7-16-2021

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Publisher: Taylor & Francis & Mass Communication & Society Division of the Association for Education in Journalism and Mass Communication

Journal: *Mass Communication and Society*

DOI: 10.1080/15205436.2021.1956542

How Music Awakens the Heart: An Experimental Study on Music, Emotions, and Connectedness

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Biographical Notes

Rebecca de Leeuw (PhD *cum laude*, 2011) is an assistant professor of Communication Science, Behavioural Science Institute, Radboud University. She devotes her research to the role of media in relation to connectedness and well-being.

Rebecca is fascinated by the question how stories can nurture children's moral and emotional development, and how parents can strengthen these effects. Her research belongs to the field of positive media psychology.

Sophie H. Janicke-Bowles (PhD, 2013) is an assistant professor at the School of Communication, Chapman University. She investigates the role that new and traditional media play in promoting and affecting character development, self-transcendent emotions, prosocial behavior, and well-being. As a member of a research team from Florida State and Penn State Universities she was awarded a 3 year $1.9M grant from the John Templeton Foundation (2015-2018) to explore how people use and are impacted by media content that elicits self-transcendent emotions such as awe, elevation, gratitude and compassion.

Qihao Ji (PhD, 2015) is an assistant professor of Communication at Marist College. Before joining Marist, Ji was a post-doctoral fellow at the Florida State University. Ji's research lies at the intersection of media effects, positive media psychology, and new media. Specifically, he studies the uses and effects of emerging media technologies at both individual and societal levels.

Funding Details

This work was supported by the Radboud University.

Data Availability Statement

The data can be provided by the first author upon request.

Acknowledgements

We would like to thank Anna-Maria Ahle and Joël Hendrix for their help with the data collection. Moreover, we would like to thank Dr. Mike Schmierbach, Dr. James Ivory, and the two anonymous reviewers for their helpful feedback during the review process. Finally, Rebecca would like to thank her son Fynn, who made listening to music even more meaningful and magical than it already was.

Abstract

Many studies in the field of positive media psychology have investigated the effects of meaningful film on viewer's feelings and openness to others, all the while music is the number #1 media source for feeling moved, touched or inspired. Therefore, the current study examined the role of meaningful compared to pleasurable music on listeners emotional experiences, feelings of connectedness, and altruistic behaviors. In a pre-posttest experiment, 105 participants (M_{age} = 23.800; *SD* = 6.082; 77.3% female) listened to either their favorite meaningful music or their favorite pleasurable music. Findings revealed that listening to meaningful music leads to stronger feelings of being moved, having a lump in one's throat and tears crying, more contemplation, a stronger motivation to seek what matters in life, and a stronger desire to express love to close others, compared to listening to pleasurable music. Both listening to meaningful and pleasurable music were found to lead to a wide range of intense and blended emotions, a desire to connect to others, and same levels of altruism. In sum, meaningful and pleasurable music can evoke a different mix of emotions, however, both are strong and open our hearts to others.

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"Music can change the world because it can change people."

— Bono

Pioneering work from the field of positive media psychology has demonstrated that entertainment media experiences could go beyond mere pleasure and enjoyment by providing meaningful insights about life (Oliver & Bartsch, 2010; Oliver & Raney, 2011; Wirth, Hofer, & Schramm, 2012) and giving rise to a desire to do good (Janicke & Oliver, 2017; Oliver, Hartmann, & Woolley, 2012; Pohling & Diessner, 2017). Most of the existing research on these meaningful media experiences has focused on films, while recent findings indicated that for many, music is the number #1 media source for feeling moved, touched, or inspired (Raney et al., 2018). In the present study, we examined whether the framework of meaningful versus pleasurable entertainment (Oliver & Bartsch, 2010; Oliver & Raney, 2011; Vorderer, 2011; Wirth et al., 2012) can also be applied to music.

In music psychology, scholars have been puzzled for a long time why people enjoy listening to sad music. State-of-the-art knowledge indicated that the seeming paradox of seeking and enjoying sad music is essentially not a paradox, but a definition issue, with the previous views on sad music being too narrow (for a review see Eerola, Vuoskoski, Peltola Putkinen, & Schäfer, 2017). After all, listening to sad music can lead to strong feelings of beauty (Peltola & Eerola, 2016; Vuoskoski & Eerola, 2017) and intense feelings of being moved (Peltola & Eerola, 2016; Vuoskoski & Eerola, 2017), which can make listening to this music a predominantly positive experience (Peltola & Eerola, 2016; Taruffi & Koelsch, 2014). In the current study, we propose that sad music that is experienced as beautiful and leads to feelings of being moved, touched, and inspired could be redefined as "meaningful music."

Media that are perceived as meaningful can encourage thinking about what is important in life (Oliver & Bartsch, 2010; Oliver & Raney, 2011; Wirth et al., 2012). How music can exactly trigger spontaneous thoughts in its listeners is not well understood, while music is often appreciated for the meaning it provides (Gabrielsson, 2011; Ji, Janicke-Bowles, de Leeuw, & Oliver, 2019; Juslin & Laukka, 2004; Raney et al., 2018). Previous findings indicate that it is sad music instead of happy music that draws the listener's attention inwards and engage them in spontaneous thought (Taruffi, Pehrs, Skouras, & Koelsch, 2017). Given the definition issue concerning sad music, more research is warranted on what type of music can exactly trigger spontaneous thought. A novel contribution of this study is that we examined whether it is meaningful music in particular that leads to these thoughts.

In addition to spontaneous reflections about life, meaningful media have the potential to contribute to motivations to live life a better way and to connect to others (Janicke & Oliver, 2017; Oliver et al., 2012; Oliver et al., 2018; Pohling & Diessner, 2017). Previous qualitative work indicated that intense musical experiences could help listeners to "recognize their inner self, their needs, goals, and dreams and can decide to live in accordance with them" (Schäfer, Smukalla, & Oelker, 2014, p. 542). Moreover, listening to music that gives chills and goosebumps is found to increase motivations as to seek what really matters in life, to be a better person, and to do good for others (Ji et al., 2019). Music is also found to contribute to feelings of connectedness to loved ones (Eerola et al., 2017; Gabrielsson, 2011; Peltola & Eerola, 2016; Sloboda & Juslin, 2001; Van den Tol & Edwards, 2013). The present study aims to examine whether it is especially listening to meaningful music that inspires to seek what matters in life and to connect to others. Altogether, we examined whether

listening to meaningful music versus pleasurable music has both unique affective and physiological reactions, along with different moral motivations.

