Piloting the Efficacy of a Mindfulness-Based Discussion Approach to Enhance Adolescents' Social Emotional Learning

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Abstract

Adolescence is a critical period for intervention to promote social emotional competencies and prevent the onset of life-long challenges. We conducted a pilot study of a mindfulness-based discussion program in a middle school. Twenty-one students participated in the program, co-implemented by teacher-researcher, and occurred for 45 min-once a week, over 8 weeks. We found that students' self-control significantly increased at posttest compared to pretest. Negative correlations between levels of mindfulness and difficulties with emotional regulation and problem behaviors also became stronger at post-test than at pre-test. Students overall experienced more positive and relaxed emotional states after each session. This program is an advancement in the nature of social emotional interventions by featuring experiential learning as a way to help students.

Objectives

The goal of this pilot study was to develop and test the efficacy of a classroom-based prevention program to enhance the social emotional competencies of middle school students. While middle school is a developmental period in which students experience tremendous personal growth and learning, it is also accompanied by various behavioral and social emotional challenges that could lead to negative consequences into their adult life (Immordino-Yang et al., 2019; Roeser et al., 2000). Middle school students tend to experience increased emotional arousal, inclination toward social risks and rewards, along with increased sensitivity in their relationships with parents and peers (Denham, 2019; Yeager, 2017). This can be explained in part because of the increases or changes in hormones such as testosterone, oxytocin, cortisol after pubertal maturation, that influence their social emotional functioning. Another reason is the psychological changes they experience, where the need to fit in, gain acceptance from peers increases, still wanting to develop an individual identity and pursue autonomy (Durlak et al., 2011; Yau, & Reich, 2018; Yeager, 2017). The middle school environment is also distinct from the elementary school environment due to departmentalized teaching, larger class sizes, and complex academic and social demands, which add additional sources of distress to these students (Durlak et al., 2011).

With additional challenges of the COVID-19 pandemic, school violence, racial injustice, negative impacts of social media, and climate change, mental health concerns such as anxiety, depression, and lack of a sense of belonging and connectedness have increased among today's youth (Office of the Surgeon General, 2021; World Health Organization [WHO], 2022). Mental health concerns can further affect students' academic achievement and rates of expulsion or

suspension from school (Jones et al., 2019; WHO, 2020). These unattended mental health conditions have also led to suicidal attempts or behavior, which is now the leading cause of death among 13-year-olds in the United States.

Schools are on the front line of efforts to combat this 21st century crisis, via the implementation of effective social emotional learning (SEL) approaches. Dermody and Dusenbury (2022) found that support for SEL at the state level has never been stronger – with 27 states, including Ohio offering free-standing K-12 SEL standards and 44 states offering guidance for SEL implementation. Educators are actively implementing social and emotional learning (SEL) programs under the preventive science framework, designed to promote positive outcomes (e.g., academic engagement) and prevent negative consequences (e.g., dropouts) through enhanced social-emotional competencies, where peers and teachers are the primary sources of social support for adolescents. Social-emotional competencies refer to the skills and attitudes that prepare students for life success but are not generally reflected in the scores that are reflected in traditional cognitive tests (Collaborative for Academic, Social, and Emotional Learning, CASEL, 2021; Farrington et al., 2012). Examples of these competencies include self-awareness (the ability to identify the emotions and thoughts that arise within oneself and understand their influence on one's behavior), self-management (regulating one's thoughts, emotions, and behaviors successfully, depending on the situation), relationship skills (skills that represent the ability to initiate and sustain healthy relationships with various individuals and groups such as communicating clearly) (CASEL, 2021). The assumption is that such social-emotional competencies (e.g., to take the perspective of others, to empathize and feel compassion) serve as psychological tools for all adolescents to enhance mental health and academic achievement.

Unfortunately, a review of middle school SEL programs revealed that they do not seem to have a robust evidence base (Rosen et al., 2022). This is in part due to them being merely aged-up versions of children's programs. That is, programs tend to adapt messages that are designed for younger children by simply changing surface features such as main characters to make it seemingly relatable to a middle schooler (e.g., the character having a skateboard) (Yeager, 2017). Another reason is that there is a need for programs with instructional practices that value students' voice and prioritize group-oriented forms of active learning over teacher-centered lecturing (Rosen et al., 2022). A lack of sense of agency and meaningful practice of social-emotional competencies leads to dampened student interest and motivation to adhere to the program. SEL programming will facilitate positive social emotional development if it affords middle school students experiences and opportunities that align with their current developmental needs of wanting to develop an identity and have more autonomy (Domitrovich et al., 2017; Rosen et al., 2022).

