

Music Connect: Effects of a Nordoff-Robbins-Inspired School Curriculum on Adolescent Mood Across Five Sessions

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Abstract

Adolescent mental health is a global issue of concern in modern society: half of all mental health problems occur before age 14 and most of these conditions are not detected in school environments. The effect of a five-session Music Connect, a music curriculum inspired by Nordoff-Robbins, on the mood and feelings of adolescents was studied using a quasi-experimental, within-subjects, longitudinal design with 16 adolescents participating, and depressive symptoms assessed with the Moods and Feelings Questionnaire. Thirty children (M age $\approx 12\pm 1$), approximately equally distributed among genders, were recruited by the convenience sampling method from a single non-government school in Mumbai, India. Results indicated there was a statistically significant decrease in MFQ scores between Session 1 (M = 9.57, SD = 7.06) and Session 5 (M = 2.07, SD = 2.80), with most of the difference in scores occurring within first three sessions of the intervention and leveling off thereafter. This trajectory was corroborated by a repeated-measures ANOVA, $F(4, 116) = 25.25$, $p < .001$, $\eta^2g = .289$, and a paired-samples t-test, $t(29) = 6.62$, $p < .001$, $d = 1.21$, where 83% of participants showed improvement overall. The findings here point to the possibility of providing a scalable and low-cost support to school wellbeing programs through a structured and group-based music curriculum. The findings do not provide evidence for causal claims as there was no control group, but they do provide some basis for further controlled, longitudinal research.

Keywords: music therapy, Nordoff-Robbins, school-based intervention, adolescent mental health, emotional regulation, social-emotional learning, positive psychology.

1. Introduction

One in seven adolescents will have a mental health disorder, 50% of all mental health conditions will onset before age 14 and the majority of mental health disorders will remain undiagnosed and untreated (WHO, 2022). Emotional well-being in adolescence is a key precursor to lifelong cognitive functioning, however epidemiological data shows a large proportion of people suffer from anxiety and depressive symptoms in adolescence. Denham (2006) linked emotional competence (which encompasses emotional expressiveness, knowledge and — and this is the most relevant to academic functioning — emotional regulation) to the core of academic functioning and total social adjustment, and he suggested that such environments are conducive to development of these competencies. In addition, Saarni (1999) suggested that emotional competence is a relational and social process and not a process of maturation, which makes group based interventions more appropriate for the development of emotional competence. There is therefore a need for easily accessible, non-pharmacological interventions in educational settings.

For this reason, music has been used as a universal medium for emotional expression; and more recent studies have outlined the mechanisms by which musical engagement and activities can bring about emotional change. Juslin and Västfjäll (2008) developed the BRECVEMA framework to classify and discuss the eight ways in which music can evoke emotional reactions: brainstem reflex, rhythmic entrainment, emotional contagion, etc. Using neuroimaging, Koelsch (2014) explained how active music-making stimulates the limbic and paralimbic regions of the brain that process emotion, including the amygdala, hippocampus, and nucleus accumbens, which create interpersonal bonding effects and increases in oxytocin. Thaut (2005) has suggested that rhythmic auditory stimulation can help to synchronise the internal physiological processes involved, thereby lowering arousal and controlling levels of stress, and active listening is more effective than passive listening.

Nordoff-Robbins is based on the humanistic notion that everyone has an inherent musicality, or "music child", which can be accessed through the use of child-led and improvisatory musical approaches (Nordoff & Robbins, 2007). There is some creativity and emotional expression in therapeutic musical relationships, in which the facilitator responds

dynamically to the expression of the participant rather than to a set goal as in the case of general performance (Wheeler, 2015). This was confirmed by Kim et al., (2009) in a randomised controlled study where they found that improvisational music therapy led to an increase in emotional responsiveness, increase in joint attention and interpersonal engagement compared to structured play.

