

# Effect of educational music intervention on emotion regulation skills of first-year university music education students

Edith N. Nwokenna, PhD<sup>a</sup>, Abatihun Alehegn Sewagegn, PhD<sup>b,c,\*</sup> , Temitope Ayodeji Falade, BEd<sup>d</sup>

## Abstract

**Background:** Making music and listening to music have been found to contribute to positive mental health. In this study, we examined whether educational music intervention improved emotion regulation skills among first-year university music education students.

**Methods:** The design of the study consisted of a randomized controlled trial with a treatment group as well as a control group. Students were randomly distributed to an intervention group and a control group. Students in the intervention group participated in twice-weekly group sessions for 8 weeks that discussed problem-solving skills, calming techniques, and retraining attributions. Instruments for data collection were; the Emotion Regulation Skills Scale and the Emotion Regulation Questionnaire.

**Results:** Results demonstrate that educational music intervention can facilitate the development of emotional regulation skills in undergraduate students majoring in music education.

**Conclusion:** Based on the results of this study, educational music intervention is effective in enhancing emotional regulation among first-year undergraduate music education students. The educational music program provides participants with the opportunity to enhance their ability to regulate their emotions.

**Abbreviations:** ERQ = Emotion Regulation Questionnaire, ERSS = Emotion Regulation Skills Scale.

**Keywords:** educational music intervention, emotion regulation, emotion regulation skills, first-year music education students, rational humorous song

## 1. Introduction

There are many advantages to using music interventions, including the ability to teach participants behavioral and adaptive skills for managing and avoiding self-imposed disturbances. As a medium, music has the extraordinary ability to convey, transmit, and elicit feelings and affection in humans, regardless of nationality or culture.<sup>[1,2]</sup> For the past 2 decades, systematic research has been conducted on how music can evoke emotional responses in humans.<sup>[3–5]</sup> Several studies<sup>[5,6]</sup> have shown that music can influence physiological processes in the body, including heart rate, skin temperature, conductance, respiration, and hormone release. Furthermore, other investigations have demonstrated that music is capable of regulating emotional states,<sup>[4,7,8]</sup> as well as stimulating cognitive functioning.<sup>[4,7–10]</sup>

The classification of music is based on its arousal characteristics, emotional quality, as well as structural components.<sup>[11]</sup> Inability to reach a consensus on the use of music in interventions for student wellbeing in schools has been caused by

disparities in methodological approaches and measurement outcomes.<sup>[12,13]</sup> In general, research has focused on either improving cognitive skills in order to improve prospects for children,<sup>[4,14,15]</sup> or decreasing undesirable behaviors in children.<sup>[14–16]</sup> For instance, enhancing young children's capacity to recognize emotions has been linked to a reduction in both verbal and physical aggressiveness when they participated in a 24-week music program.<sup>[17]</sup> Similarly, it was found that among twelve-year-old males, drumming interventions led to a decrease in instances of antisocial conduct, an increase in self-esteem, better attendance at school, and positive behaviors.<sup>[18]</sup>

According to a literature review, school music interventions and programs help pupils in both intrinsic and extrinsic ways. Participation in music has intrinsic benefits, which are changes that occur outside the realm of music. Also, social, emotional, and relationship development has been linked to advances in music therapy programs.<sup>[19,20]</sup> There is also evidence to suggest intrinsic correlations between music engagement and well-being. Using a music education curriculum that emphasizes group instrumental

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<sup>a</sup> Department of Arts Education, University of Nigeria, Nsukka, Nigeria,

<sup>b</sup> Department of Educational Psychology, University of Johannesburg, Johannesburg, South Africa, <sup>c</sup> Institute of Education and Behavioral Science, Debre Markos University, Debre Markos, Ethiopia, <sup>d</sup> Department of Educational Foundations, University of Nigeria, Nsukka, Nigeria.

\* Correspondence: Abatihun Alehegn Sewagegn, Institute of Education and Behavioral Science, Debre Markos University, Debre Markos, Ethiopia (e-mail: abatihunalehegn@gmail.com).