Collaborative learning interventions that encourage students to take an active role in learning, with opportunities to work together have shown promises for enhancing middle school students' SEL (Lin et al., 2019; 2022; Ryzin & Roseth, 2019). The Collaborative Social Reasoning (CSR) approach, for example, has shown to be effective in enhancing students' social reasoning, social perspective taking, and peer relationships (Lin et al., 2019; 2022). However, there are certain inherent challenges in collaborative learning approaches. Students sometimes struggle to come together as a group and work. They find it hard to maintain positive social emotional Interactions with one another while still working toward a common goal (e.g., Kraatz et al., 2020; Rogat & Linnenbrink-Garcia, 2011). In this pilot, I proposed to incorporate mindfulness into the CSR intervention to address these social-emotional challenges during

collaborative learning, and to foster a positive influence of collaborative learning on students' social-emotional competencies. Mindfulness has also been shown to promote students' social emotional competencies (Feuerborn & Gueldner, 2019; Waters et al., 2015). Through the recurrent practice of mindfulness and CSR discussions, I proposed that students would become more emotionally and behaviorally regulated while being more socially aware of their relationships and interactions with others over time.

Overall, the aim of this study was to pilot a school-based SEL program that features experiential learning (Kolb, 2014) where students authentically experience social-emotional challenges during the intervention and collectively learn to conquer these challenges through mindful practices and collaboration with others—to promote social-emotional competencies for adolescents at scale.

Theoretical Background

Social constructivist theories postulate that learning occurs when children get to participate in a collective setting in which they can enact existing thinking skills and competencies to build ideas and co-construct knowledge together (Goncu & Gauvain, 2012; Vygotsky, 1978). In other words, internalization through social interaction is the force driving individuals' social, emotional, and cognitive growth. Collaborative Social Reasoning (CSR) is a social constructivist approach to social emotional learning where students form small groups in the classroom to collaboratively reason about multifaceted social-emotional issues that are closely related to their personal lives (e.g., social exclusion, justice, social responsibilities) (Lin et al., 2021). However, CSR like most collaborative learning approaches comes with challenges for students such as difficulty in navigating group dynamics, arguments/conflicts leading to

negative social-emotional states such as aggression, anxiousness and/or disappointment (Nokes-Malach et al., 2015).

To address the limitation of CSR, we propose to incorporate contemplative practices such as mindful breathing and hatha yoga in the program. These are secular practices that bring individuals' attention to their own experiences (e.g., thoughts, feelings, body) at the present moment without judgment or attachment to the outcomes (Kabat-Zinn, 2003). Educational studies have repeatedly shown the positive influence of such practices on students' ability to regulate themselves socially and emotionally (see Feuerborn & Gueldner, 2019; Waters et al., 2015 for reviews).

Overall, our program mindfulness based collaborative social reasoning (MBCSR) involved introducing hatha yoga practices right before students engage in CSR to free students' cognitive processes and allow them to be more open to one another with reduced reactivity during CSR. Further, students practiced mindful breathing toward the end of the CSR discussion to maintain positive emotions and reduce any stress levels that may have been heightened by the CSR practice. We proposed that MBCSR together would help enhance early adolescents' **mindfulness or awareness**, **emotional regulation**, **social skills,** and **lower problem behaviors** (CASEL, 2021). Students' emotional states are expected to become more positive and less aroused after each contemplative practice during a MBCSR session.

Research Question #1. Do students who receive the MBCSR intervention demonstrate significantly greater social emotional competencies (mindfulness, emotional regulation, social skills, problem behaviors) from pretest to posttest?

Research Question #2. Do the correlations between students' mindfulness, emotional regulation, social skills, and problem behaviors become stronger at post-test than at pre-test?

Research Question #3. How do students' emotional states change over the course of a 45-minute MBCSR session averaged across the 8 sessions of the intervention?

