Music, emotions and first impression perceptions of a healthcare institutions' quality: An experimental investigation

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MUSIC, EMOTIONS AND FIRST IMPRESSION PERCEPTIONS OF A HEALTHCARE INSTITUTIONS' QUALITY: AN EXPERIMENTAL INVESTIGATION

Abstract

One of the direct ways of influencing emotions and service quality perceptions is by music stimulation. The purpose of this research is to examine the impact of music of different musical elements (i.e. sad vs. happy music) on respondents' emotions and their first impression perceptions of a healthcare institution's quality. The research was designed as an experimental simulation, i.e. data were collected in an online survey from respondents randomly assigned to evaluate a presentation consisting of multiple images of a healthcare institution in one of three experimental conditions (absence of, happy, and sad music stimulation). The results, in alliance with previous research, demonstrate a relationship between emotions and first impression quality perceptions and between music and emotions, but no relationship between music and first impression quality perception. The obtained significant results yet again emphasize the importance of inducing positive customer emotions as they lead to positive first impression service quality evaluations that subsequently provide appreciated returns. They also stress the importance of carefully choosing music when inducing emotions as music with different musical elements results in different emotional states. One of the limitations of this research is the non-real life situation experimental setting, which is to be overcome in future research.

Keywords: Music, healthcare institutions, servqual, first impression, pleasure, arousal

1. Introduction

The healthcare institutions' market witnesses many changes. The number of private clinics rises, the amount of public finance decreases, and the need for healthcare treatments of the ageing population increases. All of these changes push public healthcare institutions towards adopting a market orientation, just like their private counterparts. One of the main goals of the market orientation adoption is to increase the perceived quality of clients. According to Ozretić Došen and Bilić (2009), traditionally, healthcare institutions were focused on the volume of their business as well as their service and reputation, but nowadays they have to understand their purpose, environment, customer and competitors. This paper's goal it to investigate whether music related changes in the physical environment of a healthcare institution lead to changes in its first impression quality perceptions.

Previous research which investigated perception of healthcare service quality, mainly focused on the difference in the perception of service quality in private and public institutions (Camilleri, O'Callaghan, 1998; Tolga, Jiju, 2006; Angelopoulou et al., 1998); or generally on the influence of the physical environment on perceived quality of healthcare institutions (Duggirala et al., 2006; Carman, 2000; Gotlieb 2000). Lately, music has been studied in the context of the healthcare institutions as well, but mainly as a therapeutic aid (Garza-Villarreal et al., 2014; Short et al., 2013, Sacks, 2012), a stimulus to improve emotions (Gotell et al., 2009; Mogosa et al., 2013) and a stimulus to improve perception of provided care (Mogosa et al., 2013).

The presented scarce research on how music influences emotions and the perceived quality of healthcare institutions mainly focused on the positive effects of music, but left unexplored whether sad as opposed to happy music influences emotions and how those evoked emotions (either sad or happy) further affect the quality perceptions of a healthcare institution. Therefore, the contribution of the present research is in exploring whether certain types of music (with its particular musical elements i.e. mode, tempo, pitch, rhythm, harmony, volume) can result in positive or negative emotions and consequently increase, but also decrease perceptions of a healthcare institution's quality. Furthermore, unlike previous research, this research approaches perception of the healthcare institution's quality from the first impression perspective. In other words, it does not investigate the influence of music on the quality evaluation upon a medical treatment completion, when evaluation is mainly based on the received treatment, but rather before a medical treatment, when the evaluation is based on available proxy cues (like the physical environment). Understanding the relationships among music, emotions and quality perceptions within the first impression context is important for public healthcare institutions in general, but especially related to the diagnostics services they offer. Since the market for these services is becoming increasingly competitive and for these types of services patients easily switch among service providers, first impression quality perceptions play an important role in keeping current and attracting new patients.

To reach the goal of this research, an experimental simulation will be conducted in which respondents will evaluate multiple images of a public healthcare institution in an online survey in one of the three experimental conditions (absence of, positive and negative music stimulus). The remainder of the paper presents the literature review, hypothetical model, research methods, results, discussion and conclusions.

2. Literature review

Previous research which investigated the perception of healthcare service quality, mainly focused on the difference in the perception of service quality in private and public institutions. So, for example, Tolga and Jiju (2006) got results showing that users of private healthcare institutions express higher satisfaction with service quality than users of public ones. However, Camilleri and O'Callaghan (1998) showed that private hospitals are associated with higher expectations of the service quality than public ones, but an evaluation of provided service quality in public hospitals exceeded patients' expectations by a wider margin than in private ones. Although, one may argue that low expectations (at public hospitals) are naturally easy to surpass, it is not the absolute evaluation that matters the most in building a relationship with customers. The relative evaluation expressed as the difference between expectations and evaluations (i.e. satisfaction) is what service providers strive for and therefore the results of Camilleri and O'Callaghan (1998) show that public healthcare institutions in a certain way still possess an advantage in the healthcare market.

There is also a line of research that investigates an influence of the physical environment on the perceived quality of healthcare institutions. Duggirala et al. (2006) identify infrastructure, i.e. the physical environment as an important dimension of patient-perceived total service quality in the healthcare sector. Similarly, Carman (2000) asserts that although users evaluate the technical dimensions of healthcare such as physician care, nursing care and medical outcome as more important than the affective dimensions such as accommodation, food and discharge procedure, all affective dimensions, and especially accommodation, have a rather important contribution to overall evaluation of the service quality across contexts. Furthermore, Gotlieb (2000) studied the influence of the physical environment, people and service processes on the evaluation of a healthcare service. The results suggest that the physical environment and people affect the perceived healthcare institution quality directly, while service processes only indirectly through people. Although slightly different, still related research is that by Ramkumar et al. (2011) who investigated the influence of the physical environment of healthcare institutions on healthcare institution perception among nurses and found that the physical environment has a positive effect on their perception of healthcare quality. Since nurses convey their attitudes and perceptions to patients in direct contact with them, this finding is important for shedding light on the patient's perceptions of quality as well.

