Contents lists available at ScienceDirect

Heliyon

Research article

Music as a factor associated with emotional self-regulation: A study on its relationship to age during COVID-19 lockdown in Spain

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ABSTRACT

The purpose of this research is to reveal the possible relational influence of age on frequency and form of music consumption, its use, and value as a factor associated with emotional self-regulation in pandemic contexts. With this objective, this study applied a transversal, descriptive and analytical design in a sample of 1377 Spaniards during the confinement of COVID-19 from March 14 to June 20, 2020. The results report that music has been an essential generalized support for living with isolation and a powerful instrument for emotional self-regulation and relief from loneliness. Although an increase of 56% in the daily use of music for self-regulation of emotions was detected, higher frequencies of consumption, mainly in solitude, and a better conception of this artistic expression are identified in the population over 51 years old. However, young people between 18 and 40 years old stood out in the use of music as a resource to alleviate loneliness. These results confirm that music seems to have arisen as one of the most used artistic expressions to cope with loneliness, to relate to the outside or as a tool to endure psychological and emotional states catalogued as negative such as anxiety, anguish and depression, among others. Likewise, they evidence its role in personal and social wellbeing in distant age ranges, and the relational influence of music and age in contexts of isolation and loneliness.

1. Introduction

Emotional self-control helps to redirect or inhibit certain automatic responses that the body activates after certain stimuli, among which are emotional responses, such as anxiety. When this self-control refers to the management of one's own emotions it is often referred to as emotional self-regulation (Tice and Bratslavsky, 2000), an ability that, therefore, consists in managing one's own emotional responses, eliminating or changing their external expression or regulating the physical and psychological experiences thus generated (Gross and Thompson, 2007). Every individual employs these types of strategies spontaneously, such as when we take a deep breath to calm down, or close our eyes to an unpleasant scene (Koole, 2009). In this sense, research has found that the development of this type of emotional self-regulation strategies brings great benefits, both for social and academic success, as well as in the search for personal well-being (Graziano et al., 2007; Gross and John, 2003).

Indeed, the studies carried out on the psychological effects of the COVID-19 pandemic demonstrate its relationship with the generation or accentuation of emotions such as anguish, and with disorders such as anxiety, chronic stress and depression. Likewise, these conditions, developed or increased by this context of health, economic and social crisis, are associated with suicidal behavior over a period of time probably longer than the temporal persistence of the pandemic. In this sense, it is essential to activate the necessary mechanisms to reduce the levels of anxiety and social loneliness through advertising campaigns, aimed at promoting mental health, especially among vulnerable individuals such as older population groups and people with a psychiatric history (Sher, 2020)".

In this line, more studies are needed focused on the evaluation of sensory processing profiles/patterns, whose advances already show significant relationships of interdependence between high levels of sensory sensitivity and the suffering of conditions such as depression (Serafini et al., 2017). From this perspective, the research of Serafini et al. (2017) has also demonstrated the contributions of depression to the prediction of hopelessness. Deepening these relationships, as well as the role of sensory processing patterns in affective disorders, would help design and implement interventions for the improvement of functional and adaptive strategies.

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The investigation of emotions in music is extremely complex and, in essence, tries to seek justifications and answers around the way we perceive, and the factors and mechanisms that operate in listening (Tizón, 2016). Although this connection can be considered a no-brainer, it was not considered an object of study until the late nineteenth century and the first decades of the twentieth. From the 80s of the twentieth century, it would become part of what is now called "musical cognition" and a qualitative leap in research on this field would take place, mainly when the first experiments on emotions in music appeared, taking into account a series of variables with respect to the preference of subjects (Konecni, 1982).

Starting in the 1990s, new paradigms arose around the relationship of music and emotions; one of them was the one that established a distinction between perception and emotion (Gabrielsson, 2002); that is, the emotion recognized or the emotion felt in music. This ambivalence inspired a triple division of great recognition today (Hunter and Schellenberg, 2010): aesthetic emotions, real emotions and the so-called "states". The former refer to artistic experiences (listening to music), the latter (called "utilitarian") are those related to our daily life; and the "states" (of mood) denote a longer temporal range and not subject to a stimulus generating it.