Theoretical background

Listening to Music as a Transcendent Experience

In their most recent work, scholars in the field of positive media psychology have identified research designed to investigate and understand self-transcendent media experiences as essential to moving the field forward (Oliver et al., 2018; Raney et al., 2018). Self-transcendence refers to "a motivational state in which the person seeks something beyond personal benefit, for example, the furtherance of some greater cause, union with a power beyond the self, and/ or service to others as an expression of identification beyond the personal ego" (Koltko-Rivera, 2006, p. 305; see also Oliver et al., 2018; Peterson & Seligman, 2004).

In a nationally representative survey of American adults, 90.5% indicated that they have felt moved, touched, and inspired by music, making music the most common media source for self-transcendent experiences (Raney et al., 2018). This research is supported by qualitative studies that also indicate that music can give rise to feelings of transcendence (Gabrielsson, 2011; Schäfer et al., 2014; Stone-Davis, 2015). Moreover, festival attendance has been found to have psychological and social benefits (Ballantyne, Ballantyne, & Packer, 2013) that seem to overlap with transcendent experiences. That is, the most often experienced emotion of being at a festival was happiness and a sense of elation. Festivalgoers also felt more positive about their life and reported to have a greater understanding of what is important to them. They also indicated feeling more positive about other people.

Generally, humans prefer to listen to music that makes them "feel good" (Juslin & Laukka, 2004; Knobloch & Zillmann, 2002). Indeed, the most commonly

felt emotions upon listening are happy, relaxed, and calm (for a review, see Juslin & Laukka, 2004). Listening to sad music can be enjoyable as well. An extensive qualitative study revealed that listening to sad music can be so beautiful that it can be even intensely pleasurable (Peltola & Eerola, 2016). Previous findings also indicate that whether listeners of sad music liked the music is largely explained by their feelings of being moved (Eerola et al., 2017; Vuoskoski & Eerola, 2017). The feeling of being moved arises when the emotions sadness and joy are co-activated (Menninghaus, Wagner, Hanich, Wassiliwizky, Kuehnast, & Jacobsen, 2015).

Feelings of being moved are frequently felt in response to music, next to feelings of love and tenderness (Juslin & Laukka, 2004). These feelings have been defined as unique affective responses in research on meaningful film experiences (Oliver et al., 2012). Based on the outlined findings, we expected that meaningful music in particular could evoke these feelings of being touched, moved, and tender—feelings that have also been described as meaningful affect (Oliver et al., 2012). Therefore, we hypothesized:

H_1: Meaningful affect is higher for listening to meaningful than pleasurable music.

Films that are affectively challenging and evoking intense emotions, are more likely to be appreciated and considered meaningful (Bartsch & Hartmann, 2017). Listening to music can evoke intense and blended emotions as well (Groarke & Hogan, 2018). In particular, sad music is found to evoke a wide range of emotions (Peltola & Eerola, 2016). Moreover, participants in a qualitative study on sad music, indicated that they listen to sad music because they consider this music to be beautiful or "good" (Van den Tol & Edwards, 2013). Some of them even stated that this music, with high

aesthetic value, also contained more emotional content. Based on this, it is expected that it is, in particular, meaningful music that evokes a wide range of intense and blended emotions:

H_2: Listening to meaningful music leads to a wider range of emotions than listening to pleasurable music.

Physiological Responses to Music

Meaningful affect upon watching a film has been found to be associated with a particular set of physiological reactions such as having a rising or open chest, chills, a lump in one's throat, and tears crying (Algoe & Haidt, 2009; Oliver et al., 2012). These reactions are different from pleasurable reactions that are characterized by light and bouncy feelings, high energy, relaxation, and laughter. Findings from music psychology studies indicated that pieces of music that express different emotions yield different physiological reactions in listeners as well (Juslin & Laukka, 2004; Lundqvist, Carlsson, & Hilmersson, 2000). One powerful emotional response to music is shivery, commonly called "chills" or "thrills", which is more prevalent for sad than for happy music (Juslin & Laukka, 2004; Panksepp, 1995). Chills are also an indication of being moved (Menninghaus et al., 2015) and listening to music that is considered to be meaningful also appears to lead to chills or shivers (Craig, 2009). In contrast, happy music is found to lead to smiling (Juslin & Laukka, 2004; Lundqvist et al., 2000). Based on these findings, we hypothesized that:

H_3: Physical responses associated with meaningful affect are more common for meaningful than pleasurable music.

Music and Contemplation

Watching a meaningful film often provides insights about life (Bartsch, 2012; Oliver & Raney, 2011; Wirth et al., 2012). These thoughts are not only related to the film, but also concerning reflections about one's own life and thoughts about future moral intentions, such as, "use[ing] every minute to let people know that you love them" (p. 132, Bartsch, Kalch, & Oliver, 2014; see also Bartsch, 2012; Knobloch-Westerwick, Gong, Hagner, & Kerbeykian, 2012; Wirth et al., 2012). These introspective thoughts about what is important and meaningful in life have been conceptualized as contemplation (Bartsch, 2012; Oliver & Bartsch, 2010; Oliver & Raney, 2011). It appears that the more moving a film is, the stronger the reflective thoughts in its viewers (Bartsch et al., 2014). As listening to music seems to be able to evoke an intense experience of being moved, touched, or inspired (Gabrielsson, 2011; Ji et al., 2019; Juslin & Laukka, 2004; Raney et al., 2018), it is likely that it will also trigger contemplation similar to meaningful films.

Humans regularly contemplate about their relationships and interactions with others (Baumeister & Leary, 1995). Music seems to trigger such thoughts and can provide the listener with new insights about oneself and about one's relation to others (Gabrielsson, 2011; Peltola & Eerola, 2016; Van den Tol & Edwards, 2013). A recent study on the effects of sad and happy music indicated that, listening to sad music appeared to be associated with stronger mind-wandering (Taruffi et al., 2017). When listening to sad music, participants were found to draw their attention inwards and engage in spontaneous thought about love, feelings, and natural elements. They experienced mixed emotions, which probably indicates that the music experience was meaningful for them. In contrast, participants who listened to happy music were more

engaged with the music itself and had more superficial thoughts which were predominantly about dancing and the summer. In line with this, we hypothesized that:

H_4: Contemplation is higher for listening to meaningful than pleasurable music.

