

RESEARCH ARTICLE

A study on the effects of emotional expression training in music education on enhancing children's psychological motivation

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ABSTRACT

The present article investigated the effects of emotional expressive training on music education on the psychological motivation among children based on quasi-experimental data provided by Guri music education project in Brazil. The results found that this training was significant in reducing the emotional symptoms in children and that the effect was more pronounced in children in families with low maternal educational level. The training also assisted children in acquiring a better understanding of musical selections and relate to the music emotionally, especially sad music. The study also indicates using the Self-Determination Theory that emotional promotion was a key element in internalizing the learning motivation, whereby, high-quality autonomous motivation was realized by satisfying the children with the need to belong and to be competent. This study presents a theoretical model, which correlates emotional enhancement to motivation internalization and recommends to employ systematic practice of emotional expression, in an autonomous-supportive instructional framework. The results present useful insights that would help in bettering the psychological and social development of children and give empirical evidence on why music education should be used as a means of promoting educational equity.

Keywords: emotional expression training; music education; psychological motivation; children; questionnaire study

1. Introduction

With the continuous update of educational concepts, music education is gradually shifting from the traditional model that focuses on skills training and outcome evaluation to a more comprehensive education direction that pays more attention to children's emotional experience and psychological development. As an art form with strong emotional characteristics, music can cultivate children's aesthetic ability and artistic literacy. Moreover, it also plays a crucial role in aspects such as emotional perception, emotional expression, and psychological adjustment. Against such a backdrop, emotional expression training has gradually become a key component of music education. Its core is to guide children to precisely perceive, actively express and reasonably regulate their emotions through music, promoting their all-round development.

Psychological motivation is a key psychological element that influences children's learning behavior and learning outcomes. In the process of music learning, psychological motivation is directly related to learning interest, the degree of continuous engagement, and the formation of self-efficacy. Children with a

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high level of psychological motivation can generally maintain a positive attitude and strong intrinsic drive in music learning. However, in current music teaching practice, some teachers still overly emphasize technical skills and performance results, neglecting the potential value of emotional expression training in stimulating children's intrinsic learning motivation. This has led to some children experiencing problems such as reduced interest in learning and lack of emotional experience.

Previous studies have explored the relationship between emotional factors and learning motivation from the perspectives of educational psychology and art education. However, empirical research on the impact of emotional expression training on children's psychological motivation in the context of music education is still relatively scarce, and most of them are mainly qualitative analyses, lacking systematic quantitative research support. It is necessary to apply scientific research methods Conduct an in-depth analysis of the practical effect of emotional expression training in music education.

Based on this, this study employs the empirical research method of questionnaire survey to systematically analyze the influence mechanism of emotional expression training in music education on children's psychological motivation, providing data support and theoretical basis for the practice of emotion-oriented music teaching, and at the same time offering feasible suggestions for enhancing children's enthusiasm and intrinsic motivation in music learning.

2. Literature review

2.1. The emotional value of music education and the all-round development of children

Music education plays a crucial role not only in enhancing aesthetic appreciation and skill development, but also in fostering emotional growth, socialization, and psychological well-being among children. Historically, studies have explored the value of music education from various perspectives, showing that active participation in music activities significantly enhances emotional investment, experience, and intrinsic motivation for learning ^[1]. Early research in community music and higher education highlighted these emotional benefits, with a focus on the non-cognitive aspects of learning such as social emotional development.

Recent studies have extended this framework to children's music education. Ge conducted a systematic literature review demonstrating that music education fosters the improvement of children's emotional understanding, empathy, and interpersonal skills, positioning it as a core vehicle for emotional and social learning ^[2]. Similarly, Li found that music learning has a long-term impact on non-cognitive abilities, including emotional stability, self-control, and attitude toward learning ^[3]. In practical terms, research by Yang and Li on Gulangyu Island revealed music education's deep connection to emotional nourishment and cultural identity formation ^[4]. Furthermore, a comparative study between China and South Korea by Zhang emphasized the cultural adaptability of music education in fostering emotional development, albeit with diverse pedagogical forms ^[5].

Despite the recognition of music education's emotional value, few studies provide empirical evidence connecting emotional growth specifically to the psychological motivation of children through music education. This gap suggests the need for more systematic investigation into the direct relationship between music's emotional impact and motivation.

2.2. Emotional expression and regulation in music education

The emotional expression is one of the fundamental psychological processes in music learning and a significant aspect in comparison between music teaching and other subject areas. It has been demonstrated that the emotional expression training can enhance emotional regulation and overall psychological well-

being of children. The study of Lin showed that the music educational system has a strong positive effect on the recognition, expression, and control of emotions in children, which contributes to the idea of having more music expressing the emotions, as well as the development of the emotional state and social-emotional skills [6]. These results are also supported by multidisciplinary research. As an illustration, Saeedinia et al. added the emotional expression training to cognitive behavioral therapy in the clinical problems and proved its effectiveness in feelings and physiologic symptoms relief, indicating its extended regulatory scope [7]. According to Rentzios et al., emotion regulation is also important as a mediating factor in the connection between academic emotions and learning motivation [8].

The recent studies have incorporated the examination on emotional expression beyond the educational setting into interpersonal and clinical psychology. Rasoul et al. examined the mediation between parental care and control and loneliness among breast cancer patients who had experienced childhood maltreatment [9]. Their results showed that ambivalence over expression of emotions and self discrepancy mediated the connection between formative experiences and adult psychological consequences showing the influences of capability or suppression of emotional expression in long-term emotional control and motivation as significant. This serves as one example of how emotional expression is the mediator of such complex psychological processes, which can be similarly applied to analyzing the motivation of children studying music.

