

ARTICLE

Social-emotional learning through a drumming intervention

Jennifer StGeorge

University of Newcastle, Australia

Emily Freeman

University of Newcastle, Australia

ABSTRACT

The growth of social and emotional competence is considered a developmental goal of childhood and adolescence. While early caregiving and family environment are key to children's wellbeing and developmental trajectories, social-emotional learning (SEL) interventions may reduce young people's vulnerability to internalising and externalising problem behaviours if family or environment factors present some risk. The purpose of this study was to evaluate the impact of the SEL program DRUMBEAT (Discovering Relationships Using Music, Beliefs, Emotions, Attitudes and Thoughts), a ten-week school-based intervention. Students who took part in the DRUMBEAT program (N = 75, 64% male, 59% Primary School, 18% Indigenous) across six Australian schools, and their teachers, completed pre and post measures of Self-Esteem and the Strengths and Difficulties Questionnaire. Linear mixed model analyses showed there were significant improvements in students' self-esteem, and internalising and externalising behaviours, as reported by students and teachers. Drumming has the potential to draw young people into an educative environment where rhythm, collaboration and discussion can enhance understanding of intra- and interpersonal processes.

KEYWORDS

social behaviour,
emotion regulation,
intervention,
school-children,
adolescents,
drumming

Publication history:

Submitted 15 Apr 2018

Accepted 30 Sept 2018

First published 12 Nov 2018

AUTHOR BIOGRAPHIES

Jennifer StGeorge, Family Action Centre, Faculty of Health and Medicine, University of Newcastle, University Drive, Callaghan, NSW 2308, Australia. [Jennifer.stgeorge@newcastle.edu.au] **Emily Freeman**, School of Psychology, Faculty of Science, University of Newcastle, University Drive, Callaghan, NSW 2308, Australia. [Emily.freeman@newcastle.edu.au]

INTRODUCTION

The growth of social and emotional competence is considered a developmental goal of childhood and adolescence. Social and emotional skills include cognitive, affective and behavioural competencies such as self-awareness, self-management, social awareness, relationship skills and responsible decision-making (Collaborative for Academic Social and Emotional Learning, CASEL, 2012). Positive development of these attributes is related to continuance in school, further education, employment and social mobility (Zubrick, Silburn & Prior, 2005). Students lacking in socio-emotional skills are more

likely to become alienated from school settings and engage in anti-social and risky behaviours (Rutter, 1985).

Examples of such anti-social and risky behaviours were captured in a 2013 survey of Australian youth. The *Report Card: Wellbeing of Young Australians* (Australian Research Alliance for Children & Youth, ARACY, 2013) stated that the suicide rate for 15-24 year olds was 10 per 100,000, and that between 15% and 18% of 14-19 year-olds engaged in substance use (risky alcohol use and illicit drugs). Furthermore, violent behaviour (intention to cause injury) by 15-19 year olds, was 887 per 100,000. These statistics indicate a rupture in young people's developmental trajectory.

Although early caregiving and family environment are key factors in children's wellbeing and developmental trajectories (Blair, Raver & Berry, 2013), social-emotional learning (SEL) interventions in later childhood and adolescence may reduce young people's vulnerability, address their needs, and redirect their motives (Ollendick & King, 2003). Social emotion learning programs aim to teach skills that complement academic performance, and many of these programs are as successful in promoting academic mastery as other educational interventions (Durlak et al., 2011). Recent research points to the effectiveness of prevention programs in childhood and adolescence for psychosocial wellbeing, compared to both control groups as well as in comparison to treatments including medications (Merry et al., 2011), and there are now increasing numbers of psychosocial programs in schools (Morris et al., 2013). Such school-based interventions have a wide reach, can target children most at risk, and there may be less risk of participant attrition. Having interventions based in schools may also help to reduce attitudinal and pragmatic barriers to mental health care.

SEL interventions in schools vary widely in their approach, and some programs use music as a therapeutic tool, based on the premise that music is a key part of adolescent lifestyle and a gateway to self-expression and social connectedness (North, Hargreaves & O'Neill, 2000). Indeed, given the acknowledged importance of music in young people's lives, it is surprising that it is not more often used as an intervention 'hook' for re-engagement with school and its purposes. There is a generalised recognition of the benefit of school-based music education to child and adolescent psychosocial wellbeing, however, as yet, there is little empirical evidence of its benefit (Crooke & McFerran, 2014), although guidelines and best practice point to how this may be achieved (Crooke, McFerran & Bolger, 2017; McFerran, Garrido & Saarikallio, 2016). In the broader field of music therapy, there is a proliferation of programs and amassing empirical evidence to support the use of music in targeted interventions for adolescents with emotional challenges. For example, music therapy can successfully address aggressive behaviour in adolescent boys (Rickson & Watkins, 2003), psychosocial wellbeing in adolescent girls (Hadley & Veltre, 2012), grief-related distress in adolescents (McFerran, Roberts & O'Grady, 2010), and enhance the wellbeing of adolescents in psychiatric wards (Patterson et al., 2015); for a review and meta-analysis, see Gold, Voracek and Wigram (2004).