Currently, research on music and its influence on the emotional and psychological world of the human being is a fruitful field which enjoys great reception by the scientific community, and has monographic periodicals of great prestige and impact. Of course, it is a field of study of recognized complexity given its multidimensionality, since the variables conforming it are very numerous and of a very different nature (physiological, social, musical, etc.).

More and more studies have shown the effectiveness of music as a resource capable of transforming the sensation/perception of one's own state of anxiety and thus generate moods considered as more positive, as well as reducing it through listening to pleasant music (Batt-Rawden and Tellnes, 2011; González et al., 2020). Music is a factor of multiple possibilities such as the transmission of emotions and communicative ability (Vieillard et al., 2008; Collier, 2007); emotional regulation (Nonken, 2008) and as an agent that influences and directly affects emotions (Pereira et al., 2011; Trost et al., 2011). In this sense, Yehuda (2011) has pointed out that there are multiple studies that have shown that music is a catalyst for stress, although not every music is appropriate for this purpose since it is conditioned by the musical tastes of the individual (Elliot et al., 2011). People often choose one type of music or another as a tool for finding positive and/or negative effects to reach a balanced mood (Salimpoor et al., 2011; Gebhardt et al., 2016). Thus, studies by Ter Bogt, Mulder, Raaijmakers and Nic Gabhainn (2011) defend the protective role of music against stress and the fact that listening to music induces positive moods helping cope with anxiety and distress. Similarly, Pothoulaki et al. (2008) have found that music is a great mood inducer which enables to not focus attention in stressful circumstances; this reduction in anxiety is especially noticeable when listening to music pleasing to the listener (Jiang et al., 2013; Johnsen et al., 2009).

The relationship between age and affinity for music has recently been addressed in the work of Glevarec et al. (2020), in which age, social class and cultural times are defined as three of the most significant causal variables in this relationship. The first variable also focuses the interest of the research of Lindblad and de Boise (2020), whose study objective was to analyze the effects on health and well-being of music in elderly men. In this study, it was observed that the participants used music to approach their own emotions and favor their social relationships.

The objective of this research is to know if music has been used as a consumer good, as well as the possible benefits of it at an emotional, psychological and affective level during the experience of confinement as a measure of protection against COVID-19 in Spain. In this like, it has been intended to analyze whether music has been used as a tool to deal more effectively with the moments of anxiety or stress produced by the pandemic in the lockdown period, paying special attention to the possible divergences between different age ranges linked to aesthetic emotions generated by an intentional musical listening during lockdown, in order to decrease the levels of these emotions. Based on these objectives, the following research questions are formulated: 1. Is age a factor associated with the frequency of music consumption and the value assigned to this artistic expression for emotional self-regulation and relief from loneliness in contexts of health crisis? 2. Did the positive evaluations of music during the COVID-19 confinement in Spain lead to an increase in its consumption as a tool for emotional self-regulation in older adults?

2. Method

2.1. Participants

In order to access as large a sample of the population as possible and to try to overcome the initial difficulties of selection by the research team, a non-probabilistic snowball sampling was carried out. The first participants were recruited according to their profile as university students, in contact with the researchers. In a second phase, students were asked to distribute the questionnaire regardless of the socio-demographic profile of the potential participants. The reasons for applying a non-probability sampling lie in the exploratory nature of the design and purpose of this research. This sampling resulted in the recruitment of participants who were not necessarily representative of the population to which they belonged (statistical representativeness), but significant within the social group (age groups) from which they came. The selection of this design sought to respond to a research problem, until this moment, not formulated in the Spanish context.

The population under study is constituted by people of legal age who during the state of alarm decreed by the Spanish government of March 14, 2020 had their residence in Spain, achieving a participation of 1377 people. Of the people surveyed, 64.9% were women and in terms of age, 57.7% of the participants were between 41 and 60 years old. No significant differences were observed according to age and sex ranges ($X^2_{(6)} = 5,788$, $p = 0.447$). Half of the participants (50.2%) claimed to have university studies.

With regard to the current profession or occupation, the highest percentages correspond to the service sector with 74.9%. Regarding the place of residence, the highest percentage of responses, 54.4%, corresponds to people residing in the community of Castile-Leon, 12.3% in the community of Madrid and 11% in the Basque Country.