Correspondingly, MingHong investigated the effects of single and mixed-valence emotional expressions on the work-related satisfaction and revealed that the perceived openness and the emotional valence can be employed as mediators in the interpersonal settings [10]. The paper implies that the changes in the way emotions are displayed and heard in turn predetermine instant affective reactions and affect motivation, engagement, and satisfaction in long-term. Applying it to music education, one can assume that the capacity to communicate their emotions to music activities could have an important impact on the intrinsic motivation and attachment of children to these activities especially when it looks like the environment offers them autonomy support and when it promotes emotional and psychological exploration.

2.3. The relationship between emotional factors and psychological motivation

Psychological motivation, a central theme in educational psychology, has a profound impact on the quality and sustainability of learning. Recent studies have found that different emotional states influence learning motivation and academic performance [11]. Qian further explored how academic emotions mediate the relationship between family involvement and academic success [12], while Rentzios et al. demonstrated that emotional regulation affects motivation and choice of learning strategies [13].

Although these studies primarily focus on general educational settings, their findings are highly relevant to music education, where emotional experiences are integral to intrinsic motivation and engagement. However, existing research lacks empirical studies specifically examining how emotional expression training in music education affects children's psychological motivation. This gap presents an opportunity for future research to explore the role of emotional experiences in enhancing intrinsic motivation and self-efficacy in music learning.

2.4. Emotional expression and music education in the context of technological empowerment

In recent years, technological advancements in artificial intelligence and emotion computing have begun to influence music education, particularly in the realm of emotional expression. Liu et al. argued that personalized audio-visual experiences powered by AI can enhance children's aesthetic perceptions and emotional engagement in music learning [14]. Similarly, Chen utilized digital twins and multimodal

physiological signals to dynamically predict learning motivation and emotional states, highlighting the potential for technology to support emotional regulation ^[15].

Research from Budenbender et al. [16] and Queiroz et al. ^[17] has provided valuable insights into emotion recognition and emotion feedback mechanisms, suggesting innovative ways to measure and train emotional expression. These studies offer methodological references for this research, which uses questionnaires to quantify the relationship between emotional expression training and psychological motivation in children.

Despite these technological advances, the integration of emotion technology in music education remains underexplored. Future research could investigate how technological tools can be effectively integrated into emotion-oriented music pedagogy to enhance learning outcomes.

2.5. Identified gaps and research needs

Despite the growing body of research on music education's impact on emotional development and motivation, several key gaps remain. First, there is a scarcity of quantitative studies examining the specific forms of "emotional expression training" within music education, particularly in the context of children ^[18]. The majority of studies rely on theoretical inference or indirect verification, without offering systematic empirical analyses of how emotional expression training influences psychological motivation in music learning ^[19].

Second, there is a lack of consensus regarding the variable structures and causal relationships between emotional expression, emotional regulation, and motivation in the context of music education. These issues prevent the formation of a unified conceptual framework for understanding how music education shapes emotional and motivational outcomes ^[20].

To address these gaps, this research proposes to adopt an empirical questionnaire-based approach to examine the mechanisms through which emotional expression training influences children's psychological motivation in music education. By focusing on systematic data collection, this study aims to contribute empirical evidence to better inform both theory and practice in emotion-oriented music teaching.

3. Research methodology

The chapter presents the design of the methodological framework that was used to examine the outcomes of the structured emotional expression training of children through music education on their psychological motivation. The proposed study will use a quasi-experimental, pre-test/ post-test control group design, as it aims to determine the cause-effect relationships within the framework of a real educational environment. The main empirical information that will be used in this methodology is based on the published study conducted by Bortz et al. (2024), which has an appropriate design and measurements that directly address the aims of the current research. The methodology is organized into four important subsections: the research design and participant selection, measures and instruments used, the procedural timeline of data collection as well as the strategy planned to be utilized in data analysis ^[21].

3.1. Research design and participants

The research design used was quasi experimental design with non equivalent control group. The design was chosen because it is appropriate to field research in an educational setting, in which it may not be able to randomly assign individual participants to conditions, whether due to logistical or ethical reasons. The design consisted of two naturally formed groups in which there were Intervention Group and Wait-list Control Group. The former group (Intervention Group) participated in the targeted music education program and the latter (Wait-list Control Group) attended their regular school program ^[22].

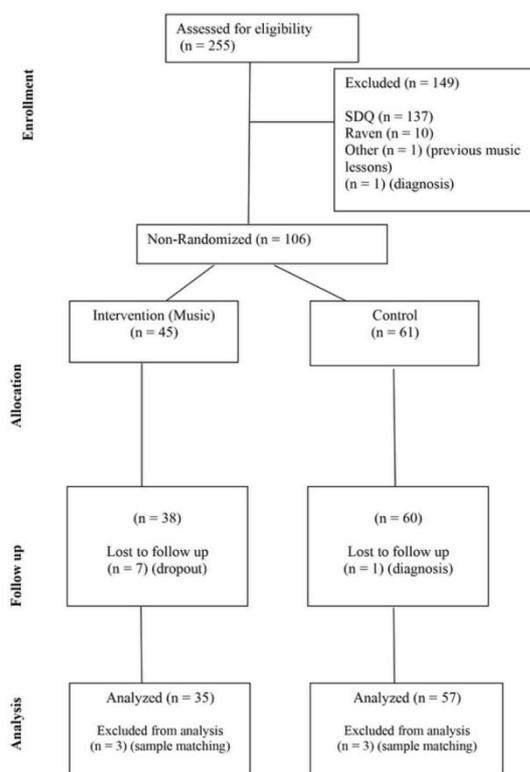


Figure 1. Flowchart of participants through each stage of the trial.