However, for children and adolescents in school settings, there are few music-based psychosocial programs or interventions either universal (aimed at the entire student population) or targeted (aimed at students at elevated risk or those already demonstrating difficulties). One experimental study in the Netherlands using rap music (singing) with a universal approach found a decline in emotional and behavioural problems for all adolescent participants, while problems increased in the control group (Uhlig, Jansen & Scherder, 2018). Two percussion/drum-based interventions in schools have also been successful (Currie & Startup, 2012; Ho et al., 2011). These

interventions utilised guided psychoeducation or group counselling along with music in order to engage young people in the program, offer opportunities for satisfying experiences, and enhance the potential for significant change in the students' emotional and social competence. In 'Doing Anger Differently', a psychotherapeutic program using drums and percussion to treat reactive aggression in adolescent males (Currie & Startup, 2012), participants demonstrated reductions in aggression and trait anger, including at a 6 month follow-up. In Ho et al. (2011), 5th grade students (boys and girls) in a low-income school took part in a drumming intervention implemented by a school counsellor. The program had wide-ranging positive effects on externalising and internalising behaviours, depression and other negative clinical and cognitive problems.

The evidence in the study by Ho et al. (2011) demonstrates that one pathway to improving internalising and externalising behaviours is through improving neuroendocrine and immune levels, so reducing physiological stress. In the Ho et al. study, this was achieved through drumming and personal interaction. Executive functions such as focus, effortful attention and inhibition can also be developed through drumming (Brown, 1997). It has been suggested that this benefit may derive from the rhythmicity and physicality of the drumming activity, which may be regulative and organising for neurological functioning (Perry, 2009).

One drumming program that has had wide uptake in Australia and internationally is DRUMBEAT (Discovering Relationships Using Music, Beliefs, Emotions, Attitudes and Thoughts, <http://www.holyoake.org.au/content-red.php?CID=114>). This prevention program uses group drumming processes and cognitive behaviour therapy principles in order to foster adolescents' self-esteem, social skills and sense of belonging. There are various formats in which DRUMBEAT is delivered, including a ten-week school-based delivery. There are five main elements in the DRUMBEAT program, which include four musical elements of core rhythms, rhythm games, improvisation and performance, and one element of discussion. Led by an accredited facilitator, the rhythm and discussion elements are combined to cover six key learning areas of rhythm in life, relationships, harmony, identity, emotions and feelings, and teamwork. Each of the themed sessions includes drum activities that focus on a specific aspect of relationship issues. For example, the game "Pass the Rhythm", where a particular rhythm pattern is passed around the drum circle, accompanies discussions of teamwork and connection. The program concludes with a performance.

The DRUMBEAT program now has considerable reach, and continues to attract new facilitators and implementations. Ivery et al. (2009) evaluated the effectiveness of the DRUMBEAT program with adolescent students and showed a reduction in school absences and behavioural incidents, and an increase in pro-social behaviour and self-esteem for the students participating. Similar positive effects were documented in reports from health and community groups with older participants (Faulkner, 2012). In a DRUMBEAT program run for disadvantaged adolescents, improvements were identified for boys' mental wellbeing, psychological distress, post-traumatic stress symptoms and antisocial behaviour, although not for girls' (Martin & Wood, 2017). The extant evaluations describe positive effects of the program for community participants; however, there appears to exist only one evaluation for school students despite the large number of schools who run DRUMBEAT each year.

Given the relative dearth of school-based music SEL programs or interventions, along with knowledge that participation in music is associated with many benefits including academic achievement (Hallam, 2010) and emotional connection (StGeorge, Holbrook & Cantwell, 2014), it is

important to gauge the effectiveness of SEL-music programs in order to inform evidence-based practices. Therefore, in this current study, we aimed to measure the impact of a school-based delivery of DRUMBEAT on child and adolescent social-emotional wellbeing in order to evaluate the usefulness of the program for students in schools, and to better understand the implications of interest in music for program effects and ongoing wellbeing. The research questions for this evaluation were:

1. Does participation in DRUMBEAT increase student self-esteem, and reduce emotional and behavioural difficulties?
2. Are there differences in outcomes for boys and girls, and for younger and older children?
3. What is the association between interest in music and changes in self-esteem and emotional and behavioural difficulties?

METHOD

Participants

Participants were 75 students, 64% male, 59% of children were in Primary School¹ (age $M=10.6$ years, $SD=1.1$, range 8-12 years), the remainder in High School (age $M=13.8$ years, $SD 1.3$, range 12-16 years). Thirteen students (18%) were Indigenous, and all spoke English at home. Only one student dropped out from their DRUMBEAT program. The 75 students were participants in one of six DRUMBEAT programs, delivered by five facilitators (3 male, 2 female) across six schools in Victoria, New South Wales and Queensland, Australia. Two schools were located in the suburbs of large cities, while the remaining four schools were located in regional towns with populations of 7,000 to 42,000 people. The facilitators were required to have delivered the program at least twice in the last two years, and all had more than five years' experience.

Sampling method

Approval for the study was granted by the University Human Research Ethics Committee. To locate DRUMBEAT workshops to evaluate, DRUMBEAT facilitator contact details were retrieved from a publicly available database on the DRUMBEAT website, and invitations were emailed to facilitators in the eastern states of Australia (New South Wales, Victoria and Queensland). Facilitator inclusion criteria were 1) that DRUMBEAT occurs in a school setting and 2) that the facilitator had delivered the program at least twice in the last 2 years. Invitational emails were sent to 240 facilitators, approximately 50 emails bounced, with follow-up not producing current addresses. Approximately 50 facilitators responded, and following screening for inclusion criteria, 9 facilitators gave informed consent. Facilitators identified the schools where they were to implement DRUMBEAT, and permission was sought from school principals to conduct the research and invite students to participate. Invitation letters were sent to the families of students participating in DRUMBEAT, and students giving

¹ In Australia, Primary School (7 years from Kindergarten to Year 6) is equivalent to US Elementary, and High School is equivalent to US Middle and High (6 years from Year 7 to Year 12).

parents' informed consent and their own assent participated in the research. Non-participation in the research did not exclude students from participating in DRUMBEAT in their school; data was not collected from these students. Four facilitators did not complete the research; no data from the attritions was included.