As for the profession, it should be emphasized that 20% of the sample were professional musicians and of these, the highest percentages corresponded to teachers of music education in Primary Education (11.9%) and instrumentalists (10.2%). 41.1% of the participants indicated that they were amateur musicians.

2.2. Instrument

An *ad hoc* questionnaire designed was created and validated by the Recognized Research Groups in 'Artistic education: processes, spaces and practices' (EAPEP), and in 'History and Social Science (Social Studies) Education' (DHISO), of the University of Burgos (Spain). The questionnaire was structured in two sections with sociodemographic content composed of 9 questions (1. Age, gender, place of residence, level of education, profession; 2. Relationship with music: professional musician, amateur musician or consumer), and a dimension of analysis composed of 11 qualitative questions on the characteristics of music consumption, use and conception during confinement (among other aspects, form of music consumption -alone or with others-, timing and frequency of consumption and use, and conception/value of music for life and health).

The temporal frequency of music consumption (presence in daily life in confinement), its evaluation for emotional self-regulation and alleviating loneliness, and the conception/value assigned for life and health, object of the present research, were measured in three scales related to: a) 'Temporal frequency', composed of four categories of ordinal nature

from F1 (*every day of the week*) to F4 (*never*); b) 'Use of music as a resource for emotional self-regulation and alleviating loneliness', composed of two categories of nominal character: 'Music as an emotional self-regulatory and anxiety reducer', and 'music as a resource to alleviate loneliness'; and c) 'Music value as an emotional self-regulator', composed of four ordinal categories from V1 (*Essential in life*) to V4 (*No personal help in confinement*).

The quality and concordance between the attributes of the questions included in the instrument (clarity in the wording, internal coherence, response induction - bias -, and use of appropriate language in the formulation of each question), was calculated the Kendall's coefficient of concordance, based on the assessments expressed by 5 independent expert judges in a range of 1–5 points. The results show the existence of a high concordance index and significant homogeneity between the assigned ranges ($W = .876, p = .000$), confirming the content validity of the proposed instrument.

2.3. Design and procedure

The study belongs to the non-experimental designs of ex post facto research, in which the independent variables are not manipulated, or on which there is no influence or intervention because they have already happened. The research is positioned in the cross-sectional quantitative methodological principles, which seek the description of the variables and its interpretative inference about its state and relationship in a given moment. The instrument was administered through *SurveyMonkey* during the month of June 2020, at which time the period of confinement in Spain ended. The survey was spread through email and social media, but WhatsApp application was used by the vast majority.

The Bioethics Commission of the University of Burgos (Spain) approved the research project on May 25, 2020 thus guaranteeing the ethical-philosophical commitment and indeclinable respect for human dignity, privacy, physical and moral integrity, as well as the protection of personal data in the treatment of the survey and throughout the course of the research.

2.4. Data analysis

The data analysis was carried out using the statistical package for Social Sciences (SPSS v26). In order to assess the association between proposed age ranges and study variables, contingency tables were created between theses ranges and the indicated variables, and the Pearson Chi-square independence test was applied. In addition, the Z-test was used, in order to identify if there were any differences, when comparing the proportions obtained in the age ranges. For statistical analysis, the threshold for the rejection of the null hypothesis was set to 0.05.

With the aim of observing what was the social behavior in age ranges against the temporal frequency, the form of music consumption (alone or with others), and its assigned value as a tool of emotional self-regulation and alleviating loneliness, the ranges were grouped in a coherent way, establishing these categories: R1 (between 18 and 40 years old), R2 (between 41 and 50 years old), and R3 (more than 51 years old).

3. Results

As for the weekly frequency with which respondents listened to music, significant differences were found between age and attendance in listening to music ($X^2_{(6)} = 30,369, p = 0.001$). However, it was observed that all age ranges listened to music daily (62.5%), although 33.9% of participants in the age range over 51 years listened to music almost every day, more than the rest of age ranges (Table 1).

Significant differences were also found between age and listening to music alone or in company ($X^2_{(6)} = 27.795, p < 0.001$). It is observed that 42% of the participants noted that they listened to music when they were always alone, increasing this circumstance in people over 51 years old.