Methods

Setting and Participants

The pilot study was implemented in one 7th grade classroom in a middle school in central Ohio in Spring 2022. A larger scale study is currently being implemented in four 6th grade classrooms and will be analyzed later. In the pilot, MBCSR was co-implemented by the authors and a 7th grade English teacher as part of students' regular English Language Arts classroom, as the CSR discussions involved social emotional themes emerging from their class novels (See Figure 1). While the teacher was trained to facilitate the collaborative small group discussions, the author being a trained yoga instructor from Isha Foundation delivered the yoga and mindfulness components. The class had 25 students, out of which 21 consented and completed the intervention (Mean Age= 12 years, Male = 12, White =18). MBCSR was implemented for a total of 8 weeks with 45-minute sessions occurring once-a-week.

Data Sources

Students were prompted to respond to an **EmojiGrid** (Toet et al., 2018) (see Figure 1 and 2) six times during every weekly session, using experiential sampling as a method. They were prompted to express what they are feeling before and after hatha yoga/mindful breathing practices and CSR discussions to explore how mindfulness influences students' emotional states and their experience of CSR discussions. The EmojiGrid consists of 17 emotions which can be divided into two dimensions (valence: unpleasant to pleasant and arousal: high to low) with a baseline in the center of the grid. In terms of social emotional competencies, students were assessed on the following before and after the MBCSR 8-week intervention using instruments

that were developmentally appropriate, valid, and reliable. [1] Mindfulness was assessed through the **Child and Adolescent Mindfulness Measure**. Developed by Greco et al. (2011), this assessment has shown good internal reliability (Cronbach's alpha = .84) and convergent validity. [2] Emotional Regulation was assessed through the **Difficulties in Emotion Regulation Scale (DERS)**. Developed by Gratz and Roemer (2004), this scale assesses the level of emotion dysregulation among students with good internal consistencies for all the subscales (Cronbach's alpha ranged between .76 and .89) and good convergent validity among adolescents. [3] Students' social skills and problem behaviors were assessed through the **Social Skills Improvement System-Rating Scales.** Developed by Gresham and Elliott (2008), the secondary form of this scale provides a comprehensive assessment of adolescents' social skills since decades, with good internal consistency (Cronbach's alpha ranged between mid to upper .90s), good test-retest reliability (.83 to .92) and good internal and convergent validity.

Results

To address research question #1, paired sample t-tests were conducted to compare the scores of mindfulness, difficulties in emotional regulation, social skills, and problem behaviors before and after students participated in MBCSR (See Table 1). While the mean scores of mindfulness improved at posttest, it was not statistically significant likely due to the small sample size. Similarly, the mean scores of difficulties in emotional regulation reduced at posttest, but the change was not significant. While the overall mean scores of social skills did not show a significant improvement, there was a significant increase in the mean scores of a subcategory: students' self-control from pretest (M=11.88, SD=4.16) to post test (M=13.81, SD=4.46); t(15)=-2.15, p=0.04). The mean scores of problem behaviors did not change significantly.

To address research question #2, Pearson correlations were conducted among all the variables at pretest and posttest (See Table 2). It was found that the negative correlation between mindfulness and difficulties in emotional regulation became stronger at posttest ($r(20) = -.675$, $p < .001$) compared to pretest ($r(23) = -.577$, $p = .008$). Similarly, the negative correlation between mindfulness and problem behavior became stronger at posttest ($r(20) = -.729$, $p < .001$) compared to pretest ($r(19) = -.46$, $p = .04$). In addition, the positive correlation between difficulties in emotional regulation and problem behaviors became stronger at posttest ($r(20) = .762$, $p < .001$) compared to pretest ($r(19) = .31$, $p = .19$). Other correlations remained similar across time points.

To address research question #3, all the EmojiGrid responses across 8 weeks were numerically scored based on level of valence and arousal. Growth curve modeling was used to evaluate the change in students' valence and arousal across the 6 time points in a session. We tested for both linear and nonlinear growth trajectories to see which model fit the data better. We found that the effect of time on students' valence was significant and best described by a linear slope ($\beta = 0.09$, $SE = 0.02$, $p < 0.01$) (See Table 3 and Figure 3). The significant values in both the intercept and linear slope parameters indicate that the initial status and linear growth rate were not constant over time. The mean estimated initial status and linear growth rate for the sample were 0.72 and 0.09, respectively. This suggested that the mean valence was 0.72 and increased as the session progressed. The effect of time on students' arousal was also significant and best described by a nonlinear curve (See Table 4 and Figure 4). The cubic model (after adding Time_cub (Time^3)) fit the data the best. It improved model fit over the linear (Δ AIC = 2891.12 – 2883.57 = 7.55; Δ BIC = 2910.49 – 2902.93 = 7.56) and quadratic models (Δ AIC = 2889.41 – 2883.57 = 5.84; Δ BIC = 2916.78 – 2902.93 = 13.85). Time, Time_sq, and Time_cub had a significant contribution in this model ($p < 0.01$). The negative effect of linear growth (β = -

