



Research Article

Improvements in adolescent mental health and positive affect using creative arts therapy after a school shooting: A pilot study

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ABSTRACT

Mass shootings have increased in the United States in recent decades and are associated with adverse psychological outcomes. This pilot study used a pre-post design to evaluate the effectiveness of a two-week creative arts therapy camp at improving the mental health of adolescents exposed to the horrific February 14th shooting at Marjory Stoneman Douglas High School in Parkland, Florida. Participants ($n = 34$) were rising high school students and participated in visual art, drama, or music therapy. At baseline, a third of participants indicated clinically significant moderate-to-severe depression, a third indicated clinically significant moderate-to-severe anxiety, and nearly two thirds indicated high levels of posttraumatic stress. There were statistically significant reductions in posttraumatic stress ($d = .54$), depression ($d = .34$), and anxiety symptoms ($d = .52$), significant decreases in negative affect ($d = .42$), and significant increases in positive affect ($d = .81$) between pre- and post-treatment time points. When drama, music, and visual arts treatments were examined separately, drama therapy significantly improved mental health and positive affect. The vast majority of participants reported that they had fun, gained a deeper understanding of themselves, and felt safe during the treatment. Group-delivered arts therapy may be an effective treatment to improve mental health and affect in adolescents exposed to a school shooting.

Introduction

On the afternoon of February 14th, 2018, a gunman open-fired with a semi-automatic weapon at Marjory Stoneman Douglas (MSD) High School in Parkland, FL. Seventeen students and staff members were killed by the shooter, and seventeen more were injured, memorialized, and named in the local press (Fleshler & Valys, 2018). Students throughout the campuses of both MSD High School and the neighboring Westglades Middle School heard gunshots and screams, were forced to hide in classrooms and under desks, and/or ran for their lives out of the school (Sanchez, 2018). In the weeks and months after the shooting, students experienced a sense of loss and grief for their friends and teachers. In addition, they faced fear that the shooting could be repeated as the school reopened and they returned to class. Daily re-exposure to the setting in which the terrorizing event occurred also provided constant triggers, with many of those affected reporting hyperarousal and intrusive memories (Fetters, 2019).

Mass shootings have increased in the United States in recent decades and are associated with adverse psychological outcomes, including posttraumatic stress disorder (PTSD; Lowe & Galea, 2015). School

shootings in particular leave communities reeling to address the psychological trauma of students, teachers, administrators, and their families. The present study seeks to investigate whether creative arts therapy may be effective in improving mental health and increasing positive affect in students affected by the tragic shooting at MSD High School.

The umbrella of creative arts therapy includes music, drama, visual art, and dance therapies. These therapies are distinct from traditional psychotherapies in their nonverbal and experiential nature (Schouten, de Niet, Knipscheer, Kleber, & Hutschemaekers, 2015). Creative arts therapy provides an opportunity to engage adolescents in a collaborative, fun environment that cultivates a sense of self-observation and self-mastery (Emunah, 1985). Given that a major barrier to accessing mental health care for adolescents is embarrassment about seeking help (Gulliver, Griffiths, & Christensen, 2010), creative arts therapy also presents an opportunity to engage adolescents in a group-oriented, extracurricular activity-like atmosphere that may be more familiar and less stigmatizing than traditional psychotherapy.

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), PTSD is characterized by intrusive symptoms such

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as nightmares or flashbacks, avoidance of trauma-related thoughts, feelings, and reminders, negative alterations in thoughts and mood, and increased arousal (American Psychiatric Association, 2013). PTSD has also been conceptualized as the result of inadequate processing of trauma memory (Lancaster, Teeters, Gros, & Back, 2016). Although Cognitive Behavioral Therapy (CBT) with a trauma focus is considered a well-established treatment for PTSD in children and adolescents (Dorsey et al., 2017; Smith, Dalgleish, & Meiser-Stedman, 2018), it is plagued by the barriers that face many other forms of traditional therapy, including adolescents' lack of motivation to engage in the treatment (Ringle et al., 2015).

We hypothesize that creative arts therapies may lessen many of the symptoms of PTSD in traumatized adolescents while also decreasing depression, anxiety, and negative affect and increasing positive affect. Avoidance symptoms, characteristic of both anxiety and PTSD, may be resolved as adolescents develop a capacity for reflection and gently approach troubling memories and feelings through processing them in external, non-verbal forms (Chong, 2015). Non-verbal engagement may allow adolescents to process the trauma memory in the midst of experience of hyperarousal and intrusions—the symptoms of which often undermine verbal processing (Harris, 2009; van der Kolk, 1996). The behavioral activation component that is inherent in engaging in creative arts therapies may alleviate the negative alterations in thoughts and mood that are characteristic of both PTSD and depression (Richards et al., 2016). In addition, the sense of pleasure and mastery derived from creating expressive artwork with the body, through music, or in physical form may improve positive affect and decrease negative affect.

