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Does music heal? Opera and the mood of people over 50 years of age

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Abstract
The authors of this work, noticing that opera is a combination of music and theater, examined the relationship between listening to opera music and mood changes in people over 50 years of age. The study took the form of a quasi-experiment. Recipients were invited to the previously prepared room, where the audiovisual material – a recording of the opera "La Traviata" – was presented for the first time. This was preceded by the respondents completing the SUPIN C30 and S30 questionnaires and a short survey by the authors. After the presentation of the stimulus, the subjects again filled in the SUPIN S30 questionnaire scale and the GEMS scale. The described procedure was carried out twice, using two different music materials. The procedure remained unchanged, while the audiovisual material changed. The second time, the participants were presented with a recording from the opera "The Barber of Seville". The participants of the study were 30 people. In the studied group, there are no significant changes in emotional states in response to the opera "La Traviata". In turn, the opera "The Barber of Seville" has no effect on a positive emotional state. Instead, it caused a statistically significant change in the level of negative emotional states. The results of this study are largely consistent with the results of other studies examining the relationship between music and mood, but there are also limitations – only two pieces of opera music were used and no control group was included. Research has shown that opera, as a specific musical genre, despite its peculiar form, affects mood and emotions.

Keywords Mood · Opera · Operotherapy · Therapy · Music

Music and its impact on people

The recognition of music in contemporary formal definitions makes it possible, above all, to show its artistic value, although it is considered not only as artwork, but also as part of the civilization's heritage. At the same time, it is a coherent combination of both the sounds of the instruments and the voice, which is sometimes referred to as the unsurpassed, the most perfect of instruments, and the sound of every individual's voice is unique (Johar, 2016). In this study, authors try to answer some of the questions about the relationship between opera music and mood. Is music related to emotional experiences? Can it contribute to a change in mood? There are a number of publications showing the relationship between music and mood (Krahé & Bieneck, 2012; Ferguson & Sheldon, 2013; Garrido & Schubert, 2015a; Shifriss et al., 2020). Although these analyses relate to various genres and styles of music, including classical music, they focus little on opera music. Perhaps this is due to the specifics of opera music, which, being a peculiar combination of theater and music, poses a special challenge for researchers.

Music not only plays an important role in the sphere of culture, but, as shown by research, also affects the human body, especially the functioning of the circulatory and respiratory systems. Listening to cheerful music leads to an increase in the heart rate, and when listening to sad passages a lower heart rate and reduced respiratory rate are shown (Bartlett, 1996). The development of modern technologies as well as the wide interest of researchers have also shown the relationship between music and the release of

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neurotransmitters. Schellenberg (2003), using neuroimaging while listening to music by Mozart, which is an example of classical music, showed increased secretion of dopamine. This is particularly important because it is a neurotransmitter whose reduction is observed, among others, in the event of drug withdrawal (Kostowski & Herman, 2006). The fact that music is not without significance for the human brain has also been shown in studies by Peeters et al. (Peeters et al., 2006). It was revealed then that songs that are perceived as unpleasant stimulate the subcortical structures of the amygdala, and their action is similar to that of drugs. A few years later, it was confirmed that music that is subjectively considered to be pleasant stimulates the reward centre, and music considered unpleasant activates the punishment centre (Goryńska et al., 2011). Taking into account the location of the stimulation of the cortical areas, it can be indicated that pleasant music activates the left frontal lobe most, while unpleasant contributes to global activation, but the dominance of the right hemisphere is visible here (Altenmüller et al., 2002). The last 20 years of research on the effectiveness of musical interventions in the face of cognitive, motor and even verbal changes and deficits that appear as a consequence of stroke have produced promising results (Sihvonen et al., 2017).

Research suggests that listening to sad songs can evoke a sense of romanticism (romantic) and, contrary to expectations, reduce malaise (tragic) (Kawakami et al., 2013). Most people, while listening to music, feel relaxed, and experience a general sense of joy, amusement or dreams. Negative feelings, such as anxiety, aggression, regret or anger, appear only to a small extent (Zentner et al., 2008).

Emotional experiences in adulthood

The period of average adulthood, including people between 35 and 60 years of age, is a time when development depends mainly on environmental factors and is characterised not only by high individuality, but also by plasticity (Harwas-Napierała & Trempała, 2000). Considering late adulthood in accordance with the assumptions of developmental psychology emphasises its unique emotional character. In late adulthood, the concept of loss appears, usually leading to strongly negative emotions. Social, professional and intimate functioning are changing. Many people lose loved ones (spouses, friends), which can contribute to a depressed mood.

When looking for possible factors that protect against experiencing depressed mood, and actions and activities that could serve therapeutic functions, attention was paid to the value of music. Research to date has shown that music stimulates the endorphin system (Gangrade, 2012). Endorphins, commonly known as "happiness hormones", reduce stress and tension, leading to a state of euphoria and suppressing pain (Robinson, 2020). Acoustic sensations stimulate centres in the temporal cortex – some respond to words, others to rhythm. Music also stimulates the prefrontal cortex which is responsible for regulating emotions, among others. Regardless of the purpose of listening to music, cognitive attention is stimulated. Vetulani and Mazurek (2015) claimed that music develops the brain and is able to improve the intellectual state of society. Music changes the mood, and stimulates and affects concentration (Indira et al., 2018).