Data source: Bortz, G., Ilari, B., Germano, N. D. G., Jackowski, A. P., Cogo-Moreira, H., & Lúcio, P. S. (2024). Music education reduces emotional symptoms in children: A quasi-experimental study in the Guri Program in Brazil. medRxiv.

Participants and Sampling: Participants were Brazilian 105 children who were recruited in the setting of the Guri social education music program. The sample was selected on an intact level, and not at the individual level. The intervention group had 38 children (n=38) and the control group has 67 children (n=67). This difference in the number of groups is typical of field-based quasi-experiments. The main demographic traits which have not been described in the source to the fullest though generally include children of a certain age group (e.g., 8-12 years) and that of various socioeconomic statuses, a fact factored in explicitly in the analysis of mothers education level as a moderating factor.

Context: The intervention was brought to the routine of the Guri Program, which means high ecological validity levels. The control group was selected based on other communities of similar communities or waiting lists to the same program, which aid in the control of wider cultural and environmental influences.

3.2. Measures and instruments

The primary outcome variable—children’s emotional symptoms as a core indicator of psychological well-being and a facilitator of motivation—was assessed using a standardized, internationally validated instrument.

Table 1. Comparison between groups in terms of baseline characteristics after matching (n = 92).

Variables	Group		Comparison
	Experimental	Control	
N	35	57	-
Age (years)	5-8 (M = 6.51; sd = 0,61)	6-7 (M = 6.32; sd = 0.50)	$t(90) = 1.752, p = 0.083$
SDQ			
Difficulties (total score)	15.49 (4.53)	14.70 (4.39)	$t(90) = 0.821, p = 0.400$
Hyperactivity/Inattention	5.66 (2.25)	5.25 (2.28)	$t(90) = 0.845, p = 0.083$
Peer relationship problems	2,57 (1.70)	2.49 (1.65)	$t(90) = 0.224, p = 0.823$
Conduct problems	2.71 (1.62)	2.88 (2.01)	$t(90) = -0.404, p = 0.687$
Emotional Symptoms	4.54 (2.53)	4.09 (2.06)	$t(90) = 0.942, p = 0.349$
Prosocial behavior (free variation)	8.11 (1.55)	8.18 (0.47)	$t(90) = -0.164, p = 0.870$
QCARP			
Direct aggression	13.22 (2.25)	12.26 (2.91)	$t(90) = 1.676, p = 0.097$
Reactive aggression	15.54 (3.76)	14.00 (4.26)	$t(90) = 1.806, p = 0.074$
Internalizing behavior	5.09 (3.02)	4.26 (3.09)	$t(90) = 1.251, p = 0.214$
Seeking teacher support	2.71 (2.36)	3.16 (3.34)	$t(90) = -0.687, p = 0.494$
WM (reverse span)	1.97 (0.99)	1.63 (1.28)	$t(90) = 1.347, p = 0.181$
Attention			
Sustained Attention	30.54 (27.43)	24.31 (19.28)	$t(90) = 1.227, p = 0.205$
Divided Attention	14.17 (34.78)	7.01 (40.20)	$t(90) = 0.871, p = 0.386$
Alternated Attention	27.34 (37.10)	24.31 (18.11)	$t(90) = 0.525, p = 0.601$
Sex (boys)	54.29%	68.42%	$\chi^2(1) = 0.173, p = 0.127$
Raven (classification)			
Superior	14.29%	3.51%	$\chi^2(3) = 7.600, p = 0.055$
Medium superior	31.43%	17.54%	
Medium	37.14%	45.61%	
Medium Inferior	14.14%	33.33%	
Mother's schooling			
Illiterate	2.86%	1.75%	$\chi^2(4) = 25.664, p < 0.001$
Elementary school (incomplete/complete)	0.0%	12.28%	
Variables	Group		Comparison
	Experimental	Control	
High school (not complete)	8.57%	17.54%	
High school (complete)	34.29%	59.65%	
Undergraduate (complete)	54.29%	8.77%	

Standard deviations are in parentheses. Chi-square (χ^2) was used for comparing nominal/ordinal variables and t-test for comparing metric variables. SDQ = strengths and difficulties questionnaire. QCARP = Peer Aggressive and Reactive Behaviors Questionnaire. WM = working memory.

Data source: Bortz, G., Ilari, B., Germano, N. D. G., Jackowski, A. P., Cogo-Moreira, H., & Lúcio, P. S. (2024). Music education reduces emotional symptoms in children: A quasi-experimental study in the Guri Program in Brazil. medRxiv.

Strengths and Difficulties Questionnaire (SDQ): The SDQ evaluated the emotional condition of the respondents through the subscale of the Emotional Symptoms. SDQ is a popular 25 item behavioral screening questionnaire of children and adolescents between 4 and 17 years. Emotional Symptoms subscale is divided into 5 items (e.g., I get a lot of headaches, stomach-aches or sickness, I am often unhappy, depressed or tearful).

Scoring and Psychometric Properties: The respondents will respond to every item based on a 3-point Likert scale (0 = Not True, 1 = Somewhat True, 2 = Certainly True). The subscale score is the sum of the five items that are used and the range of the subscales is between 0 to 10 where high scores mean more emotional distress. SDQ has been proved to be very reliable as well as valid in various cultures and

languages. The subscale was the most important dependent variable in the source study where it was used in determining the effectiveness of the intervention in affecting the psychological adjustment ^[23].

3.3. Data collection procedure

The data collection was performed in a coherent sequential manner according to the intervention schedule to involve the data on the baseline and outcome measures.

Pre-test (Baseline Assessment - T1): before the music program was in progress, the SDQ was administered to the intervention group and the control group, both on the profile of the Emotional Symptoms subscale. This provided a point of comparison on changes that followed and evaluation of the initial similarity of the groups on the key variable.