Music, Human Connectedness, and Altruism

Feelings of connectedness to loved ones can arise when music evokes memories (Gabrielsson, 2011; Eerola et al., 2017), but also listening to "sad" music can lead to feeling close to loved ones (Van den Tol & Edwards, 2013). Listening to music can also result in a transcendent experience leading to feelings of connectedness (Ballantyne, Ballantyne, & Packer, 2013; Gabrielsson, 2011; Raney et al., 2018; Schäfer et al., 2014; Stone-Davis, 2015). It appears that these feelings of connectedness not only apply to close others, but can also concern other listeners, the performers, or even to everyone else (Gabrielsson, 2011). Research on film found a consistent effect of meaningful but not pleasurable content on moral motivations and connectedness to humanity (Janicke & Oliver, 2017; Oliver et al., 2012; Schnall, Roper, & Fessler, 2010). In contrast to pleasurable film, meaningful film is more likely to motivate people to be a better person, to do good for others and to seek what really matters in life. In line with previous work on film, we predicted the same relations for meaningful versus pleasurable music:

H_5: Listening to meaningful music will be stronger related to a) moral motivations and b) feelings of human connectedness, compared to listening to pleasurable music.

Feelings of being moved do not only lead to a desire to help others, but also to actual altruistic behavior (Menninghaus et al., 2015; Raney et al., 2018; Schnall et al., 2010). More specifically, individuals who are moved are more likely to help others and donate to charity. With music potentially being a powerful motivator for moral motivation, we also hypothesized that:

H_6: Listening to meaningful music will be stronger related to actual altruistic behavior compared to listening to pleasurable music.

In sum, the aim of this study was to examine whether listening to meaningful music and pleasurable music are unique experiences. Following a previous experimental design on film experiences (Oliver et al., 2011), we asked participants to list and then listen to their favorite pleasurable or meaningful song, followed by asking them about their experiences. To broaden the scope of measuring affective experiences, we included the assessment of aesthetic emotions. Aesthetic emotions can arise in response to beautiful appeal of stimuli (Schindler et al., 2017), in this case, music. Examples of aesthetic emotions are being moved or touched, fascination, the feeling of beauty, joy, and awe. Based on previous findings, we expect that the prototypical aesthetic emotion of being moved will be stronger for listeners to meaningful music (H_1), just as epistemic emotions that are connected to meaning and insight (H_4), and feelings of sadness. However, for aesthetic emotions like fascination and feelings of beauty we were not able to give well-defined hypotheses. Whether meaningful and pleasurable music differ from each other on these aesthetic emotions was therefore explored in a research question (RQ_1).

Materials and Methods

Sample Characteristics

The final sample consisted of 105 students aged 18–62 years (M = 23.80; SD = 6.08). Most participants were female (77.3%) and European (84.2%). Participants listened to music almost two hours a day ($M_{minutes}$ = 110.84; SD = 115.39) and 41.9% of them were currently singing or playing an instrument.

Design and Procedure

The study consisted of two parts. First, participants completed a pre-questionnaire which asked about their personality characteristics as well as to name their favorite pleasurable song or music piece and their favorite meaningful song or music piece along with several fillers. After that, participants were invited to the lab for the second part of the study, where they were randomly assigned to listen to either their favorite pleasurable music they named in the pre-questionnaire or their favorite meaningful music. Songs and music tracks were played on *Spotify*, headphones were provided. After listening, the final questionnaire started. Both the pre-test and post-test questionnaire were constructed in *Qualtrics*. This study was approved by the ethics committee at the Faculty of Social Sciences of the Radboud University (ECSW-2018-157) and pre-registered at the Open Science Framework (https://osf.io/qhybx).

Measures

Strong Emotional Experiences. The extent to which the participants experienced a wide range of intense and blended emotions upon listening, was assessed with six items from the subscale "Strong emotional experiences" of The Adaptive Functions of Music Listening Scale (Groarke & Hogan, 2018). Example items are "When listening to music I felt intense emotions" and "When listening to

music I felt a range of emotions" (Cronbach's α = .887). Response options were: 1 = *Strongly Disagree* to 5 = *Strongly Agree*.

Positive Affect. Positive affect was assessed with presenting the participants the following four affect reactions: "Cheerful," "Happy," "Joyful," and "Upbeat" (Oliver et al., 2012). Participants were asked to indicate how much they experienced each reaction while listening to the music (Cronbach's α = .934). Response options were: 1 = *Not at All* to 7 = *Very Much*.

Meaningful Affect. Meaningful affect was assessed with seven items adopted from Oliver et al. (2012): "Touched," "Moved," "Emotional," "Meaningful," "Compassion," "Inspired," and "Tender" (Cronbach's α = .882). Response options were: 1 = *Not at All* to 7 = *Very Much*.

Contemplative Experiences. The extent to which listening led to contemplation was measured with the four-item "Contemplative experiences" subscale from the Revised Emotional Gratification Scale (Bartsch, 2012). Participants were presented the half-sentence: "It was good to experience these feelings…" along with items as: "... because it encourages me to focus on things that are important to me" and "... because it inspires new insights" (Cronbach's α = .757). Participants were asked to indicate how well each statement described their experience with the response options: 1 = *Strongly Disagree* to 5 = *Strongly Agree*.

Aesthetic Emotions. To examine aesthetic emotions, nine subscales from the Aesthetic Emotions Scale (AESTHEMOS) were included (Schindler et al., 2017). For this measure, participants were presented the question: "Which emotional effect did the song/ music piece have on you?", following with statements about emotions along with the response options: 1 = *Not at All* to 5 = *Very*. Of the prototypical aesthetic emotions, the subscale "Being moved" included: "Felt deeply moved" and "Touched

me" (α = .897), the subscale "Fascination": "Was impressed" and "Fascinated me" (α = .732), the subscale "Feeling of beauty/liking": "I found it beautiful" and "Liked it" (α = .533), and the subscale "Awe": "I found it sublime" and "Felt awe" (α = .720). Of the epistemic emotions, the subscale "Intellectual challenge" included: "Challenged me intellectually" and "Was mentally engaged" (α = .752), and the subscale "Insight": "Felt a sudden insight" and "Sensed a deeper meaning" (α = .706). Of the emotions indicative of amusement, the subscale "Joy" included: "Delighted me" and "Made me happy" (α = .738). Of the activating effects of aesthetic experiences, the subscale "Energy" included: "Motivated me to act" and "Energized me" (α = .854). Finally, the subscale "Sadness" included: "Made me sad" and "Made me feel melancholic" (α = .832).

