Does the Tempo of the Music Playing in Restaurants Affect the Eating Time?

*Esra ŞAHİN [a]

[a] Akdeniz University, Manavgat Tourism Faculty, Department of Gastronomy and Culinary Arts, Antalya/Turkey

Abstract

The effect of musical tempo on eating and drinking behavior is a controversial subject. In this study, the effects of musical tempo on eating time under different conditions (with no-music, fast-tempo music, and slow-tempo music) have been studied. The same menu (including meat, rice, and garnish) has been served to 30 participants selected with the snowball sampling model, and their eating times have been measured under three different conditions. At the same time, their emotional engagement, memory, cognitive load, and attention levels have been measured with the data obtained from EEG and GSR devices. The results have shown that the musical tempo has no significant effect on the participants' eating time and neurometric parameters.

* Corresponding Author
E-mail: esrasahin@akdeniz.edu.tr (E. Şahin)

INTRODUCTION

The effect of music on human behavior has been a subject of research in different disciplines for an extended period of time. Especially for businesses in the service industry, it can be said that music is the least expensive and easily changeable ambiance factor (Caldwell & Hibbert, 2002). Although the effects of music on purchasing behavior (Ding & Lin, 2012), waiting time and customer satisfaction (Eroglu, Machleit & Chebat, 2005) have been studied in the retail sector, the number of studies on the effects of music in the food and beverage industry is relatively limited. It is also seen that there is no consensus over existing studies. Eating and drinking behavior can be significantly affected by environmental factors as well as sensory qualities and tastes (Spence et al., 2014). Therefore, more research is needed specifically on the effect of environmental factors.

Becoming distinct and providing experience-based services to customers is increasingly gaining importance in restaurant businesses. The customers, as well, evaluate their service experience with environmental factors. Generally, the concept of environment is used as a term expressing both the physical environment in which the service is produced, and the interaction between the customer and employees, as well as other customers, are made. Environmental factors are usually defined as the atmosphere. Kotler (1973) defines atmosphere as a: conscious designing of space to create certain effects apprehended by our five senses, giving an idea about the quality of the environment, and enhancing the purchase probability of the consumer. According to the "Servicespace" model of Bitner, the environment is made up of tangible and intangible dimensions. One of these dimensions is the ambiance. The ambiance is an intangible background factor such as music, smell, temperature, lighting, and sound that is invisible to the eye but affects the subconscious mind (Baker, 1987). Various studies have defined the concept of ambiance as an essential component that creates the business atmosphere (Baker, 1987; Bitner, 1992; Ryu & Jang, 2007; Heung & Gu, 2012) and concluded that it is one of the most important factors affecting the purchasing decision (Ryu & Jang, 2008). It has been seen in many studies that factors such as music (Milliman, 1986), temperature (Bell & Baron, 1977), smell (Michon, Chebat & Turley, 2005; Guéguen & Petr, 2006; Biswas & Szocs, 2019), and lighting (Biswas et al., 2017; Şahin & Yazıcıoğlu, 2020) which are among the ambient factors, can affect customer experience, customer satisfaction, revisiting intention, and sales amount.

Music forms part of the concept of ambiance, along with lighting, design, temperature, color, and other environmental factors. It has been claimed that music affects cognitive and emotional processes by influencing information processing, emotional and physiological changes, psychological state, and classical conditioning process, and thus has the feature of influencing human behavior (Bruner, 1990; Sloboda & Juslin, 2001; Caldwell & Hibbert, 2002).

It has also been shown that the musical style and the physical dimensions of the music (e.g., tempo, rhythm, pitch, and volume) have a significant impact on customers' behavior (Garlin & Owen, 2006; Mattila & Wirtz, 2001). Consequently, its effects on customer behavior, especially in the retail industry, have been the subject of many studies (Eroglu et al., 2005), however, its relationship with eating behavior has been relatively less studied.