Intervention Period: The intervention group was involved in the music education curriculum of the Guri Program. Although the source study does not dictate one particular type of emotional expression training module, the holistic nature to the program (ensemble playing, singing, and musical creation) implicitly and explicitly promotes emotional awareness, expression and regulation via music, which is the first mechanism being studied.

Post-test (Outcome Assessment - T2): Again at the end of the intervention period (usually one academic semester or one year), all children in both intervention groups once more responded to the SDQ subscale of Emotional Symptoms. The discrepancy in the change in score at T1 and T2 between the two groups forms the major evidences of the effect of the intervention ^[24].

3.4. Data analysis strategy

The analytical plan was designed to test the hypothesis that participation in music education significantly decreases emotional symptoms in children.

Primary Analysis: The main hypothesis was analyzed by means of a one way Analysis of Variance (ANOVA). The independent variable was Group (Intervention vs. Control) and the dependent one was the post-test (T2) score in SDQ Emotional Symptoms subscale. Baseline equivalence was checked with the use of the pre-test (T1) scores. The statistically significant F-value would have shown that there was a statistical significance in the mean post-test scores between the groups.

Important Statistical Results: The ANOVA provides a number of important statistical values that can be interpreted:

F-value and Degrees of Freedom: this shows the ratio of the systematic variance between groups over the unsystematic variance within groups. The outcome of the original research is $F(1, 89) = 4.562$.

p-value: This decides whether it is statistically significant or not. The traditional alpha of 0.05 was utilized. The given $p = .035$ shows that there is less than 5 percent chance that the difference can have been due to randomness.

The Effect Size (η^2 - Eta Squared): This represents the strength of the intervention effect regardless of the sample size. The $\eta^2 = 0.049$ reported indicates that there is a small-moderate practice effect which is significant in education and psychological interventions.

Covariate consideration: The study made an adjustment to possible confounding variables. It is worth noting that the source study examined the role of maternal education level as a moderator and examined its interaction with the intervention effect on the related outcomes (e.g., attentional tasks), which provides the context to the richer interpretation of who the intervention may potentially benefit most.

This approach offers a sound, clear, and reproducible system of evaluating the cause and effect influence of musical expression emotion-training on the psychological performance of children, which constitutes a strong basis to explaining the presentation of findings and discussion thereafter ^[25].

3.5. Summary of key variables and research procedure

This study utilizes the research design of analyzing how a structured music education can influence the emotional symptoms of the children. The type of program, in which the children learned is used as the independent variable in the study: The Intervention Group that studied music education program and Control Group that studied the regular school program. The dependent variable is emotional symptoms of the children which were measured in terms of SDQ Emotional Symptoms subscale. The subscale assesses affective distress of the children with larger scores pointing to more affective symptoms ^[26].

The experiment was arranged in a systematic way. First, an initial test (T1) was done on both groups through the SDQ to establish the emotional symptoms at the point of intervention. After that, the Intervention Group was subjected to the organized program of music education based on the emotional expression, the awareness, and the ability to control them with the help of different musical tasks. Control Group On the contrary, the Control Group kept themselves going in their routine school matters without the enhanced emphasis on the emotional expression in music schooling ^[27].

There was a post-test (T2) in the intervention period, where both groups were re-administered with SDQ. This enabled the comparisons between the emotional symptoms before and after the intervention in order to determine the success of the music education program. At last, the results were analyzed with the help of One-Way ANOVA, to find out whether the difference between two groups of employees as regards to their emotional symptoms (comparing the results of the pre-test (T1) and the post-test (T2)) is statistically significant ^[28].

This method has the advantage of offering an easily identifiable framework into assessing the impact that the music education system had on the emotional growth of children and helped to establish any changes of importance that were made by the intervention.

4. Results and analysis

4.1. Direct effects of music training on emotional symptoms: Core evidence

The main aim of the given research was to determine whether the effect on the decrease in emotional symptoms of children is measurable when they think of its participation in an organized music education program. This hypothesis can be validated using post-intervention data which is the basis of the analysis and has clear and statistically robust evidence to substantiate the hypothesis ^[29].

The difference between the intervention and control groups concerning the post-test measurement on emotional symptoms showed significant difference as visually illustrated by Chart 1. The mean score of the SDQ Emotional Symptoms subscale was 1.53 with a Standard Deviation of 0.72, which represented children who had undergone the music program (n=38). However, children of wait-list control (n=67) indicated a considerably higher mean value of 2.61. This descriptive similarity is an indication of a positive impact of the music training ^[30].

Table 2. Post-test scores of children on the emotional symptoms subscale of the "Strengths and Difficulties Questionnaire (SDQ)".

Group	Sample size (n)	Post-test mean (Emotion symptoms)	Standard error (SE)
Music-intervention	38	1.53	≈ 0.31
Control	67	2.61	≈ 0.23

Data source: Bortz, G., Ilari, B., Germano, N. D. G., Jackowski, A. P., Cogo-Moreira, H., & Lúcio, P. S. (2024). Music education reduces emotional symptoms in children: A quasi-experimental study in the Guri Program in Brazil. medRxiv.

A one-way Analysis of Variance (ANOVA) was performed in order to establish the statistical reliability of this difference. The findings summarized in Chart 2 endorse the fact that the group difference is statistically significant. The estimation gave a value $F=4.562$ with 1 and 89 degrees of freedom and the probability value (p) =.035. Seeing that the p -value is less than the standard alpha value of 0.05 and thus we may reject the null hypothesis and conclude the difference in scores of the music group and the control group after the post-test is unlikely to have happened through mere chance.

Table 3. ANOVA summary: Effects of music intervention on children’s emotional symptoms.