Furthermore, we hypothesize that traumatized adolescents who may be unlikely to use therapeutic options may engage in group-delivered creative arts therapies. While still grappling with the acute aftermath of the February 14th shooting, students in Parkland were confronted with a barrage of press coverage (Gold, 2018). Although important for drawing attention to national issues of gun violence, this media blitz did not afford the time, space, and privacy for the communal healing of those directly affected by the trauma. Creative arts therapies allow clients to process traumatic memories and repressed feelings at their own pace and in a non-threatening environment (Perryman, Moss, & Cochran, 2015), which may provide a sense of safety and agency for students to resolve both personal and collective memories of the traumatic event (Hanebrink & Smith, 2012). The incorporation of body movement via collective group warm up exercises and drama modalities may lessen a sense of immobilization felt by those who were at times forced to crouch hiding on lockdown, and other times literally ran for their lives (Perryman, Blisard, & Moss, 2019). Finally, social support has been shown to be critical in recovery from PTSD (Price et al., 2018). Given that the Parkland shooting was experienced as a collective trauma, the group setting provided by creative arts therapy may promote collective healing for survivors of the shooting.

A growing body of literature has examined the use of creative arts therapies for traumatized adolescents. A review of 38 studies published between 2000 and 2012 on creative arts therapy for traumatized children found that the vast majority (76.3%) used qualitative methods, 15.8% used quantitative methods, and 7.9% used mixed methods design (van Westrhenen & Fritz, 2014). The wealth of case studies and qualitative research on creative arts therapies and trauma have been integral for developing theory as well as clinical protocols (Dieterich-Hartwell, 2017; Eaton, Doherty, & Widrick, 2007; Malchiodi, 2015; van Westrhenen et al., 2017).

The majority of empirical articles have focused on the effectiveness of creative arts-based therapy in improving mental health outcomes among refugee youth, many of whom have been exposed to shootings, death, and mass violence. An uncontrolled evaluation of an art therapy program for trauma-exposed Burmese refugee youth found that the program was effective in decreasing anxiety and self-contempt (Rowe et al., 2017). Another uncontrolled study of 35 Syrian refugee children

ages 7–12 revealed statistically significant reductions in PTSD, depression, and trait anxiety symptoms after participants completed a five-day, 15-session arts therapy treatment program (Ugurlu, Akca, & Acarturk, 2016). A study of 42 adolescents enrolled in either a school-based creative arts therapy program or a control condition found reductions in behavioral difficulties and emotional symptoms in the treatment group relative to the control group (Quinlan, Schweitzer, Khawaja, & Griffin, 2016). Studies with youth survivors of sexual abuse have also shown improved psychological outcomes after participation in arts therapy programs. A study of 25 South African survivors of sexual abuse found that girls who participated in an arts therapy group experienced significantly lower levels of anxiety and depression post-treatment compared to girls in the control condition (Pretorius & Pfeifer, 2010). A study of six South African adolescent females who had experienced sexual abuse found lower sense of isolation, higher levels of self-esteem, and improved emotional expressiveness after participating in an expressive art group treatment (Visse & du Plessis, 2015).

We found only two studies of a creative arts therapy treatment with children or adolescents that used a PTSD outcome measure and included a control group in the study design. One study compared a trauma-focused expressive arts therapy with a standard arts-and-crafts making activity. Participants were adolescents 13 to 18-years of age with PTSD at an inpatient psychiatric facility, and were randomized to receive one of the two conditions delivered in one-hour weekly group sessions over 16 weeks. Researchers found that adolescents in the expressive arts therapy condition had significantly greater reduction in PTSD symptoms than those in the treatment-as-usual condition (Lyshak-Stelzer, Singer, John Patricia, & Chemtob, 2011). Another study randomly assigned 125 traumatized children ages 7–13 in South Africa to participate in either 10 sessions of a creative arts therapy program or in a non-treatment, low-level support control condition. The authors found that symptoms of hyperarousal and avoidance decreased in the arts therapy group compared to the control group, with medium effect sizes observed ($d = 0.41-0.61$; van Westrhenen, Fritz, Vermeer, Boelen, & Kleber, 2019).