In this work an attempt was made to determine the relationship between listening to opera music and the mood of people over the age of 50. The relationship between the mood revealed in the listeners and the type of opera they prefer (opera series and opera buffa) was assessed. An attempt was also made to verify whether listening to opera music changes the mood of people over the age of 50.

Opera as a stage vocal-instrumental music

Popular music over time is subjected to modifications and changes, unlike opera, in which only the visual part changes, or – one can "see" (cut out) a given section, leaving the rest in its original form, created by the composer, sometimes many years before. At the same time, according to research, it is able to affect people (Balteș & Miu, 2014; Scherer et al., 2019).

In 2012 (Miu & Baltes, 2012), the relationship between opera and mood was again shown. Fifty-six people, without musical education, were presented with 2 sections of opera music: the aria Gelido in ogni vena from the opera Il Farnace by Vivaldi and the opera song Rataplan, composed by Malibran. They were concert performances of Cecila Bartolia. The aria includes the pain and despair of a mother who is about to lose her sons. In turn, the song presented a cheerful march of a boy playing a drum, accompanying an army battalion. The study used the PANAS (Positive and Negative Affect Schedule) scale, TEQ (Toronto Empathy Questionnaire) and GEMS (The Geneva Emotional Music Scales) scale. Physiological measurements were also taken, i.e. heart rate, skin conductance and breathing. The respondents, listening to the aria by Vivaldi (sad content), having a high level of empathy, indicated a sense of nostalgia, and the level of conductivity of their skin was reduced compared to people with a low level of empathy. The same people, experiencing a joyous part (Rataplan), pointed to emotions determining strength, and their heart rate increased. Thus, the perception of music could also be influenced by the individual characteristics of individuals, such as the level of empathy.

Materials and methods

The dependent variable in the study was the mood of people over the age of 50. In this case mood was defined as the state of the body, an affective state of moderate intensity, covering various internal processes occurring in a person, lasting at least a few minutes (Matthews et al., 1990). The basis was the definition proposed by Goryńska et al. (2011), which describes mood as an affective experience whose duration is moderate, while it lasts at least a few minutes and is not related to an object, or with a quasi-object. In addition, mood expressed in this way includes three dimensions of core affect, these being tension stimulation, energy stimulation and hedonistic tone. The indicator of the adopted variable was the results obtained by the respondents in the SUPIN and GEMS questionnaires.

Procedures

The study was approved by the University Ethics Committee for Research Projects of the Institute of Psychology in Szczecin and was carried out under conditions enabling the free reception of performances. The material was presented in a warm room. Subjects were provided breaks, drinks and snacks. The quality of the reproduced material was also carefully maintained. They were performances recorded in the HD standard in the largest and most prestigious opera theaters such as Opera national de Paris (Palais Garnier) and the Metropolitan Opera House (MET), supplemented with Polish subtitles, with extended display time. Sound quality was assured in the Dolby Digital format.

The study took the form of a quasi-experiment. Recipients were invited to the previously prepared room, where the audiovisual material – a recording of the opera "La Traviata" – was presented for the first time. This was preceded by the respondents completing the SUPIN C30 and S30 questionnaires and a short survey by the authors. After the presentation of the stimulus, the subjects again filled in the SUPIN S30 questionnaire scale and the GEMS scale. The described procedure was carried out twice, using two different music materials. The procedure remained unchanged, while the audiovisual material changed. The second time, the participants were presented with a recording from the opera "The Barber of Seville".

Participants

The presented study was conducted on a group of people over the age of 50. They were pensioners and students of the University of the Third Age operating at the Center for Local Activity in Gryfino, who participated voluntarily. All participants in the study have reached the age of 50, as it is a prerequisite for becoming a student at the University of the Third Age which is a teaching institution aimed at seniors. These institutions operate, among others in France, Great Britain, Germany or Poland. The aim of the Polish Universities of the Third Age is intellectual and physical activation of people over 50. Currently, there are nearly 400 such institutions in Poland that organize lectures, workshops, trips or specific courses for participants, aimed at the development of important contemporary skills, e.g. computer skills.

Thirty students participated in the study, comprising 87% women and 13% men. They were people in middle and late adulthood, aged 50 to 74 (M = 63.8 years; SD = 5.92). Half of the study group had higher education, 40% – secondary education, and the remaining 10% – basic vocational education. Most of the respondents liked (87%) and willingly listened (70%) to opera music. In addition, they declared that they do it more often in company (67%) than when alone (33%). Knowledge of the contents of individual operas was less common. Every third person said that they know the content of some operas, and as many as 67% of respondents admitted that they did not know their content.

Measurements

The SUPIN questionnaire used in the study is the Positive and Negative Feelings Scale, which is a Polish adaptation of the Watson and Clark scale. The Polish adaptation was made by Brzozowski. It uses the paper-pencil method, and examines the severity of positive and negative emotions.