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performance, study found that students could recognize emotions more easily.<sup>[17]</sup> In a related study, a group of researchers evaluated the behavioral differences between children who after school engaged in music or sports activities and those who did not.<sup>[21]</sup> When it came to identifying emotional states in photographs of eyes or empathizing with others' feelings, it was discovered that there were no significant differences between the 3 groups. This finding supports the theory that such differences seen in earlier studies are due to musical involvement. Kids between the ages of 4 and 5 can use music to convey a variety of emotions, such as happiness, sadness, anger, and fear.<sup>[22]</sup> Again others researchers discovered that students were able to perform better on deductive reasoning tasks when using video clips and background music to create joy and grief.<sup>[23]</sup> The study revealed that students' inventiveness was improved as well.<sup>[24]</sup> A study, on the other hand, noted that students have positive emotional levels as a result of an interdisciplinary approach that used music to help students acquire graphical representations in mathematics.<sup>[25]</sup> Similarly, another study found that students' motivation levels increased as a result of greater participation in music education.<sup>[26]</sup> Another researcher has argued that students might learn significant values through exposure to music since various styles of music have a strong emotional connection with them.<sup>[27]</sup>

The word "emotion regulation" refers to the innate and environmental mechanisms humans employ to track, assess, and control their emotional reactions. It specifically alludes to their properties of intensity and temporality.<sup>[28]</sup> Emotion regulation is a set of mechanisms that a person uses to try to reroute the flow of their emotions. Emotion regulation as a set of procedures a person uses to deal with emotions, effects, moods, and stress.<sup>[16]</sup> Reappraisal and suppression are 2 components of emotion regulation. A reappraisal is the process of altering our perspective on an event or situation in order to minimize its emotional impact. Reappraisal is the first step towards triggering emotional responses followed by suppression occurs thereafter. Suppression involves the prevention of external manifestations of emotion. Human interaction with the social and material world is heavily influenced by emotional states.<sup>[29]</sup> In a nutshell, emotions are a group of mental experiences, which can be pleasant or unpleasant, short-lived or long-lasting, and varying in intensity. They are controlled by cognitive processes. Thus, emotion regulation aspects demonstrate the possibility of feeling emotions more strongly or less strongly.<sup>[30]</sup> A measure of emotional regulation skills includes both the general, trait-level difficulties of controlling emotions (emotion regulation difficulties) and the use of specific adaptive or maladaptive techniques to regulate emotions (rumination).<sup>[31]</sup> An individual who possesses emotional regulation skills has the capability of successfully controlling several manifestations of emotions.<sup>[32]</sup> Berking sought to synthesize the findings from numerous investigations in order to provide a complete explanation of emotion regulation. Emotional awareness, emotional recognition and labeling, accurately interpreting bodily sensations related to emotions, attempting to understand their attributes as an adapted interaction to the circumstance, comprehending both the external and internal dispositions of emotions, confronting negative emotions when necessary to achieve important goals, actively confronting negative emotions, to change, accepting unchangeable negative emotions, tolerating negative emotions are all examples of emotional regulation skills.<sup>[33]</sup> People can enrich their emotional life by learning new and stronger techniques to regulate their emotions.<sup>[16]</sup> Otherwise, a lack of emotion regulation skills leads to the onset of a variety of mental health issues, as well as the persistence of these issues.<sup>[34]</sup> Therefore, music has been shown to have a significant impact on students' intellectual, social, and personal growth, as well as their psychological health.<sup>[35]</sup> To the best of our knowledge, no study has examined the relationship between educational music intervention and emotional regulation skills among first-year university music education students. The purpose of the study was to examine

if educational music intervention can positively affect emotion regulation skills among first-year university students studying music education.

### 1.1. Hypotheses

In view of the research objective, the following hypotheses were tested in this study.

- (1) Educational music intervention will significantly improve emotion regulation skills among first-year university students studying music education at post-test in contrast to students in control group.
- (2) Significant increase in emotion regulation skills due to educational music intervention among first-year university students studying music education will be sustained at follow-up in contrast to students in control group.