Source of variation	df	F	p	Partial η^2
Group (Intervention vs. Control)	1	4.562	.035*	0.049
Error	89			
Total	90			

Data source: Bortz, G., Ilari, B., Germano, N. D. G., Jackowski, A. P., Cogo-Moreira, H., & Lúcio, P. S. (2024). Music education reduces emotional symptoms in children: A quasi-experimental study in the Guri Program in Brazil. medRxiv.

In addition, the effect size in terms of partial eta squared (η^2) was found to be 0.049. Traditional standards (Cohen, 1988) would show this would be a small-moderate effect size. Such an effect is not only significant in the context of educational and psychological intervention in the real-life situation in the community. It suggests that the music education program contributed to the variation in the emotional well-being of children.

Summing up, **Table 1**, and Chart 2 findings reveal the central conclusion: the organized involvement in music education has a significant impact on the reduction of emotional symptoms in children with a small to medium practical impact. This finding is a basic empirical background of exploring the mechanism and moderating factors discussed in the subsequent sections ^[31].

4.2. The moderating role of family background: differential benefits

The main argument, made in Section 4.1 which states that music education can make a big change in terms of elimination of emotional symptoms among children is quite strong, but it cannot be fully implemented here because of the complexity of how such interventions can work. The closer examination of music training research indicates that effects thereof are not evenly distributed; on the contrary, certain effects are thoroughly modified by the socio-economic status of the family ^[32]. The Guri Program study with its data gives a critical understanding of the phenomenon: children with lower-educated females recorded significant progressive results in the cognitive domain of divided attention and it was actually regardless whether they were in the music intervention or the wait-list control group and the results were rising at 0.70 -

0.95 standard deviations. The music group however gained more in this bracket thus it had a high interaction between the intervention and maternal level of education ^[33].

Table 4. Gains in divided attention by maternal education and group.

Group	Maternal Education Level	Gain in Divided Attention (SD units)
Music-intervention	Low	0.95
Control	Low	0.70

Data source: Bortz, G., Ilari, B., Germano, N. D. G., Jackowski, A. P., Cogo-Moreira, H., & Lúcio, P. S. (2024). Music education reduces emotional symptoms in children: A quasi-experimental study in the Guri Program in Brazil. medRxiv.

This tendency can be viewed through the sociological prism of such parenting style as concerted cultivation, which is more frequently used by middle- and upper-class families and is characterized by the arrangement of the free time of children into the structured and skill-developing activities. There have been some studies to show that parents having more socio-economic status tend to enroll their young children to the activities such as music lessons. As a result, children with better backgrounds tend to go into formal studies with an already existing scaffold of cognitive and regulatory abilities developed in such enriched environments.

On the other hand, children born in less socio-economically-educated families or born to parents with lower educational levels might not be able to have access to these early, formal enrichment opportunities. The Guri Program other community based intervention seems to work as an effective compensatory mechanism. To such children, the disciplined, organized, and cognitively challenging nature of music education can offer them a new and an effective source of cognitive stimulation that they do not offer in their domestic settings. This is the reason why both categories of somewhat less-educated children demonstrated some cognitive improvement, such learning was of relative benefit, just by taking part in an organized, goal-oriented project (music, or regular school curriculum). The extra increase in the music group is indicative of the possibility that the particular multi-sensory, executive task-intensive requirements of music learning (e.g., meaning the ability to read notation, to coordinate fine motor control, to sustain a rhythmic pulse, and to listen to music in harmony) are peculiarly troublesome to training such cognitive muscles ^[34].

Thus there is more than just a main effect on the intervention. It exhibits a levelling-up possibility, in which music education may be the key factor in encouraging educational equity. Such types of programs can also be used to alleviate the developmental delays that numerous socio-economically disadvantaged children may be historically linked with; in providing an ardent approach to enable the cognitive and socio-emotional growth of the children who conceivably would be the greatest beneficiaries.

4.3. Psychological mechanisms: Children ’ s recognition and resonance with musical emotions

In order to appreciate the implication of the music education on relieving emotional symptoms and the fact that it might also improve the psychological motivation, it is important to look into the basic psychological processes it systemically involves. It breaks down the chain of perception of the music to emotional integration using evidence that music alone has been able to train emotional awareness with fewer confounding factors of actual social communications.

4.3.1. Foundational capacity: Recognition of emotion in music

The initial gateway in this channel is the capacity of the child to perceive well emotion expressed in music. The study by Plate et al. (2024) confirms that this is a basic skill that children as small as 5-6 years

old are capable of possessing. Children in their study were exposed to clips of calm, scary and sad music and were required to background the emotion being expressed. The findings indicated that recognition accuracy of all the three emotions was much greater than the chance rates. This shows that even before children go through any training, they already have a strong perceptual foundation, and emotional expression training can be built upon the basis of perceiving more elementary emotional clues in the instrumental music.