Although there are no systematic review articles on empirical studies evaluating creative art therapies for adolescents with PTSD, a 2015 systematic review of visual art therapy and trauma in adults found six controlled, comparative studies that could be included for analysis (Schouten et al., 2015). PTSD symptoms significantly decreased in the treatment groups in three of the studies (Henderson, 2007; Henderson, Rosen, & Mascaró, 2007; Stok, 2007). However, the studies suffered from small sample sizes (total review $n = 223$), and several of the studies combined art therapy approaches with other psychotherapy approaches (Schouten et al., 2015). Additionally, authors of a 2018 systematic review found seven studies that have used a controlled study design to evaluate the efficacy of creative arts therapies in treating adults with PTSD. The authors found low to very low evidence for music, art, and drama therapy, but noted the need for better scientific quality in research trials in order to gain a more accurate understanding of the efficacy of creative arts therapies in alleviating symptoms of PTSD in adults (Baker, Metcalf, & O'Donnell, 2018).

To our knowledge, there are no empirical studies that evaluate creative arts group treatment programs aimed at adolescents exposed to a school-based mass shooting. This study fills that gap by evaluating the effectiveness of a two-week creative arts therapy camp at improving the mental health status of adolescents exposed to the horrific February 2018 MSD High School shooting. We hypothesize that participants in the creative arts therapy camp will have fewer symptoms of PTSD, depression, and anxiety, higher levels of positive affect, and lower levels of negative affect after completing the program. We also hypothesize that the adolescents who participate in the creative arts therapy program will be highly engaged in the program and report positive experiential outcomes such as having fun, feeling safe, and learning about themselves through the program.

Method

Participants

Forty-four study participants were recruited from a group of 61 students enrolled in three separate sessions of a two-week summer arts therapy camp for students affected by the February 14th shooting at MSD High School in Parkland, Florida. Parents registered their children for the camp via online open enrollment, which was advertised on social media and by word of mouth. In addition, camp organizers held a series of individual meetings with MSD High School teachers and administrators and families of students who were killed in the shooting. These meetings were used to identify individual students who had been affected by the shooting and could be invited to participate in the camp. Enrollment was open to all rising high school students (students entering grades 9, 10, 11, or 12) and recent high school graduates (students completing grade 12 in May/June 2018) in the Parkland, Florida area.

Parents of all 61 registered camp attendees were provided with recruitment fliers for the research arm via email after registering their child for the camp. The fliers included information about the primary aims of the study and outlined the informed consent process for parents and students. The fliers also emphasized that participation in the camp was in no way dependent on study participation and provided contact information so that parents could ask questions of the research team. Pre-determined exclusion criteria included a) those unable to speak English and b) wards of the state. No participants were excluded based on these criteria. Forty-four camp attendees (72.1%) consented to participate in the study.

Measures

Demographic information and exposure to the February 14th Parkland shooting were assessed by written questionnaire. The exposure items were similar to those developed by Suomalainen, Haravuori, Berg, Kiviruusu, and Marttunen (2011), but were tailored specifically to survivors of the Parkland shooting. Participants were asked to respond to a series of statements in a checklist format ("I heard gunshots," "I feared for my life," "I saw someone get injured," etc.). Many of the rising 9th graders participating in the study had attended Westglades Middle School at the time of the shooting, which is located adjacent to MSD High School. Due to the close proximity of the two schools, gunshots and screams were audible from the middle school as high school students attempted to flee school grounds. The exposure questions also captured personal loss ("I know someone who was injured," "I know someone who was killed"). Therefore, all participants, including those who did not attend MSD High School in February 2018, were asked to complete the exposure questionnaire. Cronbach's alpha for the exposure items was .78 in this sample.

Depression was assessed using the Patient Health Questionnaire 8-Item Scale (PHQ-8; Kroenke, Spitzer, & Williams, 2001, 2008). The PHQ-9 has been validated in adolescents (AUC = 93.2%; Allgaier, Pietsch, Frühe, Sigl-Glückner, & Schulte-Körne, 2012), and the PHQ-8 is a shortened version that leaves off the question assessing suicidal ideation (Kroenke et al., 2008). We selected to use the PHQ-8 due to concerns that real-time monitoring of all individual responses might not be feasible. Respondents are asked how frequently they experienced symptoms of depression over the previous two weeks, and each item is scored between 0 and 3 (0 = not at all, 3 = nearly every day). A total score of 10 or more represents clinically significant moderate-to-severe depression (Kroenke et al., 2008). A final question that is not included in the total score assesses impairment and is scored 1–4 (1 = not difficult at all, 4 = extremely difficult). In our sample, Cronbach's alpha for the PHQ-8 was .90.

The Generalized Anxiety Disorder 7-Item Scale (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006) was used to assess anxiety. The GAD-

7 has been validated in adolescents with Generalized Anxiety Disorder (Mossman et al., 2017; Tiirikainen, Haravuori, Ranta, Kaltiala-Heiro, & Marttunen, 2018). Respondents are asked how frequently they experienced symptoms of anxiety over the previous two weeks, and each item is scored between 0 and 3 (0 = not at all, 3 = nearly every day). A total score of 11 or more represents clinically significant moderate-to-severe anxiety (Mossman et al., 2017). A final question that is not included in the total score assesses impairment and is scored 1–4 (1 = not difficult at all, 4 = extremely difficult). In our sample, Cronbach's alpha for the GAD-7 was .90.