The Music Connect curriculum expanded these concepts with the inclusion of humanistic/emotional regulation and positive psychology concepts in each thematic session. Rogers' (1961) basic conditions of unconditional positive regard, empathy, and congruence were integrated into the circle-formation structure of all sessions, and Yalom and Leszcz's (2005) therapeutic factors of group cohesion and universality were incorporated. The entrainment model (Thaut, 2005) and synchrony framework (Hove and Risen, 2009) were applied to Session II and III, respectively, and the shared manifold hypothesis (Gallese, 2003) guided the sound-movement mirroring in Session III. In the broaden and build theory (Fredrickson, 2001) was the theoretical foundation for Sessions IV and V, and in the antecedent-focused regulation model (Gross, 1998) was the theoretical foundation for Sessions IV and V (music-making to regulate emotions). Session II was informed by Tang et al. (2015) mindfulness-based attentional framework; and Session V was grounded in developmental and multimodal perspectives by Saarikallio and Erkkilä (2007) and Malchiodi (2012), respectively.

While this curriculum has some good evidence supporting it, there are still some methodological gaps within the field of music therapy interventions. Most studies use two time points in a pre-post design that masks the trajectory of emotional development within the intervention (Wheeler, 2015). Similarly, few studies have focused on the role of curriculum-based interventions based on Nordoff-Robbins principles in educational settings and there is minimal research that follows the emotional development of children over time with consistently used validated instruments. In order to fill in these gaps, the music teachers in this study examined music teachers' scores on MFQ for five consecutive sessions of the Music Connect curriculum and asked the following research question: How does participation in a Nordoff-Robbins-inspired curriculum impact mood and feelings in adolescents over five consecutive sessions? Participation was hypothesized to be correlated to decreasing negative emotional markers throughout the intervention period.

2. Methodology

2.1. Research Design

The study adopted the quasi-experimental design within subjects and longitudinal design to study the changes of depressive symptoms in five weeks of the music curriculum. The repeated measures design was used with the same cohort pre- and post-measured without a comparison condition. All participants were given the full intervention and were their own own control. Random assignment to a control condition was not logistically or ethically possible in a school-based setting (Cook & Campbell, 1979): In the school-based context, it would have been ethically impossible to withhold a wellbeing-oriented intervention from a comparison group of minors and would have been logistically challenging to implement a class-based curriculum. The repeated measures design specifically addressed the emotional change over time from session to session.

2.2. Participants and Setting

Convenience sampling was used to select participants from a single non-government organisation (NGO) based school in Mumbai, India called Aseema Charitable Trust. Enrollment at the school, age 12-15, willingness to attend all 5 sessions, assent from the child and consent from the parents were criteria for inclusion. People with severe cognitive impairment or who were unable to complete the SELQ independently were excluded. Thirty ($N = 30$) children aged around 12 years ($SD \pm 1$) (about equal sex distribution) participated in the final sample. All participants were from the same educational setting (primary and secondary education up to Grade 10) to obtain a relatively homogeneous educational and developmental background for all the children. Sessions were held in a school based closed classroom capable of accommodating the children to form a circle and move around. Parental consent and scheduling was handled by school staff. There were no incentives given and participation was voluntary.

2.3. Intervention

Music Connect curriculum is a planned sequence of five sessions designed to explore the potential of music to promote emotional expression, regulation and wellbeing in adolescents by engaging them actively. It was based on the principles of improvisation used in Nordoff-Robbins music therapy (Nordoff & Robbins, 2007) and included complementary concepts from music therapy practice, social-emotional learning and psychoeducation. The activities will take place in a group session, be two to three in each session, last between 40–60 minutes, and will be led by a person with a certified High School Programme in Nordoff-Robbins Music Therapy and supervised clinical experience.

Goal of Session I (Introduction to Music Connect), was to create a cohesive group, alleviate anxiety, and create a safe and inclusive atmosphere using verbal and non-verbal self-expression. Activities included: Ripple Effect (name and gesture introduction exercise) and Conduct the Noise (improvisational vocal activity led by a Participant Conductor). Emotional goals were initiated trust, group cohesion (Yalom & Leszcz, 2005) and present moment grounding.