1.45, SE = 0.34, $p < 0.01$) suggested that students' arousal decreased as the session progressed. The positive effect of quadratic growth ($\beta = 0.51$, SE = 0.11, $p < 0.01$) indicated a deceleration in the rate of change (i.e., arousal initially decreased and then began to increase). However, the negative effect of cubic growth ($\beta = -0.05$, SE = 0.01, $p < 0.01$) revealed that such deceleration gradually diminished over time, i.e., toward the end of the session.

Discussion and Significance

The purpose of the pilot study was to test the impacts of an eight-week mindfulness based collaborative social reasoning SEL program. The program was effective in enhancing students' level of self-control. This is in line with previous neuroscientific evidence that yoga and mindfulness facilitate self-regulation via change in the higher and lower-level brain networks that help in control and monitoring process responsible for the initiation and maintenance of behavioral change (Bergen-Cico et al., 2015; Gard et al., 2014). While there were improvements in levels of mindfulness, emotional regulation, and social skills at posttest, it is possible that due to the limited sample size, significant differences were not found. We also found that the correlations among some of the outcome variables became stronger at posttest compared to pretest, such as the negative correlations between mindfulness and difficulties in emotional regulation and problem behaviors. This indicates that after MBCSR, students displayed higher levels of mindfulness and awareness that were associated with less difficulties in regulating their emotions and problem behaviors, compared to their mindfulness and emotional/behavioral experiences before MBCSR.

MBCSR as an SEL program was also found to address a common challenge in collaborative learning—negative emotional arousal. By introducing contemplative practices such as mindfulness/yoga, students were found to experience lesser arousal (e.g., feelings of

relaxation and calmness) as shown by the cubic growth model. Students' arousal was less toward the beginning and end of the session when students participated in contemplative practices and increased in the middle when students participated in CSR discussions. This increase in arousal may have been triggered by the intense nature of the conversations and questions. Further, the linear growth trajectory of emotional valence indicates that students continued to feel positive as the session progressed. Our pilot study overall provides preliminary evidence for the value of incorporating contemplative practices to collaborative learning. It represents an advancement in the nature of social emotional intervention programs by featuring experiential learning that can be incorporated in content areas such as ELA, as a way to help enhance students' social emotional competencies, specifically their self-control and emotional states.

Tables

Table 1

Output of Paired Samples T Test

		Mean	SD	Lower	Upper	t	df	p
Pair 1	Mindful Pre - Mindful Post	-1.23	6.29	-4.46	1.99	-.81	16	.43
Pair 2	ER Pre – ER Post	1.11	17.87	-8.07	10.30	.25	16	.80
Pair 3	Social Skills - P_Social Skills	-3.37	9.10	-8.22	1.47	-1.48	15	.15
Pair 4	Communication - P_communication	-.37	2.96	-1.95	1.20	-.50	15	.62

Pair 5	Cooperation - P_cooperation	-.37	2.33	-1.61	.86	-.64	15	.53
Pair 6	Assertion - P_assertion	-.68	3.40	-2.49	1.12	-.80	15	.43
Pair 7	Self-control - P_self control	-1.93	3.60	-3.85	-.01	-2.15	15	.04*
Pair 8	Prob Beh - P_Prob Beh	.25	5.83	-2.86	3.36	.17	15	.86

Table 2

Output of Pearson Correlations

		Mindful Pre	Mindful Post	ER Pre	ER Post	Social Skills	P_Social Skills	Prob Beh	P_Prob Beh
Mindful Pre	Pearson	1	.44	-.57**	-.51*	.02	-.24	-.46*	-.43
	Sig.		.05	.00	.02	.92	.29	.04	.05
	N	23	20	23	20	19	20	19	20
Mindful Post	Pearson	.44	1	-.18	-.67**	.33	-.06	-.73**	-.72**
	Sig.	.05		.43	<.001	.16	.78	<.001	<.001
	N	20	20	20	20	19	20	19	20
ER Pre	Pearson	-.57**	-.18	1	.62**	-.34	-.08	.31	.43

