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Music listening as an emotion regulation strategy of university-students during COVID-19 lockdown

Aikaterini Vasiou, Stella Danou, Aimilianos Sideris

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Aikaterini C. Vasiou[1], Stella A. Danou[2], Aimilianos N. Sideris[3]
avasiou@uoc.gr, danoustella@yahoo.gr, aimilainos.sideris@gmail.com

[1] Department of Primary Education, University of Crete
[2] Saint Louis University, Missouri, USA
[2] University of London, UK

Abstract. The purpose of the current study was to examine the impact of positive music listening experience and musical emotion regulation strategies as predictors of university-students' affect during COVID-19 lockdown. Two hundred and three undergraduate students completed an on-line self-report questionnaire consisting of Positive Music Listening Experience Scale, Music Uses and Gratifications Scale, Positive and Negative Affect Schedule. Results indicate that students' positive affect is positively related with positive music listening experience as well as with negative mood management, whereas negative affect is negatively related with negative mood management. Furthermore, positive music listening experience was the only predictor of positive affect, while both emotion regulation strategies were predictors of negative affect. Results indicate the importance of music listening as an emotion regulation strategy of students during pandemic. The practical applications and limitations of the research are discussed.

Key-words: COVID-19, emotion regulation strategies, music listening, positive affect, negative affect, university-students

Η μουσική ως στρατηγική ρύθμισης του συναισθήματος του φοιτητικού πληθυσμού στη διάρκεια της απαγόρευσης της κυκλοφορίας λόγω του COVID-19

Περίληψη. Σκοπός της παρούσας μελέτης ήταν να εξετάσει την επίδραση της θετικής εμπειρίας μουσικής ακρόασης, καθώς και τις στρατηγικές ρύθμισης του συναισθήματος μέσω της μουσικής ως προγνωστικούς παράγοντες του συναισθήματος του φοιτητικού πληθυσμού κατά τη διάρκεια της απαγόρευσης της κυκλοφορίας λόγω του COVID-19. Διακόσιοι τρία άτομα από προπτυχιακό φοιτητικό πληθυσμό συμπλήρωσαν διαδικτυακό ερωτηματολόγιο αυτοαναφοράς, αποτελούμενο από τις κλίμακες: Positive Music Listening Experience Scale, Music Uses and Gratifications Scale, Positive and Negative Affect Schedule. Τα αποτελέσματα έδειξαν ότι το θετικό συναίσθημα του φοιτητικού πληθυσμού συσχετίζεται θετικά με τη θετική εμπειρία μουσικής ακρόασης, καθώς και με τη διαχείριση της αρνητικής διάθεσης, ενώ το αρνητικό συναίσθημα συσχετίζεται αρνητικά με τη διαχείριση της αρνητικής διάθεσης. Επιπλέον, η θετική εμπειρία μουσικής ακρόασης ήταν ο μοναδικός προγνωστικός παράγοντας του θετικού συναισθήματος, ενώ και οι δύο στρατηγικές ρύθμισης του συναισθήματος ήταν προγνωστικοί παράγοντες του αρνητικού συναισθήματος. Τα αποτελέσματα αναδεικνύουν τη σημασία της μουσικής ακρόασης ως στρατηγικής ρύθμισης του συναισθήματος του φοιτητικού πληθυσμού κατά τη διάρκεια της πανδημίας. Συζητούνται οι πρακτικές εφαρμογές και οι περιορισμοί της έρευνας.

Introduction

A substantial number of recent studies have aimed to examine university-students' well-being as related to the pandemic specific circumstances (e.g., Ballester-Ferrer et al., 2022; Krautter et al., 2022; Plakhotnik et al., 2021). In this context, there is additional data to support negative impact of COVID-19 pandemic on students' mental health and affect. For example, obsession, anxiety, and fear were identified in the questionnaires administered to approximately 500 university-students in China, resulting from conditions such as challenges of remote learning and home quarantine (Jiang, 2020). Fear of the coronavirus was mentioned to result in stress, while psychological trauma and harmful effects were expected as outcomes of physical distancing measures and economic problems (Lange & Sun, 2022). Among other findings, depression symptoms were highly rated by the majority of students participating in the study of Sun et al. (2021).

Similar findings about the psychological effects of COVID-19 pandemic can be found in surveys conducted on university students in different countries. Mild to severe generalized anxiety disorder was demonstrated in 65% of the students and high level of perceived stress in 56% of the students in a sample of 914 students participating in the study of Rogowska et al. (2020) administered in Poland. Related supporting findings were also revealed in a British study held by Gadi et al. (2022). Specifically, the levels of five distinct emotions including sadness, irritability, fatigue, frustration, and loneliness, were investigated. Most commonly, each of those emotions appeared to be increased, while more than half of the students were mentioned to experience feelings of anxiety, stress, worry, irritability, fear, and difficulty relaxing (Gadi et al., 2022). A quantitative study administered in China revealed that university students classified their perceived stress and anxiety levels as moderate (Adjepong et al., 2022). Increased levels of depression, anxiety, stress, and negative affect were found by Kornilaki (2022) on university students in Greece. Such findings could formulate an argument towards an increasingly negative impact of Covid-19 related conditions to university-students' affect, or an admission that "university life is at least moderately stressful" (Adjepong et al., 2022, p.4).