It has been stated that structural and sensory factors can be taken into account in determining the background music to be used in businesses. The structural factor refers to the objective and observable features of music such as tempo, rhythm, mode, and harmony. The sensory factor refers to factors such as the consumer's age, gender, occupation, and musical knowledge (Herrington & Capella; 1994). When the studies conducted on music are

evaluated, it is seen that the tempo, volume, mode, pitch, rhythm, and harmony of music (Bruner, 1990) and the existence of music, as well as how these elements affect behavior or perceptions are generally chosen as the subjects of study. In the meta-analysis, in which 56 studies on music in the field of tourism and hospitality were evaluated, research topics were gathered in five dimensions. These dimensions are the presence/absence of music, musical tempo, music volume, music congruence, and music liking (Trompeta et al., 2022). Musical tempo (beats per minute), which is the subject of this research, is stated as one of the most important factors affecting our cognitive and emotional responses (Dalla Bella et al., 2001; Khalfa et al., 2008). It has been shown in various studies that tempo affects the information processing process, emotions, and mood (Pantoja & Borges, 2021). It is suggested that music played at fast and slow tempos has different effects on our mood. For example, it is claimed that fast-tempo music increases stimulation level (Kellaris & Kent, 1993; Schubert, 2004; Dillman Carpentier & Potter, 2007) and indirectly leads to arousal and approach motivations (Cheng, Wu &Yen, 2009).

The effect of the tempo of the music, that is the music played slowly or quickly on the eating behavior has also been a subject of curiosity and research. In a study conducted for this purpose, a significant effect of the tempo of the music on the total eating time was not detected. However, it has been observed that the number of bites per minute increases at a fast tempo, therefore music affects the eating speed (Roballey et al., 1985). Milliman (1986) also stated in his research that slow-tempo music -perhaps because it creates a relaxing atmosphere- prolongs the stay in the restaurant and leads to the consumption of more alcoholic beverages. However, in this study, the effect of the tempo of music causing more spending was only confirmed for beverages. According to Milliman, slow-tempo music can lead to increased approach behaviors, which can lead to spending more money and time. There are also studies claiming that slow-tempo music increases not only the amount of money spent on beverages but also the amount of money spent on food. According to another study, people spent an average of 13 minutes 56 seconds more in slow-tempo music compared to fast-tempo music (Caldwell & Hibbert, 1999). In a study conducted by Stafford & Dodd (2013), the beverage consumption of female participants between the ages of 18-28 was evaluated in slow-tempo, fast-tempo, and no-music conditions. Although the expectation was an increased alcohol consumption in the fast-tempo condition, the results found that more alcohol was consumed in the conditions with music, regardless of the tempo, compared to the condition with no-music. In another study examining soft drink consumption in fast-tempo and slow-tempo music environments, it was concluded that soft drinks were consumed faster in fast-tempo conditions (McElrea & Standing, 1992). However, since there was no control condition without music in this study, there cannot be a comparison with the no-music condition. Another study on the influence of music tempo and music preference on consumer behavior analyzed the extent to which these two variables affect actual and perceived time spent eating, the amount of money spent, and the outcomes in terms of enjoyment of the experience and future behavioral intentions. The results have shown that music preference explains actual time spent eating better than the musical tempo, although neither variable has a significant effect on the perceived time. Similarly, it was concluded that the music preference had an effect on the amount of expenditure, and the tempo had no effect. This study emphasizes that music preference is important in restaurants, but the effects of musical tempo are insignificant (Caldwell & Hibbert, 2002). Additionally, another study, which reported that the eating time increased when there was music compared to silence and that the tempo of the music was effective during eating time, suggested that fast-tempo was associated with positive mood states and could positively affect purchase intention (Pantoja & Borges, 2021).

In this study, the "musicscape" (Oakes, 2000) model, which was adapted from Bitner's (1992) "servicescape" model and focused only on the music variable, was employed. This model was developed by analyzing the effects of manipulating the structural elements of music in a service environment in the light of literature information. Musicscape, unlike servicescape, doesn't analyze the behavior of both customers and employees but focuses solely on the impact on customer behavior. It is considered that music can affect the emotional state and purchase intention of the customer (Alpert & Alpert, 1990) and facilitate reaching the goals of the business (Oakes, 2000).

The aim of this study is to measure the eating speed of participants in fast-tempo, slow-tempo, and no-music conditions and to determine whether musical tempo has an effect on eating time. According to a meta-analysis by Behne (1999), approximately one-third of the studies conducted on music don't reveal significant findings, while one-third reveal inconsistent findings. Despite the fact that various studies have been conducted on the subject after Behne's (1999) study, it is thought that the effect of music should be examined with more studies. It is seen that the number of studies that will affect the activities of food and beverage businesses is quite limited. In this study, it is aimed to contribute to the literature by researching whether the tempo of the music, which is among the most easily manipulated ambiance factors (Hosea, 2004 as cited in Garlin & Owen, 2006), being a relatively little-studied subject, affects the eating and drinking time in the restaurant environment.