The test tool consists of 4 scales. Two (longer: 30 positions – S30, and shorter: 20 positions – S20) measure current emotional states. The other two (analogous division: C30 and C20) measure relatively constant affective features. Each version is a list of adjectives related to emotions and feelings. The task of the respondent is to mark, using a 5-point scale (where "1" means "slightly or not at all", and "5" means "very strongly") how much they feel a given emotion or feeling. Depending on the version – at the moment, or usually. The Watson and Clark measurement included: emotions (transient after a few seconds), moods (lasting for hours and days), emotional features (constant for years, defined as positive and negative affect) and temperaments (similarly stable as emotional features having a hereditary aspect). The tool was based on the theory of positive and negative feelings of Watson (2000). According to the authors, both affects (positive and negative) have 2 poles – weak and strong. The authors, referring to the issue of mood, claimed that it is cyclical and undergoes changes throughout the day. According to the theory, when one wakes up, they have the lowest level of positive mood. During the day, its level increases, remaining relatively high between 9 a.m and 9 p.m., and then

falls, reaching a minimum just before falling asleep in the evening. The internal compliance of the SUPIN scales is high or satisfactory. Cronbach's alpha coefficients, depending on the version and type of sample, range from 0.73 to 0.95. The C versions are also characterised by high absolute stability.

The second of the tools used, the GEMS questionnaire, is a scale used to measure the current emotions that appear in the subject after listening to a given piece of musical material. It is a tool created and published by prof. Zentner, from the University of Innsbruck (2008). For the purposes of these analyses, it was made available by prof. Zentner by email. The study used the Polish adaptation of the scale based on the research by Chełkowska-Zacharewicz and Janowski (2021). The tool consists of a list of 45 adjectives forming 9 scales: amazement/admiration, transcendence, strength, sensitivity, nostalgia, calmness, joyful agitation, sadness, tension. The respondent's task is to mark, using a five-point scale (where 1 means slightly or not at all, and 5 very strongly) how much they feel at that moment the specific emotion evoked by the music presented to them. Then, emotions are grouped into the 9 above-mentioned scales, and these into 3 areas of human activity: sublimity, vitality and anxiety/unease. The GEMS questionnaire survey was conducted immediately after the presentation of the material. The structure of the Polish version of GEMS is similar to the original, and the Cronbach's α reliability indicators are satisfactory for all subscales in the full and shortened versions (Chełkowska-Zacharewicz & Janowski, 2021) (Fig. 1).

Another variable included in the study was the transient emotional state, understood as the emotions that the respondent felt at a specific moment and whose indicator was the result obtained by the S30 scale of the SUPIN questionnaire. The set of permanent emotional features, understood as the emotions that the subject usually feels and whose indicator was the result obtained by the C30 scale of the SUPIN questionnaire, was also a dependent variable. These dependent variables also included emotional reception, the indicator of which was the result obtained by the GEMS scale.

Listening to opera music by people over 50 years of age, referred to as "reception", is included in the independent variable. It contained listening and watching the presented audio-visual material, i.e. the selected opera performance.

In addition, the study used the authors' survey to collect demographic data of the listeners, such as gender and age, current mood and previous experience with opera music. Before listening to the opera, the respondents defined their mood on a five-point Likert scale, where "1" meant "absolutely no" and "5" meant "absolutely yes". Six basic emotions were assessed: joy, sadness, fear, disgust, anger, and surprise. The respondents described their previous experience with opera by answering four questions: "Have you ever been to an opera?", "Do you like opera music?", "Do you listen to opera music (i.e. arias, overtures, duets, etc.)?" and "Do you know the content of individual operas?" The respondents answered the questions with "yes" or "no". This allowed the musical preferences of the respondents and whether there is a relationship between previous experiences

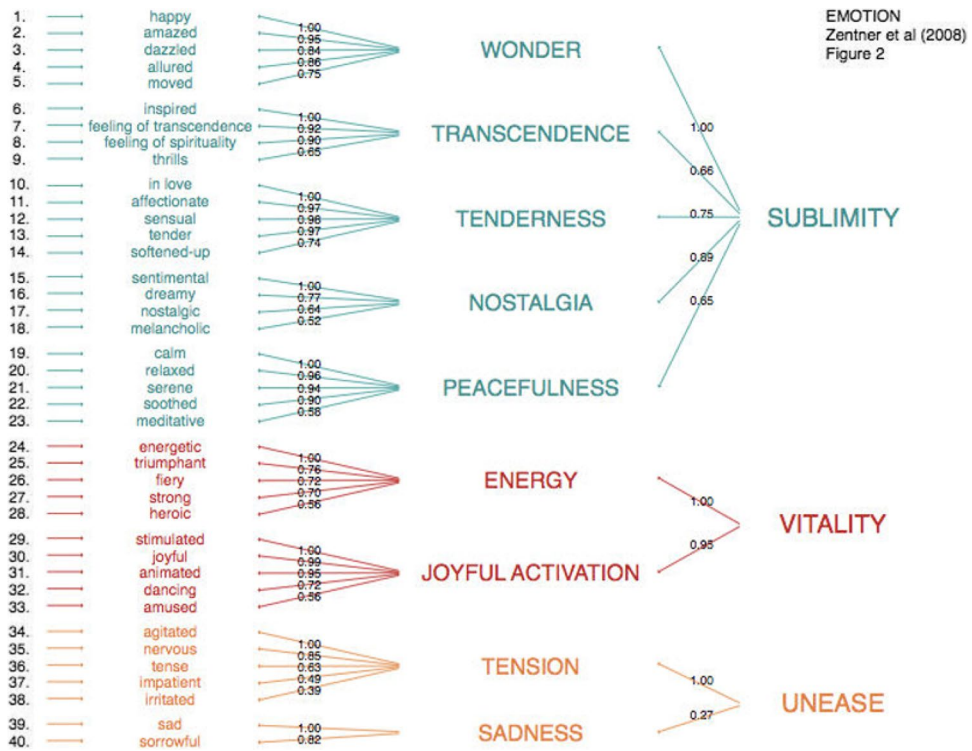

Fig. 1 Division of GEMS adjectives. Source: https://www.uibk.ac.at/psychologie/fachbereiche/pdd/personality_assessment/gems/about-the-gems/index.html.en

with opera music and reactions to the performance, understood as a change in mood, to be determined.