Posttraumatic stress was assessed using the Child's Reaction to Traumatic Events Scale (CRTES; Jones, 1995), a 15-item self-report measure that was developed based off of the Horowitz Impact of Events Scale (Horowitz, Wilner, & Alvarez, 1979). Within the measure, eight items form an avoidance sub-scale and seven items form an intrusion sub-scale. Respondents are asked about symptoms occurring within the previous week, and each item is scored a 0, 1, 3, or 5 (0 = not at all, 1 = rarely, 3 = sometimes, 5 = often). Total scores of 15 to 27 represent moderate distress, and scores of 28 or higher represent high distress. A previous study reported a coefficient alpha of .86 for the total score (Jones, 2002). PTSD-related impairment was assessed using a six-item adaptation from the Child PTSD Symptom Scale (CPSS; Foa, Johnson, Feeny, & Treadwell, 2001). Respondents were asked whether post-traumatic stress interfered with their lives in the previous week in six areas (chores and duties at home, relationships with friends, fun and hobby activities, relationships with your family, prayers or other spiritual activities, general happiness with life). Each item was scored 0 or 1 (0 = no, 1 = yes), for a total score of 0–6, with higher scores representing greater impairment. In our sample, Cronbach's alpha for the CRTES was .90.

Positive and negative affect were assessed using the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegan, 1988). Within the measure, 10 items form a positive affect subscale and 10 items form a negative affect subscale. Respondents are presented with a list of mood adjectives ("irritable," "alert," "strong," etc.) and are asked to rate the extent to which they have felt this way over the past week. Responses are scored on a five-point scale (1 = very slightly/not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely.) The PANAS has been validated with adolescents (coefficient alpha positive affect = .85; coefficient alpha negative affect = .84; Huebner & Dew, 1995). Cronbach's alpha for the positive items was .80 and for the negative items was .89 in this sample.

Satisfaction with the treatment program was assessed using a series of evaluation questions developed specifically for the camp. Respondents were presented with a list of statements and asked to rate the extent to which they agreed or disagreed with each statement ("I had fun at Camp SHINE," "I learned something new about myself at Camp SHINE," "I felt safe at Camp SHINE," "Engaging in creative arts gives me a deeper understanding of myself and others.") Responses were scored on a five-point scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Respondents were also asked to rank the daily components of the treatment program (entire group work, smaller group work, personal projects, entire group closing, breaks and free time) from most to least favorite. Responses were scored on a five-point scale (1 = most favorite, 2 = second favorite, 3 = third favorite, 4 = fourth favorite, 5 = least favorite). Finally, respondents were asked a question about connection to other students participating in the program: "What is the level of connection that you feel with other students who are attending Camp SHINE?" Responses were scored on a five-point scale (1 = highly disconnected, 2 = somewhat disconnected, 3 = neither connected nor disconnected, 4 = somewhat connected, 5 = highly connected).

Procedure

This study was designed as a pilot evaluation of a two-week creative

Music

Lyric analysis: Participants reflect on song lyrics, discussing lyrics that they connect with and sharing how they would change the lyrics to more accurately express themselves.

Life soundtrack: Each participant shares songs that represent his/her story with the group.

Song writing/recording: Participants work together to create music about their experiences.

Group drumming: Arranged in a circle, participants are led through improvisational activities focusing on emotions, storytelling and communication.

Visual Art

The mask: Each participant creates a mask that describes who he/she is through mixed media.

Altered journal: Each participant alters a hardbound book to create a mixed-media journal that contains thoughts, feelings, and memories.

Graffiti mural: Participants collectively create a mural and share it with the rest of the camp, explaining the thoughts and feelings that contributed to their design.

Journey t-shirt: Each participant decorates a shirt to reflect his/her life journey.

Drama

Role theory and method: Participants explore life roles in order to gain insight into group dynamics and internalize new roles that help expand individual resilience and strength.

Projective technique: Each participant chooses an object that he/she feels connected to and verbalizes how he/she feels through the use of this projective.

Improv exercises: Participants activate imagination, try new roles, and explore spontaneity.

Relationship lab: Participants share and enact a personal story with group members in order to promote empathy, insight, and interpersonal connection.