	Sig.	.00	.43		.00	.14	.71	.19	.06
	N	23	20	23	20	19	20	19	20
ER Post	Pearson	-.51*	-.67**	.62**	1	-.37	-.29	.53*	.76**
	Sig.	.02	<.001	.00		.11	.21	.01	<.001
	N	20	20	20	20	19	20	19	20
Social Skills	Pearson	.02	.33	-.34	-.37	1	.60**	-.41	-.41
	Sig.	.92	.16	.14	.11		.00	.07	.07
	N	19	19	19	19	19	19	19	19
P_Social	Pearson	-.24	-.06	-.08	-.29	.60**	1	-.11	-.21
Skills	Sig.	.29	.78	.71	.21	.00		.64	.36
	N	20	20	20	20	19	20	19	20
Prob Beh	Pearson	-.46*	-.73**	.31	.53*	-.41	-.11	1	.87**
	Sig.	.04	<.001	.19	.01	.07	.64		<.001
	N	19	19	19	19	19	19	19	19
P_Prob Beh	Pearson	-.43	-.72**	.43	.76**	-.41	-.21	.87**	1
	Sig.	.06	<.001	.06	<.001	.07	.36	<.001	
	N	20	20	20	20	19	20	19	20

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3

Fixed Effects of Time on Students' Valence of Emotions

Parameter	**Estimate**	**SD**	**df**	**t**	**p**	**Lower CI**	**Upper CI**

Intercept	.72	.10	21.46	6.57	<.001	.49	.94
Time	.09	.02	21.44	3.87	<.001	.04	.13

Table 4

Fixed Effects of Time on Students' Emotional Arousal

Parameter	**Estimate**	**SD**	**df**	**t**	**p**	**Lower CI**	**Upper CI**
Intercept	-.08	.31	558.97	-.26	.791	-.70	.53
Time	-1.45	.34	901.99	-4.16	<.001	-2.14	-.77
Time_sq	.51	.11	890.97	4.50	<.001	.28	.73
Time_cub	-.05	.01	890.96	-4.61	<.001	-.07	-.02

E.g., Some readers of the novel 'The Outsiders' would say that Bob's killing was justified because Johnny did it in self-defense, while others would say that nothing gives us the right to take away someone's life. As teenagers who may relate to the experiences of these characters, do you think Johnny's response to the situation was fair? Why or why not?