One of the elements of the physical environment is music (Mohan et al., 2013; Reimer and Kuehn, 2005; Harris, Ezeh, 2008; Daunt, Harris, 2012). Music is used in marketing to prolong customer stay within the premises and improve their opinions of stores and products (Gavin, 2012). If a premise in which customer contact occurs does not play music or plays randomly a selected radio station, it probably loses customers and sales (Dooley, 2012, 45).

Music has been studied in the context of healthcare institutions as well, but mainly as a therapeutic aid. For example, Garza-Villarreal et al. (2014) discovered that patients with muscle pain (fibromyalgia) who listen to a relaxing, pleasant, self-chosen music experienced a reduction in pain. Similarly, Short et al. (2013) showed that music therapy can be used to access and understand the internal recovery processes among patients in cardiovascular post-surgery rehabilitation. Furthermore, Sacks (2012) advocates the use of music for therapeutic purposes in diseases such as schizophrenia, Alzheimer's and Parkinson's. Music also becomes a necessary part of the creative environment within healthcare institutions for mentally disabled patients of different age groups (David, 1994). All the positive effects of music in healthcare institutions have resulted in many charity programs such as Music in Hospitals organized to promote the importance of using music for improving quality of life for adults and children with all types of diseases and disabilities (Music in Hospitals, 2014).

Finally, previous research also examined the influence of music on emotions in healthcare institutions. Gotell et al. (2009), for example, proved that the presence of background music and a caretaker's singing improve the mutual communication between a patient and the caretaker, foster positive emotions and a sense of vitality, and reduce aggression in patients with severe dementia. Mogosa et al. (2013) proved in an experiment that 63% of the changes in emotional states were caused by music. They further indicate that music affected the perception of the provided care in a healthcare institution and that 10% of the variance in care perception is caused by music.

3. Hypothetical model

When studying the relationship between music and first impression quality perceptions as the most relevant and intriguing relationship in this research, emotions need to be introduced into the equation as they play a crucial mediating role and help explain their relationship between the two utmost concepts of the model. As a mental and physiological state, emotions are associated with a wide range of feelings, thoughts and patterns of behaviour (Li, Lu, 2009) that assist decision-making and danger avoidance. The importance of emotions in marketing was already emphasized in the 80's by Light (American Marketing Association, 1980), who believed that marketing researchers must begin counting feelings, and not customers. Emotions are important in marketing because they impact judgments and decisions (Williams, 2014; Han et al., 2014), evaluations, (Williams, 2014), and brand attachments (Dunn and Hoegg, 2014). Moreover, emotions play an important role in advertising because an emotional advertising appeal leads to a higher purchase intention in an experienced service condition (Zhang et. al., 2014). Accordingly, emotions help differentiate services better than their

functional characteristics (Barren, Sanchez, 2009; Pavlek, 2008: 199). Both functional and emotional values arise as the result of simultaneous work of all the senses in charge of environmental stimuli intake during the service providing experience and together contribute to customer perception of the service quality. Sensing and perceiving are complex and intertwined processes that take place in a continuum process of consumer behaviour. Perceptions of the same stimuli vary among individuals (Kotler, Keller, 2007: 187) however marketers try to model perceptions to achieve the desired ones. Previous research of the relationships among musical stimulation, emotions and first impression quality perceptions will be further elaborated in the sections below.

3.1 Influence of music on emotions

Music occupies an important and central place in every culture. To a large extent unconscious, structured understanding of music is accompanied with often, immediate, intense and profound emotional responses to music (Sacks, 2012), which create a mood that can equally cause joy and sorrow. Music also has an important role in creating an atmosphere which again influences emotions (Lindstrom, 2009). In essence, music is emotional and intellectual (Sacks, 2012: 269), as well as powerful to the extent that even low-budget movies, when enriched with music, influence emotions (Damasio, 2005). It is thus often perceived as a language of emotions (Altenmülleru et al., 2002).

However, Peretz (2001) emphasizes that there is not just one unique emotional system that is responsible for all emotional reactions to music. To understand the influence of music on emotions, it is necessary to understand the physiological changes music induces during listening. In an interesting research conducted by Roy et al. (2009) the influence of pleasant and unpleasant music on the eye blink reflex was observed and linked to physical responses. Unpleasant music generated enhanced eyebrow muscle activity, decreased skin conductivity and reflex eye blinking of greater amplitude and shorter latency in comparison to pleasant music, showing reactive activation of the defensive emotion system. Likewise, the influence of music on physiological changes was also investigated by Koelsch (2005). The research was undertaken using functional brain imaging and lesion study and suggested music generated neural activation in almost all limbic and paralimbic brain structures. Finally, Nauert (2010) found that pianists arouse emotions in musically experienced respondents which is reflected in activation of the emotion and reward centres of the brain.

A whole range of studies further investigated a difference between music stimulated activation of the left and the right brain hemispheres. Flores-Gutiérrez et al. (2007) approached the research investigating the influence of music (pleasant and unpleasant) on emotions using fMRI and EEG. Both methods of visualizing brain activity identified the left cognitive areas as the ones mainly related to pleasant (positive) emotions, while the right cognitive areas related to unpleasant (negative) emotions. Along these lines, Altenmüller et al. (2002) found that within each musical genre, when listening to "positive" music, respondents showed increased activity in the left temporal lobe; while when listening to "negative" music of the same genre, respondents showed increased activity in the right temporal lobe. Gagnon and Peretz (2000) discovered that a non-affective task (evaluating correctness of tonal vs. atonal music) elicit essentially no difference in brain response by respondents listening to either type of music, while an affective task (evaluating the pleasantness of tonal vs. atonal music) induced different brain reactions depending on whether pleasant or non-pleasant music was played. The pleasant responses were mainly captured as the left brain hemisphere reaction, while the unpleasant as the right hemisphere reaction, giving yet another proof that the left hemisphere is biased toward positive emotions and the right towards negative ones.