Procedure

As part of the standing arrangement between schools and DRUMBEAT facilitators, DRUMBEAT programs took place in varying locations during 2014. During the first and final DRUMBEAT sessions, DRUMBEAT facilitators administered the study questionnaires to students. The teacher questionnaires were distributed to teachers by the school Principal, and these were also completed in the first and last weeks of the DRUMBEAT sessions.

Measures

Interest in Music Scale (student report) (Gold et al., 2012) is a 12-item measure designed for music therapy assessment and outcome research in mental health. Scores on this scale can range from 12 (no interest in music) to a maximum score of 48 (very strong interest in music). The authors demonstrated internal reliability (Cronbach's alpha 0.89 and 0.77), and test-retest reliability (1- and 3-month intra-class correlation coefficients (ICCs) ranging from 0.61 to 0.85).

The *Rosenberg Self Esteem Scale (student report)* (Rosenberg, 1965) is a ten-item scale that measures global self-worth using negative and positive statements. Items are answered using a 4-point Likert scale (from Strongly Agree to Strongly Disagree). Items concern the individual's perceived happiness, usefulness, and competence. Scores can range from 0 to 30. The scale has been widely used with youth populations, and is strongly correlated with other measures of self-esteem, such as the Single Item Self-Esteem Scale (Robins, Hendin & Trzesniewski, 2001). Previous studies have reported alpha reliabilities for the scale ranging from .72 to .88 (Gray-Little, Williams & Hancock, 1997).

Cantril's ladder-wellbeing (student-report) (Andrews & Robinson, 1991) is a single item measure of subjective wellbeing, and has been used with adolescents. Scores can range from zero to ten. In this study, it was used as an indicator of self-perceptions in addition to the Rosenberg Self-Esteem scale.

Strengths and Difficulties Questionnaire (SDQ; Goodman & Goodman, 2009) is a widely used measure in child mental health. The SDQ gives an indication of a child's emotional and behavioural functioning and is a validated screening questionnaire with reasonable internal consistency (Cronbach's alpha = 0.73) and retest stability (intraclass correlation, $r = 0.85$; (Goodman, 2001). The SDQ consists of 25 questions, divided into five subscales: hyperactivity, emotional problems, conduct problems, peer problems, a prosocial score, and a 'total problems' score. These scales are also the basis for 2 dimensions, internalising (emotional symptoms and peer problems scales), and externalising (conduct problems and hyperactivity scales). The Total Problems Score can range from 0 to 20, while the Externalising and Internalising Scores can each range from 0 to 10, with higher scores indicating more problems. These scales have demonstrated the potential to be more sensitive to

changes in non-clinical populations, such as the current school cohort. In this study, student and teacher² report data were collected.

The *Social Development Grid* is a measure developed by the DRUMBEAT program designers to assess students' psychosocial change. Class teachers who know the participants well are asked to rate behavioural changes at the end of the ten-week period across seven domains: relationships with peers; relationships with adults or teachers; emotional control; participation in group activities; self-esteem; concentration; and general mood. Response options are from one to ten with '1' a highly detrimental change, '5' indicating no change, and '10' a highly positive change. Scores can range from 7 to 70, with a score of 35 indicating no change.

Statistical Analyses

Data were analysed using SPSS, Version 21. Scale reliability in our sample was calculated using Cronbach's alpha. Linear mixed model analyses were used to compare the pre and post scores on each measure. Participant Gender (male/female) and School (Primary/High) were included as between-subjects factors and Time (pre/post) was included as a within-subjects factor. Linear mixed models were chosen for this analysis as they provide two major benefits over standard analyses of variance methods. Firstly, they enable the inclusion of participants as a random variable, meaning that individual variations between subjects are accounted for. Secondly, they allow all available data to contribute to the analysis when some data is missing at random (Verbeke & Molenberghs, 2000), which is common in longitudinal designs. The linear mixed models were fit with fixed effects for Time (Time 1 / Time 2), School (Primary / High), and Gender (Boy / Girl). As recommended by Seltman (2015), the 2x2x2 model was fit using an Identity Matrix. Participants were included in the model as a random effect and the Wald statistic indicated whether the inclusion of a random intercept was beneficial for the model.

RESULTS

Mean scores and standard deviations for each measure at each time point for both boys and girls in Primary and High School can be seen in Table 1. The Wald statistic associated with each linear mixed model is also displayed. Scale reliabilities in our sample were all high (range of $\alpha = .69$ to $\alpha = .93$). The Social Development Scale was not included in the linear mixed models as it was completed once only at the conclusion of the program. Scores on the seven social development domains ranged from 7.2 to 7.8, indicating positive change during the ten-week period for most students. Across all domains, teachers rated between 3% and 13% of students with no change. Using the total score, more than 93% of students were rated with some degree of positive change.

A 2x2x2 Linear Mixed Model was conducted on Interest in Music scores. The Wald statistic indicated that the inclusion of a random intercept was beneficial for this model. There were no significant main effects or interactions between any of the independent variables, suggesting that interest in music was not affected by the DRUMBEAT intervention.