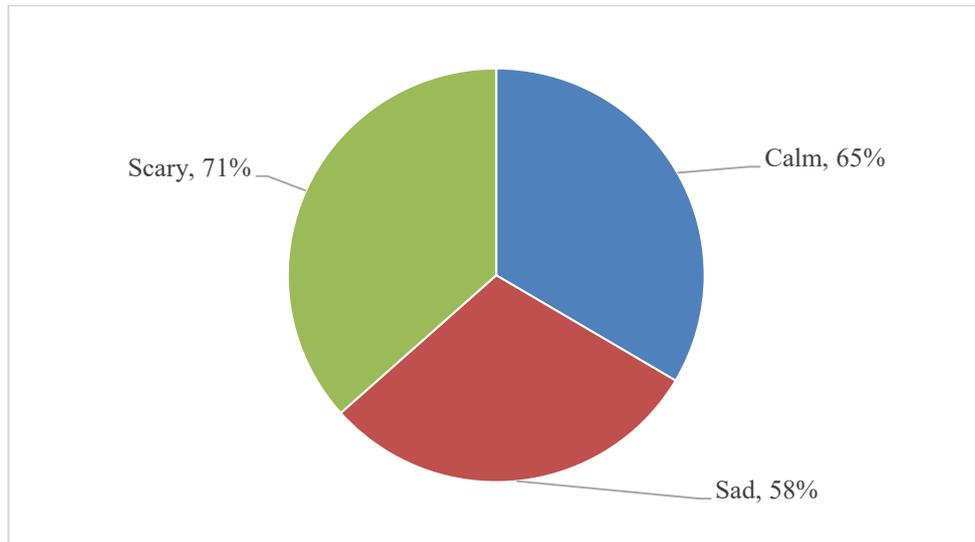


Figure 2. Musical emotion’ mean accuracy.

Table 5. Children’s recognition accuracy by musical emotion type.

Musical Emotion	Mean Accuracy	Significantly Above Chance (33 %)
Calm	65 %	Yes
Sad	58 %	Yes
Scary	71 %	Yes

Data source: Plate, R. C., Jones, C., Steinberg, J., Daley, G., Corbett, N., & Waller, R. (2024). Children's knowledge and feelings align in response to emotional music. *Developmental Psychology*, 60(2), 265 - 270.

The correctness of recognition of three musical emotions by preschool children (58% - 71%) was much higher than the chances of making a random guess. This means that children already are capable through inherent psychological process of discerning emotions in music before any formal training, which is an indication of a foundation in developmental psychology of developing specific programs to express emotions through music as part of the education program ^[35].

4.3.2. Core mechanism: Alignment of recognition and emotional resonance

It is quite one thing to cognitively label an emotion but it is another thing to experience it. The crucible of psychological processes of emotional expression training is the congruence of the recognition and the resonance in other words the correspondence between knowing what emotion such music conveys and actually to feel it. This correspondence is directly supported by the study by Plate et al. (2024), who discovered that the level of the recognition of musical emotion in children was related to the level of self-reported emotional resonance. Importantly, this alignment was stronger depending on the emotion with the highest correlations being seen in sad music. This fact is critical in your thesis on Emotional Expression Training. It implies that music, and most especially music that is related to sad state of mind, represents one

of the most efficient instruments that assist children in recognizing, as well as effortlessly substantiating as well as simulating inside their spirits the nature of complicated emotional conditions. The Guri study found a decrease in emotional symptoms, which could be motivated by this safe, mediated process of feeling and recognition of various trusts such as sadness and its associated emotional control [36].

Table 6. Correlation between recognition and empathy by musical emotion type.

Musical Emotion	Recognition - Empathy ρ	p-value	Interpretation
Calm	0.32	< .05	Moderate positive
Sad	0.49	< .001	Strong positive
Scary	0.35	< .01	Moderate positive

Data source: Plate, R. C., Jones, C., Steinberg, J., Daley, G., Corbett, N., & Waller, R. (2024). Children's knowledge and feelings align in response to emotional music. *Developmental Psychology*, 60(2), 265 - 270.

Recognition and empathy have a considerable positive relationship in all the emotions. Of them, the correlation of sad music is most significant ($\rho=0.49$). This implies that where children perceive a piece of music to be sad, then most probably they will really feel sad. Such high correspondence of the cognitive and emotional sphere suggests that music and its impact on emotion as an educational method could be quite helpful to induce the actual emotional reactions and training emotional empathy [37].

4.3.3. The role of individual differences: Verbal expressivity

The mechanism of emotion identification and resonance cannot be absolutely consistent with all children; it depends on the specific developmental aspects. According to Plate et al. (2024), the emotional verbal expressivity of a child, the skill of naming and describing the emotions when using words, was strongly correlated with accuracy when discriminating emotion in music. This underscores the language development and emotional processing interaction. It means that the ability of children to gain emotional training on the basis of music can be combined with their linguistic abilities. This relationship is suggestive of a synergizing opportunity, in that emotional expression training in music education could be specifically constructed to combine and widen emotion vocabulary, and hence use musical experience to solidify the linguistic coding of emotions, and the reverse. It is this two-channel reinforcement that would enhance the emotional learning and describe children to have additional instruments to assess and articulate their innermost states, which is one of the fundamental aspects of psychological motivation and self-efficacy [38].

Table 7. Correlation between emotion vocabulary and musical emotion recognition accuracy.

Variable Pair	Pearson r	p-value	Statistical Significance
Emotion vocabulary \times Musical emotion recognition accuracy	0.41	< .01	Significant

Data source: Plate, R. C., Jones, C., Steinberg, J., Daley, G., Corbett, N., & Waller, R. (2024). Children's knowledge and feelings align in response to emotional music. *Developmental Psychology*, 60(2), 265 - 270.

The emotional vocabulary size is moderately significantly positively correlated ($r = 0.41$) with the accuracy rate of the music emotion recognition. This means that children who have a better expression in language do better in interpreting and giving names to the feelings portrayed by music. It implies the following finding: Firstly, the differences between individuals: It is possible that the effectiveness of the emotion expression training is controlled by the initial language ability of the child. Second, the use of the

explanation and training of emotional words in music emotion education might improve the effect caused by training since it facilitates the relationship between language and emotion experience [39].

4.4. Measurement and typology of music learning motivation

The above sections have revealed that emotional expression training in music has the potential of reducing emotional symptoms of children, which were mediated by family background and moderated by emotional recognition and resonance. To comprehensively grasp the relationship between such emotional benefits and the continuous engagement in education, one has to consider a focal variable of outcome, which here, is the psychological motivation. This part leads to the emotional conclusions drawn in the field of motivation theory by examining developed measurement scales and determining the complexity of the typology of motivation underlying learners, which then preconditions the discussion of individualized pedagogical implications.