Although research indicates that music evokes emotion, it also stresses the importance of choosing the right music for the right audience. Research conducted by Sweeney and Wyber (2002) indicates that liking of a music has a major effect on consumers' evaluations of pleasure and arousal, while music characteristics (specifically slow pop or fast classical) have an additional effect on pleasure. Similarly, Gowensmith and Bloom (1997) have researched the influence of heavy metal music on the emotional state of aggression. Their results show that heavy metal music did not arouse anger emotions among the respondents who usually listen to heavy metal music, but did so among other respondents. Furthermore, Vieillard and Bigand (2014) showed that older adults have weaker emotional activation to threatening music (they are more willing

or capable to ignore it) and a higher level of liking of happy music (they are more ready to indulge in it) than younger adults.

In the context of healthcare institutions, the influence of music on emotions was researched only by Mogosa et al. (2013), who found that 63% of the change in emotions among patients was caused by music.

Evaluation of music in terms of whether it induces positive or negative emotions can be assessed by considering the elements of music that are objective and measurable parts of musical expression. According to Čuić Tanković and Alerić (2011), the following elements can be distinguished:

1) Mode - linking a series of notes or chords around a central tonality;
2) Tempo - the speed of performing a musical piece;
3) Pitch - the frequency of vibration of a particular source of a sound;
4) Rhythm - a relation between tones with regard to the length and the variety of accent;
5) Harmony - linking disparate elements into a concordant whole;
6) Volume - depends on the amplitude of oscillation, pitch and timbre.

Table 1 Musical elements combined with different emotional states

MUSICAL ELEMENT	EMOTIONAL EXPRESSION								
	Serious	Sad	Sentimental	Serene	Humorous	Happy	Exciting	Majestic	Frightening
Mode	Minor	**Minor**	Major	**Major**	**Major**	**Major**	**Major**	Major	Minor
Tempo	**Slow**	**Slow**	**Slow**	**Slow**	**Fast**	**Fast**	Fast	Medium	Slow/ **Fast**
Pitch	**Low**	Low	**Medium**	Medium	High	**High**	Medium/ **High**	Medium	Low
Rhythm	**Firm**	**Firm**	Flowing	Flowing	Flowing / **Firm**	Flowing	**Uneven**	**Firm**	**Uneven**
Harmony	**Consonant**	Dissonant	**Consonant**	**Consonant**	Consonant	**Consonant**	Dissonant	Dissonant/ **Consonant**	**Dissonant**
Volume	Medium	Soft	Soft	**Soft**	**Medium**	Medium	**Loud**	**Loud**	**Varied**

Source: Table composed by the authors based on Bruner, (1990) and Čuić Tanković and Alerić (2011)

Several studies researched the key music elements in arousing certain emotional states among respondents (Webster, Weir, 2005; Williamson, 2013; Nauert, 2010; Bruner, 1990; Čuić Tanković, Alerić, 2011). During the research of emotional reaction and musical elements, Webster and Weir (2005) have found that respondents associated major mode, non-harmonized melodies and fast tempo with happier music, while minor mode, harmonized melodies and slow tempo with sadder music. Williamson's (2013) results in accordance, also revealed that the major key evokes the emotion of happiness most of the time (when the other musical elements are kept constant), while the minor key evokes the emotion of sadness (although sometimes it can evoke emotion of happiness, even when one person does not understand the lyrics of songs because of the many musical elements that impact whether the music will be "happy" or "sad", e.g. different tempo, rhythm, timbres, etc.). Along these lines, although Kawakami et al. (2013) found that sad music usually and mainly evokes sad emotions, the felt emotion during listening to sad music is often ambivalent and results in less tragic experienced feeling and more romantic experienced feelings than initially expected.

The most comprehensive overview of the different musical elements that stimulate a certain emotional state was given by Bruner (1990) as shown in Table 1. Taking as a starting point the analysis by Bruner (1990), Čuić Tanković and Alerić (2011) conducted a research and defined tempo, rhythm and harmony as musical elements with generally the highest impact on emotional states. In Table 1 elements that

according to them have the most pronounced influence are underlined and bolded; those with mediocre influence are only bolded; while those with a small influence remained unmarked. The fields with two characteristics are those on which the two studies have not come to an agreement (the first characteristic is that by Bruner (1990), and the second by Čuić Tanković and Alerić (2011)).

Considering the above mentioned, the first hypothesis of this paper is:

H_1: Music of different musical elements in the context of a healthcare institution evaluation evokes different emotions.