² Teachers were class teachers who knew the participants well (N=10).

Measure	School	Time 1		Time 2		Wald Z	
		Boys	Girls	Boys	Girls		
Interest in Music	Primary	39.7 (3.5)	39.0 (0.0)	38.3 (1.5)	36.0 (0.0)	3.02**	
	High	32.8 (3.1)	35.8 (4.9)	33.5 (5.7)	34.9 (5.2)		
Cantril's Ladder	Primary	6.9 (1.8)	7.9 (1.6)	7.6 (1.4)	7.9 (1.2)	2.63**	
	High	5.7 (2.3)	4.2 (1.9)	7.1 (1.8)	6.7 (1.7)		
Rosenberg Self-Esteem	Primary	19.6 (5.0)	23.8 (6.0)	21.7 (4.4)	24.3 (4.8)	3.00**	
	High	16.2 (6.3)	15.4 (7.1)	19.8 (4.8)	15.6 (9.6)		
SDQ (Student)	<i>Total Problems</i>	Primary	11.4 (4.7)	10.6 (5.2)	10.6 (4.1)	8.3 (4.6)	2.30*
		High	17.9 (4.9)	18.2 (8.1)	12.1 (6.7)	13.9 (9.4)	
	<i>Externalising</i>	Primary	6.8 (3.1)	4.2 (2.7)	6.2 (3.0)	4.0 (1.9)	3.35**
		High	10.8 (4.0)	8.3 (5.5)	6.9 (3.1)	6.3 (5.4)	
	<i>Internalising</i>	Primary	4.8 (2.5)	6.7 (4.2)	4.4 (3.2)	4.4 (3.4)	2.64**
		High	7.3 (2.8)	10.1 (3.3)	5.3 (4.0)	7.8 (4.6)	
SDQ (Teacher)	<i>Total Problems</i>	Primary	10.8 (8.3)	5.5 (7.8)	12.5 (8.0)	6.3 (7.8)	4.54***
		High	15.3 (5.5)	20.5 (3.9)	15.8 (5.6)	13.8 (2.2)	
	<i>Externalising</i>	Primary	6.7 (5.9)	2.8 (4.6)	7.5 (5.7)	2.7 (5.0)	4.55***
		High	8.2 (5.0)	7.3 (1.5)	7.5 (3.2)	5.6 (1.7)	
	<i>Internalising</i>	Primary	4.4 (3.4)	3.3 (3.8)	4.9 (3.3)	3.7 (2.9)	4.62***
		High	7.4 (3.3)	10.5 (5.1)	5.8 (3.5)	5.7 (3.2)	
Social Development	Primary	-	-	52.7 (9.9)	60.7 (11.7)	-	
	High	-	-	46.9 (4.8)	50.3 (5.6)	-	

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 1: Descriptive statistics for each measure at each time point broken down by student gender and school and Wald statistic for each linear mixed model

A 2x2x2 Linear Mixed Model was conducted on Cantril's Ladder score. The Wald statistic indicated that the inclusion of a random intercept was advantageous for this model. There were significant main effects of both Time, $F(1,43.5)=7.03, p=.011$, and School, $F(1,58.7)=10.09, p=.002$, and a significant interaction between the two, $F(1,43.5)=6.19, p=.017$. Primary School students had higher wellbeing scores than High School students. There was no change in Primary School students' scores over Time, but High School students' scores were found to increase after their participation in DRUMBEAT. No other effects were significant.

A 2x2x2 Linear Mixed Model was conducted on Rosenberg's Self-Esteem scores. The Wald statistic indicated that the inclusion of a random intercept was beneficial for this model. There was a significant main effect of Time, $F(1,68.7)=5.97, p=.017$. Scores on the self-esteem scale increased after participation in the DRUMBEAT program. The main effect of School was also significant, $F(1,72.7)=20.25, p<.001$. Primary School students had higher levels of self-esteem than High School students. The interaction between Gender and School was also significant, $F(1,72.7)=4.36, p=.040$, indicating that there was a larger difference between Primary School and High School girls' self-esteem, than there was between Primary and High School boys. No other effects reached significance.

Three separate 2x2x2 Linear Mixed Models were performed on Student Reported SDQ Total Problems, Externalising, and Internalising scores. The Wald statistic indicated that the inclusion of a random intercept was beneficial for these models. For Total Problems scores, there were significant main effects of Time, $F(1,66.3)=16.16, p<.001$, and School, $F(1,68.7)=5.97, p=.017$ and the interaction between Time and School was also significant, $F(1,66.3)=5.16, p=.026$. Primary School students reported fewer Total Problems than High School students at both Time 1 and Time 2. There was a larger decrease in Total Problems scores following involvement in DRUMBEAT for High School students compared to Primary School students. On Externalising scores, there were also significant main effects of Time, $F(1,66.2)=11.81, p=.001$, School, $F(1,71.9)=9.65, p=.003$, and Gender, $F(1,71.9)=6.56, p=.013$. Student Reported SDQ Externalising scores decreased following participation in DRUMBEAT, were lower for girls than boys, and were lower in Primary compared to High School students. The interaction between Time and School was also significant, $F(1,66.2)=9.01, p=.004$. There was a larger decrease in Externalising scores from Time 1 to Time 2 for High School students than for Primary School students. For Internalising scores, there was a significant decrease in scores from Time 1 to Time 2, $F(1,68.4)=16.23, p<.001$. Boys reported significantly fewer Internalising problems than girls, $F(1,73.3)=7.93, p=.006$, and Primary School students reported fewer problems than High School students, $F(1,73.3)=13.04, p=.001$. No other effects were significant.