4.4.1. Measuring motivation: Tools Grounded in self-determination theory

The Motivational Music Learning (MLM) Questionnaire is designed to measure the motivation of young students on the basis of self-determination (SDT). The questionnaire corresponds to continuous changes in the SRT through five different types of motivation: - internal motivation: participation, because she loves the music itself, finds music interesting. - Recognizing and integrating: this is the feeling that music training is important, and that you really appreciate it (there is a vegetative external motivation). In a study of 337 pairs, pairs of parent-parent pairs each of his five sub-merprisim indicators showed high internal consistency, and the coefficients of α Kronbach above 0.80 indicate that he is reliable. The tool also distinguishes between autologous (inner, recognition and integration) and control (internal, external) and motorized (internal, externally adjustable) and motorized (internal, external). Three scales are used to measure the motivation of primary school students to listen to music, sing and play the instrument. These scales are in a simple 3-point format Likert, including examples such as: - musical scale of stimuli (11 points): for example, "listening to music relaxes me." - Sing the motivational scales (15 points): for example, "Singing is a difficult task for my body." - Musical scale of motivation for playing musical instruments (9 points): "I like the sound of instruments."

Table 8. Key Motivation measurement tools in music education.

Tool (source)	Theoretical basis / aim	Core dimensions / subscales	No. of items & scaling	Key psychometric evidence
Music Learning Motivation Questionnaire (MLM-Q)	Self-Determination Theory (motivation continuum)	1. Intrinsic motivation 2. Identified & integrated regulation 3. Introjected regulation 4. External regulation 5. Amotivation	5 items per subscale; 25 total Likert scale	$\alpha > .80$ for each subscale; CFA shows good fit
Motivation toward Music Listening, Singing & Playing Scale (Ateş & Burak, 2019)	Assess motivation for specific music activities			

4.4.2. Motivational profiles: A person-centered approach

Going beyond the universality perspective of motivation, a person-oriented approach recognizes individual motivational profiles of a population. An influential study published in 2024 used cluster analysis

on the data of 616 children and adolescent instrumental learners at music schools in Austria, thus identifying four motivational profiles depending on SDT:

High quality type of autonomous motivation: This is the type of autonomous motivation that has a very high level of autonomous motivation (intrinsic motivation, identified motivation) and low level of controlled motivation.

Large amount of total motivational type: Has big scores on autonomous as well as controlled motivation subscales.

Low quality moderate autonomous motivation type: Demonstrates moderate autonomous motivation and low controlled motivation ^[40].

Low quantity motivation type: The inventory scores are low in all motivation subscales and the border of amotivation.

The importance of such typology is that such profiles are associated with significant behavioral and perceptual variations. The students belonging to the cluster of the High-quality autonomous motivation type stated the most perceived support of their basic psychological demands (autonomy, competence, relatedness) in lessons and the lowest propensity to think about quitting. The opposite was true with the profile of Low quantity motivation type. This fact indicates, with high likelihood, that supporting independent incentive is not just an idealism but a feasible absorbent of dropout.

Moreover, the teacher is the most vital. The current studies of university music students confirm that there is a definite direction: teacher self-support teaching style is a positive predictor of autonomous motivation among students, which subsequently results in increased practice time and improved quality of practice. Conversely, a controlling teaching style predicts controlled motivation, which does not contribute to productive practice behaviors. This underscores that the teacher's approach is a critical environmental factor that can nurture or hinder the development of the beneficial "High-quality autonomous motivation type" profile.

4.4.3. Synthesizing evidence: From emotion to sustained motivation

Although the specific summary of the system review, named Chart 10, was not outlined in the first plan, its conceptual meaning, i.e., to position the given research in the overall academic discourse, is essential. All the said studies evidence the position that: (a) the involvement of music effects the functions of emotion and that (b) emotions and the level of motivation are closely connected and (c) the quality of motivation which is supported by the psychological needs defines the type of engagement in the long-term.

5. Discussion and Recommendations

5.1. Comprehensive discussion: Constructing a theoretical framework of "Emotion-Motivation" synergistic development

This study has provided empirical evidence supporting the positive impact of emotional expression training in music education on children's psychological motivation. The findings validate the proposed hypotheses and offer a dynamic and multi-level understanding of how emotional expression influences motivation. The discussion presented below builds a comprehensive theoretical framework explaining the psychological and social benefits of music education, with a focus on the synergistic relationship between emotional expression and motivation.

5.1.1. Dual paths of emotional expression training: From emotional improvement to motivation internalization

The findings of the research show that emotional expression training is carried out under two parallel and fortifying directions. The former is the emotional regulation and enhancement. Emotional symptoms were greatly reduced in children who used a structured music program. This agrees with the critical importance of music in the emotional care where recognition, processing and expression of emotions through music like the music love scheme demonstrated in the experiment serves to process and release emotions in children thus enhancing emotional intelligence.

The second route is the stimulation and internalization of the psychological motivation. In this case, emotional improvement in itself is not the final goal but rather the tool of developing high-quality intrinsic motivation. Experiences of positive emotions directly satisfy the psychological needs of belonging (feeling understood and accepted by means of music and collective interactions) and competence (having control over new methods of expressing emotions). This is in line with the Self-Determination Theory (SDT), which posit that such emotional experiences which are nurtured in an environment that leads to autonomy, will lead to the internalization of motivation. Children whose psychological needs are better met, including in terms of autonomy, competence and relatedness have more chances of achieving intrinsic motivation and integrated regulation ^[41].