## 2. Method

### 2.1. Ethics statement and design

The ethics committee of the Faculty of Education of the University of Nigeria, Nsukka, gave its approval to this study. A randomized controlled trial design was adopted for the study. The research was conducted in tertiary institutions in South East, Nigeria.

### 2.2. Participants

Sixty individuals participated in the study. Participants were randomly assigned a number between 1 and 60 and divided into 1 of 2 groups: music or non-music, with each group including 30 people (see Fig. 1). During the preliminary stage of the project, 150 undergraduate students in music education were reached using the volunteer technique. All subjects were required to give their informed consent.

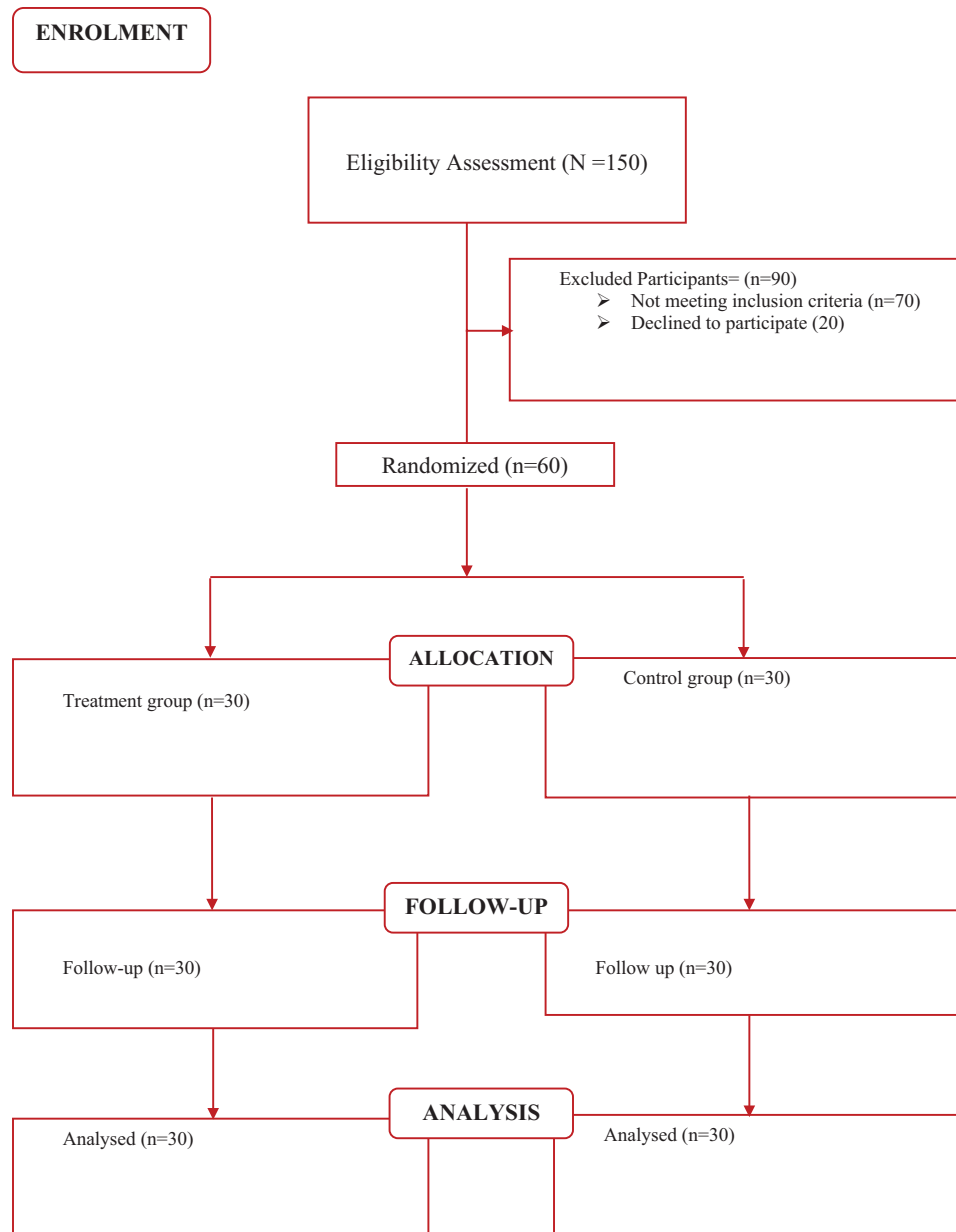
### 2.3. Outcome measures

**2.3.1. Emotion Regulation Skills Scale.** The present study adopted an instrument titled Emotion Regulation Skills Scale (ERSS) developed by Berking and Znoj<sup>[32]</sup> as a tool for ascertaining the primary outcome. There are 27 questionnaire items on this scale, and it is a 5-Likert scale. Compared with the average of this scale, the high scores suggest that the individual has better emotion regulation abilities. The dataset of ERSS was subjected to an internal consistency test and it revealed that at the pretest, the dataset had an internal consistency coefficient of .792 and .973 at the posttest respectively which indicates that the instrument was highly reliable since the coefficients were above 0.6.