Material and Methods

This study was conducted in an actual restaurant environment in Istanbul with 30 volunteer participants (15 female, 15 male) selected by snowball sampling method on 17-18 April 2018. Before the study, it was confirmed that the participants did not have any health problems or food allergies that could prevent the study, and they were informed not to eat anything 4 hours before the study and notified to come to the restaurant with an empty stomach at the appointed time. The study was conducted in a high-class restaurant environment in Istanbul. EEG (Electroencephalography) and GSR (Galvanic Skin Response) devices were used along with observations as data collection methods. EEG and GSR devices are neuroimaging tools that are widely used in neuromarketing studies to understand consumer behavior. The EEG device is the recording of electrical changes that occur spontaneously during the activities of the brain or that develop due to a stimulus, through electrodes. The GSR device, on the other hand, is a test for measuring the effect of emotional stimulation on the skin. In studies using neuroimaging tools, a sample size of 30 is considered to be sufficient (Sands, 2009; Bercea, 2012). A predetermined main course (meat, garnish, and rice) and a beverage were served to all participants. Participants were divided into 3 groups of 10 people. Group 1 (control group) ate the food served in the absence of music. Group 2 ate in the condition of music playing at a fast-tempo, and Group 3 in the condition of music playing at a slow-tempo. Based on previous researches in determining the tempo of the music, 72 bpm (beats per minute) was used for slow-tempo and 94 bpm was used for fast-tempo condition as a reference (Milliman, 1986; Caldwell & Hibbert, 2002) and Audacity 2.0 software was used to determine the tempo of the music used. "Little Walter Rides Again" by Medeski Scofield Martin & Wood was chosen for the fast-tempo condition and "Blue and Sentimental" by Oscar Peterson was chosen for the slow-tempo condition. In order to prevent the lyrics from having any effect on the participants, instrumental pieces were chosen.

Each participant ate alone and with their backs turned against other customers in a section reserved for the experiment, which was included in the atmosphere of the restaurant but where they were prevented from interacting with other customers. In this way, it was aimed to prevent the study from being affected by other customers and any

other situation in the restaurant. Before the experiment, the music to be used in the study was saved to the music system of the restaurant, and during the experiment, adjustments were made at the same volume under fast and slow tempo conditions, and a person was assigned to stand by the system in order to intervene in a possible problem. The same music has been played until the participants' meal was finished. In the calculation of the mealtime, the starting point was the serving of the meal to the table, and the endpoint was the participant's stopping of eating.

Primarily, a pilot study was conducted with 6 people in the business where the research would be conducted. 3 of the participants were male and the 3 others were female. After the participants were informed about the study, they were taken to the area where the study would be conducted. EEG and GSR devices, which were to be used in the study, were fitted to the participants, and their comfort levels were asked. After making sure that they did not feel any physical discomfort, the necessary calibration procedures were carried out. The researcher observed the mealtimes of the participants during the experiment and took notes. Since no problems were detected in the pilot study, the actual study was started.

Results

In order to examine whether the music in the restaurant has an effect on the eating times of the participants, a one-way analysis of variance (One- Way ANOVA) was carried out on the eating times of the participants who ate in three different musical environments (no-music, slow-tempo music, fast-tempo music). Analysis of variance results has shown that the background music had no significant effect on participants' eating times, $F_{(2,29)} = .72$, $p > .05$, $\eta p2 = .05$. Participants in the slow-tempo music group (Avg = 386.00, SS = 135.74), participants in the fast-tempo music group (Avg = 357.90, SS = 88.76), and participants in the no-music control group (Avg = 323.40, SS = 120.25) completed their meals in similar times. In other words, the tempo of the background music did not significantly affect the participants' eating times.