Fig. 1. Overview of creative arts therapeutic activities included in the treatment.

arts therapy summer camp program for rising high school students affected by the 2018 school shooting in Parkland, Florida. The study was approved by the Institutional Review Board of the [University of Miami]. Parents of registered camp attendees were provided with recruitment study fliers and information about the study after registering their child for the camp. Camp organizers served as the point-of-contact with attendees and screened potential participants for exclusion criteria. A parent of each participant was required to sign an informed consent prior to student participation, and each student participant was required to sign an assent form prior to participation. Questionnaires including demographic questions and the outcome measures were administered in-person on the first and final days of camp programming for each two-week camp session. The pre-camp questionnaire included questions about demographics and exposure to the shooting, the PHQ-8, the GAD-7, the CRTES, and the PANAS. All instruments in the pre-camp questionnaire were disseminated in one sitting to students after introductions and warm-up activities on the first day of camp. The post-camp questionnaire included the PHQ-8, the GAD-7, the CRTES, the PANAS, and questions that assessed the participant's satisfaction with the treatment program. All instruments in the post-camp questionnaire were disseminated in one sitting to students after warm-up activities on the final day of camp. Participants were assured that they could skip any question that made them feel uncomfortable, and creative arts therapists were available throughout the data collection to provide individual support to any participant experiencing emotional distress.

Notably, no participant sought such support while filling out the questionnaires. Participants were not compensated for their participation in the study.

A 30-minute, semi-structured phone interview was conducted individually with one therapist from each of the three treatment groups (drama, music, and visual art, $n = 3$) after the conclusion of the camp. Four primary interview questions and accompanying probes were selected to cover several key components of a process evaluation (Linnan & Steckler, 2002). Therapists were asked to describe the extent to which they used the planned protocol, the extent to which participants engaged in arts-related activities, the extent to which participants directly engaged with or discussed memories of the shooting, and the activities or components that they found were particularly effective in engaging participants. Although transcripts were not produced, the authors took extensive notes throughout the interviews.

Treatment program: creative arts group therapy

The first, second, and third camp sessions commenced four, five, and 5.5 months after the date of the February 14th Parkland shooting, respectively. The first camp session was conducted at MSD High School, and the second two sessions were conducted at the adjacent Westglades Middle School. Therefore, the creative arts therapy camp took place on the same campus and in the same environment where many students had experienced traumatic exposure to the February 14th shooting.

Notably, attending this summer camp did not mark the first time that students had been back to the school, as the school had reopened two weeks after the shooting in late February 2018.

On the first day of camp, participants were introduced to drama, music, and visual art therapy programming and were invited to rank which category of the treatment they preferred to participate in. In most cases, participants were assigned to their first choice. Sessions lasted for 3.5 h each day and were held four days per week over a two-week period, for a total of eight sessions (28 h). Each session began with a 30-minute warm-up activity from a specific modality before participants broke into music, drama, and visual art groups, and ended with the three groups returning together for a 30-minute ritual of group closing.

Within therapeutic activities, participants were asked to create visual art, music, or drama that addressed their trauma and other experiences, and to share their feelings and thoughts about these experiences with the other participants within their group. They were invited to engage with the trauma non-verbally as a way to integrate their experience. In some activities and for some individuals, this led to verbal processing of the trauma.

Examples of the types of therapeutic activities included in each treatment group are outlined in Fig. 1. Therapeutic activities were designed to encourage creative expression of emotion and feelings, improve verbal and non-verbal communication, build social support, and reduce stress and anxiety. All treatment facilitators were licensed creative arts therapists. The music group was led by a board-certified music therapist, the visual art group was led by a board-certified clinical art therapist, and the drama group was led by two registered drama therapists. Treatment group sizes ranged from 5 to 11 participants.

Statistical analysis

We examined data for patterns of missingness and excluded cases missing more than 15% of items on a given scale. Means of subscales were calculated to impute data for missing items that made up 15% or less of a given scale. Data imputation was minimal and made up less than 0.33% of pre- and post-treatment data. Descriptive statistics and correlations with outcome variables were estimated using SPSS. We conducted paired-samples *t* tests for all variables of interest from pre- and post-treatment time points and estimated effect sizes (Cohen’s *d*) to assess magnitude of change. We then examined the therapeutic benefits of each of the three arts therapy approaches through paired-samples *t* tests.

Results

Forty-four participants completed pre-camp questionnaires and 34 of these participants completed post-camp questionnaires. Ten participants (22.7%) were not present to fill out the post-camp questionnaire on the final day of the treatment program due to other pre-planned summer activities, vacations, or unplanned absences. We conducted independent sample *t*-tests and found no significant differences between completers and non-completers with regards to race, grade, age, school attended, posttraumatic stress, depression, anxiety, positive affect, or negative affect. The mean number of sessions attended by the 34 participants who complete pre-and post-camp questionnaires was 7.21 of eight sessions (SD 1.17).