3.2. Influence of emotions on first impression quality perceptions

Perceptions are often more important than reality because they express attitudes and opinions of customers and have a stronger impact on their behaviour (Ozretić Došen, 2002: 65). Customers frequently reach conclusions based on the first impression within 90 seconds (Singh, 2006) and only few stimuli (Foxall et al., 2007: 53). This is because they are less rational in decision making than traditional economics assumes (Ariely, 2009: 190). According to Grbac and Lončarić (2010, 102-104), perception consists of three phases: sensing (through sight, hearing, smell, taste and touch), perceptual organization (of stimuli into a meaningful whole) and perceptual interpretation (of the meaningful whole based on previous knowledge, memories, expectations, attitudes, motives, emotions, personalities and other experiences).
The influence of emotions on the evaluation of a healthcare institution's quality was previously investigated by Zifko-Baliga and Krampf (1997). They concluded that during a healthcare institution's quality assessment, customers use emotions as a criterion for evaluating the technical quality of the service. Since negative emotional evaluations can jeopardize even the best healthcare institutions' quality, they conclude that emotions cannot be ignored during communication between customers and healthcare institutions. Similarly, Essen and Wikström (2008) discovered that customers in retirement housing care in a Swedish rural community, during an evaluation of the overall service quality, concentrated exclusively on the dimensions of the service that aroused emotional responses, while dimensions of the service which did not arouse any emotional reaction, did not influence the perception of the overall quality of the provided service. Dubé and Menon (1998) got results which indicate that it is important to reduce negative emotions in providing hospital services (e.g. hostility, frustration, depression, excitation, nervousness), while positive emotions should not be especially emphasized as they have only a weak correlation with consumer satisfaction. Edvardsson (2005), similarly, asserts that negative emotions have a stronger effect on perception of service quality than positive ones.
A related stream of research investigates the importance of emotions in creating positive service perception among employees (Slåtten, 2009) who directly influence perceptions of customers (Gotlieb, 2000; Pugh, 2001). Slåtten (2009) and Slåtten (2010) confirmed the assumptions that managerial awards and supports are directly connected with positive (happiness) and negative (frustration) emotions and that employees' feelings of joy and frustration explain more of the variance in employee-perceived service quality than managerial practices like reward and empowerment.
As already stated, previous research did not attempt to investigate how positive emotions change the first impression quality perceptions of healthcare institutions. However since emotions influence quality perceptions in general (Zifko-Baliga, Krampf, 1997; Essen, Wikström, 2008), and since consumers make conclusions regarding many aspects of a service including perceived quality based on the first impressions (Bergeron et al., 2008), we draw an analogy and deduct the second hypothesis:

H2: More positive emotions result in more positive first impression quality perceptions of healthcare institutions.

3.3 Influence of music on first impression quality perceptions

While the previous sections described the relationship between music and emotions, and emotions and quality perceptions, this one presents how music directly influences quality perceptions. There are several reasons why such a direct relationship may exist. According to Ozretić Došen (2002: 118) customers perceive organizations that play music during service delivery as taking more care of them,

while according to Namkung and Jang (2008) music during service delivery makes customers feel comfortable and thus easier to satisfy.

As formerly mentioned, Mogosa et al. (2013) conducted an experiment to test whether music can cause a change in the perception of the provided care in a healthcare institution. They proved that 10% of the change is indeed caused by music. Other research studied the influence of music on the perceived quality, but in contexts other than healthcare. For example, Sweeney and Wyber (2002), in their research found that liking a musical piece itself as well as its characteristics has a major effect on consumers' evaluations of service quality. However, they also stress that music must be adapted to the area in which a specific service is performed and that the same music in different settings can have a completely different effect on consumer perceptions. Along these lines, Magninia and Thelena (2008) have not found a significant impact of classical music on the perception of restaurant service quality.

At this point it must again be stressed that the first impression quality perceptions have previously not been researched in this context. However, taking into account the confirmed relationship between music and the quality perceptions of healthcare institutions in general (Mogosa et al., 2013), the fact that people make up their minds within 90 seconds of their initial interactions with services (Singh, 2006), which is also more than enough time for people to emotionally respond to music stimuli (Mitterschiffthaler et al., 2007; Sacks, 2012), an analogy similar to the one presented before the previous hypothesis, leads to deduction of the final hypothesis:

H_3: Music of different musical elements evokes different first impression quality perceptions of healthcare institutions.

4. Research methods

4.1. Research procedure and stimuli

Research design chosen for this study was experimental simulation, i.e. research data were collected in an online survey using a convenience snowball sample including respondents who were arbitrarily assigned to evaluate a presentation containing multiple images of a public healthcare institution in one of the three experimental conditions (absence of, positive and negative music background). The presentation was composed in windows media player and lasted 70 seconds. After having watched the presentation respondents were instructed to fill in a questionnaire on *Surveymonkey* online research platform. The respondents were older than 25 as this age group represents a major portion of the target audience of the public healthcare institutions.

Prior to conducting the main research, a pilot study followed with certain respondents' feedback interviews and a series of expert consultations. The questionnaire used in the pilot study was much simpler and shorter than the one presented in the main research. This is because the aim of the pilot research was mainly to understand how respondents deal with and perceive the presentation and not to test the well-established but lengthy measurement scales. Several issues were discovered. Firstly, the images presented were "too nice" and were associated by the respondents with a private healthcare institution; therefore, they were replaced with those of a typical public healthcare institution. Secondly, despite clear instructions, some respondents did not turn on the sound while answering the online questionnaire, or were in noisy surroundings, which potentially diminished the influence of the chosen music, while on the other hand, some of those who were instructed to answer the questionnaire with no music stimulation, were exposed to loud sounds sometimes even including the background music of their choice. This challenge was resolved by instructing the respondents not only to turn on the sound on their computers, but also to turn off all other sounds surrounding them as well as by introducing control questions to the questionnaire of whether music could be heard and whether it was a dominant sound. As will be reported in the results of the main study, even with such clear instructions, a noticeable portion of the respondents was not exposed to the intended audio stimulation.