The second session (Mindfulness) aimed at developing mindfulness and present-moment attention by reinforcing sustained attention and working memory using rhythmic and coordinated activities, which was inspired by Tang et al., 2015's attentional framework. Activities consisted of a Mindful Percussion structured body-percussion entrainment task, and a Call and Response Rhythm activity based on Hove and Risen's (2009) synchrony model and Thaut's (2005) entertainment model.

The goal of Session III (Compassion and Connection) was to minimize the sense of isolation by helping to cultivate feeling connected and attuned with each other through rhythmic interaction and non-verbal expression. Activities included the creation of the beat (Build the Beat), the sound and movement mirroring (Gallese, 2003), and Follow the Leader. The desired outcomes included: increased group trust, greater empathy and emotional regulation (Koelsch, 2014).

In Session IV (Expressing Our Emotions), individual emotional identification, expression and regulation were strengthened by creating a musical form for the expression of emotions. The two activities, Draw What You Hear (a cross-modal music-to-art activity) and Playing Our Emotions (a composition/performance activity) used Gross's (1998) antecedent-focused regulation framework and Fredrickson's (2001) broaden-and-build theory to enhance emotional identification and to boost confidence in self-expression.

The purpose of Session V (Safe Space and Comfort) was to build group bonding and offer closure that was meaningful and kept connection. The Introspection and Reflection activity required participants to build their own 'sensory comfort bank' (Malchiodi, 2012) and the Music Scrapbook activity involved a collaborative mural-building exercise, inspired by Saarikallio and Erkkilä's (2007) model of music as a tool to regulate mood, producing transferable wellness tools. Intervention fidelity was maintained by using a detailed facilitator guide that outlined objectives, materials, and activity sequence, and by having a consistent opening, activity sequence, and reflection at the end of each session.

2.4. Measures

The main outcome measure was the 13 item screening tool for adolescents and children with depression symptoms known as Moods and Feelings Questionnaire: Child Self-Report Short Version (MFQ; Angold & Costello, 1987). These items are rated from 0 (not true) to 2 (true), with higher scores reflecting higher depression symptoms. The MFQ has good psychometric properties, good test-retest reliability and good convergent validity in clinical and non-clinical samples (Angold & Costello, 1987; Thapar & McGuffin, 1998), and has been reported to measure the affective and cognitive aspects of mood including sadness, fatigue, self-worth, and concentration. It was presented in English at the beginning of Session 1 and the end of each subsequent session, allowing mood to be tracked over five points in time incrementally. The independence of participants' responses was maintained by administering them with the facilitator present to aid with clarifying the meaning.

2.5. Ethical Considerations

All participants signed informed written parental consent forms and children gave their assent before taking part, and were made aware of the right to withdraw at any time without penalty. Answers provided on the questionnaire were anonymised and kept in secured and limited access. The safeguarding policies were put in place to ensure that if there was any sign of significant distress this would be sensitively referred to the relevant school support systems whilst maintaining the wellbeing of the participants throughout the intervention.

3. Results

Table 1 shows descriptive data for the MFQ scores for the five sessions. Mean scores were adequately low across each of Session 1 (9.57, SD = 7.06) and Session 5 (2.07, SD = 2.80) and there was a clear, consistent decrease in scores from the former to the latter session. There was significant reduction in symptom load over time, as well as in scores, as seen in the decreasing of the SDs.

Table 1 Descriptive Statistics for MFQ Scores Across Sessions (N = 30)

Session	n	M	SD	Min	Max
Session 1	30	9.57	7.06	0	24
Session 2	30	6.30	4.11	0	14
Session 3	30	4.10	3.85	0	13
Session 4	30	2.50	2.81	0	10
Session 5	30	2.07	2.80	0	10

Note. MFQ = Moods and Feelings Questionnaire. Higher scores indicate greater depressive symptomatology.