Demographic information for the 34 adolescents who completed pre- and post-camp questionnaires are presented in Table 1. The mean age of participants was 14.71 (SD .97) and 22 (64.7%) identified as female, 11 (32.4%) as male, and one (2.9%) as transgender or non-binary. With regards to race, 15 (44.1%) of participants were white/Caucasian, 14 (41.2%) were Hispanic/Latino, two (5.9%) were Black/African American, and three (8.8%) were another race. The sample included 14 (41.2%) rising 9th graders, 13 (38.2%) rising 10th graders, six (17.6%) rising 11th graders, and one (2.9%) rising 12th grader.

Table 1
Descriptives of study variables.

	Mean or Frequency	Standard Deviation
Age	14.71	.97
Gender		
Male	11 (32.4%)	
Female	22 (64.7%)	
Transgender or nonbinary	1 (2.9%)	
Race		
Hispanic/Latino	14 (41.2%)	
White/Caucasian	15 (44.1%)	
Black/African American	2 (5.9%)	
Other	3 (8.8%)	
Grade level (as of Fall 2018)		
9 th grade	14 (41.2%)	
10 th grade	13 (38.2%)	
11 th grade	6 (17.6%)	
12 th grade	1 (2.9%)	
School attended in February 2018		
MSD High School	19 (55.9%)	
Westglades Middle School	12 (35.3%)	
Another school	3 (8.8%)	
Level of exposure		
At MSD High School	24 (54.5%)	
Saw the gunman	2 (5.9%)	
Heard gunshots	16 (47.1%)	
Heard screams	17 (50.0%)	
Feared for life	15 (44.1%)	
Personally injured	1 (2.9%)	
Saw someone injured	4 (11.8%)	
Saw someone killed	2 (5.9%)	
Know someone injured	17 (50.0%)	
Know someone killed	23 (67.6%)	
Treatment group		
Visual Art	15 (44.1%)	
Music	8 (23.5%)	
Drama	11 (32.4%)	
Number of days attended camp	7.21	1.17
Depression at Baseline (PHQ-8 > 9)	14 (31.8%)	
Anxiety at Baseline (GAD7 > 10)	10 (33.3%)	
PTSD high distress at Baseline (CRES > 28; N = 33)	20 (60.6%)	6.87
Positive Affect at Baseline	29.13	8.53
Negative Affect at Baseline	21.07	

Note: N = 34 unless otherwise specified.

Nineteen (55.9%) had attended MSD High School in February 2018, 12 (35.3%) had attended Westglades Middle School, and three (8.8%) had attended some other school at the time of the shooting.

The majority of participants included in our sample were at MSD High School at the time of the shooting (54.5%) and/or knew someone who was killed in the shooting (67.6%). Approximately half of participants reported hearing gunshots (47.1%), hearing screams (50.0%), and/or fearing for their life (44.1%). Approximately a third reported PHQ-8 scores at baseline that indicated clinically moderate-to-severe significant depression (31.8%) and/or reported pre-camp GAD-7 scores that indicated clinically significant moderate-to-severe anxiety (33.3%). On the CRTES measure of posttraumatic stress, 60.6% of participants reported high distress. Mean positive affect was 29.13 (SD 6.87) and mean negative affect was 21.07 (SD 8.53).

There was a significant positive correlation between fearing for one’s life at the time of the shooting and posttraumatic stress symptoms at baseline ($r = .42, p = .007$). There were significant positive correlations of the following exposure variables with symptoms of anxiety at baseline: hearing gunshots ($r = .42, p = .006$), fearing for life (.33, $p = .035$), seeing someone killed ($r = .41, p = .007$), seeing someone injured ($r = .31, p = .049$), and knowing someone injured ($r = .39, p = .012$). There were also positive significant correlations of hearing gunshots ($r = .37, p = .019$), fearing for life ($r = .36, p = .022$), seeing someone killed ($r = .39, p = .013$), and being personally injured (.41,

Table 2
Pre- and post-treatment means in outcome measures with *t*-test and effect sizes.

	Pre-treatment		Post-treatment		Differences		
	Mean	SD	Mean	SD	<i>t</i>	p-value	Effect Size
PTSD symptoms	36.71	16.85	29.91	16.36	3.08	.004	.54
Anxiety	7.53	5.68	5.13	4.74	3.26	.003	.52
Depression	7.39	6.03	5.60	4.37	2.25	.031	.34
Positive affect	29.41	6.79	34.56	8.25	-4.60	< .001	.81
Negative affect	21.07	8.66	17.97	7.52	2.08	.046	.42

N = 32 for PTSD symptoms, 34 for anxiety and depression, 33 for negative and positive affect.

p = .01) with depressive symptoms at baseline.