Thirdly, respondents in the pilot phase claimed that they could not estimate certain points of service quality as they were only shown a few images. For that reason, instruction was slightly changed stressing that they are required to give estimates based on their first impression, and the middle point of the scale was relabelled from the usually used format of "neither… nor…" to a label "cannot estimate" giving it a slightly different meaning for respondents but remaining the same from the point of view of the analysis. Fourthly, and finally, two different musical compositions than those used in the main study were used in the pilot study. Musical compositions

used in the pilot study were Strauss's *Blue Danube* and Barber's *Adagio for strings*, both previously used in a similar research by Jeong et al. (2011). However, two issues were noticed to pose problems for respondents: the chosen sequences did not represent harmonious units (with their harmonious beginnings and ends) and *Blue Danube* had a strong association to Christmas and the New Year and was therefore deemed unsuitable for a healthcare institution presentation. For these reasons two new compositions based on the research by Mitterschiffthaler et al. (2007) were chosen. The musical composition identified as "happy" in the literature is Mozart's *Little night music* which is composed in major, contains rather frequent and high pitches, and fast tempo. The musical composition identified as "sad" is Albinoni's *Adagio in sol minor* with a slow tempo and extremely slow, mournful style. To define the exact sequences which represent harmonic units of the chosen compositions, musical experts were consulted. Apart from the music experts, 4 more marketing academics were consulted in order to discuss the overall study design as well as the questionnaire.

4.2 Variable definition

The three main variables of the research are: music, emotions and first impression quality perceptions. Moreover, there were three control variables: clarity of exposure, general evaluation of the previous visits to healthcare institutions, and general level of stress related to visiting healthcare institutions.
Music is a categorical variable with three values; (i) absence of, (ii) happy and (iii) sad music. To analyse emotions, the Mehrabian Rusell model of three emotional states (pleasure, arousal, dominance) was used. Items for these constructs are based on Donovan and Rossiter (1982 citing Mehrabian and Russell, 1974). These three constructs are measured on a 7 point semantic differential, using 6 items each. First impression quality perception was measured by a SERVQUAL originally proposed by Parasuraman et al. (1988), but adopted to healthcare services by Babakus and Mangold (1992). The latter kept all 5 originally defined service quality constructs (tangibles, reliability, responsiveness, assurance and empathy), but reduced the number of items in each, so that altogether 15 items were used to measure service quality. Babakus and Mangold (1992) also turned this scale into a five-point scale because they discovered in their pre-study interviews that it reduces the frustration level of the responding patients which in return increases the response rate and the quality of the responses. Such an approach was accepted in the present research as well. Finally, although SERVQUAL usually measures the difference between expectations and experienced perceptions, the nature of this research required measurement of only the perceived quality upon the first impression experience. A similar approach was used by Dlačić et al. (2013).
Clarity of the exposure is a categorical variable which measures whether the desired sound was heard and whether it was dominant. General evaluation of the previous visits to healthcare institutions and general level of stress related to visiting healthcare institutions were both measured with a single item five point scale.

5. Results

5.1. Case validity analysis

Altogether 143 respondents commenced filling in the questionnaire, but 128 responses were considered valid.

Table 2 Case validity analysis

Clarity of exposure	No music	Happy music	Sad music	Total
1-Desired conditions	29	38	28	95
2-Music could not be heard (but should have been)	-	0	2	2
3-Music could be heard but it was not dominating	-	13	12	25
4-Voices could be heard in the no music stimulus	4	-	-	4
5-Voices including music could be heard in the no music stimulus	2	-	-	2
Total	35	51	42	128

Source: Authors

Other responses were excluded from further analysis because they were incomplete (12) or answers were very incoherent in giving reason to doubt that the questions were read at all (3). Among the 128 cases that were taken for the analysis, there were quite a few not exposed to the desired conditions, that is, the sounds that respondents were primed with were not as they were supposed to be. As Table 2 shows, in a no music stimulus, there were voices present (neither too quiet nor too loud) that in 2 cases even included music; while in the happy and sad stimuli, music could either not be heard or it was not a dominant sound. All of these cases will have to be handled specifically (excluded or controlled for) during the hypotheses testing.

5.2 Constructs validity and reliability

In order to test whether examined emotional states load to three predisposed constructs all items were put into exploratory factor analysis. Principal axis factoring using Oblimin rotation with Kaiser Normalisation yielded three rather clear factors, but with minor cross-loading and communalities of three Arousal items below .4 suggesting their removal (Hair et al., 2006). Cronbach's alpha tests of construct reliability for Arousal also suggested removal of the *jittery...dull* item which demonstrated lowest communality in the factor analysis (.141) and for which corrected item-total correlation was .287 (which is below required minimum of .3). After removal of this item, the factor analysis solution cleared up and Cronbach's alpha for Arousal although significant in the first place (.746), slightly increased to .762 (cf. Hair et al., 2006 for critical levels of reported tests). The other two items with communalities below required minimum (*excited…calm* = .247 and *stimulated…relaxed* = .303) were kept in the analysis because they loaded clearly and their corrected item-total correlations were above the critical level of .3. The final factor analysis solution and Cronbach's alphas are presented in Table 3. These results indicate convergent and divergent validity of the three emotional states constructs.

Table 3 Principal Axis Factoring and Cronbach's alphas for emotional states

Items	Factors		
	Pleasure	Dominance	Arousal
satisfied... unsatisfied	.859		
happy...unhappy	.629	.329	
pleased...annoyed	.903		
contented... melancholic	.724		
hopeful... despairing	.671		
relaxed...bored	.517		
excited...calm			.471
frenzied...sluggish			.600
wide awake... sleepy	.393		.659
aroused... unaroused	.310		.771
stimulated... relaxed			.543
dominant... submissive		.588	
controlling... controlled		.813	
influential... influenced		.717	
in control... cared for		.694	
important...awed		.722	
autonomous... guided		.869	
Cronbach's alpha	.901	.891	.762

Extraction Method: Principal Axis Factoring; Rotation Method: Oblimin with Kaiser Normalization. Items excluded: jittery…dull, (belonging to arousal) Source: Authors