Emotion regulation is one of the most widely developed area in psychological research (Tull & Aldao, 2015) and refers to the processes that modify the frequency, intensity, and duration of emotional states (Gross, 2015) to function adaptively (Beauchaine & Cicchetti, 2019). When people are asked about their emotion regulation, they usually describe their efforts to down-regulate negative emotions, such as anger, sadness, and anxiety (Gross et al., 2006) or to up-regulate positive emotions, such as love, interest, and joy (Quoidbach et al., 2010). Gross and John (2003) proposed two main emotion regulation strategies: *cognitive reappraisal,* which is associated with positive behavioral, emotional, and cognitive outcomes and *suppression,* which is related to negative and maladaptive adjustment. Emotion regulation not only reinforces psychological health and well-being, but also helps to deal with negative life events and stress (for review, see Kobylińska & Kusev, 2019). The ability to regulate emotions' experience and expression, within challenging situations, is fundamental for healthy development across the lifespan (Zeman et al., 2006).

Researchers have been increasingly interested in the effect of music upon emotions for decades (Gross, 1998; Juslin & Lakka, 2004; Sloboda & O'Neil, 2001; Uhlig et al., 2013). Although feelings through music are reported to vary among individuals (Baltes & Miu, 2014), the psychological response to rhythm is viewed as a universal human experience (Zentner &

Scherer, 2008). Particularly, a substantial amount of research has revealed that music listening may enhance the development of pleasant emotions like excitement, relaxation, calmness, affection, and satisfaction (Juslin et al., 2008; Juslin & Laukka, 2004; Maksimainen & Saarikallio, 2015), esthetic enjoyment, like beauty (Istók et al., 2009) and ultimate experiences, like surprise, desire, sensuality, power, or exceedance (Zentner & Scherer, 2008). Accordingly, a number of recent studies reported that musical therapy sessions may take effect as beneficial interventions because they increase positive affect and reduce negative affect (e.g., Fredenburg & Silverman, 2014).

Concurrently, music listening can be employed as a tool for emotion regulation, as some individuals choose music in order to reduce negative emotions (Getz et al., 2012) and high levels of stress (Getz et al., 2012; Vella & Mills, 2017) or even to reduce their negative moods and increase their positive moods (Lonsdale & North, 2011). From a biological perspective, slow, meditative music is expected to reduce stress by adjusting heart rate, a part of the different natural body rhythms (Bernardi et al., 2006; Bringman et al., 2009; Chlan, 2000; Hilz et al., 2014; Nomura et al., 2013; Thaut & Hoemberg, 2014). Pursuing this further, evidence supports the use of music as a means to manage emotions (Allen et al., 2009; Juslin et al., 2014; Juslin & Laukka, 2004; Sloboda & O'Neill, 2001). Indicatively, music is thought to have a positive impact on long term mood disorders like depression (Miranda & Claes, 2009; Miranda et al., 2010). Ter Bogt et al., (2017) claimed that adolescents with anxious and depressive behavior are more likely to look for comfort through music. Further, young adults often turn to music in response to their feelings of anger or in an effort to vent their emotions (Labbé et al., 2007; Sharman & Dingle, 2015). In a recent study involving university-students, (Cook et al., 2019) certain types of music were able to determine the result of emotional regulation.

As the COVID-19 pandemic offered a unique opportunity to study individual strategies to a collective stressor, there are several studies which examined how people used music to regulate their emotions effectively in response to this situation (Hennessy et al., 2021). For example, people in Spain dedicated to musical activities during the lockdown to cope, and declared that music listening helped them relax, escape, and raise their mood (Cabedo-Mas et al., 2021). Hennessy et al. (2021) examined in an online survey if people from four different countries (Italy, United Kingdom, United States, and India) used music to manage their emotions and found that there was a positive relationship between the use of music listening for affect regulation and current well-being, particularly for participants from India. Furthermore, another online research conducted by Granot et al. (2021) in 11 different countries found that music was remarkably effective at expressing negative emotions and retaining good mood, across cultures. In a sample consisting of 402 domestic and international university-students in Australia, it was found that strategies such as music listening were effective under the circumstances of a pandemic, as they were related positively with well-being (Vidas et al., 2021). Additionally, in a survey with over 700 students in Canada music was rated in the top spots for maintaining well-being and 52% of the participants indicated or consider participating in music therapy classes (Finnerty et al., 2021).