3.1. Repeated Measures ANOVA

The one-way repeated measures ANOVA was used to determine whether there were significant differences in MFQ scores across the five sessions. The assumption of sphericity was violated on Mauchly's test, $W = 0.117$, $p < .001$; hence, the degrees of freedom were adjusted with the Greenhouse–Geisser estimate ($\epsilon = 0.53$). The ANOVA was corrected, and session was significant with a large effect size ($F(4,116) = 25.25$, $p < .001$, $\eta^2g = .289$, Cohen, 1988). The means show a monotonic decrease in depressive symptomatology from Session 1 to Session 5, which is reflected in the pattern of means. Table 2 shows the results.

Post-hoc Bonferroni-corrected pairwise comparisons (Table 3) indicated that there was a significant increase in MFQ scores from all sessions after Session 1 (all $p_{\text{Bonf}} \leq .025$). All of the scores in Session 2 were also significantly greater than those in Sessions 3, 4, and 5 (all $p_{\text{Bonf}} \leq .013$). The result of Session 3 was significantly different from that of Session 4 ($p_{\text{Bonf}} = .022$), but not from Session 5 ($p_{\text{Bonf}} = .105$). There was no significant difference between sessions 4 and 5 ($p_{\text{Bonf}} = 1.000$), which means that the largest part of the decrease in MFQ scores occurred during sessions 1–3 and remained stable during the remaining sessions.

Table 2 Repeated Measures ANOVA for MFQ Scores Across Sessions

Source	SS	df	MS	F	p	η^2g
Session	1144.96	4	286.24	25.25	< .001 ^a	.289
Error	1315.04	116	11.34			

Note. SS = sum of squares; MS = mean square; η^2g = generalised eta-squared. ^aGreenhouse–Geisser corrected p-value ($\epsilon = 0.530$); uncorrected $p < .001$.

Table 3 Bonferroni-Corrected Pairwise Comparisons of MFQ Scores Between Sessions

Session A	Session B	df	MD	SE	t	p (uncorr.)	p (Bonf.)
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Session 1	Session 2	29	3.267	0.988	3.31	.003	.025
Session 1	Session 3	29	5.467	1.147	4.76	< .001	< .001
Session 1	Session 4	29	7.067	1.244	5.68	< .001	< .001
Session 1	Session 5	29	7.500	1.133	6.62	< .001	< .001
Session 2	Session 3	29	2.200	0.620	3.55	.001	.013
Session 2	Session 4	29	3.800	0.630	6.04	< .001	< .001
Session 2	Session 5	29	4.233	0.787	5.38	< .001	< .001
Session 3	Session 4	29	1.600	0.476	3.36	.002	.022
Session 3	Session 5	29	2.033	0.743	2.73	.010	.105
Session 4	Session 5	29	0.433	0.502	0.86	.395	1.000

Note. MD = mean difference (Session A – Session B); SE = standard error of the difference. Bonferroni correction applied across 10 comparisons.

3.2. Paired-Samples t-Test

MFQ scores for Session 1 and Session 5 were directly compared by using a paired-samples t-test. The analysis revealed a highly significant reduction, $t(29) = 6.62$, $p < .001$, $d = 1.21$, with a mean reduction of 7.50 points (95% CI [5.18, 9.82]), constituting a large effect (Cohen, 1988). Twenty-five of the 30 participants (83%) had lower scores at Session 5, 3 (10%) had scores unchanged and 2 (7%) had scores slightly higher. The results are shown in Table 4 and individual score trajectories and group means are presented in Figures 1 and 2.