The study used audio and video recordings of two opera performances. The first was the recording of the opera "La Traviata" from the Opera National de Paris from 2014, cast: Violetta Valery: Diana Damrau, Alfredo Germont: Francesco Demuro, Giorgio Germont: Ludovic Tezier. "La Traviata" is an opera from the genre of opera series, with compositions by Giuseppe Verdi, and a libretto by Francesco Maria Piave. It tells the story of a courtesan who, out of love, abandons her previous life, full of luxury and fun. Because of her position, under the pressure of the future (and would-be) father-in-law, she is forced to leave her beloved. In the end, she dies alone because of a terminal illness. La Traviata is considered by both composers, critics and music lovers as a perfect work and an ideal example of the opera series, where the music and emotions reflect reality, and the message of the work is serious. The recording from the Opera National de Paris was chosen because of the soloists, the winner of many prestigious awards, currently considered one of the best dramatic sopranos in the world, Diana Damrau, in the title role, and singers performing on the stage of the most prestigious operas in the world (i.e. Teatro alla Scala, MET, Opera National de Paris or Royal Opera House). The opera's pronunciation is momentous.

The second performance presented was "The Barber of Seville" – a recording of the performance from the Metropolitan Opera House from 2013, cast: Rosina: Joyce DiDonato, Earl: Almaviva / Lindoro: Juan Diego Florez, Dr Bartolo: John Del Carlo. It is the work of Gioacchin Rossini, with the libretto of Cesare Sterbini, from the genre of opera buffa. The opera has a fun, love plot in which Rozyna plays the main role – a woman who is sought-after by Dr Bartolo and Count Almaviva. "The Barber of Seville" is considered one of the most joyful operas in its message. As in the case of "La Traviata", the soloists appearing in the recording are among the best and most popular singers of modern times. This is demonstrated by, among others, operas and concert halls sold out in just a few days, along with the appearance of their names in the repertoire. "The Barber of Seville'' is considered to be one of the funniest operas in pronunciation.

The results collected in the research procedure were statistically analysed using the IBM SPSS Statistics v.20 package. Descriptive statistics were used to characterise the studied group and main variable.

Results

In order to verify whether the mood declared by the listeners is related to the type of opera presented, a description of the mood results was made, whose indicator was the measurement of transient emotional states – before and after reception of the opera. Table 1 contains basic indicators of the distribution of transient levels, and positive and negative emotional states, measured before listening to each opera.

Transient state plots had distributions similar to the normal distribution. In each measurement, the skewness and kurtosis indicators were within normal limits. In the case of the first of the operas ("La Traviata"), the respondents were characterised by an average intensity (6 STEN on average) of positive emotions, both before and after listening to music, and a normal, although slightly reduced, intensity of negative emotions (4–5 STEN). In the second attempt, the average positive mood before and after the opera was slightly higher and exceeded 7 STEN, thus indicating an increased intensity of positive emotions. Negative emotions were close to the first attempt and on averaged achieved 4–5 STENs. It is noticeable that after hearing the opera "The Barber of Seville", the respondents showed the highest average indicators in the assessment of positive feelings and the lowest in the assessment of negative feelings.

Table 1 Basic values of the distribution of measurement results of instantaneous emotional states, including positive and negative feelings before and after reception of the opera

	N	Minimum	Maxmum	Mean	Standard deviation	Skośność	Kurtosis
Positive emotional states before Traviata	30	1	10	6.37	2.798	-0.719	-0.570
Negative emotional states before Traviata	30	3	10	4.70	2.054	1.305	1.113
Positive emotional states after Traviata	30	1	10	6.50	2.515	-0.418	-0.657
Negative emotional states after Traviata	30	1	9	4.77	1.675	0.396	0.711
Positive emotional states before the Barber	30	1	10	7.03	2.356	-0.687	0.562
Negative emotional states before the Barber	30	3	9	4.73	1.639	0.914	0.233
Positive emotional states after the Barber	30	2	10	7.53	2.609	-0.533	-1.224
Negative emotional states after Barber	30	3	6	3.93	1.081	0.843	-0.576

Source: own research

Next, the results of the measurement of the permanent emotional features before and after the reception of the opera are described in Table 2.

A distribution of results similar to the normal distribution was achieved in all four measurements. This is demonstrated by the values of skewness and kurtosis, which were close to zero. In addition, the results ranged from low (1–2) to high (9), and the average results in all measurements indicated the average severity (5–6 STEN) of the analysed features, i.e. exactly as in a normal distribution.