While research in Greece has examined how university-students experienced online education (Giannoulas, et al., 2021) and the psychological consequences of the pandemic on them (Kornilaki, 2022), very little evidence exists about how students regulated their negative emotions and whether they did use music as a strategy to regulate them. Therefore, the purpose of the current study was to examine the impact of positive music listening experience and musical emotion regulation strategies as predictors of university-students' affect during COVID-19 lockdown and to explore the potential distinctive influences of different sources of emotion regulation on students' affect as well.

We formulated the following hypotheses:

1. Positive music listening experience and musical emotion regulation strategies will be correlated positively with students' positive affect and negatively with negative affect.

2a. Positive music listening experience and musical emotion regulation strategies will be identified as positive predictive factors of students' positive affect.

2b. Positive music listening experience and musical emotion regulation strategies will be identified as negative predictive factors of students' negative affect.

Method

Participants and procedure

Participants were 203 undergraduate students. More specifically, they were 173 (85.2%) women and 27 men (13.3%). Their average age was 24.97 years old (*SD*= 8,80). The study was conducted in October 2021, when students returned to university after the country's lockdown due to the COVID-19 pandemic. For the purpose of the study, we created a comprehensive online questionnaire. The survey was promoted through social media so that we could recruit enough students. Participants were provided with an electronic form describing the objective of the study and the confidential nature of their participation. In addition, the form elaborated on issues of protection of privacy and ethics, and provided contact details of the first author. Participants were asked to confirm that they had read the form and that they were willing to participate in the study. Upon receipt of this confirmation, they were directed to the questionnaires described below. Students were asked to respond to all the answers, while they were informed participation would be anonymous.

Measures

The impact of music listening was measured by the Positive Music Listening Experience Scale (*PMLES*; Chang et al., 2021). The PMLES consists of one item on the frequency of intentional listening to music and 14 items regarding the effects of this listening on (1) coping, for example "Helps me to better cope with worries", (2) solitude, for example "I Prefer to do alone", and (3) contemplative experience, for example "Gives me a sense of beauty that nothing else can". These comprised three subscales, respectively. The total PMLES score was estimated by adding all 15 items. The score for the 15 items ranges on a five-point Likert-type scale from 1 (not at all or never) to 5 (very much or very often). In the current study, Cronbach's was α = .94.

Musical emotion regulation strategies were measured by two subscales from the 48-item Music Uses and Gratifications scale by Lonsdale and North (2011). The scale includes eight subscales, each with six items, measuring additional reasons for listening to music that are less affective in nature (all subscales had good internal consistency; α ≥ .74). For the purpose of this research only two subscales were used. Specifically, the first related to positive mood management, where music is used to entertain and create positive moods, and the second related to negative mood management, where music is used to alleviate negative feelings and to enhance mood. Both subscales have been previously employed in a similar recent study (Cook et al., 2019). Participants were asked to rate the extent to which each statement accurately described why they listened to music, and responses were measured on an 11-point scale (0 = not at all, 10 = completely). Examples of the questions are: "I hear music as a relief from stress (negative mood management)" or "I hear music to feel better (positive mood management)". In the current study, the Cronbach's for these two subscales were α≥ .73.

Positive and negative trait affect was measured by Positive and Negative Affect Schedule (*PANAS*; Watson et al., 1988). The PANAS is a 20-item self-report instrument that consists of two affect scales (10 items each), positive trait affect and negative trait affect. Each scale is measured by a 5-point Likert-type scale ranging from 1 (very slightly or not at all) to 5 (extremely). Participants were asked to indicate the extent to which they have had a certain feeling over the past week (for example: interested, excited, guilty, scared). Some examples of the questions are the following: "Indicate the extent you feel enthusiastic right now" or "Indicate the extent you feel disappointed right now". In the current study, Cronbach's was α= .849 for positive affect and α= .840 for negative affect.

Results

According to the answers (Table 1), there were high levels of positive music listening and musical emotion regulation strategies and students' positive affect while there were low levels of students' negative affect.

Table 1. Mean and standard deviation of the variables

Variables	M	SD
Positive Music Listening[a]	3.68	.76
Positive Mood Management[b]	7.41	1.91
Negative Mood Management[b]	8.61	1.58
Positive Affect[c]	3.14	.94
Negative Affect[c]	1.85	.86

Note. [a]Scale 1-5, [b]Scale 1-10, [c]Scale 1-5.

In order to examine the relationship between positive impact of music listening, musical emotion regulation strategies and students' affect during the pandemic of COVID-19, Pearson correlation coefficient r was calculated (Table 2). In terms of positive affect, a positive moderate correlation was found with positive impact of music listening $r(201) = .27$, $p < .01$, as well as with negative mood management $r(201) = .25$, $p < .01$, whereas in terms of negative affect, a negative moderate correlation was found only with negative mood management $r(201) = -.14$, $p < .05$.

