perception between the 5th and 16th second, both stimuli are perceived very similarly. A change can be seen from the 17th second onwards where the difference in valence of the musical samples starts to widen. When we are speaking about valence, it's important to mention that valence values range between -1 and 1. So if our emotional responses have recorded differences in audio stimuli perception around 0.035 it is a small emotional change. But we must take into consideration that even such a small difference in emotional perception can make a change

Figure 5 Graph of valence when vocal and instrumental music was played.

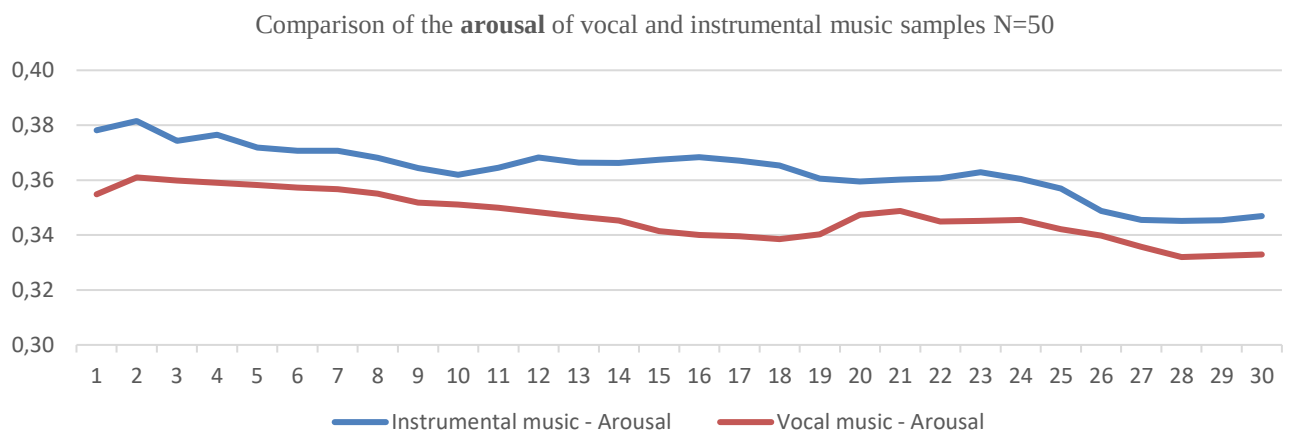


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3.2 Analysis of emotionality - arousal when listening to musical stimuli

When analysing arousal during instrumental and vocal music playback, we equally revealed differences in emotional perception, as demonstrated by the arousal values. The average arousal value during the entire listening time of the instrumental sample was 0.363. The mean arousal value for the vocal music was at 0.346, and the difference in arousal measures between the instrumental and vocal music was only 0.016. In the graph of Fig. 6, we can see slightly better arousal values for the respondents who listened to instrumental music. The arousal when listening to vocal music caused on average lower values in the respondents, but from the graph we can see the decreasing tendency of both curves at the same time. Arousal values can be from 0 to 1. By our analysis we have recorded values around 0.3 what can be considered as significant emotional status. If we look closer at average differences between instrumental and vocal music perception, we can clearly see that value of 0.016 as less significant, but although important insight.

Figure 6 Graph of arousal when vocal and instrumental music was played.



Source: Own data processing

4 Conclusions

The presented study provides an initial insight into the impact of the same audio stimulus on the emotionality of respondents and reveals the importance of addressing this issue in more detail. The study presents a pilot testing the impact of genres on consumer emotions which are analyzed by a combination of implicit and explicit feedback. This study is a start for further investigations. As we already know, the right choice of music genre, tempo, and loudness can contribute significantly to the creation of a more pleasant shopping environment and also to a better mood for the shopper (Petruzzellis et al. 2015). Michel et al. (2017) adds that the positive emotionality caused by music can contribute to longer time spent in the store, more money spent, etc.

The main findings of quantitative part of this study present that up to 73% of the research sample N=200 prefer the Pop music genre when shopping. Other preferred music genres are Hip-Hop by 12 respondents (6%) and disco by 10 respondents which represents (5%). Music genres such as Metal, Punk, and Folk music are preferred by only 1% of the research sample. We can conclude that the results of music genre preferences are strongly influenced by the music played in mass media, which is largely represented by the Pop genre. Instrumental music is preferred by 110 participants (55%), and vocal by 90 (45%).

The qualitative part of the research has been carried out on 50 participants and brought interesting insights into music perception through emotionality. The research sample was represented by a mixture of generations not equally represented. The most represented generation was Generation Z with 18 participants (36%), followed by Millennials with 15 participants (30%), Generation X with 10 participants (20%), and the least represented age groups were Boomers with 4 participants (8%) and Generation Alfa with 3 participants (6%).

Qualitative finding from FaceReader on respondents' emotionality have found that, there is significantly better emotional perception of instrumental pop music over vocal music. This is evidenced by the average valence values, which reach 0.014 for instrumental music whereas for vocal music the valence is at -0.020. The difference in emotional perception is significant at the level of 0.035.

The arousal values when listening to instrumental and vocal music samples show noticeable differences. For instrumental music, arousal values were more positive, at 0.363, while those for vocal music were 0.346. Although the difference in arousal is only 0.016, it can still be considered significant.

The differences in emotional perception of vocal and instrumental music can be considered as the negative impact of vocal music on the respondent in case he listens to audio stimuli that contain lyrics (also in a foreign language) that the customer does not understand. This fundamentally affects the cognitive load which can cause a more negative perception of the music, and this also affects emotions.

As we report, this study is pilot testing research that precedes further quantitative but also qualitative data collection. We see the limitations of this study in the small research sample of respondents. A better representation of the different

age categories may contribute to more specific results. Bias in the testing results may also have been influenced by the length of the musical stimulus tested. In the future, we suggest testing longer musical segments or even entire musical pieces. To obtain better data, analysing also other emotions e.g. Happy, Surprised, or even more negative emotions e.g. Sad would be helpful. In future research to take into consideration also personal profile of participants, as e.g. introverts vs extroverts might have a different music. Improving the respondent's focus on the music sample during testing may also contribute to better results in the future.

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