Tables 3 and 4 contain distribution indicators of the results of the assessment of the emotional states that accompanied the subjects during the experience of each opera.

During the reception of the first of the operas, astonishment apparently appeared in the subjects – on this scale, the average result was approaching 20 raw points. The feelings of transcendence (17 points) and sensitivity (16 points) were also intense. Slightly lower average results were obtained in the scales of nostalgia, peace and joyful stimulation (13–14 points). On average, the respondents attributed about 11

Table 2 Basic values of the distribution of measurement results of permanent emotional traits, including positive and negative feelings after reception of the opera series and buffo

	N	Minimum	Maksimum	Średnia	Odchylenie standardowe	Skośność	Kurtoza
Positive emotional traits before Traviata	30	1	9	6.13	2.080	−0.584	0.027
Negative emotional traits before Traviata	30	2	9	5.17	1.802	0.340	−0.652
Positive emotional features before the Barber	30	1	9	5.87	1.978	−0.404	0.045
Negative emotional features before the Barber	30	2	9	4.90	1.668	0.551	−0.139

Source: own research

Table 3 Basic values of the distribution of the results of measuring the emotional states of the subjects, felt after the Traviata opera

Opera 1: Traviata	N	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
Amazement	30	9	29	19.60	5.893	-0.096	-0.877
Transcendence	30	9	30	17.40	6.190	0.688	-0.458
Strength	30	5	23	11.30	4.872	0.899	0.084
Sensitivity	30	7	25	16.00	4.742	−0.0160	-0.847
Nostalgia	30	7	20	14.27	3.433	-0.287	-0.296
Calm	30	7	23	13.73	4.578	0.609	-0.494
Joyful stimulation	30	6	29	13.23	5.987	1.307	0.910
Sadness	30	3	15	8.33	3.565	0.020	-1.215
Tension	30	5	21	7.87	3.785	2.339	6.153

Source: own research

Table 4 Basic values of the distribution of results of measurement of emotional states of the respondents, felt after the opera the Barber of Seville

Opera 2: Barber	N	Minimum	Maximum	Mean	Standard deviation	Sekwens	Kurtosis
Amazement	30	7	25	19.57	4.352	-1.223	1.784
Transcendence	30	6	25	14.17	4.103	0.793	2.448
Strength	30	5	20	13.40	4.484	-0.506	−0.0636
Sensitivity	30	5	19	12.87	3.421	-0.681	0.190
Nostalgia	30	4	16	9.17	2.755	0.471	0.094
Calm	30	5	20	14.77	2.885	-1.218	3.463
Joyful stimulation	30	6	25	19.00	5.079	-0.711	-0.133
Sadness	30	3	7	3.47	1.008	2.370	5.268
Tension	30	5	12	5.63	1.426	3.458	13.949

Source: own research

points to the feeling of strength, and 8 points on average for sadness and tension.

The distribution of results is mostly similar to normal. The only exception is the tension scale result. Increased skewness and kurtosis indicate a divergence of this distribution with the assumptions of the Gaussian Curve. The results are presented in Chart 1.

High skewness describes the shift in the centre of the chart to the left, as is visible on the graph. This means that below average results (5–8 points) occurred more frequently, while the range of above average results (from 8 to 21 points) is greater. High kurtosis indicates sharpness of the chart, i.e. a greater concentration of results around the average value. An analogous description for the second opera ("The Barber of Seville") is presented in the next table (Table 4).

In the assessment of The Barber, amazement was also the dominant feeling (19.57). A slightly lower average score was achieved on the joyous arousal scale (19 points). The next feelings about intensity were calmness (almost 15 points), transcendence (14), and strength and sensitivity (13 points each). Unpleasant emotions such as nostalgia or tension occurred at a clearly lower frequency, while the least intense was sadness, to which the subjects assigned an average of about 3 raw points. All measurements, except for sadness and tension, reached a distribution close to normal. The results of two nonparametric distributions are illustrated in Charts 2 and 3.

The advantage of the low scores is clear, at 3 points. Other values – from 4 to 7 points – were much rarer and with a successively decreasing amount. This graph is