A series of three 2x2x2 Linear Mixed Models were conducted on Teacher Reported SDQ Total Problems, Externalising, and Internalising scores. The Wald statistic indicated that the inclusion of a random intercept was beneficial for these models. There was a significant main effect of School, $F(1,83.4)=8.65, p=.004$, with teachers reporting fewer Total Problems in Primary School compared to High School. There was also a significant interaction between School and Time, $F(1,48.1)=7.90, p=.007$. Teacher Reported Total Problem scores increased from Time 1 to Time 2 for Primary School students, but decreased for High School students. The interaction between Gender and Time was also significant, $F(1,48.1)=5.93, p=.019$. Teacher Reported Total Problem scores increased slightly from Time 1 to Time 2 for boys, but decreased for girls. Finally, the interaction between Gender and School was significant for Total Problems scores, $F(1,83.4)=4.46, p=.038$, with a larger difference in scores for

Primary and High School girls compared to boys. For Externalising scores, there was a significant main effect of Gender, $F(1,84.2)=7.13, p=.009$, with Teachers reporting fewer Externalising Problems for girls compared to boys. For Internalising scores, there was a significant main effect of Time, $F(1,60.6)=15.09, p<.001$, with scores decreasing from Time 1 to Time 2. The main effect of School was also significant, $F(1,71.5)=16.80, p<.001$, with Teachers reporting fewer Internalising Problems in Primary School compared to High School. There was a significant interaction between School and Time, $F(1,60.6)=25.2, p<.001$. Teacher Reported Internalising Problem scores increased from Time 1 to Time 2 for Primary School students, but decreased for High School students. The interaction between Gender and Time was also significant, $F(1,60.6)=6.49, p=.013$. Teacher Reported Internalising Problem scores decreased slightly from Time 1 to Time 2 for boys, but showed a larger decrease for girls. No other main effects or interactions were significant.

DISCUSSION

This study aimed to examine the effect of the social-emotional learning program DRUMBEAT on young people in school in three eastern states of Australia. The program targets young people's social and emotional attitudes and beliefs, and through rhythm, collaboration and discussion, gives young people the opportunity to reflect on, engage with and experience a range of emotional and social challenges. Previous evaluations of the program show that DRUMBEAT is successful in raising students' self-esteem and improving social behaviour; this study adds to those evaluations by providing between-group analyses to show who benefits most from DRUMBEAT, and which aspects of social and emotional skills are most impacted by the program. The results revealed that all students benefited: primary and high school, males and females. Specific differences are discussed below.

Students improved in their self-esteem, and in their own ratings of internalising, externalising and total problem behaviours. Teachers also observed improvements in students' internalising behaviours. These results suggest that DRUMBEAT had a positive effect on students' self-perceptions, consistent with previous evaluations of the program that show improvements in self-esteem (Ivery et al., 2009). Self-esteem is found to be causal to broad lifespan outcomes such as physical health and job satisfaction (Butler & Gasson, 2005; Orth & Robins, 2014) and psychopathologies (Cohen et al., 2016). However, the findings that students experience not only improvements in their self-worth but also feel more emotionally stable and behaviourally self-controlled, points to a holistic effect of the program on the participants. These results are consistent with other evaluations of social-emotional learning interventions that show students' self-reported improvements (Cramer & Castro-Olivo, 2016), as well as with the social-emotional learning goal of self-awareness articulated by CASEL (2012).

Of further interest is that children's enhanced self-perceptions appeared in the relative absence of teachers' reports of behavioural change, as there was only one main effect of time on teachers' reports on student behaviour (internalising scores decreased overall). However, teachers did rate a change in 93% of the sample's social behaviour through the Social Development Scale. Possibly, children feel that they are more stable before they actually act that way or before it is noticed by others. Theories of learning generally posit that internal attitudes and beliefs are precursors to behavioural change (e.g., the Reasoned Action Approach, Fishbein & Ajzen, 2011). It may be that participating in DRUMBEAT catalyses personal internal growth that could be built on with further interventions to

facilitate behavioural responses to the internal change. Longitudinal studies could also demonstrate this developmental change process and enhance confidence in the intervention's effectiveness.

Some of the intervention outcomes also highlighted differences for gender and school level. For example, the measure of subjective wellbeing (which correlated with self-esteem, $r=.65$, $p<.001$) significantly changed only for High School students. Although Primary School students' overall ratings were significantly higher than the High School students', it is possible that this global construct was too difficult for the primary students ($M^{age}=10$ years) to finely judge. This may be a reasonable explanation given that abstract reasoning is a phenomenon related to the 'formal operational' stage of children's cognitive development, which occurs during the early teens (Ferrer et al., 2013).

The interactions demonstrate that there was a greater change (decrease) in student-reported externalising and total problems by High School students than by Primary School students. This difference may be an artefact of the higher prevalence of problems in the older students, who therefore have a greater margin for improvement. The difference could alternatively be explained as a more comprehensive learning of the concepts by the older students, who then more effectively internalise and self-regulate.