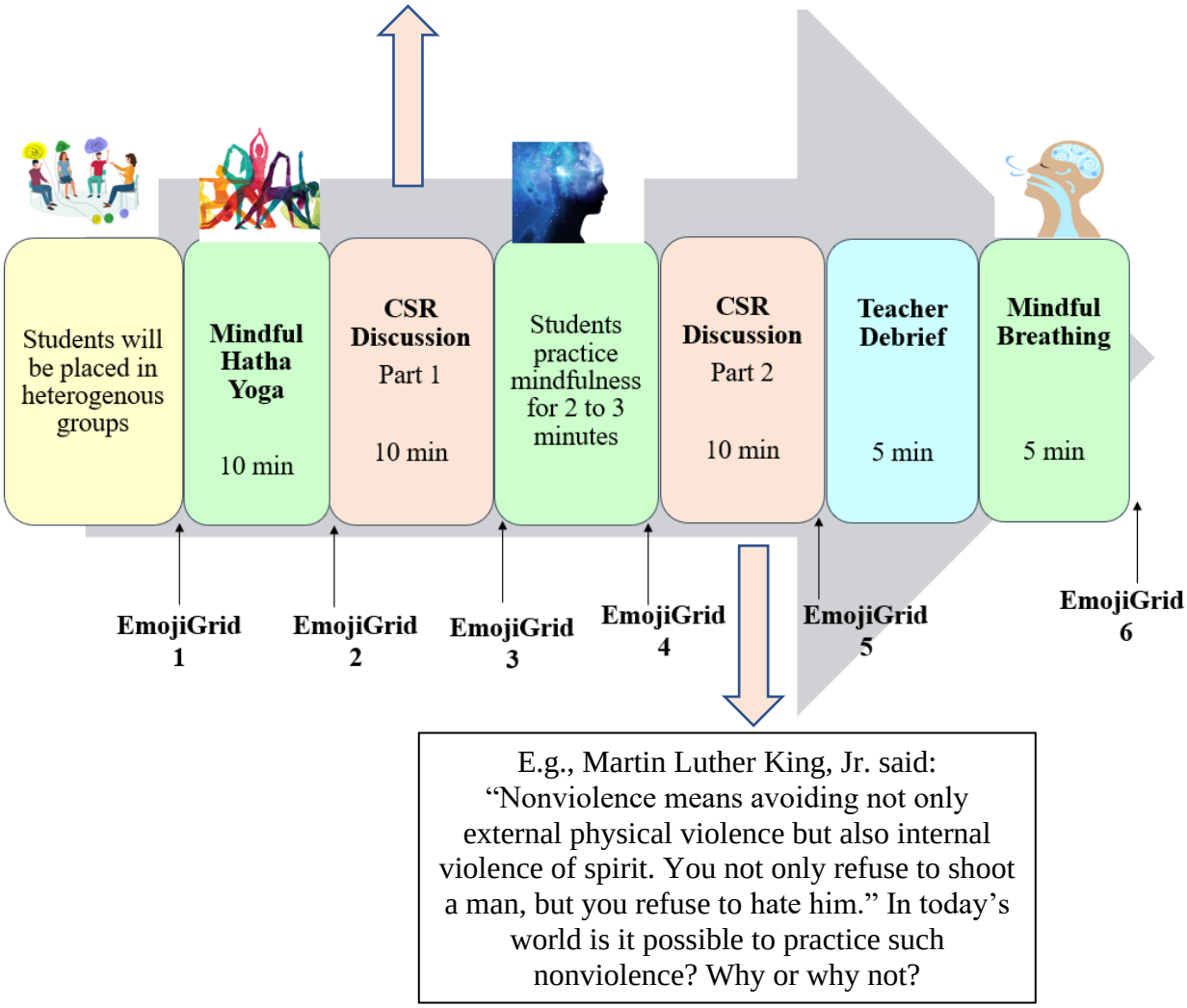

Figure 1. Outline of the MBCSR intervention 45 min-session

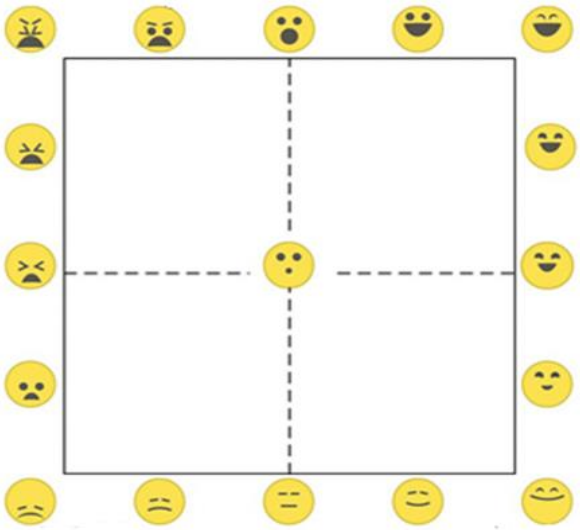

Figure 2. EmojiGrid Rating Tool (Toet et al., 2018)