**2.3.2. Emotion Regulation Questionnaire.** The study also used the Emotion Regulation Questionnaire (ERQ)<sup>[33]</sup> which was created by Gross and John as a tool for ascertaining the primary outcome. The ERQ uses a standard 10-point scale to measure cognitive reappraisal. A scale of 1 to 7 is used to grade the instrument, with 1 denoting strongly disagree and 7 denoting strongly agree. Furthermore, the ERQ dataset had an internal consistency coefficient of 0.707 at pretest and 0.966 at posttest respectively which denotes that the instrument was reliable because the coefficients are above 0.6.

### 2.4. Experimental procedure

Consent forms were issued to all eligible first-year undergraduate students. The study's objective was explained to participants, and they received guarantees that any information they



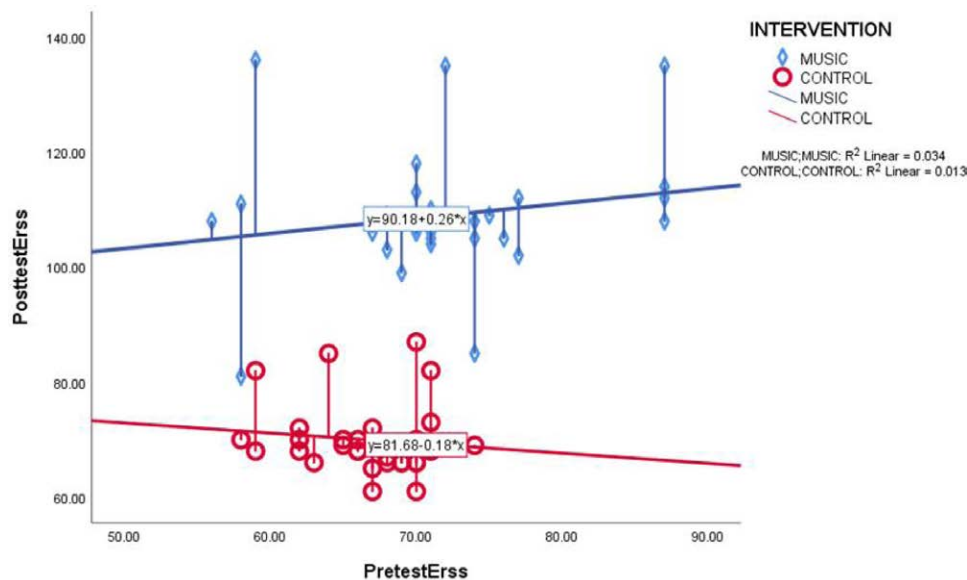
**Figure 1.** Participants' flowchart.

submitted would be kept private. Participants were completely free to leave at any time because participation was voluntary. Eight weeks of intervention were provided to all participants. A trained research assistant administered the questionnaires to the 2 groups as part of the pre-testing process. Two music lecturers provided the training. In the intervention group, music instrument performance training sessions were conducted for 8 weeks, followed by follow-up sessions for 2 weeks, and post-test measurements were given at the conclusion of the intervention. The control group received no intervention.