Table 2. Correlation between variables

Variables	1	2	3	4	5
Positive music listening	-				
Positive mood management	.43**	-			
Negative mood management	.40**	.59**	-		
Positive affect	**.27****	.11	**.25****	-	
Negative affect	.06	.04	**-.14***	-.02	-

Note. 1. Positive music listening, 2. Positive mood management, 3. Negative mood management 4. Positive affect, 5. Negative affect. *p < .05, **p < .01

Moreover, a multiple regression analysis was performed, with students' positive affect as the dependent variable and both positive impact of music listening and musical emotion regulation strategies as predictors (Table 3). The resulting model was statistically significant (F =8.03, df = 3, p <.05) and explained 33% of the variance (R^2 = .03) of students' positive affect. Of the 3 predictor variables participating in the model, only positive impact of music listening emerged as statistically significant.

Table 3. Multiple regression analysis for predicting positive affect by music listening and musical emotion regulation strategies

Predictors	B	Std. Error	Beta	t	Sig.
(Constant)	1.36	.39		3.45	.00
Positive music listening	**.29***	.09	.23	3.08	**.00**
Positive mood management	-.07	.04	-.13	-1.56	.12
Negative mood management	.14	.05	.24	2.79	.01

*Note. *p < .0,5 **p < .01*

Afterwards, a multiple regression analysis was performed with students' negative affect as the dependent variable and both positive impact of music listening and musical emotion regulation strategies as predictors (Table 4). The resulting model was statistically significant (F =3.92, df = 3, p <.01) and explained 56% of the variance (R^2 = .06) of students' negative affect. Of the 3 predictor variables participating in the model, musical emotion regulation strategies, thus positive mood management and negative mood management, emerged as statistically significant.

Table 4. Multiple regression analysis for predicting negative affect by music listening and musical emotion regulation strategies

Predictors	B	Std. Error	Beta	t	Sig.
(Constant)	2.22	.37		5.95	.00
Positive music listening	.11	.09	.09	1.22	.22
Positive mood management	**.08***	.04	.18	2.00	**.05**
Negative mood management	**-.16****	.05	-.29	-3.31	**.00**

*Note. *p < .05, **p < .01*

Discussion

The purpose of the current study was to examine music listening and musical emotion regulation strategies as predictors of university-students' affect during COVID-19 lockdown and to explore the potential distinctive influences of different sources of emotion regulation on their affect as well. In regard with Hypothesis 1, it was found that students' positive affect was positively related with positive music listening experience as well as with negative mood management, while students' negative affect was negatively related with negative mood

management. These findings are in line with previous research indicating that music listening enhances pleasant emotions (Juslin et al., 2008; Juslin & Laukka, 2004; Maksimainen & Saarikallio, 2015) and explaining why individuals use music as a tool to regulate their negative emotions (Getz et al., 2012; Vella & Mills, 2017). Results extend the emotion regulation theory about adaptability of emotional states (Beauchaine & Cicchetti, 2019; Gross, 2015). Furthermore, from the field of psychoanalysis, music-listening has been reported to open space for people to connect to their own life stories and to show greater acceptance for disruptive phases e.g., the death of a loved one (Storr, 1992). This has also been reported to coincide with greater demand for music-listening. This might allow us to expect that participants who scored higher on the first PMLES item would show greater acceptance to the disruptive effects of the pandemic and the restricting policies that followed it.

Moreover, the impact of positive music listening experience was a positive predictor of students' positive affect (Hypothesis 2a), while positive mood management and negative mood management were negative predictors of students' negative affect (Hypothesis 2b). These findings suppose that students who listen to the music have increased levels of positive affect, while students who listen to the music either to feel better or to find relief from stress have reduced levels of negative affect. Therefore, the present findings are in line with previous ones proposing that music as an emotion management tool can operate as a positive relaxation factor and lighten negative emotions (Shifriss et al., 2015). Music-listening has also been linked to increased levels of imagination deployment (Hess, 2021), which is in turn associated with problem-solving abilities (McFarland et al., 2017). Intentional music-listening and the effects it has on negative emotion management could be seen as prospective problem-solving, where the problem is the changes brought about by the pandemic and thus protect the listener from feelings of helplessness.

In the face of the pandemic, where people had to make drastic changes in their everyday habits, routines and ways of socialization, music-listening helped them face and metabolize the hardship that came with uncertainty and anxiety due to the invisible enemy (Finnerty et al., 2021). Given that emotion regulation is fundamental during challenging situations of human life (Zeman et al., 2006), present findings propose that adaptive strategies such as music listening can help people deal with negative life events like COVID-19 pandemic. Building on from this, the use of music as a tool for psychological well-being can be generalized outside the strict context of the pandemic and the changes in social habits that followed.