Table 4 Paired-Samples t-Test Comparing MFQ Scores: Session 1 vs. Session 5

Comparison	$M_1 - M_2$	SD_diff	df	t	p (two-tailed)	d
Session 1 vs Session 5	7.50	6.21	29	6.62	< .001	1.21

Note. M_1 = Session 1 mean; M_2 = Session 5 mean; SD_diff = standard deviation of difference scores; d = Cohen's d. 95% CI for mean difference: [5.18, 9.82]

Figure 1. Individual MFQ score trajectories from Session 1 to Session 5. Green lines indicate participants whose scores decreased (improved; $n = 25$), red lines indicate increases (worsened; $n = 2$), and grey lines indicate no change ($n = 3$). The dashed line represents the group mean trajectory.

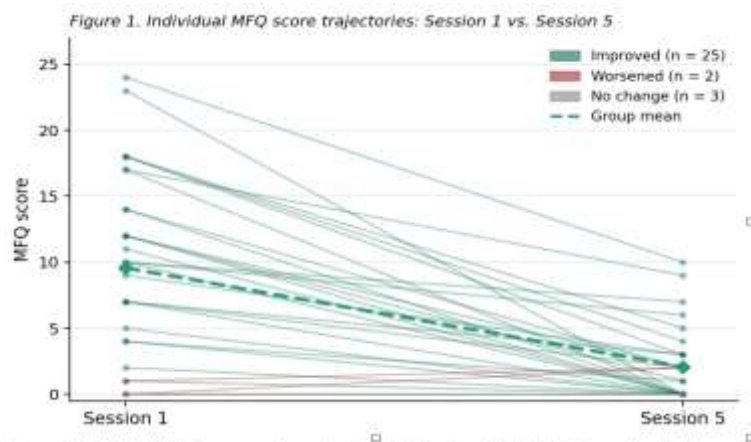
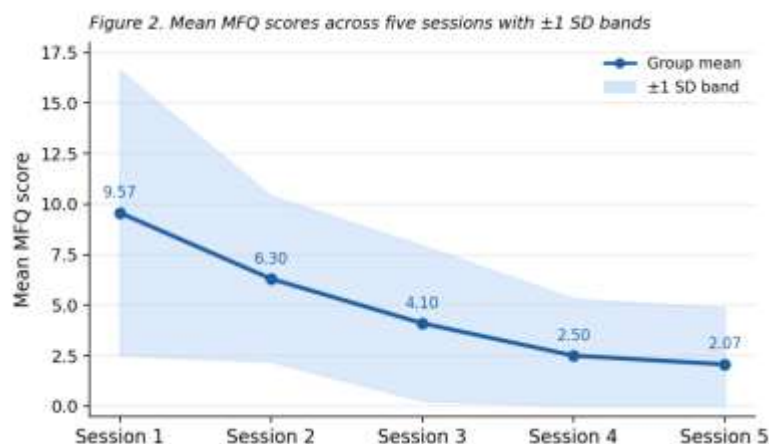


Figure 2. Mean MFQ scores across all five sessions (N = 30). Error bands represent ± 1 standard deviation. Mean values are labelled above each data point. Scores declined monotonically from Session 1 to Session 5.



4. Discussion

The purpose of this study was to examine if there were positive changes in moods and feelings in adolescents over time after participating in the five-session Music Connect curriculum. The hypothesis of a progressive decrease in depressive symptoms was supported: Means scores on the MFQ decreased across Sessions (from $M = 9.57$, $SD = 7.06$ at Session 1 to $M = 2.07$, $SD = 2.80$ at Session 5). This reduction was statistically confirmed by a repeated-measures ANOVA (Cohen, 1988), with a large effect size ($d = 1.21$), and corroborated by a paired-samples t-test: $t(29) = 6.62$, $p < .001$, $d = 1.21$, mean reduction = 7.50 points (95% CI [5.18, 9.82]). Most of the sample (83%, $n = 25$) had lower MFQ scores at Session 5, about 7% ($n = 2$) had a slight improvement, and 10% ($n = 3$) had no change from their scores at Session 1. The overall results showed that the decrease in depression symptoms was spread throughout the sample and not only within a smaller number of "responders".