### 2.5. Intervention description

A brief introductory session precedes the actual training modules. In this session, the participants get to know the trainers, the materials to be covered, and set goals for the training. There were 16 sessions in this study. Kim and Kim created a program specifically designed for musical instrument performance that was modified for the investigation.<sup>[17]</sup> As part of this program,

students were taught how to play the flute. The program was run 2 music lecturers. Each music instrument performance class typically lasted 50 minutes, involving a 5-minute warm-up, the main session that lasted 40 minutes, and a final 5-minute wrap-up. Students built relationships and became familiar with the musical experience throughout the warm-up phase. Before the main session, these exercises were created to help students unwind and feel more at ease. During the main lesson, students played music in a set order with the music teachers. These tasks required the students to use their cognitive abilities in order to comprehend the musical process and participate in group instrument playing. In addition, they displayed emotional and social aspects related to learning an instrument in a group setting as well as aspects related to the music they were actively playing. Students had the chance to rehearse a kid's song, a sonata, rational humorous songs, or an ensemble work that was appropriate for their level as part of each lesson. In order to apply skills to other nonmusical tasks, such as socializing and identifying emotions, students had the chance to talk about their difficulties



**Figure 2.** Homogeneity of regression slope of ERSS dataset. ERSS = Emotion Regulation Skills Scale.

and feelings of success while playing music during the wrap-up period.

## 2.6. Data analysis plan

The dataset were subjected to repeated ANOVA tests. Furthermore, a post hoc test was conducted to test the difference in mean scores in the pretest and posttest of the dataset of the emotion regulation skills of first-year students as measured by ERSS and ERQ. On the basis of assumptions guiding repeated analyses of variance and questionnaire data, a preliminary analysis was conducted on the dataset obtained from the instruments. Some of these basic assumptions include internal consistency, homogeneity of variance, Levene's test of equality of variance, and test of sphericity. The internal consistency of these datasets was established with Cronbach's Alpha reliability estimate. The choice of Cronbach alpha reliability was that the instruments were dichotomously scored indicating that there were no correct answers.

## 3. Results and discussion

### 3.1. Test for equality of variances (Levene's)

For ERQ dataset, there was no significant difference in the variance of pretest and posttest,  $F(1, 58) = 0.005$ ,  $P = .945$  for pretest and  $F(1, 58) = 3.341$ ,  $P = .073$  respectively. The  $P$  values of pretest and posttest were above 0.05 level, hence, the assumption of homogeneity of variance was not violated by the dataset of ERQ. Similarly, the Levene's test of equality of variance was significant for ERSS pretest dataset  $F(1, 58) = 4.948$ ,  $P = .030$  while the post-test dataset was not significant,  $F(1, 58) = 2.503$ ,  $P = .119$ , at the 0.05 level of significance. Therefore, the assumption of homogeneity of variance was violated in the pretest dataset while the posttest dataset was not violated at the posttest as measured by ERSS.

Figures 2 and 3 showed the homogeneity of the regression slope of ERSS and ERQ datasets. The dataset of ERSS and ERQ is made up of pretest and post-test scores. The regression lines in the figures represent the educational music intervention and control group. The slope of the regression lines indicates contrasting directions. This means that these lines point in different directions, therefore, the assumption

of homogeneity is violated. Hence, there was an interaction between the covariate and the treatment, which is expected due to the effect of the treatment on the students' emotional regulation skills.

### 3.2. Demographic variables

The demographic variables examined in this study were age and gender. Concerning Gender, the dataset revealed that 51.7% of the participants were female while 48.3% of the participants were male. Similarly, the dataset also revealed that 26.7% of the participants were within the age bracket of 18 to 20, 48.3% of the respondents were within the age bracket of 21 to 22, and 25% were within the age bracket of 23 to 24.