The present study reveals a general trend towards the beneficial results of exposure to music. Given that the findings concern university students in emerging adulthood (Arnett, 2000, 2012) and that emerging adults spend most time on the internet and listening to music (Coyne et al., 2016), it seems that music could not be taken as the predictor of mental health for general population. Music listening is already used as a therapeutic tool for mental health problems, and this provides a solid basis for assuming that the introduction of music therapy to universities could be a promising field for the promotion of mental health well-being among students. Further research is needed, as well as meticulous planning and careful implementation. Drawing from research on assisted vs. self-guided mental health interventions, on the other hand, a general tendency for the greater effects of the former can be seen (Fischer et al., 2020). Bringing these together, we could formulate the basis for a common ground between the two. A class or workshops where students are taught the importance of musical characteristics like timbre and tempo, how they help shape musical experience and how we could use them as targets for channelling and changing our mood (e.g., Swaminathan & Schellenberg, 2015) could be suggested as an idea for improving the mental well-being of students around the globe.

In general, our research indicates positive music listening experience and musical emotion regulation strategies as important factors to predict university-students' affect during a global crisis experienced at the same time by large populations and suggests a general trend for students' mental well-being. Nevertheless, the present study has some limitations. The cross-sectional design and the small number of participating students do not permit the generalisation of the findings. Future studies with longitudinal design and more participants are needed to permit causal inferences among these variables. Of course, local, and culture-specific ways of interpreting musical characteristics would have to be taken into consideration (Ryczkowska, 2022). The lack of such explorations can be considered as another limitation of our research. Our study also brings to light the importance of listening to self-selected music. Future qualitative research could also include students' interviews to examine in-depth factors that bring the focus into the act of selecting music with certain characteristics such as timber, tempo, tone (McAdams & Giordano, 2015; Siedenburg et al., 2016) to mirror and/or to modify the listeners' emotions during specified and adverse circumstances, such as that of a global health crisis.

References

Adjepong, M., Amoah-Agyei, F., Du, C., Wang, W., Fenton, J. I., & Tucker, R. M. (2022). Limited negative effects of the COVID-19 pandemic on mental health measures of Ghanaian university students. *Journal of Affective Disorders Reports,* 100306. https://doi.org/10.1016/j.jadr.2021.100306

Allen, R., Hill, E., & Heaton, P. (2009). Hath charms to soothe...' An exploratory study of how high-functioning adults with ASD experience music. *Autism, 13*(1), 21-41. https://doi.org/10.1177%2F1362361307098511

Arnett, J. J. (2000). Emerging adulthood: A theory of development from late teens through the twenties. *American Psychologist, 55,* 469–480. https://doi.org/10.1037/0003-066X.55.5.469

Arnett, J. J. (2012). New horizons in research on emerging and young adulthood. In A. Booth, S.L. Brown, N.S. Landale, W. D. Manning, & S. M. McHale (Eds.), *Early adulthood in family context* (pp. 231–244). Springer.

Ballester-Ferrer, J. A., Carbonell-Hernández, L., Pastor, D., & Cervelló, E. (2022). COVID-19 Quarantine Impact on wellbeing and cognitive functioning during a 10-week high-intensity functional training program in young university students. *Frontiers in Behavioral Neuroscience, 16.* https://doi.org/10.3389/fnbeh.2022.822199

Baltes, F. R., & Miu, A. C. (2014). Emotions during live music performance: Links with individual differences in empathy, visual imagery, and mood. *Psychomusicology: Music, Mind, and Brain, 24*(1), 58. https://psycnet.apa.org/doi/10.1037/pmu0000030

Beauchaine, T. P., & Cicchetti, D. (2019). Emotion dysregulation and emerging psychopathology: A transdiagnostic, transdisciplinary perspective. *Development and Psychopathology, 31*(3), 799–804. https://doi.org/10.1017/S0954579419000671

Bernardi, L., Porta, C., & Sleight, P. (2006). Cardiovascular, cerebrovascular, and respiratory changes induced by different types of music in musicians and non-musicians: the importance of silence. *Heart, 92*(4), 445-452. http://dx.doi.org/10.1136/hrt.2005.064600

Bringman, H., Giesecke, K., Thörne, A., & Bringman, S. (2009). Relaxing music as pre-medication before surgery: A randomised controlled trial. *Acta Anaesthesiologica Scandinavica, 53,* 759–764. https://doi.org/10.1111/j.1399-6576.2009.01969.x

Cabedo-Mas, A., Arriaga-Sanz, C., & Moliner-Miravet, L. (2021). Uses and perceptions of music in times of COVID-19: a Spanish population survey. *Frontiers in Psychology,* 3928. https://doi.org/10.3389/fpsyg.2020.606180