The perceived quality was also measured with a multi-item scale (SERVQUAL). The same procedure was repeated as with emotional states. In this case, both Eigen values higher than one and scree plot inception point criteria (Cattell, 1966) suggest only two factors although SERVQUAL normally displays five factors. The initial two factor solution,

Table 4 Principal Axis Factoring and Cronbach's alphas for perceived quality

Items	Factors	
	Intangibles	Tangibles
Healthcare institution has up-to-date equipment.		.706
Healthcare institution's physical facilities are visually appealing.		.792
Healthcare institution's employees appear neat.		.616
When patients have problems, healthcare institution's employees are sympathetic and reassuring.	.794	
Healthcare institution's employees tell patients exactly when services will be performed.	.641	
Healthcare institution's employees are always willing to help patients.	.839	
Patients feel safe in their interactions with healthcare institution's employees.	.678	
Healthcare institution's employees are knowledgeable.	.815	
Healthcare institution's employees are polite.	.773	
Healthcare institution's employees give patients personal attention.	.890	
Healthcare institution's employees have their patients' best interests at heart.	.905	
Cronbach's alpha	.940	.755

Extraction Method: Principal Axis Factoring; Rotation Method: Oblimin with Kaiser Normalization. Items excluded: Healthcare institution provides its services at the time it promises to do so; Healthcare institution is accurate and tidy with its documentation; It is realistic for patients to expect prompt service from the healthcare institution's employees; Healthcare institution's employees should get adequate support from their employers to do their jobs well.
Source: Authors

however, had three items fully cross-loaded and communality of one lower than .4. According to Costello and Osborne (2005), several factor analyses were conducted (with various number of factors and/or excluding weak items) and one offering the cleanest factors (items loadings above .3; few items cross-loading, no factors with fewer than three items) was retained. The final factor analysis which still obtained only two factors is presented in Table 4 together with Cronbach's alphas that are adequately high. The two new factors are named Tangibles (which includes the three items originally placed in this construct) and Intangibles (which includes all the other items usually distributed among the other four SERVQUAL factors).

It is assumed that the four factors merged into one because they all represent service quality elements that, unlike the Tangible aspects, share for this research a very important common trait of being difficult to evaluate on the first impression basis.

5.3 Hypotheses testing

Firstly, for further analysis, 8 cases were excluded (respondents that could not hear music in a music present stimuli and those who were not supposed to hear music but were exposed to sounds with or without music - in Table 2 those cases are classified as conditions 2, 4 and 5). Further 25 cases in which the desired stimuli were present but not dominant (classified as condition 3 in Table 2), were taken for further analysis, but to be studied cautiously.
To test the first and the third hypotheses, i.e. influence of music on emotions and first impression quality perceptions, five ANOVAs/ANCOVAs were tested with music acting as predictor in both, while emotional states (Pleasure, Arousal or Dominance) or first impression quality perceptions (Tangibles or Intangibles) acting as dependent variable in each. To decide whether to apply ANOVA or ANCOVA, first we had to test whether the scaled control variables (evaluation of the previous visits to healthcare institutions, and general level of stress related to visiting healthcare institutions) should be included in each of the analysis and the first condition is too check

Table 5 Spearman Correlation Matrix

	Tangibles	Intangibles	Arousal	Pleasure	Dominance	Past experience	Stress
Tangibles	1.000						
Intangibles	.455**	1.000					
Arousal	-.177	-.272**	1.000				
Pleasure	-.463**	-.356**	.342**	1.000			
Dominance	-.080	-.093	.237**	.459**	1.000		
Past experience	.099	.163	-.104	-.058	-.128	1.000	
Stress	-.095	-.023	-.011	.251**	.182*	-.282**	1.000

**p<.05; **p<.01*
Source: Authors

whether they correlate to each of the five dependent variables. Since, all control and most dependent variables are not normally distributed according to the Shapiro-Wilk's test, Spearman correlation was used. As Table 5 shows, general level of stress related to healthcare institutions visits is correlated to Pleasure and Dominance. Therefore, ANCOVA will be used for those variables and ANOVA for all others. All the assumptions for ANCOVA (Lund Research, 2013) are met except approximate normality of distribution for Intangibles, Tangibles and Dominance (Shapiro-Wilk's tests report p=.000 for all three variables) at all levels of independent variable. For those variables the between-subject effects had to be tested with a non-parametric alternative to a one-way ANOVA (Corain and Salmaso, 2007), i.e. Kruskal-Wallis test with Mann-Whitney alternative to a post-hoc test and manually performed Bonferroni correction (cf. Homack, 2001).

To proceed with tests for the first and the third hypotheses, 25 cases in which music was present but a non-dominating sound, were first treated as two new stimulus groups, so that there were five groups to be studied each exposed to a different sound stimulus (no music, dominating happy music, dominating sad music, non-dominating happy music and non-dominating sad music). Since the non-dominating groups have less than 20 observations each, the marginal results have to be interpreted with caution. The results of ANCOVA and ANOVA tests are shown in Table 6.

As Table 6 shows, the only significant effect of music on emotions and first impression perceived quality was observed in the Pleasure emotional state in a way that a group which was exposed to dominating sad music felt statistically significantly lower pleasure than the group exposed to non-dominating happy music with a medium effect size (partial η2=.09). Interestingly, the group exposed to dominating happy music did not demonstrate a significant difference from the group exposed to sad music (dominating or not).

Furthermore, not only no difference was found between means of music dominating vs. music non-dominating groups for sad or for happy music across five analyses, but those paired groups (music dominating and music non-dominating) demonstrate high similarity of their means across analyses. This finding indicates that cases exposed to equal music (dominant or not), might be studied together and in that way possibly increase the strength of the results. Before proceeding with that type of analysis, a two-way ANOVA had to be conducted to discover whether clarity of exposure (2) and music stimuli (3) display an interaction effect. Two-way ANOVA discovered no significant interaction effect across five dependent variables, thus the 25 cases exposed to non-dominant stimuli were reallocated to their respective dominant groups so that in the repeated ANOVA/ANCOVA analyses three groups are compared (no music, happy music and sad music).