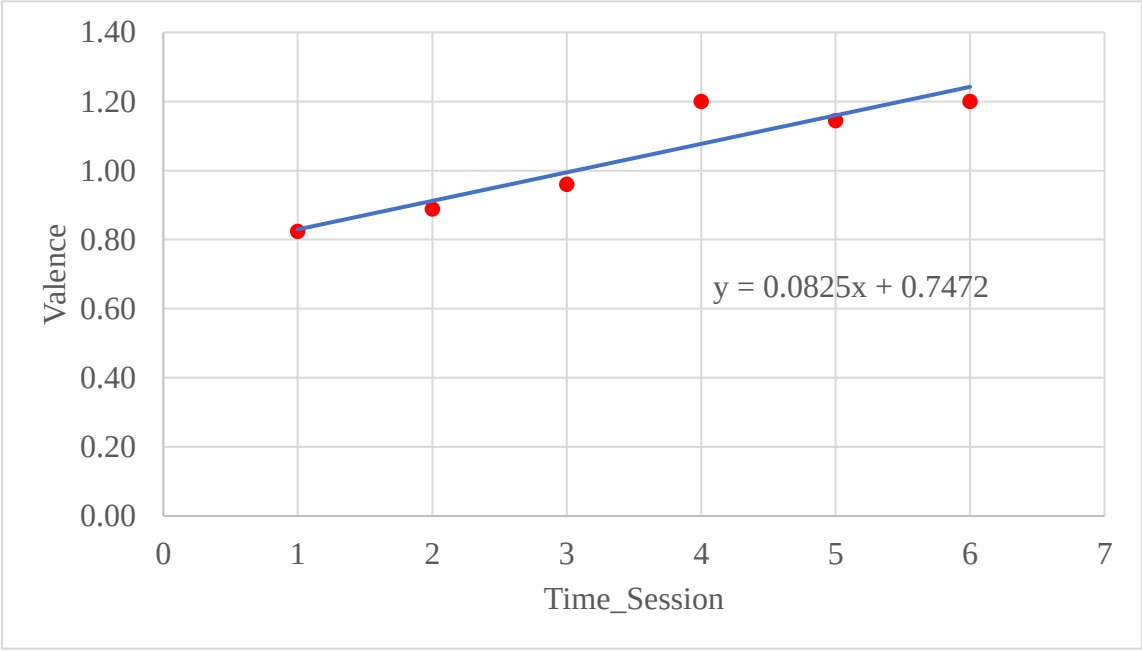

Figure 3. Linear growth trajectory depicting change in students' mean valence of emotions across six time points in an MBCSR session.

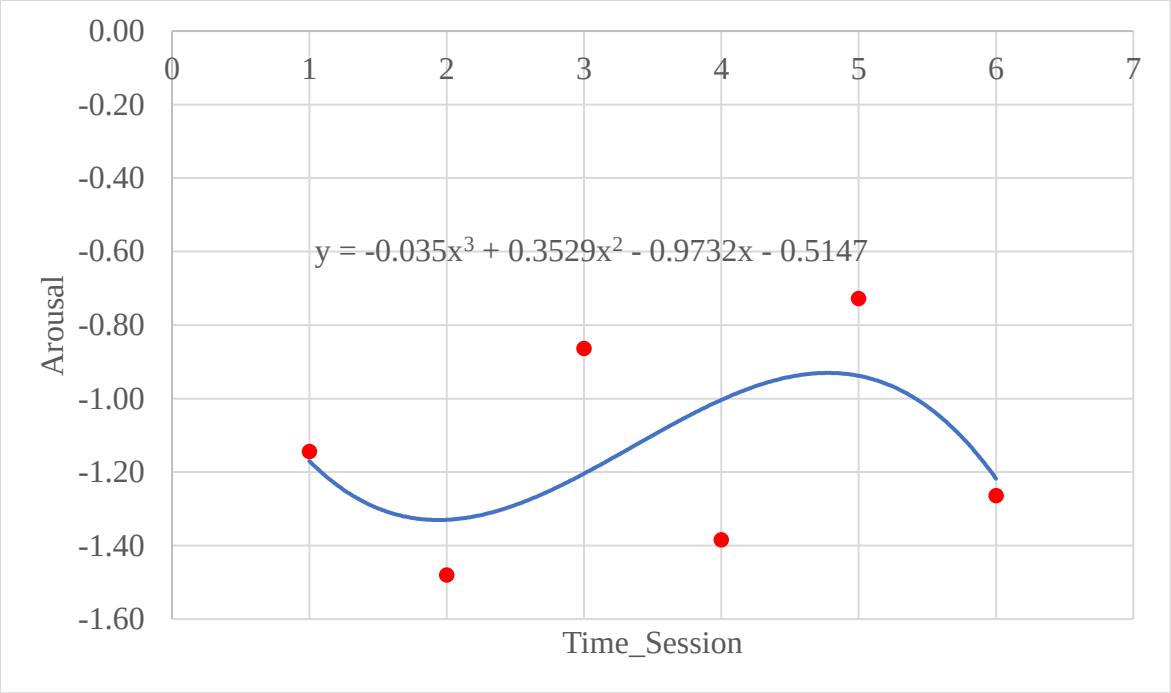

Figure 4. Nonlinear growth trajectory depicting change in students' mean emotional arousal across six time points in an MBCSR session.

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