Chang, J., Lin, P., & Hoffman, E. (2021). Music major, affects, and positive music listening experience. *Psychology of Music, 49*(4), 841-854. https://doi.org/10.1177%2F0305735619901151

Chlan, L. L. (2000). Music therapy as a nursing intervention for patients supported by mechanical ventilation. *AACN Advanced Critical Care, 11,* 128–138. https://doi.org/10.1097/00044067-200002000-00014

Cook, T., Roy, A. R. K., & Welker, K. M. (2019). Music as an emotion regulation strategy: An examination of genres of music and their roles in emotion regulation. *Psychology of Music, 47,* 144–154. https://doi.org/10.1177%2F0305735617734627

Coyne, S. M., Padilla-Walker, L. M., & Howard, E. (2016). Media uses in emerging adulthood. In J. J. Arnett (Ed.), *The Oxford handbook of emerging adulthood* (pp. 349–363). Oxford University Press.

Finnerty, R., Marshall, S. A., Imbault, C., & Trainor, L. J. (2021). Extra-curricular activities and well-being: Results from a survey of undergraduate university students during COVID-19 lockdown restrictions. *Frontiers in Psychology,* 2316. https://doi.org/10.3389/fpsyg.2021.647402

Fischer, R., Bortolini, T., Karl, J. A., Zilberberg, M., Robinson, K., Rabelo, A., Gemal, L., Wegerhoff, D., Nguyễn, T. B. T., Irving, B., Chrystal1, M., & Mattos, P. (2020). Rapid review and meta-meta-analysis of self-guided interventions to address anxiety, depression, and stress during COVID-19 social distancing. *Frontiers in Psychology,* 1-20. https://doi.org/10.3389/fpsyg.2020.563876

Fredenburg, H. A., & Silverman, M. J. (2014). Effects of music therapy on positive and negative affect and pain with hospitalized patients recovering from a blood and marrow transplant: A randomized effectiveness study. *The Arts in Psychotherapy, 41,* 174–180. https://doi.org/10.1016/j.aip.2014.01.007

Gadi, N., Saleh, S., Johnson, J. A., & Trinidade, A. (2022). The impact of the COVID-19 pandemic on the lifestyle and behaviours, mental health and education of students studying healthcare-related courses at a British university. *BMC Medical Education, 22*(1), 1-9. https://doi.org/10.1186/s12909-022-03179-z

Getz, L. M., Chamorro-Premuzic, T., Roy, M. M., & Devroop, K. (2012). The relationship between affect, uses of music, and music preferences in a sample of South African adolescents. *Psychology of Music, 40,* 164–178. https://doi.org/10.1177%2F0305735610381818

Giannoulas, A., Stampoltzis, A., Kounenou, K., & Kalamatianos, A. (2021). How Greek students experienced online Education during COVID-19 Pandemic in Order to Adjust to a Post-Lockdown Period. *Electronic Journal of e-learning, 19*(4), 222-232. https://doi.org/10.34190/ejel.19.4.2347

Granot, R., Spitz, D. H., Cherki, B. R., Loui, P., Timmers, R., Schaefer, R. S., Vuoskoski, J. K., Cárdenas-Soler, R., Soares-Quadros Jr., J. F., Li, S., Lega, C., La Rocca, S., Martínez, I. C., Tanco, M., Marchiano, M., Martínez-Castilla, P., Pérez-Acosta, G., Martínez-Ezquerro, J. D., Gutiérrez-Blasco, I. M., Jiménez-Dabdoub, L., Coers, M., Treider, J. P., Greenberg, D. M., & Israel, S. (2021). "Help! I need somebody": music as a global resource for obtaining wellbeing goals in times of crisis. *Frontiers in Psychology, 12,* 1-22. https://doi.org/10.3389/fpsyg.2021.648013

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*(3), 271–299. https://doi.org/10.1037%2F1089-2680.2.3.271

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry, 26*(1), 1-26. https://doi.org/10.1080/1047840X.2014.940781

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*(2), 348. https://psycnet.apa.org/doi/10.1037/0022-3514.85.2.348

Gross, J. J., Richards, J. M., & John, O. P. (2006). Emotion regulation in everyday life. In D. K. Snyder, J. A. Simpson, & J. N. Hughes (Eds.), *Emotion regulation in couples and families: Pathways to dysfunction and health* (pp. 13–35). American Psychological Association.