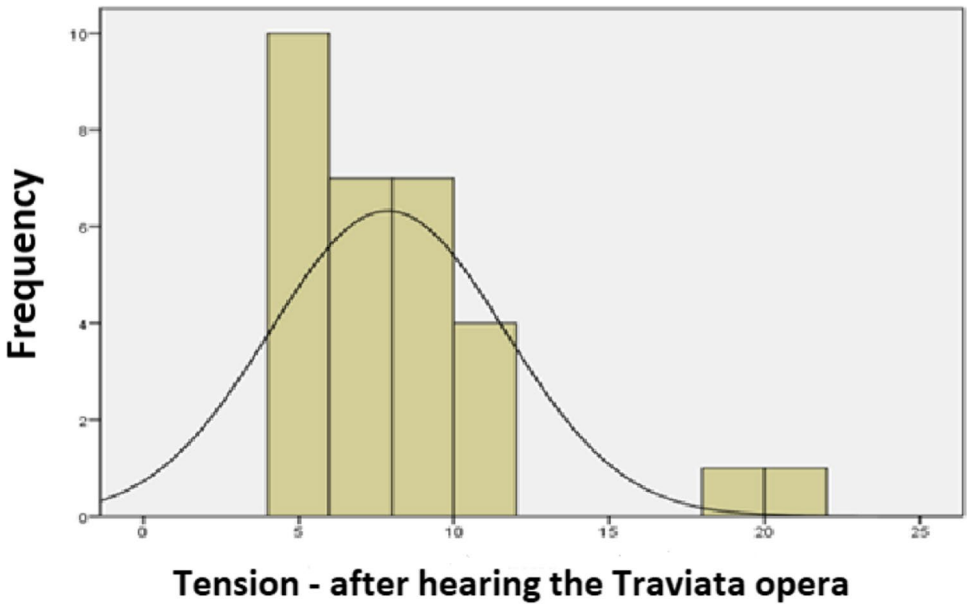

Chart 1 Histogram of tension measurement results after hearing the first opera

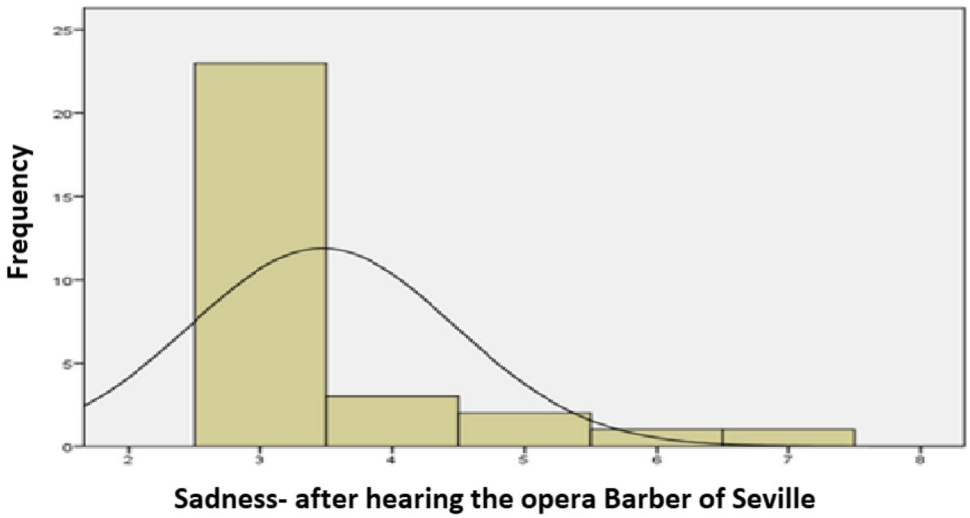

Chart 2 Histogram of the results of measuring sadness after hearing the second opera

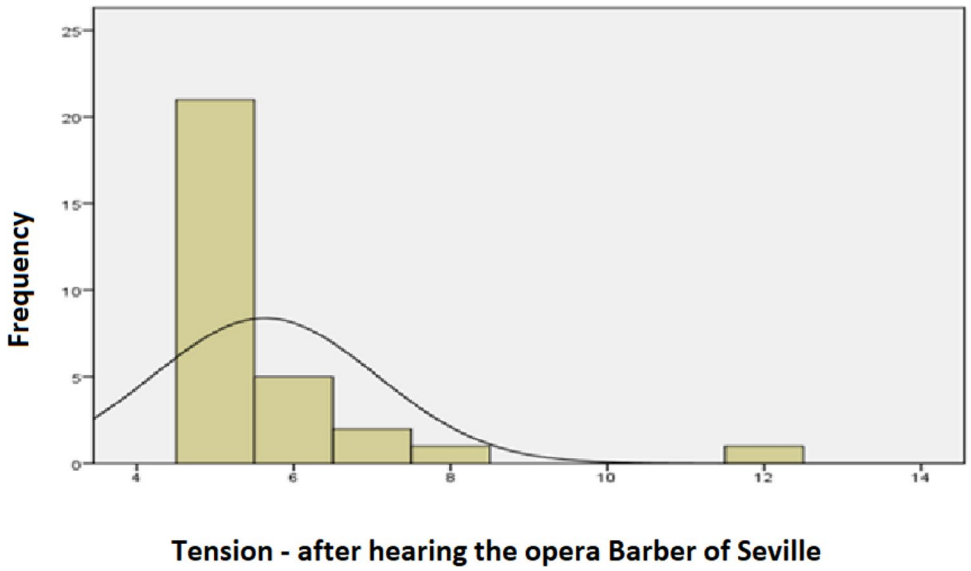

Chart 3 Histogram of tension measurement results after hearing the second opera

completely different from the distribution of features in the general population.

This chart is similar to the previous one. It indicates the clear predominance of the lowest results; a significant flattening of the chart towards its right side indicates a negligible number of higher results. Additionally, Chart 4 presents a comparison of the average results in both operas simultaneously.

The chart shows that the dominant feeling after listening to both operas was amazement (average in both cases was close to 19.6). Joyful arousal was the emotion felt by most of the respondents in the case of the opera "The Barber of Seville". Accordingly, for "La Traviata", the feeling of transcendence was similarly strongly experienced.

Based on the research results cited above, it can be confirmed that the mood declared by the listeners is related to the type of opera presented. Depending on the type of opera received (series and buffa), the emotional state of the respondents changes. In the case of opera series, after receiving the opera ("La Traviata") there was an increase in both positive and negative emotions, while in the case of opera buffa ("The Barber of Seville") – an increase in positive emotions and a decrease in negative emotions.