The relationship between age and the use of music during lockdown as a resource to alleviate loneliness and as emotional self-regulation showed a contingency coefficient of $C = 0.245\ p < .001$. Therefore, significant differences were found between age and response options for the item ($X^2_{(2)} = 83.012, p < 0.001$). 73.8% of participants indicated that music was used as a resource for self-regulation of emotions, highlighting that participants, in the age range of 18–40 years, indicated that they listened to music as a resource for emotional self-regulation less often than the rest (57.2%). Likewise, this group of participants indicated that they used music as a resource to combat loneliness, more frequently than the rest of the groups (42.8%) (Table 2).

It should be noted that significant differences were found between the participant's age and the worth that respondents generally give to music in their daily lives ($X^2_{(6)} = 72,272, p = < 0.001$). The option mainly chosen by the participants in the study was that music brings beauty and helps us relax to go through difficult times (53.5%). The next most frequent option was that life in general, and confinement in particular, would not be the same without music (39.7%). Participants in the age range of more than 51 years indicated more frequently, compared to the other groups, that they were aware that music is something essential to feel better (8.5%) (Table 3).

4. Discussion and conclusions

Based on the results obtained in this study, it can be confirmed that the consumption of music during lockdown was very frequent and was also frequently used as a means of self-regulation of negative emotions such as anxiety and/or distress, as 73.8% of the participants indicated that they did use music as a resource to cope with the negative emotions produced by isolation, loneliness, etc. This has a close relationship with other research that shows that music is a good component to reduce states of stress (Yehuda, 2011). However, some studies assert that to modify mood and/or emotional states using music as therapy it is necessary to keep in mind the musical tastes of the subject or patient (González et al., 2020). In this regard, it should be emphasized that we have not been able to specify which musical styles or genres the respondents have listened to, because we understand that the musical choice that each listener makes when he wants to enjoy musical listening is the one that most satisfies them and makes them feel better, always in a subjective way.

Table 1. Music consumption and its presence in daily life in confinement by age ranges.

	R1		R2		R3		Total	
F1	248$_a$	69.1%	254$_{a,b}$	62.6%	315$_b$	58.0%	817	62.5%
F2	78$_a$	21.7%	93$_a$	22.9%	184$_b$	33.9%	355	27.1%
F3	25$_{a,b}$	7.0%	48$_b$	11.8%	34$_a$	6.3%	107	8.2%
F4	8$_a$	2.2%	11$_a$	2.7%	10$_a$	1.8%)	29	2.2%
Total	359	100%	406	100%	543	100%	1308	100%

Every letter in the subscript expresses a subset within the category age ranges, whose row proportions are not significantly different among them in level 0.5. Age range: R1 (18–40), R2 (41–50), R3 (more than 51). Weekly frequency: F1 (every day of the week), F2 (almost every day of the week), F3 (very few days a week), F4 (never).

Table 2. Use of music as a resource for emotional self-regulation and alleviating loneliness by age ranges.

	R1		R2		R3		Total	
U1	222a	57.2%	317b	77.5%	422b	83.6%	961	73.8%
U2	166a	42.8%	92b	22.5%	83b	16.4%	341	26.2%
Total	388	100%	409	100%	505	100%	1302	100%

Every letter in the subscript expresses a subset within the category age ranges, whose row proportions are not significantly different among them in level 0.5. Age range: R1 (18–40), R2 (41–50), R3 (more than 51). Use of music: U1 (Music as an emotional self-regulatory and anxiety reducer), U2 (Music as a resource to alleviate loneliness).

Table 3. Music value as an emotional self-regulator by age range.

	R1		R2		R3		Total	
V1	14a	3.6%	11a	2.5%	46b	8.5%	71	5.2%
V2	256a	66.0%	252b	57.5%	225c	41.4%	733	53.5%
V3	111a	28.6%	166b	37.9%	266c	49.0%	543	39.7%
V4	7a	1.8%	9a	2.1%	6a	1.1%	22	1.6%
Total	388	100%	438	100%	543	100%	1369	100%

Every letter in the subscript expresses a subset within the category age ranges, whose row proportions are not significantly different among them in level 0.5. Age range: R1 (18–40), R2 (41–50), R3 (more than 51). Use of music: V1 (Essential in life), V2 (Brings beauty and wellbeing), V3 (Personal help in confinement), V4 (No personal help in confinement).