Table 1. Eating time according to the music conditions
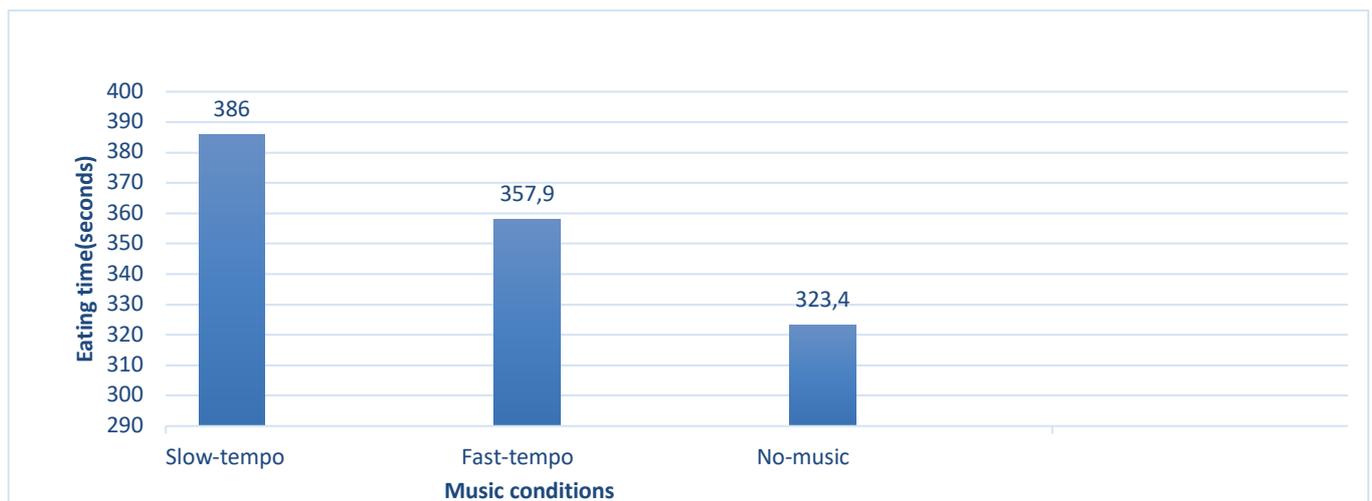
In order to determine the emotional engagement, attention, memory, and cognitive load levels of the participants, the data obtained from the EEG and GSR devices were analyzed and visualized with a commercial software (Smartlook Analytics, 2019). As a result of the analysis, the emotional engagement, attention, memory, and cognitive load scores of the participants in the no-music, fast-tempo music, and slow-tempo music conditions are shown in Table 2.

Table 2. Neurometric parameter measures of the participants according to the music conditions.
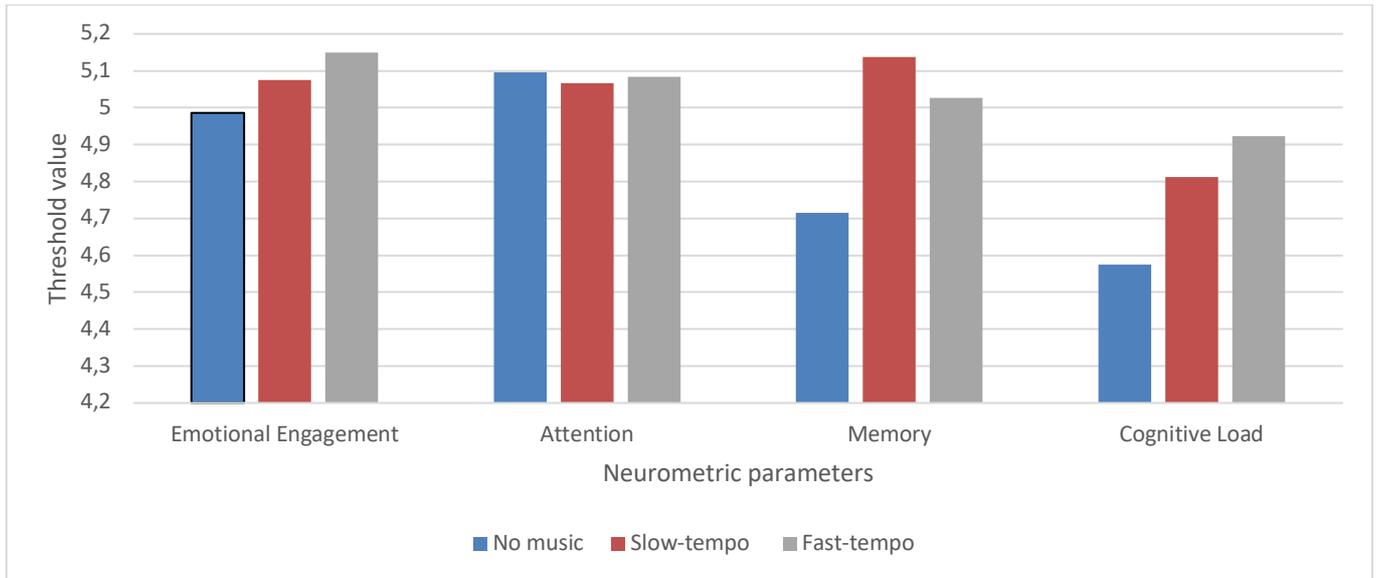
Considering the parameter scores, no significant difference apart from the software threshold score of 5 was observed in any parameters.

