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Research report

Background music genre can modulate flavor pleasantness and overall impression of food stimuli ☆

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ABSTRACT

This study aimed to determine whether background music genre can alter food perception and acceptance, but also to determine how the effect of background music can vary as a function of type of food (emotional versus non-emotional foods) and source of music performer (single versus multiple performers). The music piece was edited into four genres: classical, jazz, hip-hop, and rock, by either a single or multiple performers. Following consumption of emotional (milk chocolate) or non-emotional food (bell peppers) with the four musical stimuli, participants were asked to rate sensory perception and impression of food stimuli. Participants liked food stimuli significantly more while listening to the jazz stimulus than the hip-hop stimulus. Further, the influence of background music on overall impression was present in the emotional food, but not in the non-emotional food. In addition, flavor pleasantness and overall impression of food stimuli differed between music genres arranged by a single performer, but not between those by multiple performers. In conclusion, our findings demonstrate that music genre can alter flavor pleasantness and overall impression of food stimuli. Furthermore, the influence of music genre on food acceptance varies as a function of the type of served food and the source of music performer.

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Introduction

Think about the last time you stepped foot in a restaurant or bar. Do you remember what type of background sounds filled the atmosphere? It is apparent that people often consume foods and beverages in the presence of background sound, in addition to sounds produced by mastication or drinking. Nevertheless, little attention has been paid to the influence of background sound on sensory perception and acceptance of foods.

The Mehrabian–Russel (MR) model (Mehrabian & Russel, 1974) proposes that individuals respond emotionally to environmental stimuli such as background music, leading to an approach–avoidance behavior to the stimuli. Approach behaviors include a willingness to move towards, stay in, perform well in, and return to the environmental stimuli, whereas avoidance behaviors are opposing (Donovan & Rossiter, 1982). In service environments, approach–avoidance behaviors are also seen in spending behavior, shopping time, and evaluations of environment and service experience (Donovan & Rossiter, 1982; Herrington & Capella, 1996). In fact, previous research has shown that background sounds, whether it is music or noise, affect what is consumed or purchased (Areni & Kim, 1993; North, Hargreaves, & McKendrick, 1997), the amount consumed (Caldwell & Hibbert, 1999; Gueguen, Le Guellec, & Jacob, 2004), the consumption rate (Milliman, 1986), the dollar amount spent (Jacob, 2006; Milliman, 1986), and the sensory perception and pleasantness (Seo, Gudziol, Hähner, & Hummel, 2011; Seo & Hummel, 2011; Seo, Hähner, Gudziol, Scheibe, & Hummel, 2012; Seo, Lohse, Luckett, & Hummel, 2014; Spence, Shankar, & Blumenthal, 2009; Stafford, Fernandes, & Agobiani, 2012; Woods et al., 2011; for reviews see Spence, 2012; Spence & Shankar, 2010). For example, it has been shown that fast tempo sounds cause consumers to eat at a faster rate (i.e., more bites per minute) than slow tempo sounds (Milliman, 1986). Fast tempo music also leads patrons to spend more money in a restaurant than slow tempo music (Caldwell & Hibbert, 2002). In addition, loud noises decrease perceived intensities of taste stimuli in foods when compared to quiet noises (Woods et al., 2011; but also see Stafford et al., 2012).

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Altogether, previous studies highlight the impacts of specific musical components such as tempo, pitch, timbre, loudness, and complexity on consumers' eating and shopping behavior.

The current study focuses on the impact of music genre on food perception and acceptance. Due to ambiguous boundaries there has not been universal consensus on a definition for music "genre" (Scaringella, Zola, & Mlynek, 2006), but it can be characterized as "a style or category of art" (Oxford University Press, 2008). Given that musical components such as pitch, tempo, timbre, and complexity are different between music genres, we would expect that musically evoked emotions vary between music genres. In fact, fast tempo and major mode elicit happiness, whereas slow tempo and minor mode induce sadness (Peretz, Gagnon, & Bouchard, 1998). Further, Rentfrow and Gosling (2003) classified 14 different genres of music into four dimensions. For example, the "reflective and complex" dimension included blues, classical, jazz, and folk music pieces and the "intense and rebellious" dimension contained rock, alternative, and heavy metal pieces. In addition, country, sound tracks, religious, and pop music pieces were placed into the "upbeat and conventional" dimension, whereas rap/hip-hop, soul/funk, and electronica/dance music pieces were attributed to the "energetic and rhythmic" dimension. Similarly, Zentner, Grandjean, and Scherer (2008) demonstrated that classical and jazz music listeners commonly experience the "complex/reflective" emotion (e.g., tender longing, amazement, spirituality, and peaceful), whereas techno and Latin American music listeners often experience the "energetic" emotion (e.g., activation). In addition, the "rebellious" emotion (e.g., revolt and anger) was more common in the listeners of pop/rock music. Likewise, the variations between genres in the music-elicited emotions may lead to an approach–avoidance behavior (Mehrabian & Russel, 1974), resulting in the difference in food perception and acceptance between genres of background music. In fact, it has been reported that emotions affect sensory perception, pleasantness, and food choice (Gibson, 2006; Nakagawa, Mizuma, & Inui, 1996; Pollatos et al., 2007; Seo & Hummel, 2011). For example, in an unpleasant emotional state, odor stimuli are perceived less pleasant and/or more intense (Pollatos et al., 2007; Seo & Hummel, 2011). Therefore, combining the evidence that (1) music-elicited emotions are different between music genres (Rentfrow & Gosling, 2003; Zentner et al., 2008) and (2) emotions affect sensory perception, pleasantness, and food choice (Gibson, 2006; Nakagawa et al., 1996; Pollatos et al., 2007; Seo & Hummel, 2011), the present study was designed to examine effects of music genre on sensory perception and impression for food stimuli by presenting four music genres: classical, jazz, hip-hop, and rock. Based on previous findings of musically evoked emotions (Rentfrow & Gosling, 2003; Zentner et al., 2008), the four music genres used in the current study can be grouped into three groups: (1) classical and jazz stimuli, (2) hip-hop stimulus, and (3) rock stimulus. Therefore, it would be expected that three music groups elicit different emotions, leading to variation in sensory perception and impression for food stimuli.