The dataset in Table 1 indicates that at the pretest, the difference in the mean scores of the participants in music and control groups is close ( $M = 66.57$ ,  $SD = 4.01$ ) for the control group, and ( $M = 71.80$ ,  $SD = 8.10$ ). Moreover, in the posttest, the difference between the means of the participants in music intervention and control groups is very wide ( $M = 70.00$ ,  $SD = 6.25$ ) for control and ( $M = 108$ ,  $SD = 11.57$ ) for music intervention, indicating that there was an increase in mean gain for participants in music intervention group compared to control group.

Based on time, there was a significant difference in the mean score of emotion regulation skills of first-year students [ $F(2, 58) = 218.422$ ;  $P = .001$ ,  $\eta_p^2 = 0.288$ ]. The dataset also showed a significant difference in mean scores of emotion regulation skills of first-year students in control and intervention groups [ $F(1, 58) = 206.530$ ;  $P = .001$ ,  $\eta_p^2 = 0.341$ ]. Furthermore, the results revealed a significant intervention and time interaction effect [ $F(2, 58) = 150.736$ ;  $P = .199$ ].

Holm's post hoc test showed that the music intervention group had a higher significant mean score when compared to the control group (Mean difference = 22.08, standard error = 1.537,  $P = .001$ ) as measured by ERSS. Based on time, pretest was compared to posttest in the dataset of ERSS and there was a significant difference in the mean score of the dataset of the emotion regulation skills of first-year students as measured by ERSS (Mean difference = 20.28, standard error = 1.372,  $P = .001$ ).

The dataset in Table 2 shows that at pretest, the difference in the mean scores of the participants in music and control groups is close ( $M = 30.37$ ,  $SD = 3.11$ ) for the control group, and

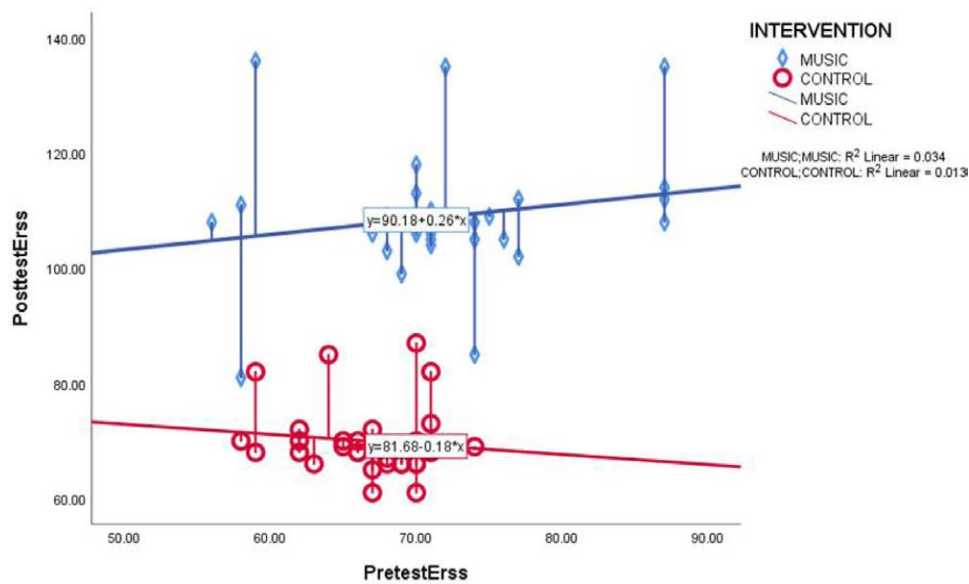


Figure 3. Homogeneity of regression slope of ERQ dataset. ERQ = Emotion Regulation Questionnaire.

**Table 1**  
Mean and SD of participants as measured by ERSS.

Times	Intervention	Mean	SD	N
Pretest	Control	66.57	4.01	30
	Music	71.80	8.10	30
Posttest	Control	70.00	6.25	30
	Music	108.93	11.57	30

ERSS = Emotion Regulation Skills Scale, SD = standard deviation.