This change trend was described as being steep, starting early and leveling off with the greatest drop between Sessions 1 and 3. The Bonferroni corrected pairwise comparisons showed that the differences between Session 1 and all other sessions and between Session 2 and all other sessions were significant. The difference between Session 4 and Session 5 was not significant ($p_{\text{Bonf}} = 1.000$) nor was the difference between Session 3 and Session 5 ($p_{\text{Bonf}} = .105$). This is an indication that the first sessions resulted in the highest emotional benefits and consolidation was achieved in the subsequent ones. This is consistent with literature on brief psychosocial interventions which demonstrates the pattern of dose response with rapid early improvement and subsequent stabilisation (Stiles et al., 2015), in which Baldwin et al.'s (2009) "good enough level" model was used to illustrate. In this scheme, it seems that the essence of Sessions IV and V was more to integrate and close rather than to actively reduce symptoms.

This observed decline in depressive symptomatology can be partially explained by Fredrickson's (2001) broaden and build theory of positive emotions, which suggests that when a person is feeling positive those emotions help them broaden their momentary thought-action repertoire, and generate enduring psychological resources such as resilience that can be used over repeated occurrences. The sessions of the Music Connect curriculum aimed to create a cumulative pattern of positive affective experiences and the subsequent decline in depressive symptoms as seen in the MFQ trajectory, in order to lessen depressive symptoms. The structure of the curriculum is based on the music therapy framework by Bruscia (2014), which includes the core elements of music, such as rhythm, singing, improvisation and reflection, occurring within every session, matching the different types of music therapy functions. Sessions II and III are rhythmic, offering a nonverbal approach to co-regulation (Thaut, 2005; Hove & Risen, 2009); Session I is vocal, offering an alternative way for the client to externalise emotional content without relying on verbal disclosure; and Session V is reflective, which helps to consolidate and integrate emotional experience (Saarikallio & Erkkilä, 2007; Malchiodi, 2012). Such a scheme of work from concrete musical activities to emotional integration can be seen in the sequential decline of the MFQ scores, and suggests that the advantage of the curriculum stems from the cumulative nature of the programme as a whole.

These effects were amplified in the group delivery format by the mechanisms identified by Yalom and Leszcz (2005) for adolescents' group contexts, which included the circle-formation structure, and the provision of collective creative tasks (Build the Beat; Music Scrapbook) that fostered cohesion, universality and mutual recognition as curative factors. The curriculum further incorporated CASEL's (2020) SEL competencies: Self-Awareness (Draw What You Hear); Self-Management (Playing Our Emotions); and Relationship Skills (Sound and Movement; Follow the Leader:). The present findings are consistent with Durlak et al. (2011), who found that providing SEL in schools has a significant impact on reducing emotional distress across 213 school-based SEL programmes with 270,034 students. It was not a single psychological mechanism that made this intervention possible, but rather a combination of multiple interacting mechanisms: cumulative positive affect, musical-therapeutic involvement, group social processing, and socialization of emotional skills.

The effect size of the present study ($d = 1.21$, $\eta^2g = .289$) is significantly larger than previously reported meta-analytic values. According to Tang et al. (2020), the pooled SMD from RCTs is -0.66 for music therapy and depression; and the pooled SMD for music-based interventions and internalising problems in children and adolescents was medium (Yinger & Gooding, 2014) for Geipel et al. (2018). The present effect is roughly double these estimates, and requires interpretive caution because of: 1. the lack of a control group, 2. the measurement of MFQ shortly after session (Watson & Clark, 1994) and 3. regression to the mean in a sub-clinical sample. However, the consistency of direction is not easy to explain as an artefact. In community samples of adolescents, significant mood decreases over 17 weeks have been reported in a recent cluster-RCT of a school-based music programme (Lin et al., 2024) that provides convergent evidence that music-based school curricula can have clinically meaningful effects in community samples of youth.