Physical Reactions upon Listening. Physical indicators of meaningful affect were assessed with seven bodily reactions borrowing from previous research, including "Lump in throat" and "Tears crying" (Silvers & Haidt, 2008; Oliver et al., 2012). The reaction "Goosebumps" was added as this is another important physical response to music (Hodges, 2016; Cronbach's α = .743). Physical indicators of pleasure were assessed with four items, including: "Light bouncy" and "Laughter" (Oliver et al., 2012). For all physical reactions, participants were asked to indicate how much they experienced each reaction. Response options were: 1 = *Not at All* to 7 = *Very Much*.

Motivations upon Listening. To assess motivational outcomes upon listening, participants were presented a list of ways the music may have motivated them to behave, including both moral motivations and motivations not related to meaning making. After the half-sentence: "As a result of listening to this song/ music piece I (more or less) feel like..." motivations were presented, such as: "seek what

really matters in life", and "make people laugh" (Algoe & Haidt, 2009; Oliver et al., 2012). Participants were asked to indicate the extent to which each motivation applied to them. Response options were: 1 = *Much Less* to 9 = *Much More*.

Spontaneous Motivations to Connect. Spontaneous reactions and motivations concerning connectedness were assessed with the Twenty Statements Test (TST; Fredrickson & Branigan, 2005). After listening to the music, participants were asked to describe the strongest emotion they felt while listening. Next, they were asked to list all the things they would like to do at that moment given this feeling. These instructions were followed by 20 blank lines that began with: "I would like to_____." A content analysis was done on the written responses. Two independent coders classified each written response into: (1) whether or not each participant indicated a desire to connect or to affiliate with others, and (2) the extent to which participants desired to express their love for others, for instance, by wishing to thank others, to tell beloved ones how much they love them or to hug a beloved one (Algoe & Haidt, 2009). The Krippendorff's alpha test was used to estimate the inter-rater reliability between the two coders (Hayes & Krippendorff, 2007). The inter-rater reliabilities were excellent (α = .956 for the overall desire to connect and α = .931 for the desire to express love).

Altruistic behavior. Altruism was captured with whether or not the participants donated to charity at the end of the study. Upon finishing the post-test questionnaire, the participants received the following instruction: "For your participation, you receive a voucher of 5 euro. Obviously, you can keep it, but you can also give it away to help others. For this study, you can donate your voucher to the foundation *De Vrolijkheid* (translated: Cheerfulness). *De Vrolijkheid* organizes weekly music lessons and workshops at many asylum seekers centers, because they

believe in the power of art and because music plays a huge connecting force. As they state on their website: "The language of music is universal." For more information, see https://vrolijkheid.nl/wat-we-doen/met-muziek/. Would you prefer to keep the voucher or give it away to help them?" Subsequently, they were able to donate anonymously by putting the voucher in an envelope.

Control variables. In the analyses, the following potential confounders were included: sex (Panksepp 1995; Pohling & Diessner, 2016; Raney et al., 2018), age (Oliver & Raney, 2011), currently singing or playing an instrument and how many minutes the participants listened to music every day (Molnar-Szakacs, 2017). Engagement with beauty as a trait was also included with the subscale "Artistic Beauty" from the Engagement with Beauty Scale (Diessner, Solom, Frost, Parsons, & Davidson, 2008; α = .860), along with need for affect (Appel, Gnambs, & Maio, 2012; α = .723), empathy with "Empathic Concern" subscale from the Interpersonal Reactivity Index (IRI; Davis, 1980; α = .751), and feelings of nostalgia (Juslin & Laukka, 2004; α = .929).

Strategy of Analyses

After examining whether randomization resulted in a balanced distribution across conditions, MANOVA's and logistic regression analyses were conducted to test the hypotheses. All analyses were repeated with sex, age, currently singing or playing an instrument, minutes of listening to music per day, engagement with beauty, need for affect, empathy, and nostalgia included as covariates. Finally, we performed additional analyses to examine potential differences between meaningful and pleasurable music. Next to descriptive analyses, a textual analysis on the lyrics was done using the Self-Transcendent Emotions Dictionary (STED; Ji et al., 2018), a

dictionary tool which counts the number of lexicons related to self-transcendent emotions.

Results

Randomization Check

No differences were found between participants in the meaningful music condition and the pleasurable music condition in terms of sex (x^2 [df = 1, N = 105] = 1.318, p = .251), age (t [df = 103, N = 105] = 1.744, p = .084), ethnicity (x^2 [df = 1, N = 105] = .499, p = .480), how many minutes a day they listen to music (t [df = 103, N = 105] = -.338, p = .738), and whether they currently play an instrument or sing (x^2 [df = 1, N = 105] = 1.028, p = .311), indicating that the randomization was successful.

Emotional and Contemplative Experiences upon Listening to Meaningful versus Pleasurable Music

Two analyses were done to shed light on the differences between meaningful and pleasurable music. First, and in line with previous work on film (Oliver et al., 2012), differences in emotional and contemplative experiences upon listening to meaningful or pleasurable music were examined with a MANOVA (Table 1). Findings revealed a significant multivariate effect of music condition [F (4, 100) = 27.066, p < .001, η^2 = .520]. The univariate results provided support for the first hypothesis, as ratings of meaningful affect were significantly higher for the participants who listened to meaningful music, compared to participants who listened to pleasurable music. In other words, listening to meaningful music resulted in stronger feelings of being touched, moved, inspired, compassion, and tenderness. In contrast, positive affect was significantly stronger for the participants who listened to pleasurable music, it made them feel cheerful, happy and joyful. Also, support was found for the fourth hypothesis, as contemplative experiences were significantly

stronger among the participants who listened to meaningful music. This indicated that listeners to meaningful music were more encouraged to think about issues that are of importance to them compared to listeners of pleasurable music.

Contrary to the second hypothesis, the findings did not reveal a significant difference between the two conditions on strong emotional experiences, which indicates that both meaningful and pleasurable music leads to a wide range of intense and blended emotions. When the covariates were included, findings remained the same (these findings are presented in the Supplemental Appendix).