(M = 31.033, SD = 3.737). Further, the difference in the mean scores of the participants in the music intervention group and the control group at the posttest was very wide (M = 32.97, SD = 5.03) for the control group and (M = 55.80, SD = 9.35) for the music intervention group. The wide mean difference at posttest suggests that there was a significant increase in mean gain for those in the music intervention group over the control group.

Based on time, there was a significant difference in the mean score of emotion regulation skills of first-year students [ $F(1, 58) = 182.382; P = .001, \eta_p^2 = 0.323$ ]. The dataset also showed a significant difference in mean scores of emotion regulation skills of first-year students in control and intervention groups [ $F(1, 58) = 110.734; P = .001, \eta_p^2 = 0.238$ ]. Furthermore, the results revealed a significant intervention and time interaction effect [ $F(2, 58) = 119.657; P = .001; \eta_p^2 = 0.212$ ].

Holm’s post hoc analysis revealed that the music intervention group had higher significant mean scores when compared to the control group (Mean difference = 11.75, standard error = 1.117,  $P = .001$ ). Based on time, pretest was compared to posttest in the dataset of ERSS and there was a significant

**Table 2**  
Mean and SD of participants as measured by ERQ.

Times	Intervention	Mean	SD	N
Pretest	Control	30.37	3.11	30
	Music	31.03	3.74	30
Posttest	Control	32.97	5.03	30
	Music	55.80	9.35	30

ERQ = Emotion Regulation Questionnaire, SD = standard deviation.

difference in the mean score of the dataset of the emotion regulation skills of first-year students as measured by ERSS (Mean difference = 13.683, standard error = 1.013,  $P = .001$ ).

This investigation concentrated primarily on assessing the effect of an educational music intervention on emotion regulation skills among undergraduate music education students. The educational music intervention has been shown to boost emotion regulation skills in first-year undergraduates studying music education. The results of this investigation are in line with an earlier study, which concluded that listening to music serves as a natural approach to coping with their emotions.<sup>[8,36,37]</sup> Similarly, a previous study examined the perceptions of students with and without musical training and discovered that those with musical training were more competent at identifying emotions in both visual and textual materials.<sup>[38]</sup> A researcher also conducted a study with a group of participants and revealed that music is more effective than verbal instructions in teaching individuals to identify emotion.<sup>[39]</sup> Additionally, it was found that using background music associated with the emotion under study yielded superior results to using nursery rhymes, particularly when analyzing the emotion of anger as opposed to the emotions of happiness, sadness, and fear. It has been concluded from these studies that, unlike other activities that do not involve music, educational music enhances a child’s ability to recognize emotions in music, texts, and visuals. An investigation found that a music therapy program improved aggravation, attentiveness, and a variety of internal and external attitudes.<sup>[40]</sup> The findings are also in line with other previous studies, which found that educational interventions involving music enhanced people’s ability to recognize emotion.<sup>[17,41]</sup>

This investigation had certain limitations. The only source of data for this study is self-reports. Although students who took part were guaranteed their anonymity and confidentiality, it is likely that some did not answer all the questions completely truthful. The sample size is also modest requiring caution in how the results could be generalized. The study’s relatively brief time frame is another drawback. Future investigations are advised to improve the diversity of study groups, sample size, intervention timeframe and could use alternative means of data gathering such as interviews.

**4. Conclusion**

This study demonstrates that an educational music intervention can facilitate the increase of emotional regulation



skills in undergraduate students majoring in music education. Adolescence is a period of development, change, and emotional turmoil when people are still learning how to control their emotions. Through educational music program, adolescent participants can become engaged and can gain improved skills in self-regulation of emotions.

### Author contributions

**Conceptualization:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Data curation:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Formal analysis:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Funding acquisition:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Investigation:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Methodology:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Project administration:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Software:** Edith N. Nwokenna, Temitope Ayodeji Falade.

**Supervision:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Validation:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Visualization:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn.

**Writing – original draft:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

**Writing – review & editing:** Edith N. Nwokenna, Abatihun Alehegn Sewagegn, Temitope Ayodeji Falade.

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