Teacher-reported total and internalising problems increased for primary students, whereas they decreased for high school students, they also showed a larger reduction in girls. The year level and gender means and differences mirror the generally higher levels of problem behaviours in older boys and internalising behaviours in older girls, as found in the population more generally (Klostermann, Connell & Stormshak, 2016). An interesting contrast was the increase in teacher-reported total and internalising problems in Primary School. This concurs with the normative developmental increase of internalising behaviours during childhood (Bongers, Koot, Van der Ende et al., 2003). In addition, given the practice of selecting 'at-risk' students for participation in DRUMBEAT, the family and parenting environment of this sample may be influencing the increase over and above the intervention effects. These background factors were not accounted for in the current study, yet are important covariates to consider in the future.

The discrepancies between student and teacher report give important alternative lenses on students' behaviours. Other researchers have found differences between teacher and student ratings, with teachers rating students differently than students rate themselves (Ruchkin et al., 2012). Generally, inter-informant correlations tend to be low (Achenbach, McConaughy & Howell, 1987) and in this study, SDQ student-teacher correlations ranged from .19-.58, average $r=.39$, higher at pre-test than post-test. However, the differences highlight different perceptions of functioning, and may also reflect different contexts of functioning (Kuppens et al., 2009). As Verhulst and Ende (1992, p. 1011) argue, adolescents are "indispensable informants on their own problem behaviors"; these variations may help practitioners target their interventions at particular aspects of social emotional regulation, as well as underscoring the principle of aligning assessment tools to program goals.

Some limitations to this study are that no evaluation of the implementation of DRUMBEAT was included, therefore we cannot say how fidelity and dose may have varied across the participating schools. As practitioners need reliable evidence bases for their programs, and to understand how personal factors can influence effectiveness (Robb, Burns & Carpenter, 2011), this will be important to include in future studies. Furthermore, the study design did not include a control group, which constrains confidence in ascribing change to the intervention. The capacity to include a control group

was limited to an extent by school resources and by the schools' varying selection procedures for participation in DRUMBEAT. Finally, there was no measure of participating children's family environment, which likely affects their potential for behaviour change (Bongers et al., 2003).

This study adds to an understanding of the effects of DRUMBEAT, and builds on the recommendations of Ivery et al. (2009) to investigate differences by age and gender. A strength of the study was that despite the heterogeneity of location, facilitators and implementation, the ten-week program was associated with an increase in students' perceptions of self-esteem, as well as their social and emotional functioning. These changes were also observed by teachers in the children's classroom settings. Even though boys and girls of different ages have different normative levels of self-esteem, and internalising and externalising behaviours, the program goals targeted and successfully facilitated change for the whole cohort. More broadly, the study shows the effectiveness of a music-based program that incorporates social-emotional learning into creative and collaborative group-work; as others have found (e.g., Bittman et al., 2001), group drumming that includes facilitated discussion and reflection can be more effective than drumming only.

ACKNOWLEDGEMENTS

No external funding supported this research. The authors have declared that they have no competing or potential conflicts of interest. The authors thank the school principals, DRUMBEAT facilitators and the students for assisting in the research.

REFERENCES

- Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin*, *101*, 213-232.
- Andrews, F. M., & Robinson, J. P. (1991). Measures of subjective wellbeing. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 61-114). San Diego: Academic Press.
- Australian Research Alliance for Children & Youth (ARACY). (2013). *Report card: The wellbeing of young Australians*. Retrieved from <https://www.aracy.org.au/projects/report-card-the-wellbeing-of-young-australians>
- Baker, F., & Roth, E. A. (2004). Neuroplasticity and functional recovery: Training models and compensatory strategies in music therapy. *Nordic Journal of Music Therapy*, *13*, 20-32.
- Bittman, B. B., Berk, L. S., Felten, D. L., Westengard, J., Simonton, O. C., Pappas, J., & Ninehouser, M. (2001). Composite effects of group drumming music therapy on modulation of neuroendocrine-immune parameters in normal subjects. *Alternative Therapies in Health and Medicine*, *7*(1), 38.
- Blair, C., Raver, C. C., & Berry, D. J. (2013). Two approaches to estimating the effect of parenting on the development of executive function in early childhood. *Developmental Psychology*, *50*(2), 554-565.
- Bongers, I. L., Koot, H. M., Van der Ende, J., & Verhulst, F. C. (2003). The normative development of child and adolescent problem behavior. *Journal of Abnormal Psychology*, *112*, 179.
- Brown, S. W. (1997). Attentional resources in timing: Interferences effects in concurrent temporal and nontemporal working memory tasks. *Perception & Psychophysics*, *59*, 1118-1140.
- Butler, R. J., & Gasson, S. L. (2005). Self esteem/self concept scales for children and adolescents: A review. *Child and Adolescent Mental Health*, *10*, 190-201.
- CASEL (2012). *Effective social and emotional learning programs. Preschool and Elementary School Edition*. Retrieved from <https://casel.org/preschool-and-elementary-edition-casel-guide/>
- Cohen, L., Leibu, O., Tanis, T., Ardalán, F., & Galynter, I. (2016). Disturbed self concept mediates the relationship between childhood maltreatment and adult personality pathology. *Comprehensive Psychiatry*, *68*, 186-192.
- Cramer, K. M., & Castro-Olivo, S. (2016). Effects of a culturally adapted social-emotional learning intervention program on students' mental health. *Contemporary School Psychology*, *20*, 118-129.
- Crooke, A., & McFerran, K. (2014). Recommendations for the investigation and delivery of music programs aimed at achieving psychosocial wellbeing benefits in mainstream schools. *Australian Journal of Music Education*, *48*(1), 15-37.
- Crooke, A., McFerran, K. S., & Bolger, L. (2017). Promoting engagement in school through tailored music programs. *International Journal of Education & the Arts*, *18*(3). Retrieved from <http://www.ijea.org/v18n3/>.