Hennessy, S., Sachs, M., Kaplan, J., & Habibi, A. (2021). Music and mood regulation during the early stages of the COVID-19 pandemic. *PloS One, 16*(10), e0258027. https://doi.org/10.1371/journal.pone.0258027

Hess, J. (2021) Musicking a different possible future: the role of music in imagination. *Music Education Research, 23*(2), 270-285. https://doi.org/10.1080/14613808.2021.1893679

Hilz, M. J., Stadler, P., Gryc, T., Nath, J., Habib-Romstoeck, L., Stemper, B., Buechner, S., Wong, S., & Koehn, J. (2014). Music induces different cardiac autonomic arousal effects in young and older persons. *Autonomic Neuroscience, 183,* 83–93. https://doi.org/10.1016/j.autneu.2014.02.004

Istók, E., Brattico, E., Jacobsen, T., Krohn, K., Müller, M., & Tervaniemi, M. (2009). Aesthetic responses to music: A questionnaire study. *Musicae Scientiae, 13*(2), 183–206. https://doi.org/10.1177%2F102986490901300201

Jiang, R. (2020). Knowledge, attitudes and mental health of university students during the COVID-19 pandemic in China. *Children and Youth Services Review, 119,* 105494, 1-4. https://doi.org/10.1016/j.childyouth.2020.105494

Juslin, P. N., Harmat, L., & Eerola, T. (2014). What makes music emotionally significant? Exploring the underlying mechanisms. *Psychology of Music, 42,* 599–623. https://doi.org/10.1177%2F0305735613484548

Juslin, P. N., & Laukka, J. P. (2004). Expression, perception, and induction of musical emotions: A review and a questionnaire study of everyday listening. *Journal of New Music Research, 33,* 217–238. https://doi.org/10.1177%2F0305735613484548

Juslin, P. N., Liljeström, S., Västfjäll, D., Barradas, G., & Silva, A. (2008). An experience sampling study of emotional reactions to music: Listener, music, and situation. *Emotion, 8,* 668–683. https://psycnet.apa.org/doi/10.1037/a0013505

Kobylińska, D., & Kusev, P. (2019). Flexible emotion regulation: How situational demands and individual differences influence the effectiveness of regulatory strategies. *Frontiers in Psychology, 10,* 72, 1-9. https://doi.org/10.3389/fpsyg.2019.00072

Kornilaki, A. (2022). The psychological consequences of COVID-19 pandemic on university students in Greece. The role of daily activities during the quarantine. *Psychology: The Journal of the Hellenic Psychological Society, 26*(3), 144–164. https://doi.org/10.12681/psy_hps.28859

Krautter, K., Friese, M., Hart, A., & Reis, D. (2022). No party no joy?—Changes in university students' extraversion, neuroticism, and subjective well-being during two COVID-19 lockdowns. *Applied Psychology: Health and Well-Being, 14*(4), 1314-1332. https://doi.org/10.1111/aphw.12336

Labbé, E., Schmidt, N., Babin, J., & Pharr, M. (2007). Coping with stress: The effectiveness of different types of music. *Applied Psychophysiology and Biofeedback, 32*(3–4), 163–168. https://doi.org/10.1007/s10484-007-9043-9

Lange, K. W., & Sun, Y. (2022). Music and health in times of the COVID-19 pandemic. *Journal of Disease Prevention and Health Promotion, 6,* 1-3. https://doi.org/10.5283/jdphp.35

Lonsdale, A. J., & North, A. C. (2011). Why do we listen to music? A uses and gratifications analysis. *British Journal of Psychology, 102,* 108–132. https://doi.org/10.1348/000712610X506831

Maksimainen, J., & Saarikallio, S. (2015). Affect from art: Subjective constituents of everyday pleasure from music and pictures. Overview and early results. In J. Ginsborg, A. Lamont, M. Phillips, & S. Bramley (Eds.), *Proceedings of the Ninth Triennal Conference of the European Society for the Cognitive Science of Music (ESCOM),* 11–22 August 2015, Manchester, UK.

McAdams, S. ,& Giordano, B.L. (2015). The perception of musical timbre. In S. Hallam, I. Cross, & M. Thaut (Eds.), *The Oxford handbook of music psychology,* (pp. 72-80). Oxford University Press.

McFarland, C., Primosch, M., Maxson, C.M., & Stewart, B. T. (2017) Enhancing memory and imagination improves problem solving among individuals with depression. *Memory & Cognition, 45,* 932-939. https://doi.org/10.3758/s13421-017 -0706-3

Miranda, D., & Claes, M. (2009). Music listening, coping, peer affiliation and depression in adolescence. *Psychology of Music, 37*(2), 215–233. https://doi.org/10.1177%2F0305735608097245

Miranda, D., Gaudreau, P., & Morizot, J. (2010). Blue notes: Coping by music listening predicts neuroticism changes in adolescence. *Psychology of Aesthetics, Creativity, and the Arts, 4*(4), 247–253. https://psycnet.apa.org/doi/10.1037/a0019496

Nomura, S., Yoshimura, K., & Kurosawa, Y. (2013). A pilot study on the effect of music-heart beat feedback system on human heart activity. *Journal of Medical Informatics & Technologies, 22,* 251-256.