People tend to consume sweet and fatty foods to alleviate stress (Gibson, 2006). Also, emotional eating shows a significant correlation with the consumption of energy dense and sweet foods, but not with the consumption of vegetables and fruits (Konttinen, Männistö, Sarlio-Lähteenkorva, Silventoinen, & Haukkala, 2010). These findings mean that certain foods (e.g., "emotional foods") seem more suitable to mediate emotions. Therefore, an additional aim was to answer how the effect of background music on sensory perception and impression can vary between emotional and non-emotional foods. On the basis of the two ideas: (1) music-elicited emotions play an important role in modulating the effect of music genre on food perception and acceptance and (2) sensory perception and liking for certain foods such as chocolate are more influenced by emotional status, we hypothesized that the impact of music genre on sensory perception and impression for food stimuli would be more pronounced in emotional foods such as chocolate than in non-emotional foods such as bell peppers.

Even though two different playlists perform an identical music piece, listeners often show different emotional responses to their performances. In addition, music pieces arranged by two different editors do not elicit the same emotion although both music pieces are placed into an identical genre of music. In fact, earlier studies have illustrated that identical music pieces can be altered through editing mechanisms, which may lead to differences in musically evoked emotion (Hailstone et al., 2009; Livingstone, Muhlberger, Brown, & Thompson, 2010). To focus on the influence of music genre on food perception and acceptance, four music genres were transformed from a traditional music piece ("Air on the G string"), lessening potential influences of music familiarity and preference (Davies, 1991; Fontaine & Schwalm, 1979; Gorn, 1982; Russell, 1987). In addition, the four music genres were edited and played by either a single or multiple music performers, allowing us to determine whether the effect of music genre on sensory perception and impression for food stimuli can be dynamic as a function of source of music performer (i.e., single performer versus multiple performers). Music pieces arranged by multiple performers could be considered to have complex musical textures and harmonies, which may reduce variations between music genres in the music-elicited emotion. Therefore, it would be expected that the difference in sensory perception and impression for food stimuli is more obvious among four music genres arranged by a single performer than among those arranged by multiple performers.

As mentioned above, the overall purpose of this study is to determine whether background music genres can influence sensory perception and impression for foods consumed simultaneously, in addition to determining the influences as a function of type of food (i.e., emotional versus non-emotional foods) and source of music performer (i.e., a single versus multiple performers). Currently, atmospheric characteristics such as background music commonly go overlooked and underappreciated. This study will provide foodservice professionals and business owners with valuable and concise explanations as to how their consumers will behave in a given background music filled environment.

Materials and methods

This study was conducted according to the Declaration of Helsinki for studies on human subjects. The protocol was approved by the University Institutional Review Board of the University of Arkansas (Fayetteville, AR).

Participants

A total of 99 healthy volunteers (46 males and 53 females) with an age range from 18 to 30 years [mean age ± standard deviation (SD) = 21 ± 3 years] took part in this experiment. In this study, Western musical pieces (see below) were presented to all participants. To control participants' familiarity with the music samples, only North American people (90 Caucasian, 5 Hispanic, 3 African-American, and 1 American-Indian) were considered for this study. Prior to the experiment, all participants reported no clinical history of major diseases including diabetes, cancer, cardiovascular diseases, and renal diseases. They also reported no smelling, tasting, or hearing impairments. All participants proved to have no impairments in gustatory and auditory function based on results of the following tests: "taste spray" test (Burghart Instruments, Wedel, Germany; for details see Vennemann, Hummel, & Berger, 2008) and "tuning fork" test (Doyle, Anderson, & Pijl, 1984), respectively.

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