- Currie, M., & Startup, M. (2012). Doing Anger Differently: Two controlled trials of percussion group psychotherapy for adolescent reactive aggression. *Journal of Adolescence*, *35*, 843-853.
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, *82*, 405-432.
- Erkkilä, J., Gold, C., Fachner, J., Ala-Ruona, E., Punkanen, M., & Vanhala, M. (2008). The effect of improvisational music therapy on the treatment of depression: protocol for a randomised controlled trial. *BMC Psychiatry*, *8*, 50.
- Faulkner, S. (2012). It is not just music and rhythm. Evaluation of a drumming-based intervention to improve the social wellbeing of alienated youth. *Children Australia*, *37*, 31-39.
- Ferrer, E., Whitaker, K. J., Steele, J., Green, C. T., Wendelken, C., & Bunge, S. A. (2013). White matter maturation supports the development of reasoning ability through its influence on processing speed. *Developmental Science*, *16*, 941-951.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press.
- Gold, C., Rolvsjord, R., Mössler, K., & Stige, B. (2012). Reliability and validity of a scale to measure interest in music among clients in mental health care. *Psychology of Music*, *41*(5), 665-682
- Gold, C., Voracek, M., & Wigram, T. (2004). Effects of music therapy for children and adolescents with psychopathology: A meta-analysis. *Journal of Child Psychology and Psychiatry*, *45*(6), 1054-1063.
- Goodman, A., & Goodman, R. (2009). Strengths and Difficulties Questionnaire as a dimensional measure of child mental health. *Journal of the American Academy of Child & Adolescent Psychiatry*, *48*, 400-403.
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*, 1337-1345.
- Gray-Little, B., Williams, V. S. L., & Hancock, T. D. (1997). An item response theory analysis of the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, *23*, 443-451.
- Hadley, S., & Veltre, V. J. (2012). It's bigger than hip-hop: A hip-hop feminist approach to music therapy with adolescent females. In S. Hadley & G. Yancy (Eds.), *Therapeutic uses of rap and hip-hop* (pp. 121-140). New York: Routledge.
- Hallam, S. (2010). The power of music: Its impact on the intellectual, social and personal development of children and young people. *International Journal of Music Education*, *28*, 269-289.
- Ho, P., Tsao, J. C., Bloch, L., & Zeltzer, L. K. (2011). The impact of group drumming on social-emotional behavior in low-income children. *Evidence-Based Complementary Alternative Medicine*, *2011*, 250708.
- Ivery, P., Wood, L., Rosenberg, M., & Donovan, R. (2009). *An evaluation of a therapeutic intervention using music: DRUMBEAT, Discovering relationships using music: Beliefs, emotions, attitudes, and thoughts with alienated youth*. Australia: UWA.
- Klostermann, S., Connell, A., & Stormshak, E. A. (2016). Gender differences in the developmental links between conduct problems and depression across early adolescence. *Journal of Research on Adolescence*, *26*, 76-89.
- Kuppens, S., Grietens, H., Onghena, P., & Michiels, D. (2009). A longitudinal study of childhood social behaviour: Inter-informant agreement, inter-context agreement, and social preference linkages. *Journal of Social and Personal Relationships*, *26*, 769-792.
- Martin, K. E., & Wood, L. J. (2017). Drumming to a new beat: A group therapeutic drumming and talking intervention to improve mental health and behaviour of disadvantaged adolescent boys. *Children Australia*, *42*(4), 268-276.
- McFerran, K., Garrido, S., & Saarikallio, S. (2016). A critical interpretive synthesis of the literature linking music and adolescent mental health. *Youth & Society*, *48*(4), 521-538.
- McFerran, K., Roberts, M., & O'Grady, L. (2010). Music therapy with bereaved teenagers: A mixed methods perspective. *Death Studies*, *34*(6), 541-565.
- Merry, S., N., Hetrick, S., E., Cox, G., R., Brudevold-Iversen, T., Bir, J., J., & McDowell, H. (2011). Psychological and educational interventions for preventing depression in children and adolescents. *Cochrane Database of Systematic Reviews*, (12).
- Morris, P., Lloyd, C. M., Millenky, M., Leacock, N., Raver, C. C., Bangser, M., & Karoly, L. (2013). *Using classroom management to improve preschoolers' social and emotional skills*. Retrieved from <http://ssrn.com/abstract=2202401>
- Nilsson, U. (2008). The anxiety-and pain-reducing effects of music interventions: a systematic review. *AORN journal*, *87*, 780-807.
- North, A., Hargreaves, D., & O'Neill, S. (2000). The importance of music to adolescents. *British Journal of Educational Psychology*, *70*, 255-272.
- Ollendick, T. H., & King, N. J. (2003). Empirically supported treatments for children and adolescents: Advances towards evidence-based practice. In P. M. Barrett & T. H. Ollendick (Eds.), *Handbook of interventions that work with children and adolescents* (pp. 3-26). Chichester: Wiley.
- Orth, U., & Robins, R. W. (2014). The development of self-esteem. *Current Directions in Psychological Science*, *23*, 381-387.
- Patterson, S., Duhig, M., Darbyshire, C., Counsel, R., Higgins, N., & Williams, I. (2015). Implementing music therapy on an adolescent inpatient unit: a mixed-methods evaluation of acceptability, experience of participation and perceived impact. *Australasian Psychiatry*, *23*(5), 556-560.
- Perry, B. D. (2009). Examining child maltreatment through a neurodevelopmental lens: Clinical applications of the neurosequential model of therapeutics. *Journal of Loss and Trauma*, *14*(4), 240-255.
- Rickson, D. J., & Watkins, W. G. (2003). Music therapy to promote prosocial behaviors in aggressive adolescent boys—a pilot study. *Journal of Music Therapy*, *40*(4), 283-301.
- Robb, S. L., Burns, D. S., & Carpenter, J. S. (2011). Reporting guidelines for music-based interventions. *Journal of Health Psychology*, *16*, 342-352.
- Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem scale. *Personality and Social Psychology Bulletin*, *27*, 151-161.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Ruchkin, V., Kopusov, R., Vermeiren, R., & Schwab-Stone, M. (2012). The Strength and Difficulties Questionnaire: Russian validation of the teacher version and comparison of teacher and student reports. *Journal of Adolescence*, *35*, 87-96.
- Rutter, M. (1985). Family and school influences on cognitive development. *Journal of Child Psychology and Psychiatry*, *26*, 683-704.
- Seltman, H. J. (2015). *Experimental design and analysis*. Pittsburgh, PA: Carnegie Mellon University.