Second, another MANOVA was performed to examine differences in aesthetic emotions (RQ_1; Table 1). Findings revealed a significant multivariate effect of music condition [F (9, 95) = 10.578, $p < .001$, $\eta^2 = .501$], with the univariate results indicating that ratings for the prototypical aesthetic emotions of being moved and fascination were higher for the participants who listened to meaningful music. Concerning the epistemic emotions, the findings revealed that insight was greater among the meaningful music listeners, but no significant difference was found for intellectual challenge. Feelings of sadness were significantly stronger among the participants who listened to meaningful music relative to the participants who listened to pleasurable music. In contrast, joy and increased energy were significantly higher among listeners to pleasurable music. Feelings of beauty and liking did not differ between the two music conditions, which indicates that both listening to meaningful and pleasurable music was experienced as beautiful. Including the covariates did not change the findings (see the Supplemental Appendix).

[Table 1 near here].

Physical Responses upon Listening to Meaningful versus Pleasurable Music

Differences in subjective ratings of physical responses upon listening to meaningful or pleasurable music were also examined with a MANOVA (Table 2). Findings demonstrated a significant multivariate effect of music condition [F (12, 92) = 4.971, $p < .001$, $\eta^2 = .393$], with the univariate results providing some support for the third hypothesis. More specifically, experiences of having a lump in the throat and tears crying were significantly higher for listeners of meaningful music compared to listeners of pleasurable music. In contrast, light and bouncy feelings, higher energy, and laughter were significantly higher for listeners of pleasurable music. However, no significant differences were found for the other physical responses. Including the covariates did not affect the findings (see the Supplemental Appendix).

[Table 2 near here].

Motivation Outcomes upon Listening to Meaningful versus Pleasurable Music

Differences in motivational outcomes were also examined with a MANOVA, of which the findings demonstrated a significant multivariate effect of music condition [F (11, 93) = 3.010, $p = .002$, $\eta^2 = .263$]. Univariate findings indicated that the motivation to seek what really matters in life was significantly higher for listeners of meaningful music compared to listeners of pleasurable music, while the motivation to make people laugh, to enjoy oneself, and to meet new friends was significantly stronger for listeners of pleasurable music (Table 3). No differences were found between meaningful and pleasurable music for the other motivations. When the covariates were included, findings remained comparable (see the Supplemental Appendix).

[Table 3 near here].

Spontaneous Motivations to Connect upon Listening to Meaningful versus Pleasurable Music

Descriptive statistics on the coded spontaneous motivations of the open-ended TST (Fredrickson & Branigan, 2005) indicated that 66.7% of the participants in the pleasurable music condition expressed a desire to connect or to affiliate with others. This was not significantly different from the meaningful condition, in which 72.5% expressed this desire (x^2 [df = 1, n = 105] = 1.101, p = .294). However, a significant difference was found for the desire to express love for others, with 16.7% of the participants in the pleasurable music condition and 39.4% in the meaningful condition expressing this desire (x^2 [df = 1, n = 105] = 5.359, p = .021). The most frequently expressed desire was to hug a beloved one, followed by the desire to tell friends and family how much they love them. A logistic regression indicated that participants who listened to their favorite meaningful music were three times more likely to indicate a desire to express their love to their beloved ones, compared to participants who listened to their favorite pleasurable music (*OR* = 3.226, *95% CI* = 1.298—8.014, p = .012, Nagelkerke R^2 = 9%). This effect remained after including the covariates (see the Supplemental Appendix).

Altruistic Behavior upon Listening to Meaningful versus Pleasurable Music

Descriptive statistics revealed that 41.2% of the participants in the meaningful music condition donated to charity, compared to 37.0% in the pleasurable condition. This was not significantly different (x^2 [df = 1, n = 105] = .189, p = .664). A logistic regression analysis was done to examine the effect of condition on donation behavior while controlling for the covariates. This did not change this finding.

Features of Meaningful and Pleasurable Music

Descriptive statistics indicated that meaningful music was more likely to be instrumental (x^2 [df = 1, n = 104] = 7.799, p = .005) with 13.7% of the pieces being instrumental in contrast to none of the pleasurable pieces. Pop and rock music were

the most popular music genres among both meaningful and pleasurable music (respectively 24.0% and 19.2%). The frequencies for the remaining genres were too small to run x^2- and *t*-tests. Inspection of the genres indicated that (contemporary) classical, epic, and film music were only present among the meaningful music condition, while reggae was only present among the pleasurable condition. Year of release did not significantly differ across conditions (t [df = 102, N = 104] = -.589, p = .557), indicating both pleasurable and meaningful music pieces can be of all times. Findings from the content analysis indicated no differences between the songs on overall self-transcendent emotional experiences (t [df = 73.586, N = 88] = -.028, p = .978), which indicates that both meaningful and pleasurable songs included equal references to general inspiration, awe, admiration, elevation, gratitude, and hope.

Discussion

Findings of this study reveal that listening to meaningful music can be distinguished from listening to purely pleasurable music as it appears to induce unique affective and physical reactions along with different motivations. More specifically, feelings of being moved were stronger for listening to meaningful music compared to listening to pleasurable music (H_1). Two of the physiological responses previously associated with meaningful affect were also higher after listening to meaningful music, namely having a lump in one's throat and being moved to tears (H_3). In contrast, pleasurable music was more likely to lead to joy and other responses indicative of positive affect, including the physical responses of feeling light bouncy, high in energy, and laughter. Another important difference was that meaningful music stemmed listeners to contemplate more and provided them with insight (H_4). Previous findings indicated that strong musical experiences can provide its listeners with new insights about one's thoughts and feelings (Gabrielsson, 2011), and that it appeared to

be sad music that draws the listener's attention inwards (Taruffi et al., 2017). Findings of the present study shed a novel light on this, because music that leads to contemplation and insight appears not to be "just" sad music, but music that is experienced as beautiful and meaningful.

Music as an Emotional Roller Coaster

In contrary to our expectation, listening to meaningful music did not lead to a wider range of intense and blended emotions than listening to pleasurable music (H_2). A possible explanation can be derived when considering the findings on the aesthetic emotions (RQ_1; Schindler et al., 2017). It appears that both listening to meaningful and pleasurable music resulted in feelings of beauty (which is not surprising as they listened to their favorite music). Although both groups liked listening to the music, the experience was different: Listening to meaningful music led to the prototypical aesthetic emotions of being moved and fascination, and the epistemic emotion of experiencing insight. Also, a hint of sadness characterized the experience. This is in line with previous qualitative work indicating that sad music can be experienced as tremendously beautiful (Peltola & Eerola, 2016; Van den Tol & Edwards, 2013). In contrast, pleasurable music led to more amusement and experiences of joy and energy. This is in line with previous work where happy music was found to be related to thoughts about dancing and the summer (Taruffi et al., 2017). Altogether, these findings indicate that both listening to meaningful and pleasurable music can lead to a wide range of intense emotions, but that the blends are different.