Plakhotnik, M. S., Volkova, N. V., Jiang, C., Yahiaoui, D., Pheiffer, G., McKay, K., Newman, S., & Reißig-Thust, S. (2021). The perceived impact of COVID-19 on student well-being and the mediating role of the university support: Evidence from France, Germany, Russia and the UK. *Frontiers in Psychology, 12,* 2663, 1-13. https://doi.org/10.3389/fpsyg.2021.642689

Quoidbach, J., Berry, E. V., Hansenne, M., & Mikolajczak, M. (2010). Positive emotion regulation and well-being: Comparing the impact of eight savoring and dampening strategies. *Personality and Individual Differences, 49,* 368–373. https://psycnet.apa.org/doi/10.1016/j.paid.2010.03.048

Rogowska, A. M., Kuśnierz, C., & Bokszczanin, A. (2020). Examining anxiety, life satisfaction, general health, stress and coping during COVID-19 pandemic in Polish sample of university students. *Psychology Research and Behavior Management, 13,* 797.yc, 797—811. https://doi.org/10.2147%2FPRBM.S266511

Ryczkowska, A. (2022). Positive mood induction through music: the significance of listener age and musical timbre. *Psychology of Music, 50*(2), 1-15. https://doi.org/10.1177%2F03057356221081164

Sharman, L., & Dingle, G. A. (2015). Extreme metal music and anger processing. *Frontiers in human neuroscience, 9,* 272. https://doi.org/10.3389/fnhum.2015.00272

Shifriss, R., Bodner, E., & Palgi, Y. (2015). When you're down and troubled: Views on the regulatory power of music. *Psychology of Music, 43*(6), 793–807. https://doi.org/10.1177%2F0305735614540360

Siedenburg, K., Fujinaga, I., & McAdams, S. (2016). A comparison of approaches to timbre descriptors in music information retrieval and music psychology. *Journal of new music research, 45*(1), 27-41. https://doi.org/10.1080/09298215.2015.1132737

Sloboda, J. A., & O'Neill, S. A. (2001). Emotions in everyday listening to music. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research* (pp. 415–428). Oxford University Press.

Storr, A. (1992). *Music and the Mind*. Ballantine

Sun, S., Goldberg, S. B., Lin, D., Qiao, S., & Operario, D. (2021). Psychiatric symptoms, risk, and protective factors among university students in quarantine during the COVID-19 pandemic in China. *Globalization and Health, 17*(1), 1-14. https://doi.org/10.1186/s12992-021-00663-x

Swaminathan, S., & Schellenberg, E. G. (2015). Current emotion research in music psychology. *Emotion review, 7*(2), 189-197. https://doi.org/10.1177/175407391455828

Ter Bogt, T. F., Vieno, A., Doornwaard, S. M., Pastore, M., & Van den Eijnden, R. J. (2017). "You're not alone": Music as a source of consolation among adolescents and young adults. *Psychology of Music, 45*(2), 155-171. https://doi.org/10.1177/0305735616650029

Thaut, M. H., & Hoemberg, V. (2014). *Handbook of neurologic music therapy.* Oxford University Press.

Tull, M. T., & Aldao, A. (2015). Emotion regulation [Special issue]. *Current Opinion in Psychology, 3,* iv-x. https://www.researchgate.net/publication/273840516

Uhlig, S., Jaschke, A., & Scherder, E. (2013). Effects of music on emotion regulation: A systematic literature review. In G. Luck & O. Brabant (Eds.), *The 3rd international conference on music & emotion.* Jyväskylä.

Vella, E. J., & Mills, G. (2017). Personality, uses of music and music preference: The influence of openness to experience and extraversion. *Psychology of Music, 45,* 338–354. https://doi.org/10.1177%2F0305735616658957

Vidas, D., Larwood, J. L., Nelson, N. L., & Dingle, G. A. (2021). Music listening as a strategy for managing COVID-19 stress in first-year university students. *Frontiers in Psychology, 12,* 1-9. https://doi.org/10.3389%2Ffpsyg.2021.647065

Watson, D., Clark L. A., & Tellegen, A. (1988) Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and social Psychology, 54*(6), 1063-1070. https://doi.apa.org/doi/10.1037/0022-3514.54.6.1063

Zeman, J., Cassano, M., Perry-Parrish, C., & Stegall, S. (2006). Emotion regulation in children and adolescents. *Journal of Developmental and Behavioral Pediatrics, 27, 155–168.* https://doi.org/10.1097/00004703-200604000-00014

Zentner, M., & Scherer, K. R. (2008). Emotions evoked by the sound of music: Characterization, classification, and measurement. *Emotion, 8*(4), 494–521. https://psycnet.apa.org/doi/10.1037/1528-3542.8.4.494