- StGeorge, J., Holbrook, A., & Cantwell, R. (2014). Affinity for music: A study of the role of emotion in musical instrument learning. *International Journal of Music Education, 32*, 264-277.
- Uhlig, S., Jansen, E., & Scherder, E. (2018). "Being a bully isn't very cool...": Rap & Sing Music Therapy for enhanced emotional self-regulation in an adolescent school setting – A randomized controlled trial. *Psychology of Music, 46*(4), 568-587.
- Verbeke, G., & Molenberghs, G. (2000). *Linear mixed models for longitudinal data*. New-York: Springer-Verlag.
- Verhulst, F. C., & Ende, J. (1992). Agreement between parents' reports and adolescents' self-reports of problem behavior. *Journal of Child Psychology and Psychiatry, 33*, 1011-1023.
- Zubrick, S. R., Silburn, S. R., & Prior, M. (2005). Resources and contexts for child development: Implications for children and society. In S. Richardson & M. Prior (Eds.), *No time to lose: The well-being of australia's children* (pp. 161-200). Melbourne: Melbourne University Press.

Ελληνική περίληψη | Greek abstract

Κοινωνικο-συναισθηματική μάθηση μέσω μιας παρέμβασης με χρήση κρουστών οργάνων

Jennifer StGeorge | Emily Freeman

ΠΕΡΙΛΗΨΗ

Η ανάπτυξη της κοινωνικής και συναισθηματικής ικανότητας θεωρείται αναπτυξιακός στόχος της παιδικής και εφηβικής ηλικίας. Παρόλο που η πρώιμη φροντίδα και το οικογενειακό περιβάλλον είναι καίριες σημασίες για την ευημερία και την αναπτυξιακή πορεία των παιδιών, οι παρεμβάσεις κοινωνικο-συναισθηματικής μάθησης [social-emotional learning – SEL] δύνανται να μειώσουν την ευαλωτότητα των νέων ως προς την εσωτερίκευση και εξωτερίκευση προβληματικών συμπεριφορών εάν οικογενειακοί ή περιβαλλοντικοί παράγοντες παρουσιάζουν κάποιο κίνδυνο. Ο σκοπός αυτής της μελέτης ήταν να αξιολογήσει τον αντίκτυπο του προγράμματος κοινωνικο-συναισθηματικής μάθησης DRUMBEAT (Discovering Relationships Using Music, Beliefs, Emotions, Attitudes and Thoughts – Ανακαλύπτοντας Σχέσεις Χρησιμοποιώντας Μουσική, Πεποιθήσεις, Συναισθήματα, Στάσεις και Σκέψεις), μια παρέμβαση δέκα εβδομάδων σε σχολικό πλαίσιο. Οι μαθητές που έλαβαν μέρος στο πρόγραμμα DRUMBEAT (N = 75, 64% γένους αρσενικού, 59% μαθητές του Δημοτικού, 18% γηγενείς) σε έξι σχολεία της Αυστραλίας, και οι εκπαιδευτικοί τους, συμπλήρωσαν ένα εργαλείο Αυτοεκτίμησης και το Ερωτηματολόγιο Δυνατοτήτων και Δυσκολιών [Strengths and Difficulties Questionnaire] πριν και μετά την παρέμβαση. Οι αναλύσεις γραμμικού μικτού μοντέλου έδειξαν ότι σημειώθηκαν σημαντικές βελτιώσεις στην αυτοεκτίμηση των μαθητών, καθώς και στην εσωτερίκευση και την εξωτερίκευση συμπεριφορών, όπως ανέφεραν μαθητές και εκπαιδευτικοί. Η ομάδα κρουστών έχει τη δυνατότητα να προσελκύσει τους νέους σε ένα εκπαιδευτικό περιβάλλον όπου ο ρυθμός, η συνεργασία και η συζήτηση μπορούν να ενισχύσουν την κατανόηση ενδοπροσωπικών και διαπροσωπικών διαδικασιών.

ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ

κοινωνική συμπεριφορά, συναισθηματική ρύθμιση, παρέμβαση, μαθητές, έφηβοι, παρέμβαση με κρουστά όργανα