Music to Spark Human Connectedness

The findings on motivations demonstrated that listening to meaningful music led to a stronger tendency to seek what really matters in life, compared to listening to pleasurable music (H_{5a}). This is in line with previous work on film which indicated

that meaningful film could spark its viewers to reflect on what matters in life and adjusting their life to what they truly desire (Oliver & Hartmann, 2010; Oliver et al., 2012). It also supports previous experimental work on music that found that listening to awe-eliciting music was related to a stronger motivation to seek what really matters in life, compared to listening to amusing music (Ji et al., 2019). However, the findings also indicated that both pleasurable and meaningful music led to a stronger motivation to be a better person, to do good for others, and to live their lives a better way—all intrinsic motivations, which are related to living a meaningful life (Ryan, Huta, & Deci, 2008).

Moreover, the findings indicated that most listeners of both meaningful and pleasurable music expressed a desire to connect or to affiliate to others—which was in contrast to our expectations (H_{5b}) and previous findings on film (Oliver et al., 2012; Janicke & Oliver, 2017). Nevertheless, only listeners to meaningful music were more likely to express their love for others, for instance, by wanting to hug a beloved one, or to tell friends and family how much they love them. The odds of this desire to express love was almost three times higher for the ones listening to meaningful music than the ones who listened to pleasurable music. Previous findings indicated that music can trigger feelings of connectedness to loved ones (Eerola et al., 2017; Gabrielsson, 2011; Peltola & Eerola, 2016; Sloboda & Juslin, 2001; Van den Tol & Edwards, 2013). The present findings extend this knowledge by demonstrating that listening to music can even lead to behaviors that further strengthen relationships with beloved ones.

That listening to pleasurable music also led to a desire to connect and bond can be explained by the higher levels of positive affect. According to the broaden-and-build theory (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008), positive emotions

can spark individual growth and social connection. Thus, feeling moved, touched and inspired as well as feeling joyful and happy from listening to music can broaden one's thought-action repertoire and therefore wishing to seek out connection with others (Gabrielsson, 2011; Menninghaus et al., 2015; Oliver et al., 2012; Janicke & Oliver, 2017). Meaningful music can open the listener's heart by sparking them to contemplate about life, and expressing love toward close others, while pleasurable music can open the listener's heart by being joyful, making people laugh and make new friends. These findings contribute to the existing knowledge that not only meaningful affect can open up hearts to others, but strong pleasurable affect as well.

The assumption on positive emotions might also explain why we did not find a difference between listening to meaningful and pleasurable music on actual altruistic behavior (H_6), as listening to both meaningful and pleasurable music led to positive feelings. Unfortunately, we do not have a control condition to check this assumption, but there is considerable evidence that positive feelings promote prosocial behavior (Aknin, Van de Vondervoot, & Hamlin, 2018).

Features that Make Music Pleasurable and Meaningful

Descriptive analyses revealed that, compared to pleasurable music, meaningful music was more likely to be instrumental, containing the genres: (contemporary) classical, epic, and film music. The music pieces that were given for these genres were comparable to the awe-inspiring pieces that have been used in previous work (Ji et al., 2019), for instance, Chopin's famous classical piece *Nocturne in E-flat major, Op. 9, No.* 2, but also the modern classic pieces *Night* from Ludovico Einaudi and award-winning *Arrival of the Birds* from The Cinematic Orchestra. These pieces are characterized by unexpected harmonies, rhythmic surprises, and crescendo (Colver & El-Alayli, 2016; Huron & Margulis, 2010). Musical pieces with these features have

been found to predict the presence of meaning in life and willingness to volunteer via feelings of inspiration (Ji et al., 2019). The present study contributes to these prior findings that listening to such music can be experienced as meaningful, move us to think, and provide insight. It can even help to strengthen bonds with others.

Nevertheless, it is not only instrumental music that could be meaningful as most of the meaningful music pieces contained lyrics. Concerning the lyrics, no differences were found between meaningful and pleasurable songs in terms of their references to self-transcendent emotions. In that sense, the extent to which lyrics can resonate with the listener's personal life might be more relevant to the meaningfulness of a song (Eerola et al., 2017). It could also be that meaningful music is perceived as meaningful not (just) because of the lyrics, but because of other features of the music.

Limitations of this Study

It is important to consider the findings of the present study in light of its limitations. First, we did not include a control group. It would be intriguing to replicate this study with a control group and compare the motivations and altruistic behaviors of the music listeners to the ones who do not listen to music. Second, although it is a strength that participants listened to their own favorite music, their level of familiarity with their favorite music piece was not measured. It is conceivable that some of the participants listened so often to their favorite music piece that it made the music less intellectual and affective challenging (Bartsch & Hartmann, 2017; Schindler et al., 2017), which could have weakened the strength of the relations. Third, the level of musicality of the participants was captured in a somewhat limited way. For future studies, it is recommended to examine this more in-depth, for instance, by measuring musical sophistication (Müllensiefen, Gingras, Musil, & Stewart, 2014).

More Challenges for Future Research

Listening to either meaningful or pleasurable music was experienced as beautiful, but both led to a different blend of emotions. Positive emotions can help to draw attention to opportunities (Algoe, 2012; Fredrickson & Branigan, 2005; Fredrickson et al., 2008) and our findings suggest that both meaningful and pleasurable feelings upon listening to music can create this opportunity. According to the find-remind-and-bind theory (Algoe, 2012), the positive emotion of gratitude can help people to bind more closely together and can even set into motion an upward spiral of bonding and positive behaviors. A new theoretical angle would be to examine whether listening to music can put into motion such an upward spiral. Our findings imply that purely pleasurable music can help listeners to *find* a new relationship, while meaningful music can encourage listeners to *remind* them of existing relationships in their lives, and that both help to *bind* people together. Future research is needed to examine whether music actually can enrich social relationships in this way.