It was also noted that the respondents were characterised by a greater intensity of both positive and negative emotional features before receiving "La Traviata" than in the case of receiving "The Barber of Seville". This means that the subjects presented different moods based on the type of opera they received.

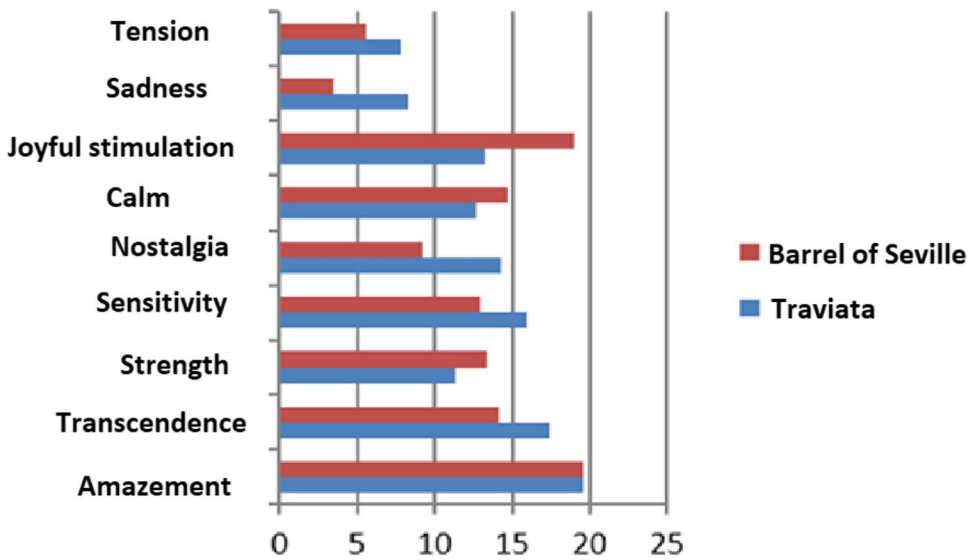

Chart 4 Comparison of average results regarding emotions felt after the performance, in both operas simultaneously

To verify whether listening to opera music influences mood changes in people over the age of fifty, the calculation used the parametric Student's t-test for two dependent groups, the results of which are included in Table 5.

The obtained results indicate that in the studied group, there are no significant changes in emotional states in response to the opera "La Traviata". In turn, the opera "The Barber of Seville" has no effect on positive emotional states. Instead, it caused a statistically significant change in the level of negative emotional states. The unpleasant affect was lowered by an average of 0.8 raw point after hearing "The Barber of Seville". One of the two operas presented caused significant changes in emotional states only in relation to negative emotional states. It turns out, therefore, that the surveyed recipients found a beneficial mitigation of negative mood in response to the experience of the opera buffa composed by Gioacchino Rossini.

Discussion

The conducted study provided several important conclusions. It has been shown that opera music can affect the mood of people over 50.

This research is to some extent consistent with other studies done so far that have found a relationship between mood and music (Krahé & Bieneck, 2012; Ferguson & Sheldon, 2013; Garrido & Schubert, 2015a; Shifriss et al., 2020). The use of two pieces with different rhythms in the study was important for the emotions evoked in the recipients, and this is confirmed in the analyses so far. For example, studies have shown that the rhythm of music influences emotions. A slower pace of a song can lead to feelings of sadness (Poon & Schutz, 2015).

So far, researchers have shown that listening to music in general can reduce anxiety levels (Yung et al., 2002; Elliot et al., 2011; Ahmad & Rana, 2015). On the other hand, classical music can reduce the level of tension (Danhauer & Kemper, 2005). Research reports indicate that classical music may have the potential to evoke basic emotions in adults, as long as the type of music is compatible with the preferences of the audience (Kreutz et al., 2008).

Moreover, in opera, which is a combination of theater and music, the emotional expression of the artists shown during the performance is of great importance for the emotions evoked in the audience (Palusis, 2017). Maria Callas, whose performance was used as material in this study, is indicated as one of the most emotional opera artists (Palusis, 2017). A study by Baltes et al. (2011) using recordings from the performance of Maria Callas showed that skin reactions in the participants of the study indicating emotional arousal were noted. The authors proved that presenting the participants of the study with a live performance deepened this effect, causing a feeling of wonder and transcendence.

Although the results of this study are largely consistent with the results of other studies examining the relationship between music and mood, there are also limitations that should be kept in mind. Only two pieces of opera music were used, and this study lacked a control group, so we were unable to confidentially confirm the effect of opera on emotional regulations. The study participants were also presented with recordings, not live performances. The extent of depression among the participants could not be controlled in the present study, so the effect of the operas on emotional regulation may have been confounded by depressive mood and/or the effect of gender. In addition, the study did not take into account the effect of familiarity with the opera, which applied to 33% of the participants, and did not take into account the learning effect when listening to the recording a second time. The prior opera experience and the musical preferences of the study participants should be measured more precisely in the future.

Conclusion

The quasi-experiment conducted provided information on the impact of music on mood. Considering the specificity of disorders in which music is used as a therapy, it is possible that the sounds of "La Traviata" would be soothing for people suffering from anxiety symptoms or emotional lability. They could, however, increase the sadness of depressed people who still have negative emotional states.