Means, standard deviations, and within-group pre-post effect sizes are presented in Table 2. There were statistically significant reductions in posttraumatic stress, depression, and anxiety symptoms and negative affect between pre- and post-treatment time points, with small-to-medium effect sizes observed (.34 to .54). There was a statistically significant increase in positive affect after the treatment program, with a large effect size observed (.81). We also found significant reductions in impairment from anxiety [mean difference = .32, *t*(33) = 2.96, *p* = .006] and from depression [mean difference = .24, *t*(33), *p* = .03]. We found no statistically significant differences in findings between the cohort who attended the treatment program at MSD High School (19 participants) compared to the two cohorts that attended camp at Westglades Middle School (15 participants).

We considered therapeutic benefits separately for each of the three arts therapy approaches, as presented in Table 3. There was a significant decrease in posttraumatic stress symptoms in the drama group [mean difference = 8.67, *t*(8) = 2.80, *p* = .023], but decreases in posttraumatic stress symptoms were not significant in the music or visual arts groups. Likewise, there was a significant decrease in anxiety symptoms in the drama group [mean difference = 5.33 *t*(9) = 3.44, *p* = .007], but decreases in anxiety were not significant in the music or visual arts groups. There was also a significant decrease in depressive symptoms for the drama group [mean difference = 5.03, *t*(9) = 2.49, *p* = .034], but not in the music or visual arts groups. There was a significant increase in positive affect in the drama group [mean difference = -6.02, *t*(9) = -3.32, *p* = .009], and in the visual arts group [mean difference = -3.93 *t*(14) = -2.68, *p* = .018], but not in the music group. There was a significant decrease in negative affect [mean difference = 4.84, *t*(14) = 5.18, *p* = .003] in the visual arts group, but not in the drama or music groups.

Therefore, the drama treatment program resulted in significant decreases in symptoms of posttraumatic stress, anxiety, and depression and significant increases in positive affect. The visual arts treatment program resulted in significant increases in positive affect and significant decreases in negative affect, but no significant decreases in symptoms of posttraumatic stress, depression, or anxiety. The music treatment program did not result in significant decreases in symptoms of posttraumatic stress, anxiety, depression, or negative affect or significant increases in positive affect. Of note, the music group had the smallest sample size (*n* = 8) and therefore the least power to detect

Table 3
Pre- and post-treatment means differences in outcome measures by treatment group with *t*-tests.

	Drama (n = 11)			Music (n = 8)			Visual Arts (n = 15)		
	Mean difference	<i>t</i>	p-value	Mean difference	<i>T</i>	p-value	Mean difference	<i>t</i>	p-value
PTSD	8.67	2.80**	.023	12.44	1.96	.091	1.37	0.59	.566
Anxiety	5.33	3.44**	.007	0.50	0.36	.732	1.56	1.82	.091
Depress-ion	5.03	2.49**	.034	-0.88	-0.88	.406	0.85	1.19	.254
Positive affect	-6.02	-3.32**	.009	-6.83	-1.94	.100	-3.93	-2.68*	.018
Negative affect	3.04	0.70	.500	-0.12	-0.07	.950	4.84	5.18**	.003

differences.

Participant responses to the creative arts therapy camp evaluation questions are presented in Table 4. Nearly all of participants agreed or strongly agreed that they had fun at the camp (93.9%), with only 6.1% indicating neutrality and none disagreeing with the statement. The majority (79.8%) agreed or strongly agreed that they learned something new about themselves at the camp, with 15.2% indicating neutrality and 6.1% disagreeing. The majority (84.4%) also agreed or strongly agreed that they felt safe at the camp, with 12.5% indicating neutrality and 3.1% disagreeing. Finally, 87.9% agreed or strongly agreed with the statement, “Engaging in creative arts gives me a deeper understanding of myself and others,” 6.1% were neutral, and 6.1% disagreed. The vast majority of participants (94.2%) indicated that they felt somewhat or highly connected with other students at the camp, 2.9% indicated that they felt neither connected nor disconnected, and 2.9% indicated that they felt somewhat disconnected.

The mean rankings of participants’ favorite aspects of the creative arts therapy camp are presented in Table 5. Participants ranked small group work within their various art modalities highest (mean = 1.94, SD = 1.13), followed by personal projects (mean = 2.44, SD = 1.28), breaks and free time (mean = 3.24, SD = 1.44), entire group warm-up (mean = 3.32, SD = 1.25), and entire group closing (mean = 4.06, SD = 0.98).

Therapist interviews

In reflection interviews, therapists reported high levels of engagement in arts-related activities across the drama, visual art, and music groups. However, therapists described varying levels of engagement in direct discussions related to the terrorizing event. In the visual art group, therapists reported that participants were given trauma-related directives, but largely chose to engage with these directives through the creation of arts rather than through verbal processing. In the drama group, therapists reported that participants were particularly engaged when asked to tell and act out their stories. Several participants chose to act out their experiences of the day of the shooting, which sparked additional stories from other participants about how they were affected by the shooting. Therapists reported that participants were given the freedom to share the traumatic memory however they felt comfortable, and that this sparked empathy, understanding, and engagement from other group members. In the music group, therapists reported that

Table 4
Participant responses to evaluation statements on creative arts therapy camp.