Discussion

In this study, although the researcher's expectation was a longer eating time in the slow-tempo condition compared to the fast-tempo and no-music conditions, the results of the experiment have shown that there was no significant difference in terms of eating times in all three conditions. In this way, this study differs from the results found in certain studies in the literature that measure the tempo of the music and the eating time and length of stay in the restaurant. For example, Roballey et al. (1985) observed that the number of bites per minute increases at fast-tempo music, and thus the tempo of the music affects the eating time. Although the number of bites per minute was not measured in this study, no significant difference was observed in the total eating time. In the research of Milliman (1986), who is one of the pioneers of this subject, it has been stated that the time of finishing the meals and staying in the restaurant is prolonged under slow tempo music conditions. However, in the current study, the total staying time was not calculated, although the staying time was also not interfered with since the participants ate a certain menu. Nevertheless, when evaluated in terms of finishing the meal, the effect of the slow-tempo music condition was not observed. In the study of McElrea & Standing (1992), it was determined that soft drinks were consumed faster in the fast-tempo condition, but it is not possible to make a comparison in this study, since there was no control condition without music. Research conducted by Mathiesen, Mielby, Byrne, & Wang (2020) suggests that the slow-tempo condition (45 bpm) differs significantly from the fast-tempo condition (180 bpm) on eating time. However, in this study, a comparison is not considered a sensible option because there was no control condition without music and the bpm values were different from the current study. The above-mentioned studies show that the tempo is related to the time spent in the restaurant. However, it is controversial whether the tempo or the customers liking the playing music affects the eating time (Mathiesen et al., 2020). In addition, it is seen that some of these studies do not have a control condition without music (McElrea & Standing, 1992). It is unclear whether the no-music condition affected the results. Meanwhile, the results of the meta-analysis of 11 studies conducted by Trompeta et al. (2022) in the fields of tourism and hospitality which were related to the tempo indicated that the tempo does not have a significant effect

on total consumption and length of stay. Although Caldwell & Hibbert (1999; 2002) stated that more time was spent in the restaurant under the slow-tempo music condition, it was not stated whether the participants ate a predetermined meal or made their own selection from the menu. Therefore, the general sitting time was calculated, but the time spent solely on eating was not calculated. In this respect, the two studies differ, however, they are similar to the results of Caldwell & Hibbert (2002) who shared the conclusion that the music preference in restaurants is more important compared to the tempo. In the study of Stafford & Dodd (2013), it has been concluded that music preference is more effective on eating time than tempo. Although music preferences were not examined in this study, the subject of whether music preferences or the tempo of the music affects the eating time emerges as a subject that needs to be investigated further. When the participants' data obtained from neuromarketing tools are interpreted, it is difficult to say that there are significant changes among the parameters for all three conditions. The relatively higher memory score in the slow-tempo music condition could signify that this experience was more likely to be remembered. It is seen that the cognitive loads of the participants increased the least in the condition with no-music and the most in the fast-tempo condition. It can be said that the participants were not exposed to complex stimuli in the no-music condition and did not experience any stress. It is also seen that the attention parameter is slightly higher in the no-music condition compared to other conditions. Increased attention doesn't always indicate that positive emotions are triggered. Attention can also increase with the flow of the music, the words used in the dialogue, their effects, etc. (Neuromarketing Research Report, 2018). In the no-music condition, participants may have been more influenced by external sounds and dialogues. The fact that the emotional engagement level has increased in the fast-tempo condition compared to other conditions can be explained by the increase in emotional bond at the points where brain activation increases (Khushaba et al., 2013).

Conclusions

This study has been aimed to contribute to the evaluation of the subject from the perspective of gastronomy by measuring the effect of musical tempo on the eating time in the restaurant environment. At the same time, it aims to help clarify the contradicting ideas about the effect of musical tempo on eating time in the literature. Although this study provides a different perspective to the literature, it has some limitations. Primarily, the participants in the study ate their meals alone. In order to better evaluate the effect of tempo on eating time, it is considered that it would be appropriate to repeat this study in a situation where the participant is not alone and to re-evaluate the results without the condition of being alone. Secondly, 72 bpm for slow-tempo music condition and 94 bpm for fast-tempo music condition were tested in the study. The effect of tempo on participants' eating times can be examined in slower and faster tempo conditions. In this way, which tempo level is the most suitable range for businesses can be understood. In addition, a predetermined menu was given to the participants by the researcher. The effect of the tempo on the eating time of the participants on the foods they independently choose is another subject that can be studied. The effect of the relationship between music preferences and musical tempo on eating times may be the subject of another study.

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