The study showed a number of interesting relations that support the positive effect of music on mood regulation. The

Table 5 Verification of differences in the intensity of positive and negative emotional states before and after receiving each opera

		Difference in means	Standard deviation	Student-t test		
				T	Df	P
Pair 1	Positive emotional states before and after Traviata	-0.133	3.093	-0.236	29	0.815
Pair 2	Negative emotional states before and after Traviata	-0.067	1.946	-0.188	29	0.852
Pair 3	Positive emotional states before and after Barber	-0.500	2.129	-1.286	29	0.209
Pair 4	Negative emotional states before and after Barber	0.800	0.887	4.942**	29	0.001

Source: own research

conclusions drawn from it may be of interest to both healthy people seeking emotional relief in music, and for practitioners who want to introduce music therapy methods to work with patients suffering from difficulties in regulating their own emotional states.

The study showed that opera music significantly affects the emotional state of people over the age of fifty and can (opera buffa) change the mood (from negative to positive) that they are expressing. Both in the case of "La Traviata" and "The Barber of Seville", the respondents reacted with increased emotionality, showing mood swings (in the case of "The Barber"). Part of the study, including the opera "La Traviata", showed that despite the sad and serious (opera series) message of the song, after listening to it, the emotions shown were associated with a positive mood. What is more, the initial state of mood changes, i.e. people with negative affect experience a sense of peace and positive emotions under the influence of the music, which changes their mood to positive. This confirms the results of research by A. Kawakami and colleagues (Kawakami et al., 2013), in which they state that listening to sad songs reduces malaise.

Opera music is able to evoke certain emotional states, which may indicate its therapeutic usefulness. By choosing the right type of opera (series, buffa), it is possible to change the mood in adults. Opera, being a musical form which is accompanied by intense emotions (pick experience) that are heightened by the theatrical form, affects the listeners in a similarly intense way, reducing tension and inducing amazement. Opera series also evokes a sense of strength, while opera buffa increases the perceived joy and reduces negative mood.

Bearing in mind the conclusions presented in this paper, it would be worth continuing and developing analyses covering the relationship between opera music and emotional states, because the change in negative mood occurring in the case of a specific version of "The Barber of Seville" was quite significant, thus showing that opera music has a strong impact on listeners.

Future implications

Although the analysis includes a group representing listeners over 50 years old, the special role of music as a regulator of our emotional experiences is not without significance for younger people. According to analyses by North et al. (2000), in the case of adolescents, listening and creating this type of music brings more value to their lives than creating or listening to classical music. We already know that depending on the preferred genre, the repertoire of themes shown in the texts or moods built thanks to sound accompaniment changes. An example is the analysis of metal music, in which the topic of death, suffering and dying appears many times. However, research has shown that metal music enthusiasts show a low level of anxiety as well as fewer depressive symptoms in relation to people who do not listen to this type of music (Recours et al., 2009).

In the future, it would be worthwhile to broaden the analysis to include the aspect of awareness of music choice: whether users of certain musical genres, including opera, actively undertake activities aimed at the conscious use of music to regulate their emotions. Research by Garrido and Schubert (2015b) has shown that listening to music that changes the mood, i.e. incompatible with current emotions, is often more effective than listening to music in accordance with it; e.g. sad music when we feel depressed (Garrido & Schubert, 2015b).

We also know that there are specific types of music intended to regulate our experiences (McCraty et al., 1998; Labbé et al., 2007; Sachs et al., 2015). For example listening to relaxing music, through which it is possible to reduce the physiological symptoms of anxiety (Hamel, 2001), but it would be worth extending future analyses with the age component and verifying if there are significant differences in this respect between people at different stages of development, and thus also having a different range of perceptual or cognitive abilities. We already know that even brief distraction-based mood regulation can be helpful, as it leads to a reduction in the time spent on ruminating, and also may reduce the incidence of self-harm and even suicide attempts (Polanco-Roman et al., 2015). Research has shown that listening to music is a frequent and highly valued form of managing leisure time by the elderly, and that older music users use this precisely to experience pleasant emotions (Laukka, 2007).

In future research, it would be worth using neuroimaging and making comparisons in this regard, taking into account the biological age of the recipients. Research to date in brain imaging suggests that in listeners, responses are seen in regions identical to those involved in experiencing rewards and feelings of pleasure (Blooda & Zatorre, 2001). These results could be of particular interest if we include music audiences with dementia. In 2019, research has shown that traditional Chinese opera can be a potentially effective method of cognitive function therapy in elderly people with dementia, leading to a reduction in both behavioural and psychiatric symptoms (Chen et al., 2019). Research by McDermont et al. (2014) has developed a psychosocial model of the importance of music in dementia and demonstrated the importance of music in supporting the personal resources of people with dementia.

Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

We confirm that all co-authors approved the content of the text.
The manuscript has never been published or reproduced or sent anywhere. The study was conducted in accordance with global Good Clinical Practice (GCP) standards and confirmed to acceptable ethical standards as outlined by local requirements and the Declaration of Helsinki (World Medical Association, 1989).

Conflict of interest The Authors declare no conflict of interest. All experiments were performed with approval of the Ethics Committee in Szczecin, Poland.

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