Another avenue for future research could be to include the role of the "happy chemical" oxytocin—the neuropeptide that is involved in social bonding. Increased levels of oxytocin can promote improved social decision making and unique social behaviors, but also sensitive parenting, and more hugging with beloved ones (for reviews, see Feldman & Bakermans-Kranenburg, 2017; MacDonald & MacDonald, 2010). This is particularly interesting as the current findings revealed that only listeners to meaningful music were more likely to express their love for others. An underlying mechanism explaining this finding could be increased levels of oxytocin among the ones who listened to meaningful music. To the best of our knowledge, only one study has examined the role of oxytocin in explaining the relationship between meaningful film exposure and mothers being more loving toward their babies

(Silvers & Haidt, 2008). This study provided the first evidence that the connection between a meaningful media experience and the inclination to connect to others might be explained by a release of oxytocin.

Conclusion

Compared to listening to purely pleasurable music, listening to meaningful music appears to evoke stronger feelings of being touched and moved to tears, a hint of sadness, contemplation, insight, a stronger drive for seeking what matters in life, and the wish to express one's love to others. However, both listening to meaningful and pleasurable music led to intense emotions and a willingness to connect to others. In other words, both emotional experiences are rich, but in a different way. Finally, findings of this study indicate that the label of "meaningful music" can help to understand why people listen to music that makes them sad. After all, the experience of listening to meaningful music appears to go beyond feelings of sadness and is characterized by aesthetic emotions of being moved and feelings of beauty.

Declaration of interest statement

No potential conflict of interest was reported by the authors.

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Table 1

Emotional and Contemplative Experiences upon Listening

	Meaningful Music *M (SD)*	Pleasurable Music *M (SD)*	Univariate *F*(*df*)	η^2
Emotional and contemplative experiences			(4, 100)	
Strong emotional experiences	3.74 (.85)	3.60 (.86)	.729	.007
Positive affect	3.88 (1.46)	5.94 (1.00)	71.519***	.410
Meaningful affect	5.37 (.88)	4.34 (1.45)	19.209***	.157
Contemplative experiences	3.95 (.70)	3.44 (.99)	9.304**	.083
Aesthetic emotions			(9, 95)	
Prototypical aesthetic emotions				
Being moved	4.02 (.87)	3.12 (1.40)	15.499***	.131
Fascination	4.17 (.80)	3.68 (.93)	8.350**	.075
Feeling of beauty/ liking	4.59 (.59)	4.50 (.51)	.671	.006
Awe	3.33 (.99)	3.06 (1.07)	1.765	.017
Epistemic emotions				
Intellectual challenge	3.14 (1.09)	2.88 (1.21)	1.309	.013
Insight	3.42 (.96)	2.73 (1.36)	8.901**	.080
Amusement				
Joy	3.43 (1.06)	4.31 (.70)	25.110***	.196
Animation				
Energy	3.14 (1.14)	4.44 (.78)	46.648***	.312
Sadness				
Sadness	3.30 (1.11)	1.81 (1.10)	47.852***	.317

Note. ** $p < .01$; *** $p < .001$.

Table 2

Physical Responses upon Listening

	Meaningful Music *M (SD)*	Pleasurable Music *M (SD)*	Univariate $F(12, 92)$	η^2
Lump in throat	3.39 (1.78)	2.19 (1.53)	13.941***	.119
Tears crying	2.75 (1.81)	1.80 (1.42)	8.993**	.080
Muscles tensed	2.35 (1.47)	1.93 (1.24)	2.602	.025
Rising or open chest	3.20 (1.55)	3.30 (1.87)	.089	.001
Chills	3.73 (1.91)	3.19 (1.85)	2.165	.021
Warmth in chest	3.55 (1.70)	4.06 (1.98)	1.972	.019
Goosebumps	3.35 (1.65)	2.87 (1.78)	2.071	.020
Increased heart rate	2.76 (1.67)	3.39 (1.82)	3.352	.032
Light bouncy	2.90 (1.57)	4.46 (1.86)	21.517***	.173
High energy	3.41 (1.79)	5.43 (1.69)	35.177***	.255
Laughter	2.24 (1.57)	4.02 (1.85)	28.244***	.215
Muscles relaxed	4.47 (1.73)	4.61 (1.66)	.181	.002

Note. ** $p < .01$; *** $p < .001$.

Table 3

Motivation Outcomes upon Listening

	Meaningful Music *M (SD)*	Pleasurable Music *M (SD)*	Univariate $F(11, 93)$	η^2
Be a better person	6.04 (1.39)	5.61 (2.12)	1.479	.014
Do good things for other people	6.14 (1.79)	6.13 (2.05)	.000	.000
Seek what really matters in life	7.02 (1.56)	6.17 (2.21)	5.139*	.048
Live my life a better way	6.25 (1.71)	6.28 (2.14)	.004	.000
Adjust my life to what I really want	6.43 (1.88)	6.37 (2.09)	.025	.000
Make people laugh	4.78 (2.33)	5.91 (2.48)	5.725*	.053
Enjoy myself	6.53 (2.03)	7.72 (1.37)	12.580**	.109
Work hard to achieve success	5.69 (2.45)	5.26 (2.44)	.801	.008
Meet new friends	4.65 (2.29)	5.91 (2.23)	8.187**	.074
Make a lot of money	3.39 (2.13)	3.80 (2.57)	.767	.007
Be popular	2.76 (1.74)	3.41 (2.13)	2.845	.027

Note. * $p < .05$; ** $p < .01$.