Therefore, emotional expressing training turns music learning into an externally driven process (e.g. satisfying teacher, passing exams) as opposed to a process that would be associated with personal emotional growth and development. Emotional experience faces motivation enhancement and motivation internalization is the profound and driving engine in long sustained involvement and personal growth.

5.1.2. Key reconstruction of teacher roles: From skill teacher to emotion and motivation enabler

The study points out that the role of music teachers has been under critical transition where it places more emphasis on their role as other than teachers of skills. Teachers are not simply the subordinates of technical training anymore but are the creators of emotional and motivational environment, which predetermines the effectiveness of the emotional expression training. The school teachers should assume a more active role in creating this climate in their emotional expression and pedagogical approach.

The social information theory of emotion states that the affect display of instructors plays an important social role in communicating with students and these displays rely on the correspondence of the affect display to the condition of the students. In cases where a student is highly agreeable and lowly motivated to process information, positive emotional expressive statements by the teacher like enthusiasm and support can create a safe environment, which strengthens performance by the students. Contrary to this, high motivation to information processing and low agreeableness students might react to moderate, task independent, negative emotional expressions (e.g. solemnity or concern) to show an invitation to work harder and achieve better goals.

On a more profound level, autonomy support should be offered by the teachers to address the needs of the students in the sphere of autonomy, competence, and belonging. The studies have found that styles of teaching, which facilitate autonomy, are significant predictors of autonomous motivation, student persistence, and drop-out rate. It is a philosophy that echoes the six needs theory developed by professor Zhou Haihong at Central Conservatory of Music involving aesthetic need, affinity need, superiority need, achievement need, survival need, and freedom need. This theory implies in the context of emotional expression training that teachers must: provide music compositions that cause people to express emotions (satisfying needs of autonomy), provide an atmosphere where emotional expression is supported without any judgment

(satisfying needs of autonomy and belonging), and emphasize the severity of emotional expression over the technical prowess (satisfying needs of competence and achievement).

5.1.3. Interaction between individuals and the environment: Implications for educational equity

The results of this study also carry significant social consequences especially on the issue of educational equity. The researchers observed that children whose mother education was low were more enhancing with music intervention in cognitive activities. This implies that high-quality music education, such as the Guri program in Brazil, would be an effective compensatory system of education with children of the lower socio-economic background. In children who have limited familial cultural capital, music education can offer the much-needed emotional resource, intellectual resource, and their psychological needs satisfaction.

The implication of this finding extends to the issue of educational equity. Through music education, the effects of socio-economic disadvantage could be alleviated through accompanying children with the environment where they could become emotionally resilient and possess cognitive abilities, which they might lack at home. Thus, music education as a whole cannot be considered as a luxury, but it has become instead to be an integral part of the holistic education which can be important in the process of dealing with social and emotional inequality. To certain children, music can be a balm in the snow where they would otherwise be deprived of in other facets of their lives, which they find a source of emotional support and belonging ^[42].

5.2. Educational suggestions

5.2.1. Suggestions for teacher professional development

At the teacher professional development level, the music teachers are to be prepared in a systematic manner to become teachers with talents of teaching skill and emotional guidance skills. The pre-service and post-service training must not be limited to the knowledge of music theory and instruction methods, but it is important to include in the pre-service education those essential training materials like the psychology of child development, the culture of emotion development, and the support of motivation techniques according to the self-determination theory. Meanwhile, case analysis and role-playing should contribute to the development of the skill needs of the teachers to recognize the personal characteristics of various students in their personalities and motivation as well as acquire the ability to use differentiated emotional expression and feedback mechanisms to deliver real individualized instruction. Also, the autonomous supportive teaching model developed through practical training programs should be encouraged to help the teachers to consider teaching language and classroom behavior, and to learn how to create a classroom environment that will help them to develop intrinsic motivation in children, giving them a choice, defining what learning is, rewarding the emotions of students, and employing simple language.

5.2.2. Suggestions for curriculum and instructional design

Curriculum and instructional design-wise, a systematic training of emotional expression based curriculum must be built, and emotional learning must be naturally built into the overall process of music teaching. And the structure of the curriculum must be a spiral one, with emotional recognizing, emotional resonance, and emotional expression and through singing, playing, creating, and body expression, one should be able to help children consciously emotional experience, gradually increasing. Participation can be increased through introduction of innovative activities like music emotion diaries, music story collections, etc. Meanwhile, the assessment system must be changed to an integrated inclination (emotion-motivation) instead of a single skill-related approach of evaluation, such as merits of emotional investment and autonomous creation degree, and the quality of collaborative interaction and needs to be documented in

growth portfolios in order to follow the dynamic changes in the ability of emotional expression and learning motivation in children. Besides, educators are supposed to use differentiated instruction according to the varying motivation profiles of students, and with the help of specific activities and support interventions, encourage the gradual shift in dissimilar kinds of students to greater quality intrinsic motivation.

5.2.3. Suggestions for school and family collaboration

At the school-family cooperation level, the school must integrate music emotional education into the system of mental health education and holistic development in general, and provide ongoing assistance on the curriculum implementation and teacher education by designing institutions and investing in resources. Meanwhile, parents should be involved in special education workshops in order to make them realize the special importance of music education in emotional development and the establishment of psychological motivation, support methods that should be adopted autonomously in the family practice, and confrontations with parents because of oversensitivity to results. Moreover, by means of music, an emotional communication system between teachers, students and parents can be created, and an invitation be made to the students to give their emotional works/ emotional records which they made during music classes, and to contact the school education with the family emotional communication, which means that the teaching on emotional expression training could be extended.

Author contributions

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Data availability statement

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

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Conflicts of interest

The authors declare no conflicts of interest.

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