The results presented in Table 7 are somewhat different than those in Table 6. Most of the effects still remained insignificant. However, although Pleasure remained significant (at p<.1), it disclosed a slightly diminished effect (partial η2=.05), which made it not strong enough to capture significant post-hoc tests between groups applying the Bonferroni correction (a pretty common, although rather conservative approach to post-hoc testing). Opposite to the results shown in Table 6, Arousal now became significant, with a small effect size of partial η2=.05.

Table 6 ANCOVA and ANOVA analyses for five groups

Dependent[1]	Estimated Marginal Means (s.d.)[2,3]					Music stimulus (indep.)			Stress (covar.)	
	1= no music (N=29)	2= dominating happy music (N=38)	3= dominating sad music (N=28)	4= non-dominating happy music (N=13)	5= non-dominating sad music (N=12)	F (1, 120)	Partial η2	Kruskal-Wallis sig.	F (1, 120)	Partial η2
Pleasure	3.90 (.22)	3.53 (.19)	4.13 (.22)$_4$	2.95 (.33)$_3$	3.50 (.34)	2.75 **	0.088		9.40**	0.076
Arousal	4.28 (.18)	3.79 (.15)	3.98 (.18)	3.59 (.26)	4.18 (.27)	1.78				
Dominance	4.89 (.20)	4.48 (.17)	4.91 (.20)	4.43 (.29)	4.58 (.30)	1.15		0.234	3.38*	0.029
Tangibles	3.87 (.16)	4.09 (.14)	3.85 (.16)	4.05 (.23)	3.97 (.24)	0.23		0.814		
Intangibles	3.76 (.15)	4.04 (.13)	3.96 (.15)	4.33 (.23)	4.13 (.24)	1.250		0.333		

*p<.1; **p<.05;*

[1]For Pleasure, Arousal and Dominance lower means represent more positive emotions; For Tangibles and Intangibles higher means represent higher perceived quality.

[2] Estimated Marginal Means represent means when covariate (if present) is kept constant.

[3] The indices behind the brackets indicate which groups are statistically significantly different (Bonferroni post-hoc test).

Source: Authors

Table 7 ANCOVA and ANOVA analyses for three groups

Dependent[1]	Estimated Marginal Means (s.d.)[2,3]			Music stimulus (independent)			Stress (covariate)	
	1= no music (N=29)	2= happy music (N=51)	3= sad music (N=40)	F (1, 120)	Partial η2	Kruskal-Wallis sig.	F (1,120)	Partial η2
Pleasure	3.89 (.22)	3.38 (.17)	3.93 (.19)	3.04*	.050		8.79**	0.070
Arousal	4.28 (.18)2	3.74 (.13)1	4.04 (.15)	3.28**	.053			
Dominance	4.86 (.20)	4.48 (.15)	4.82 (.17)	1.89		.142	3.64*	0.030
Tangibles	3.87 (.17)	4.02 (.13)	3.88 (.14)	.361		.552		
Intangibles	3.76 (.15)	4.11 (.11)	4.01 (.13)	1.700		.161		

**p<.1; **p<.05;*

[1]For Pleasure, Arousal and Dominance lower means represent more positive emotions; For Tangibles and Intangibles higher means represent higher perceived quality.

[2] Estimated Marginal Means represent means when covariate (if present) is kept constant.

[3] The indices behind the brackets indicate which groups are statistically significantly different (Bonferroni post-hoc test).

Source: Authors

In a way that group exposed to happy music shows statistically higher arousal than the group exposed to no music. Sad music did not have an effect. The fact that an insignificant result turned into a significant one, further indicates that whether music is dominant or not, it does not play a difference for consumers as long as they hear it. This result is further important since in a real life situation it will not be possible to produce conditions in which the music will dominate (it will only be background music).

To test the second hypothesis, the Spearman Correlation Matrix in Table 5 is observed. It shows that more positive emotions lead to more positive first impression quality perceptions. From the three

emotional states tested, Pleasure has the strongest correlation to perceived quality. Negative correlation coefficients between emotional states and perceived quality elements should be interpreted as positive correlations since lower levels of Pleasure, Arousal and Dominance indicate more positive emotions, whereas lower levels of Tangibles and Intangibles indicate lower perceived quality. Pleasure is significantly moderately correlated with Tangibles (r=-.463) and Intangibles (r=-.356), Arousal is weakly correlated to Intangibles only (r=-.272), while Dominance has no significant correlation with either Tangibles or Intangibles.

6. Discussion and conclusion

The importance of the physical environment in achieving service differentiation and quality perception is well known in service marketing (Rajh and Ozretić Došen, 2009; Kotler et al., 2006, 637). The element of the physical environment in the focus of this research is music. Although previous research explored the influence of music on customer perceptions in general as well as within a healthcare institution, it did not explore how music influences the first impression quality perceptions of a healthcare institution and neither did it carefully study the difference between happy and sad music on the perceived quality. Therefore, this research set itself the task to explore the identified gaps, i.e. to examine the direct impact of different music stimuli (sad vs. happy) on the respondents' first impression quality perceptions of a healthcare institution as well as the indirect impact mediated by emotions (pleasure, arousal and dominance).