Supplemental Appendix

Table A1

Emotional and Contemplative Experiences upon Listening including the Covariates

	Meaningful Music *M (SD)*	Pleasurable Music *M (SD)*	*F*(*df*)	η^2
Emotional and contemplative experiences			(4, 92)	
Sex	—	—	.675	.028
Age	22.75 (5.03)	24.80 (6.83)	2.084	.083
Currently singing or playing	—	—	.417	.018
Minutes of music listening	111.77 (126.46)	107.13 (104.94)	1.384	.057
Engagement with beauty	4.44 (1.34)	4.50 (1.41)	2.597*	.101
Need for affect	5.01 (.80)	4.99 (.76)	1.779	.072
Empathy	3.88 (.52)	3.94 (.61)	.931	.039
Nostalgia	3.83 (1.90)	4.78 (1.82	.921	.079
Strong emotional experiences	3.74 (.85)	3.60 (.86)	1.470	.015
Positive affect	3.88 (1.46)	5.94 (1.00)	63.744***	.402
Meaningful affect	5.37 (.88)	4.34 (1.45)	27.916***	.227
Contemplative experiences	3.95 (.70)	3.44 (.99)	9.779**	.093
Aesthetic emotions			(9, 87)	
Sex	—	—	1.426	.129
Age	22.75 (5.03)	24.80 (6.83)	1.376	.125
Currently singing or playing	—	—	1.156	.107
Minutes of music listening	111.77 (126.46)	107.13 (104.94)	.357	.036
Engagement with beauty	4.44 (1.34)	4.50 (1.41)	.863	.082
Need for affect	5.01 (.80)	4.99 (.76)	2.605*	.212
Empathy	3.88 (.52)	3.94 (.61)	1.847	.160
Nostalgia	3.83 (1.90)	4.78 (1.82	.805	.077
Prototypical aesthetic emotions				
Being moved	4.02 (.87)	3.12 (1.40)	22.649***	.193
Fascination	4.17 (.80)	3.68 (.93)	9.629**	.092
Feeling of beauty/ liking	4.59 (.59)	4.50 (.51)	.957	.010
Awe	3.33 (.99)	3.06 (1.07)	2.643	.027
Epistemic emotions				

Intellectual challenge	3.14 (1.09)	2.88 (1.21)	1.850	.019
Insight	3.42 (.96)	2.73 (1.36)	12.620***	.117
Amusement				
Joy	3.43 (1.06)	4.31 (.70)	20.183***	.175
Animation				
Energy	3.14 (1.14)	4.44 (.78)	40.013***	.296
Sadness				
Sadness	3.30 (1.11)	1.81 (1.10)	45.917***	.326

Note. ** $p < .01$; *** $p < .001$. The multivariate effect of music condition was F (4, 92) = 26.138, $p < .001$, $\eta^2 = .532$ and F (4, 87) = 9.582, $p < .001$, $\eta^2 = .498$, respectively.

Table A2

Physical Responses upon Listening including the Covariates

	Meaningful Music *M (SD)*	Pleasurable Music *M (SD)*	*F*(12, 84)	η^2
Sex	—	—	2.109*	.232
Age	22.75 (5.03)	24.80 (6.83)	1.072	.133
Currently singing or playing	—	—	1.033	.129
Minutes of music listening	111.77 (126.46)	107.13 (104.94)	1.475	.174
Engagement with beauty	4.44 (1.34)	4.50 (1.41)	.258	.036
Need for affect	5.01 (.80)	4.99 (.76)	1.158	.142
Empathy	3.88 (.52)	3.94 (.61)	1.014	.127
Nostalgia	3.83 (1.90)	4.78 (1.82)	1.272	.154
Lump in throat	3.39 (1.78)	2.19 (1.53)	15.550***	.141
Tears crying	2.75 (1.81)	1.80 (1.42)	7.543**	.074
Muscles tensed	2.35 (1.47)	1.93 (1.24)	3.850	.039
Rising or open chest	3.20 (1.55)	3.30 (1.87)	.109	.001
Chills	3.73 (1.91)	3.19 (1.85)	2.268	.023
Warmth in chest	3.55 (1.70)	4.06 (1.98)	1.705	.018
Goosebumps	3.35 (1.65)	2.87 (1.78)	2.929	.030
Increased heart rate	2.76 (1.67)	3.39 (1.82)	1.814	.019
Light bouncy	2.90 (1.57)	4.46 (1.86)	20.333***	.176
High energy	3.41 (1.79)	5.43 (1.69)	28.581***	.231
Laughter	2.24 (1.57)	4.02 (1.85)	18.475***	.163
Muscles relaxed	4.47 (1.73)	4.61 (1.66)	.317	.003

Note. ** $p < .01$; *** $p < .001$. The multivariate effect of music condition was F (12, 84) = 4.197, $p < .001$, $\eta^2 = .375$.

Table A3

Motivation Outcomes upon Listening including the Covariates

	Meaningful Music *M (SD)*	Pleasurable Music *M (SD)*	*F*(11, 85)	η^2
Sex	—	—	.906	.105
Age	22.75 (5.03)	24.80 (6.83)	1.218	.136
Currently singing or playing	—	—	.445	.054
Minutes of music listening per day	111.77 (126.46)	107.13 (104.94)	1.093	.124
Engagement with beauty	4.44 (1.34)	4.50 (1.41)	.914	.106
Need for affect	5.01 (.80)	4.99 (.76)	1.098	.124
Empathy	3.88 (.52)	3.94 (.61)	1.443	.157
Nostalgia	3.83 (1.90)	4.78 (1.82	1.192	.134
Be a better person	6.04 (1.39)	5.61 (2.12)	2.399	.025
Do good things for other people	6.14 (1.79)	6.13 (2.05)	.358	.004
Seek what really matters in life	7.02 (1.56)	6.17 (2.21)	6.683*	.066
Live my life a better way	6.25 (1.71)	6.28 (2.14)	.010	.000
Adjust my life to what I really want	6.43 (1.88)	6.37 (2.09)	.100	.001
Make people laugh	4.78 (2.33)	5.91 (2.48)	3.604	.037
Enjoy myself	6.53 (2.03)	7.72 (1.37)	9.212**	.088
Work hard to achieve success	5.69 (2.45)	5.26 (2.44)	.794	.008
Meet new friends	4.65 (2.29)	5.91 (2.23)	5.984*	.059
Make a lot of money	3.39 (2.13)	3.80 (2.57)	.666	.007
Be popular	2.76 (1.74)	3.41 (2.13)	2.747	.028

Note. * $p < .05$; ** $p < .01$. The multivariate effect of music condition was F (11, 85) = 2.558, $p < .01$, $\eta^2 = .249$.

Table A4

Findings of the Logistic Regression for the Desire to Express Love

		95% CI for Odds Ratio		
	b	*Lower*	*Odds*	Upper
Constant	-2.306			
Sex	.097	.316	1.102	3.849
Age	.039	.965	1.040	1.120
Currently singing or playing	-.912	.146	.402	1.109
Minutes of music listening per day	.001	.997	1.001	1.005
Engagement with beauty	.009	.706	1.009	1.443
Need for affect	.230	.679	1.259	2.335
Empathy	-.050	.357	.951	2.536
Nostalgia	.077	.827	1.080	1.410
Condition	1.318*	1.366	3.737	10.227

Note. Nagelkerke R^2 = 15.9%; model χ^2 (9) = 12.218; * $p < .05$.