To corroborate the initial approach, we rely on previous studies based on functional neuroimaging, which demonstrates how music can modify the activity of all the structures of the limbic and paralimbic brain that is to say, the areas or structures involved in the initiation, generation, maintenance, termination, and modulation of emotions (Koelsch, 2009) and the possible participation of dopaminergic mechanisms, since the pleasurable experience that is generated during the listening to music is associated with the release of striatal dopamine in the reward systems (Salimpoor et al., 2011). Stress and its regulation also have a physiological basis: the activation of the hypothalamic-pituitary-adrenal axis (HPA) which indicates the potential of the physiological Association of these two (Wang and Saudino, 2011).

Music has always been used in all societies as an optimal therapeutic tool (Trallero, 2013). Therefore, the mood is what determines the music we choose to listen to and, at the same time, music can serve to express the emotion we are feeling (Juslin and Sloboda, 2001). According to Juslin et al. (2008), approximately 64% of musical experiences affect us emotionally, causing happiness, joy, nostalgia or longing, while negative emotions such as anger, irritation, boredom, anxiety or fear are not usually experienced when listening to music, which supports and subscribes to the results obtained.

It can be confirmed that music is more valued and used as a means of emotional self-regulation in higher age groups (41–50 years and more than 51) than in the younger category (18–40 years), since participants in the age range over 51 indicated more frequently, compared to the rest of groups, that music is something essential to feel better (8.5%). Regarding these results, main objective of this study and basis of the second research question, are complementary to those obtained in the recent study by Shifriss et al. (2020) on the influence of age and emotional musical tone on moods, whose evidence shows that older participants, who were less focused on emotions, were more likely to choose music to feel better.

The results obtained inform that music seems to have arisen as one of the most used artistic expressions to cope with loneliness, to relate to the outside or as a tool to endure psychological and emotional states catalogued as negative such as anxiety, anguish and depression, among others. These results are consistent with those obtained in the study by Lindblad and de Boise (2020), in which it is shown that musical engagement provides an effective response to different psychological, social and emotional needs.

Likewise, they evidence its role in personal and social wellbeing in distant age ranges, and the relational influence of music and age in contexts of isolation and loneliness. The results obtained in the present study suggest, consequently, the need to deepen the relationships identified between consumption and the perception of the value given to music, and its potential as a resource to face the negative emotions produced by isolation and loneliness. In this sense, the influence of socio-cultural experiences on human adaptive capacities and their resilience has already been evidenced, whose increase could be mediated by music therapy (Pasiali, 2012). Likewise, Morris' recent research (2020) shows that music workshops are presented as an affective conditioning factor in the perception of temporal and spatial reality of immigrants held in British detention centers. This evidence, together with others on the contributions of music livestreams in the creation of collective consciousness and social solidarity during the COVID-19 (Vandenberg et al., 2020), explains how the practice of music, regardless of its format, can be able to attenuate loneliness and isolation and, in some way, favorably affect an increase in resilience.

Nevertheless, the limitations found in the study may be derived from not having included a control group by age ranges to give greater validity to listening to music as emotional self-regulation during confinement, a line of work that may be addressed, in a comparative manner, in future research. The exploratory design of this research constitutes another of its limitations.

Considering that the objective of this type of design is to approach the knowledge of a little known or not yet formulated research problem (in this case, in the Spanish context) and not its statistical representativeness (Hernández et al., 2010), the results obtained should allow the generation of new research hypotheses capable of promoting a deeper development of the ways in which age is proposed as a factor associated with the consumption, use and perception of music, and of the potential influence of this artistic expression in the emotional realm, specifically, as an emotional self-regulator. Likewise, the transversal design of this research suggests the need to carry out new studies of longitudinal character capable of analyzing, through different temporary measures, the possible changes in the perception and musical valuation, and its specific link with emotions after the COVID-19 pandemic. Finally, the disadvantages of administering the instrument as a self-report should be considered, especially in relation to the potential biases produced by social desirability and assent (De las Cuevas and González de Rivera, 1992).

Declarations

Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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