The dominance dimension of emotion is the least significant variable in the model. That is, it is neither influenced by music, nor does it further influence the first impression quality perceptions. According to Fitzgerald Bone and Scholder Ellen (1999), when mood or emotional states are tested, very often they are tested for only Pleasure and Arousal. In this research Dominance was also taken into consideration particularly as it was expected that it might influence the quality perceptions and not necessarily that it would be influenced by the specifically chosen music compositions. The other two elements of emotion (Pleasure and Arousal) were as expected more related to both music and perceived quality, with Pleasure having a stronger influence on the perceived quality whereas Arousal being more influenced by music (in particular happy music), while displaying only a weak correlation to each other.

The results confirmed H2, that is, more positive emotions result in more positive first impression quality perceptions of a healthcare institution. However, it has to be stressed that not only the direction of emotion (positive vs. negative), but also the type of emotion (pleasure, arousal, dominance) is important because not all types of emotions equally influence quality perceptions. A positive relationship between emotions and quality perceptions is in accordance with previous research (Zifko-Baliga and Krampf, 1997; Ladhari and Rigaux-Bricmont, 2013), although the research did not test the first impression context. Such results suggest that managers of healthcare institutions should do their best to stimulate positive feelings of pleasure and arousal among their patients immediately upon their arrival on the premises as patients in positive emotional states develop more positive attitudes towards the healthcare institution. Positive attitudes are important for patients, because they reduce stress normally associated with healthcare institutions, and for healthcare institutions because they promise calmer patients and thus easier contact procedures. Furthermore, the role of positive emotions in achieving better first impression quality perceptions of healthcare institutions is also important from the public finance point of view. That is, enormous public finance is given to public healthcare institutions that are often equipped with superior technology and more competent professionals, and nevertheless perceived as having an inferior quality in comparison to private ones. If arousing positive emotions of patients can help in improving overall quality perceptions of an otherwise unchanged healthcare institution, then making a small extra effort to arouse positive emotions can be a highly effective and efficient investment, especially since governments actively try to define what components of a public service program are most valuable to invest in, so as to increase the service quality and customer satisfaction (Gutiérrez Rodríguez et al., 2009).

Although substantial previous research established a connection between music and emotions (Altenmüller et al., 2002; Čuić Tanković, Alerić, 2011; Bruner, 1990) and some even between music and quality perceptions (Mogosa et al., 2013; Sweeney, Wyber, 2002), the results of this research confirmed the first hypothesis that music of different musical elements in the context of a healthcare institution evaluation evokes different emotions, while they

did not confirm the third hypothesis that music of different musical elements evokes different first impression quality perceptions of healthcare institutions'. The rejection of the third hypothesis leads to the conclusion that the influence of music on quality perceptions is neither simple nor straightforward. The influence of music however is not to be neglected. Music influences certain emotions and through emotions the perceived quality. Managers of healthcare institutions are thus advised to take into account music not only as a therapeutic aid, but also as an aid to increasing positive feelings and positive quality perceptions. However, choosing the right music stimuli is very important since wrongly chosen music will not lead to the desired changes in the mood as the results showed.

There were several limitations related to research design. First of all, research was conducted online and although the primary motive for that was to provide a comfortable responding environment to ensure quality results, it was impossible to control all the experimental conditions. While answering the online questionnaire respondents were probably in different situations (e.g. at work or at home) causing differences in the initial levels of stress. Secondly, a healthcare institution was presented by a set of images rather than in real life. This option was chosen because stimulating negative emotions in a real life healthcare context was considered inappropriate, and also because in a real life situation it would be more difficult to control other environmental conditions like crowding, time of the day and similar. For the later reasons, Broekemier et al. (2008) also avoided using a real life experience and used video in their research. Nevertheless, a simulation of the environment, rather than real life experience might have not been convincing enough for the respondents and might have skewed the results.

For the above explained reasons, future research should be directed towards conducting real-life research at least with positive music and its absence. Finally, manipulating other easily modified elements of the physical environment such as decor or odour to see whether they are more important than music and whether they interact with music is also an interesting further research option.

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Glazba, emocije i percepcije o kvaliteti zdravstvenih institucija temeljene na prvom dojmu: eksperimentalno istraživanje

Sažetak

Jedan od neposrednih načina utjecaja na emocije i percepciju kvalitete usluga je glazbena simulacija. Svrha ovoga istraživanja je istražiti utjecaj glazbe različitih glazbenih elemenata (npr. tužna u odnosu na sretnu glazbu) na emocije ispitanika te njihovu percepciju kvalitete ustanove za zdravstvenu skrb stvorenu na temelju prvoga dojma. Istraživanje je osmišljeno kao eksperimentalna simulacija. Podatci su prikupljeni temeljem online upitnika. Ispitanici su nasumično odabrani kako bi procijenili prezentaciju koja se sastoji od višestrukih slika institucije za zdravstvenu skrb u jednom od tri eksperimentalna uvjeta (izostanak, prisutnost sretne i prisutnost tužne glazbene stimulacije). U skladu s prethodnim istraživanjima, rezultati pokazuju odnos između emocija i na prvom dojmu stvorene percepcije kvalitete te između glazbe i emocija, ali nema odnosa između glazbe i na prvom dojmu stvorene percepcije kvalitete. Dobiveni rezultati naglašavaju važnost poticanja pozitivnih emocija klijenata budući da oni vode pozitivnim, na prvom dojmu stvorenih procjena kvalitete usluge, a koji kasnije pružaju poželjne rezultate. Oni također naglašavaju važnost pažljivog odabira glazbe pri poticanju emocija, jer glazba s različitim glazbenim elementima kao razultat ima različita emocionalna stanja. Jedno od ograničenja ovoga istraživanja je eksperimentalno okruženje koje ne predstavlja situaciju iz stvarnoga života što će biti prevladano u budućemo istraživanju.

Ključne riječi: glazba, ustanove za zdravstvenu skrb, SERVQUAL, prvi dojam, zadovoljstvo, poticanje