The results of the present study suggest that a music education programme of this nature may have potential to be delivered as a whole class wellbeing promotion programme and is not only a clinical intervention. The low cost of the materials makes it very accessible, as can be scaled up between class groups and across different groups or demographics, and can be delivered in a format that is accessible to everyone, which is very relevant in the context of existing school wellbeing programs, particularly in schools with limited resources like the one in this study. It is also a curriculum that is transferable to other settings studied and could be effectively implemented in community programmes or other preventative mental health programmes. The current investigation contributes to the larger effort of promoting arts-based, social-emotional learning as part of school wellbeing programs (CASEL, 2020; Durlak et al., 2011) at the policy level. The implications of these, however, should be treated as inferential rather than as causal effects of participation in the curriculum on adolescent mental health.

There are a number of methodological advantages to this study. The repeated-measures design (5 individual observations, not just one pre-post comparison) enabled the pattern of emotional changes to be examined throughout the entire period of intervention, which provided a gap in the literature that was specifically identified by Wheeler (2015). All outcomes were measured using a psychometrically sound and validated instrument (the MFQ) with good psychometric properties (Angold & Costello, 1987; Thapar & McGuffin, 1998). The true school setting brings ecological validity which is often lacking in the highly controlled setting of intervention research, while the entire sample of 30 who gave usable data at each time point eliminated attrition bias.

There are some restrictions on interpretation. First and most importantly, because there was no control group, observed reductions cannot be attributed to the intervention alone because other explanations such as testing effects, maturational changes, and demand characteristics cannot be ruled out (Cook & Campbell, 1979; Shadish et al., 2002). The small, homogeneous convenience sample (30 participants, single site) means that generalisations are limited. This may have tapped into temporary state-mood elevation, not long-term change (Watson & Clark, 1994), and follow-up data was not available, so durability is not known (Stiles et al., 2015). The MFQ is a self-report instrument, and so is subject to social desirability bias. Future research could use RCT designs with an active comparator, larger and more diverse samples, neutral timing of outcome measures, longitudinal follow-up measures, and mediator analyses to explore emotional regulation, self-esteem, and positive affect as potential mechanisms of change (Fredrickson, 2001; Durlak et al., 2011).

5. Conclusion

The purpose of this study was to determine the effect of an adolescent music class using a Nordoff-Robbins based curriculum, on the mood and feelings of the adolescents over five consecutive sessions in a school-based setting. A quasi-experimental, within-subjects, longitudinal design was used with 30 adolescent participants (N = 30) from one non-government school in Mumbai, India. Each of the sessions in the Music Connect curriculum had a specific theme, such as mindfulness, group cohesion and connection, safe spaces and grounding, etc., and they also incorporated the Nordoff-Robb improvisational principles (Nordoff & Robbins, 2007), the positive psychology mechanisms (Fredrickson, 2001), social-emotional learning (CASEL, 2020; Durlak et al., 2011), and group therapeutic theory (Yalom & Leszcz, 2005). Based on both the repeated-measures ANOVA and the paired-samples t-test, a consistent, statistically significant decrease was observed in MFQ scores from Session 1 (M = 9.57) to Session 5 (M = 2.07), with the bulk of the decrease taking place during the first three sessions before leveling off.

The findings have implications at both a school and policy level. In schools, these findings would indicate that a music-based, structured curriculum to improve wellbeing could be a low cost, scalable supplement to current mental health services that would be applicable to students in every school with a wide range of students and could be implemented at the universal level with ease. From educators and policymakers, the steady decrease observed offers preliminary evidence for arts-based, social-emotional learning interventions, especially in cases of educationally limited resources, where the availability of clinical mental health services is still limited. Although the conclusions are more suggestive than causal as there was no control group, the results suggest the usefulness of incorporating structured, evidence-informed musical interventions into an integrated mental health policy for prevention. This study represents a cumulative description of emotional change across sessions, which is a missing component in the literature, and provides a foundation for future longitudinal studies that use the RCTs approach.

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