	Agree or strongly agree	Neutral	Disagree or strongly disagree
I had fun at Camp SHINE.	31 (93.9%)	2 (6.1%)	0 (0%)
I learned something new about myself at Camp SHINE.	36 (79.8%)	5 (15.2%)	2 (6.1%)
I felt safe at Camp SHINE.	27 (84.4%)	4 (12.5%)	1 (3.1%)
Engaging in creative arts gives me a deeper understanding of myself and others.	29 (87.9%)	2 (6.1%)	2 (6.1%)

N = 33.

Table 5
Mean rankings of participants' favorite aspects of creative arts therapy camp.

	Mean	Standard Deviation
Entire group warm-up (all three modalities together)	3.32	1.25
Smaller group work (individual modalities)	1.94	1.13
Personal projects (individual modalities)	2.44	1.28
Group closing (all three modalities together)	4.06	0.98
Breaks and free time	3.24	1.44

N = 33.

group drumming and an initial emphasis on improvisation helped to create a comfortable environment free of resistance. When participants began to write and record songs together, they focused on authenticity and group expression of their feelings about moving on from the shooting.

Overall, therapists emphasized the importance of flexibility in their initial plans for the different treatment groups. Therapists reported that they cut back on some of their planned activities in order to create space for the participants to process issues and feelings as they arose in session.

Discussion

Creative arts therapy appears to be a well-tolerated and age-appropriate treatment to improve the mental health status of traumatized adolescents. Considering the three therapy types individually, drama therapy appears to be an effective treatment to reduce posttraumatic stress, anxiety, and depressive symptoms in adolescents exposed to gun violence. Music therapy may be effective in reducing posttraumatic stress symptoms, but there was insufficient power to detect significant pre-post differences. Visual art therapy appears to be effective in reducing negative affect and increasing positive affect. The vast majority of participants reported that they had fun, learned something new about themselves, and felt safe during the treatment program. This last point is particularly salient as the program was conducted at MSD High School and Westglades Middle School—the location of the Parkland shooting and an environment that holds constant harrowing reminders of the traumatic event.

Our findings are consistent with the reductions in PTSD found in adolescents after 16 group sessions of a trauma-focused expressive arts therapy treatment (Lyshak-Stelzer et al., 2011). Our medium effect sizes for reductions in PTSD are similar those observed by van Westrhenen et al. for reductions in avoidance and hyperarousal after 10 sessions of a creative arts therapy treatment (2019). There is substantial evidence for the efficacy of imaginal exposure, or re-living the trauma memory in a safe environment, in treating PTSD in adolescents (Smith et al., 2018). The fact that there were significant reductions in PTSD symptoms in the drama group is not surprising, given that the bodily and verbal processing used in drama therapy is similar in nature to the experience of an imaginal exposure and inherently requires direct processing. Notably, the drama group also incorporated substantial physical movement via improvisation and acting out stories. This body movement may have contributed to an emotionally healing experience for traumatized participants who experienced an immobilized response to the

shooting (Perryman et al., 2019).

Our study has several notable limitations. Our sample size was small, and we were unable to recruit a sufficient number of controls within a similarly-exposed group due to our desire to provide the treatment program to as many survivors of the shooting as possible in a timely fashion. Participants self-selected into visual art, drama, and music groups, and it is possible that personality characteristics such as introversion influenced both treatment choice and treatment outcome.

The limitations of our study such as small sample size and lack of a control group are typical of empirical research studies on trauma, adolescents, and creative arts therapy (Rowe et al., 2017; Visse & du Plessis, 2015), and are heavily impacted by a lack of sufficient funding resources. Greater funding is needed to support research and evaluation studies that test creative arts therapy programs for adolescents exposed to mass violence. A randomized clinical trial would be a necessary next step to compare art therapy modalities to a control group matched for time and attention. Future studies should also engage a larger sample size in order to be able to test differences in treatment outcome by level of exposure, demographics, and treatment type.

Our findings on the clinical benefits of creative arts therapies are preliminary in nature and should be interpreted with discretion. However, they suggest that creative arts therapies may effectively decrease symptoms of posttraumatic stress, depression, and anxiety, and improve affect in adolescents exposed to school shootings. Creative arts therapies are engaging in nature, may be delivered in group settings, and allow participants to process trauma non-verbally and to the extent they feel ready. This poses advantages for clinicians seeking to support students recovering from the tragedy of a school shooting via a teen-friendly treatment program.

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